A Kaleidoscope Journey: Integrated Andragogy in the Diploma of Nursing – Quantum Learning and Campbellteaching

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ABSTRACT

The researcher's experiences as a clinical facilitator culminated in this research project that sought to explore a paradigm shift in nursing education that had the potential to reduce the theory-practice gap. Quantum Learning and Campbellteaching were integrated and trialed to determine if their focus on accelerated learning, visualisation, and the methods specific to their pedagogical and andragogical processes, could assist in the retention of knowledge and the application of theory in nursing practice. The paradigm of Freirean pragmatism sought the potential of each student and allowed for a multiphase mixed method research design that framed the study. Quantitative and qualitative data was gathered from two cohorts, who participated in two core units of study in the Diploma of Nursing Program: Confirm Physical Health Status and Analyse Health Information. The first unit dealt with the Anatomy and Physiology of the human body and the latter provided a broad overview of health issues, and the role of a multidisciplinary team. The data was collected sequentially and concurrently. Qualitative data provided insight into students' experiences of learning in a nursing course that could not be drawn out by quantitative data alone. By implementing accelerated learning techniques, alongside diagrammatic learning with explicit dialogue, and a linking table could students retain and recall theory, experience deep reflection that could give rise to critical thinking that in turn, could assist in linking theory to practice. Findings suggested that the quality of student reflection aligned to their capacity to connect theory to their practice. In addition, the research outcomes affirmed that the combination of Quantum Learning and Campbellteaching had the potential to decrease the theory-practice gap by enhancing student nurses' theoretical knowledge and the linking of their theory to their practice. An important aspect of this research was the expert knowledge of the teacher, and their ability to facilitate a cohesive and culturally safe learning environment. This was coupled with their attitude and belief in their students' ability to succeed.

STUDENT DECLARATION

'I Corrine Jones, declare that the Doctorate of Education thesis entitled, *A Kaleidoscope Journey, Integrated Andragogy in the Diploma of Nursing: Quantum Learning and Campbellteaching is no more than 60,000 words in length, including quotes and exclusive of tables, figures, appendices, references and footnotes. This thesis contains no material that has been submitted previously, in whole or part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.'*

Signature [redacted] *Date* 30 APRIL 2019

DEDICATION

To my grandchildren that they may know that if they have a dream – it can be achieved through self-belief, diligence, motivation, true grit and prayer.

To my sons and their wives – Sheldon, Monte, James and Solomon Lee Wen for their wisdom, support and love.

And to my mother, Olive Barrett, who never had the opportunity to follow her dreams, but believed in mine and to my Aunt Agnes Sutherland, who unwaveringly stood by me and encouraged me throughout my life.

Most importantly to my Heavenly Father for the love, strength, persistence and motivation he provided me throughout this journey.

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Corrine Jones, July 2020

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ABBREVIATIONS

- ANMAC
  - Australian Nursing & Midwifery Accreditation Council
- A & P
  - Anatomy & Physiology
- AVID
  - Advancement Via Individual Determination
- CT
  - Campbellteaching
- EAL
  - English as an additional language
- NLP
  - Neurolinguistic Programming
- QL
  - Quantum Learning
- QLN
  - Quantum Learning Network
- TAFE
  - Technical and Further Education
- TT
  - Theory tests
- VET
  - Vocational Education & Training
- ZPD
  - Zone of proximal development

DEFINITIONS

- Accelerated Learning
  - A method of learning that utilises a multi-sensory system that claims to increase the speed of retention and recall.
  - Students learn faster by seeing, hearing, saying and doing.
- Accreditation
  - To certify (a school, college, or the like) as meeting all formal official requirements of academic excellence, curriculum, facilities, etc. (Dictionary.com).
- Anatomy
  - The study of the structure of the human body.
- Brain-Based Education
  - E. Jensen (2008) states that, "Brain-based Education considers how the brain learns best" (p.4). He provides three key components, "ESP – active ENGAGEMENT, of purposeful METHODS, based on PRINCIPLES derived from neuroscience" (p. 4).
- Buy-In
  - is a form of Engaged commitment to the work. Buy-in is specifically used in Quantum Learning to describe student commitment when they learn 'what's in it for me.'
- Campbellteaching
  - A method of teaching Anatomy and Physiology that provides simple, clear instructions to make complex systems easy to understand. It has a similar process to that of a student moving through Vygotsky's zone of proximal development, expressed visually.

- Clinical Facilitator
    - A registered nurse who assists a group of student nurses, while on hospital placement; ensures that they meet their objectives, plans opportunities for them to practice their skills, and assesses their progress.
- Confirm Physical Health
    - This refers to the first unit of study in the research. The main focus of this unit entailed learning the structure and function of the human body commonly referred to as Anatomy and Physiology. In this study, Confirm Physical Health will be referred to as Anatomy and Physiology for clarity, with one exception that occurs when the units are first described.
- Constructivism
    - Is student focused and employs active learning, Students build upon their prior experiences and cultures; therefore, there will be various interpretations within a classroom.
- Diagrammatic Learning
    - This is part of Campbellteaching methodology. It takes complex diagrams of body systems and makes them simple and easy to understand.
- Disadvantaged students
    - In this study, are students who come from lower socio-economic backgrounds, rural areas, indigenous backgrounds, EAL backgrounds and South Pacific Islanders backgrounds.
- Empowered learning

        - Empowered learning can occur when students feel they have autonomy and are personally motived to learn (Fymeir, Shulman and Houser, 1996).
- Freire, Paulo – Construct of Education
    - Freire believed that education should be democratic where there is mutual respect between teachers and students. Students play an important role in learning and what takes place in a classroom. He also, looked at the cultural aspects that influence education of the poor and disadvantaged, which is a critical aspect of this study.
- Learning Styles
    - Teaching with a student's learning preference in mind.
- Mind mapping
    - A form of note taking developed by two brothers – Buzan and Buzan (1996).
    - Notes are taken in the form of a map or diagram. All information is found on one page and ideas are displayed with pictures, writing and colour, and are linked throughout by branches of ideas.
- Multidisciplinary team
    - Is a group of professionals within an organisation that work together to deliver comprehensive holistic care to meet patients' needs.
- Neuroplasticity
    - The ability of the brain to change and rewire itself – to make new connections.
- Physiology
    - The study of the function of the human body.

- Pop Quiz
  - A quiz that is administered without prior warning. In this study student were forewarned that they would be given two pop quizzes at unspecified times. This was to ascertain retention and recall of theory.
- Quantum Learning
  - "Is a simple yet dynamic model for creating an all-encompassing culture of academic and personal excellence. It is [a] research-based educational methodology [that] increases teacher effectiveness and improves student performance through the orchestration of five core components: Foundation, Atmosphere, Environment, Design and Delivery" (Quantum Learning Education, 2018, para 1).
- Quantum Reading
  - Is a form of speed reading that uses visualisation of the pages of a book, mind mapping what was read onto an A3 page and then using another visualising technique to store the memory.
- Schema
  - Schemas are building blocks that help form a mental picture of one's world. Simply put, schema is 'the basic building block of intelligent behaviour – a way of organizing knowledge (McLeod, 2018, para 11).
- Signs versus symptoms
  - Signs are what can be observed or measured by a nurse.
  - Symptoms are what a patient tells the nurse.
  - They are often not differentiated.
- Tenet
  - A principle or belief held by an organisation or group (Online dictionary).

- Theory
  - A set of principles upon which an activity or idea is based. Within nursing, theory includes content that is taught in an academic context. For example, Anatomy content taught at university is referred to as ‘theory’.
- Theory-practice gap
  - This is a gap between theory [what is taught in a nursing course] and the practice of what is taught in the clinical setting. It is an inability to put the theory into practice in the clinical environment.
- Theory Test
  - Each week a quiz [theory test] was given on the prior week’s content; in order to assess student progress and for students to assess their learning.
- Vocational Education & Training
  - “Refers to the sector responsible for developing the skills and knowledge of individuals for work. It includes vocational education and training undertaken in industries, enterprises, government agencies, and community and school settings. The vocational education and training sector encompass both recognised training leading to a qualification/Statement of Attainment under the Australian Qualifications Framework (AQF), and non-recognised training, such as in-house, product-based training. Recognised training is delivered by organisations registered by state/territory training authorities (STAs), in accordance with the Australian Quality Training

> Framework (AQTF).” (TAA04 Training and Assessment Training Package, Workforce Council, 2015, p. 12).

Important Please Note: Names have been changed in this document to maintain anonymity as required by ethics. In addition, no names or specific dates are added to personal student conversations or student journals, in order to maintain anonymity.

Chapter One
The Journey Forward

'I am not a teacher, but an awakener'
~ Robert Frost 1874-1963 (Goodreads Inc., 2020)

Intriguing steps that followed a path of investigation over a number of years culminated in valuable insights. This thesis offers a glimpse into the vast aggregates of knowledge that assisted in the formulation and subsequent outcomes of this study.

The Kaleidoscope Journey

The thesis is entitled The Kaleidoscope Journey due to the multiple factors that combined to formulate the research, as well as the multiplicity that is the learning process. As aspects of the study evolved they culminated and formed a dynamic masterpiece of brilliant ideas and thoughts. It was like looking through the eyepiece of a kaleidoscope and viewing the intricate and ever-changing patterns of colours and brilliance. The various elements merged and formed impression that led to the development of this thesis. The kaleidoscope journey embraced the use of colour, multiple methods and various theories of learning that redesigned the teaching of theory in the Diploma of Nursing course.

Epistemology positioning of this thesis.

This study was based on an emic epistemology, which means that the researcher is actively involved in the research. Etic epistemology is the exact opposite. In this instance, the researcher remains apart from the research. In this project, I [the researcher] was actively involved in the process; in order to gain deeper insight into the participants feelings, beliefs and uptake of this new paradigm. A more detailed explanation can be found in Chapter Three.

Ontological positioning of thesis.

The students who made up the research cohorts for this study were considered disadvantaged. They came from various personal and social backgrounds. Finances were often an issue; as well as culture differences and English as an additional language. Freire was an advocate for the oppressed. He wrote prolifically about the issues surrounding these individuals and likened some aspects of education to oppression (Freire, 1993).

Freire was against what he called banking education where teachers were the espousers of knowledge and students were the receptacles who know nothing. He likened this to situations of the oppressed. When speaking of student learners, Freire stated, “The solution is not to “integrate” them into the structure of oppression, but to transform that structure so that they can become “beings for themselves” (Freire, 1993, p.74).

This research was undertaken within a Freirean framework, which encourages students to take responsibility for their learning, teaches life skills, and engages student interaction through ongoing dialogue, while encouraging their input so that they can share the knowledge and experience that they bring to a classroom. The teacher becomes the facilitator of learning, who recognizes each students potential and shares her belief in their ability to succeed.

Thesis Development

During my lengthy personal journey in the education system, I developed a plethora of knowledge and skills that provided understanding and insights into the difficulties, hurdles and challenges that students from low socioeconomic situations might experience. This section of the introduction describes the latter portion of that journey. It begins when I was employed as a clinical facilitator in the Certificate IV in Nursing Program.

Clinical supervisors oversee the students’ performance of their skills and

deem them competent or not yet competent. Towards the end of an eight-hour shift, students leave the patient area an hour early and meet to debrief about their experiences that day.

Even though these students were being signed off as competent in a task, it was apparent that this alleged competency did not mean that they could see the link between the task and the theory (Personal experience as a clinical facilitator, 2006-2008). The story below relates my initial observation of this issue.

It was a beautiful warm sunny day outside in 2005, but the students were oblivious to the weather. Inside the aged care facility, they were anxious about starting their first clinical rotation. This was a two-week period where students practiced the skills they had been taught in the nursing laboratory at their training facility. An hour before the end of the

seven-hour shift, the students attended a one-hour debriefing session. In debriefing sessions, the students had an opportunity to discuss what they saw, experienced or how they felt during the day.

We met in a storage room for excess chairs and other equipment. Once these were moved to one side a semi-circle of chairs was formed in front of a white board. The students took turns sharing their impressions of the day. Afterwards, I asked questions about the class material they had studied and practiced in the nursing labs prior to their placement. I asked the following questions that were related to their classroom lectures:

- Why do you loosen the sheets at the foot of the bed when making it?' I did not get an answer.
- What would happen if you used a cuff that was too large or too tight when taking someone's blood pressure? Again, there was no answer. I wondered why the students were not explaining the rational.

I wondered why the students did not reply to my questions. Did they not learn about this aspect in class, did they not know the answers, were they afraid to answer or did they not understand how to apply what they had learned?

This same scenario occurred during other debriefing sessions, which led me to wonder what was happening in the classroom where the initially learning took place. This was the start of the kaleidoscope journey.

It is imperative that nursing students retain, recall and link their theory to practice. Theory is the content knowledge that is taught in a classroom, such as anatomy and physiology or any other nursing unit. Practice refers to the clinical environment where students work as a nurse, such as a hospital, or a nursing home. In order to for students to become effective nurses, they must be able to apply theory to practice. This enigma caused me to spend many hours in deep contemplation. Two more sets of pre-research questions developed:

- Did the students simply not consider the classroom theory when they arrived on clinical placement; did they only concentrate on the skills

- Could they not recall the theory?
- Did the students not understand how to link the theory to their skills?

As a result, I developed a set of mini lessons that paralleled their classroom theory and reinforced the learning during the debriefing sessions. Heads nodded as the 'ah-ha' moments were realised. After further reflection, my quest to understand what was happening in the classroom began in earnest. A further two pre-research questions were formulated:

- What could nurse educators and clinical facilitators do differently?
- Would close examination of the methods employed by nurse educators and clinic supervisors assist in understanding the student's ability or inability to link the theory and practice?

While working in nursing education I had the opportunity to observe various educators in their classrooms. All but one taught using the behaviourist method that has been the standard in nursing education for many years.

In an attempt to answer these questions, I undertook a Master's Degree in Educational Leadership, which focused on learning styles education, and I obtained a course coordinator /nurse educator position in a major university. In the university classroom I found some plausible explanations as to why students were experiencing difficulty linking theory to practice.

In the classroom, students were being taught within the traditional behaviourist model. These teaching sessions were largely authoritative, with a content transfer focus, and most lectures were power point based. Despite Landers' call for a change in nursing education (2000), the students were still relying heavily on memorisation of the theory and self-study after class, where they hoped to gain understanding of the lessons (Personal conversations with students, 2006-2008).

During this time, I was developing as a nurse educator and learning from first-hand experience. I had the opportunity to observe colleagues' teaching methodologies. I often

discussed with students their classroom experience. All the while, I was gaining important knowledge regarding the teaching of adults and how learning could be built and disseminated. My studies indicated the need for experienced and skilled nurse educators, who would embrace new paradigms in the delivery of nursing education.

Upon completion of my Master's Degree I realised that although learning styles education was important, there was still something missing. The concept of a paradigm shift grew in importance. I revisited the question as to whether nursing students were being adequately prepared.

I had found answers to some of my driving questions. Theoretically, the content was sound. The teaching staff were working together to provide excellent theoretical subject matter. They were experts in their fields. In addition, the students were receiving excellent practical skills training – once again from experts in the field. I came to the same conclusion: I considered that the problem lay in the delivery of the content. During the time of reflection, I received an offer to attend an intensive seminar that focused on the development of personal awareness and abilities.

This seminar was held over a six period. It demonstrated the power of positivity in such unique ways and I was excited. After attending the seminar, I was offered a free Quantum Reading course. Quantum Reading introduced the concept of neuroplasticity, in regard to memory and mind maps. These new ideas led me to conduct an internet web search for reviews on Quantum Reading, during this search I stumbled across the Quantum Learning Network (QLN). I read their information and so many of the ideas that I had considered important in education appeared there in one package, plus additional methods and methodologies. The Kaleidoscope Journey moved onto a highway of learning. I began to wonder if what I had learned during these two seminars, could assist in decreasing the theory-practice gap.

In order to more fully understand the problem of the theory-practice gap, I started with a search of the history of nursing in Australia. The theory-practice gap has been an issue for many years, and I wanted to find its beginning and understand the continuing issues surrounding its existence. The only way this could be achieved was through a

thorough in-depth study of the history of nursing in Australia. I have included a condensed history of nursing in Australia, so that the readers of this thesis can understand the complexity of this phenomenon and the need to try and decrease or bridge it.

History of Nursing in Australia

Nursing education in Australia began with Lucy Osborn, a former student of Florence Nightingale, who was sent to Australia to oversee the Sydney Infirmary in the early 1800s at the request of Sir Henry Parks. The infirmary was initially a convict hospital, but later became a charity for settlers in Australia, which attended to approximately 2000 patients per year (Godden, 2006; Willetts, 2015). Lucy Osborn was an educated 'lady' from London with little training herself, but she oversaw the training and work of a small group of nurses, due to her higher social status. Lucy had to struggle with a male-dominated society. Consequently, she experienced many ups and downs in her work at the infirmary while advocating for her nurses and the patients (Goddard, 2006; Willett, 2015). At this time nursing education was hospital-based, where it remained for the next 120 years.

During the period between 1974 to 1978 there was a continuing debate about the transfer of nursing education from hospitals to higher education institutions. Several problems had been identified in relation to hospital-based training in a document prepared by the Australian Government (2001). The list of concerns included:

- lack of linking between theory and practice being taught
- lack of work preparation
- forcing too much theory in short time periods
- lack of educators; not enough practical placement
- practical needs of hospital service came first
- not enough money for nursing education
- variance in standards of the education
- no time for socialising
- no formal recognition of nursing certificate

- high rates of student attrition

Despite the identification of these problems, it was argued that a move for nursing education into higher education would be too expensive (Australian Government Department of Health, 2013). As a consequence of these issues not being adequately addressed, nursing in the 1970s entered a period of crisis:

At the end of the 70s student nurses were responsible for entire hospital wards, experienced nurses were paid the same wages as cleaners and, with an acute shortage of 1300 nurses across the state, patient workloads unsafe (Australian Nursing & Midwifery Federation [Victorian Branch], 2018, para 9). Skeleton staff were left on hospital wards to care for patient needs. Tensions reached a climax in 1986, when nurses in the state of Victoria held a strike that lasted 50 days and only ceased when an agreement was made that met their requests. Pay increases and better working conditions resulted, which in turn affected enrolment in nursing programs (Australian Nursing & Midwifery Federation [Victorian Branch], 2018). Parallel to these industrial tensions, in 1984 legislation was passed that allowed nursing to be transferred to tertiary education systems. This move was not finalised until 1991 (Australian Government Department of Health, 2013). During the transfer from hospital-based training to higher education:

> From 1985 to 1993 the funding of nursing in higher education was shared by the state and territory governments (75%) and the Commonwealth (25%) . . . From 1 January 1994, the Commonwealth assumed responsibility for full public funding for tertiary nursing education (Australian Department of Health, 2013, para 5).

This was clearly a time of significant upheaval: not only was the process of learning to become a nurse changed, but there was on-going potential for tension between state and federal governments over the funding of nursing education. Nursing education and nursing as a profession were both at risk during this time. Not only was education funding a cause for concern, but salary and staffing cuts resulted in negotiations and strikes in the state of Victoria continuing to be intermittent. The worst of these industrial disputes occurred during the Kennett government's term (1992 – 1999), when nursing positions were

slashed, and pay and staffing levels were decreased.

During the transfer phase of nursing from hospital-based training to tertiary education, the need for theoretical learning in nursing education became apparent (Willetts, 2015). The practice-theory gap that was recognised during hospital-based training turned full circle and became a theory-practice gap after the move to higher education. Instead of the students not acquiring enough theory, they now had the theory and the practical, but could not connect the theory in the clinical setting (Jones, 2016). The concern became one of how to close the theory-practice gap. This phenomenon of the disconnection of the theory and the practical skills in the clinical environment continues today and is well recognised nationally and internationally (Arnold, 2000; Cook, 1991; Corlett, 2000; Goldreenidhi, 1999; Landers, 2000; Patchett, 2000; Schroeder, 2004).

The Theory-Practice Gap

The theory-practice gap is a phenomenon that has been identified in the literature for many years. Hussain and Osuji (2016) define the theory-practice gap as "a discrepancy between what students acquire through theoretical classroom lectures and what they experience in the clinical setting" (p.20). The observation of a theory-practice gap in nursing is not specific to Australia. It can be found in numerous international studies with examples from Ireland, Iran, Canada, the United Kingdom, Germany and the United States of America (Arnold, 2000; Cardin and McNeese-Smith, 2005; Cheraghi, Salasli and Ahmadi, 2007; Corlett, 2000; Evans, 2009; Khatib and Ford, 1999; Landers, 2000; Wilson, 2008).

The theory-practice gap is multileveled and complex. Several factors affect the retention and transference of theoretical knowledge, as well as the understanding of the relevance of the theory as it relates to clinical practice. Salifu, Gross, Salifu and Ninnoni (2018) suggest that there are multiple players involved in the conundrum of the theory- practice gap, such as:

- curriculum implementation
- management of nursing programs
- students

- student rivalry
- classroom educators
- clinical supervisors, and
- nursing staff

The theory-practice gap is present in a range of interactions: it surrounds communication, attitudes, reflection abilities, learning methods, time allotment for practising skills in the school environment, and work-based learning opportunities. The theory-practice gap posed significant challenges for me as a nurse educator. Like many others, I could see the problem, but did not have tools that adequately addressed it. It was this need to develop a more reflexive and responsive toolbox that resulted in my incorporation of Quantum Learning into my nurse education classrooms.

Introduction to Quantum Learning

Quantum Learning is a brain-based, accelerated learning model (Jones, 2016; Quantum Learning Network, 2011). Setting the classroom culture is one of the most important factors in Quantum Learning. This is formed by the prime directive, the five tenets, the FADE concept and life skills education. “Theirs to Ours, Ours to Theirs” is the prime directive, which means “The degree to which we enter our students’ world is the degree of influence we have in their lives” (Quantum Learning Network, 2011, p. 2.11). This is directly related to building caring student-teacher relationships.

The five tenets are teacher focused and woven throughout all aspects of teaching and learning. They are: Everything Speaks from the classroom setting to teachers tone of voice to how the lesson is delivered. Everything is on Purpose refers to everything a teacher does has a valid reason; nothing is done by accident. Experience before label builds on students exciting knowledge and suggests that students engage in the learning process before they put a label on their experience. Acknowledging Every Effort, no matter how small

encourages self-confidence and engagement in the learning process. Lastly, If It’s Worth Learning, It's Worth celebrating – allows for positive feedback and encourages

learning.

FADE is an acronym for foundation, atmosphere, design and environment. FADE is a process of analyzing and working with the students' environment, shifting the focus from the teacher to the learner, and ensuring that connections are drawn across learning content. The *8 Keys of Excellence,* locates learning within the individual's value system, providing life skills training that epitomizes professional nursing attributes. This is coupled with Home Court Advantage and living above the line, which builds a safe learning environment and encourage personal responsibility for learning.

Synopsis of Quantum Learning/Teaching

Bobbi DePorter, Eric Jensen and Greg Simmons co-founded a youth program termed "SuperCamp" (DePorter & Hernacki, 1992) in 1982. The program teaches students learning skills and life skills. It runs over a seven to ten-day period. The students learn in an engaging, fun, interactive environment. Parents and teachers saw changes in the students who had attended super camps and both parents and teachers requested it be taken into schools. As a result, Bobbi DePorter formed the Quantum Learning Network. Quantum Learning has now been systematised into a learning and teaching program and utilised in over eighty countries worldwide (Quantum Learning Network, n.d.).

Several theorists form an interwoven foundation to Quantum Learning (QL), which provides an inclusive learning model [the theorists will be discussed in the literature review]. Quantum Learning occurs when new learning is combined with previous knowledge termed schema. When new information and schema combine numerous neuronal connections are formed within the brain. The creation of multiple connections is referred to as brilliant energy and radiance (Buzan & Buzan, 1996; DePorter & Hernacki, 1992). Buzan and Buzan (1996), explain that individual schema will differ, due to cultural, educational, social, economic and religious differences found among students. This is an important factor for educators because a word or concept will produce a different thought process for each student (Buzan & Buzan, 1996). They asked a group of four people from similar backgrounds to write down words that they associated with the word run. The results found that there were no commonalities. The group wanted another word that they

felt would be more common to all of them and once again there were none (Buzan & Buzan, 1996). Another practical way to communicate what they mean by the word radiance, is by looking into a kaleidoscope and watching the wonderful changes of colours and patterns – all are different with motions into and out of the centre. Buzan and Buzan (1996) claim that this kaleidoscopic effect is similar to the movement of neurons in the brain when learning occurs.

Quantum Teaching

Quantum teachers orchestrate the learning environment and know why they are using specific methods. They incorporate multiple intelligences to engage all learning styles, life skill education, aspects of fun, and focus on developing lifelong learning (Quantum Learning Network, 2011). DePorter, Reardon and Singer-Nourie (1999) state that, "Quantum Teaching is the orchestration of learning in living color, in surround sound, with all the nuances. It factors in the connections, interactions and distinctions that maximize the moment of learning" (p. 3).

Campbellteaching

While Quantum Learning could provide a range of pedagogical and andrological methods to support attempts to invigorate nursing education, I also sought out a content-specific source. A nurse's knowledge, understanding and capacity to apply content is frequently a life and death decision. It was critical that in attempting to determine a new way to teach in nursing education, the content was not overlooked or diminished. This led me to the work of Dr John Campbell.

Dr. Campbell is a registered nurse, who worked at Carlisle University in England. He taught anatomy and physiology to nursing students in higher education. His videos can be found on YouTube under Dr. John Campbell. More about Dr. Campbell can be found in the literature review.

Introduction to Campbellteaching – Siri's story

I became aware of Campbellteaching through a mature age student, who I will call Siri, to protect her identity. Siri was a student in a group I taught prior to undertaking the research for this study. Siri was a quiet student, who sat up front, next to the window. She

engaged during class discussions and her dream was to be a nurse. Following the outcome of the weekly theory test on the cell Siri approached me after all the students had left the classroom. Siri explained that she would be withdrawing from the course as the material was too difficult. I sat with Siri as she told me about the tragic car accident she was involved in at age of fifteen.

Siri was hospitalised and treated for extensive swelling in her frontal lobe. This area of the brain is responsible for thinking, reasoning, organising thought processes and sending information to short term memory (Goss, 2013). All prior knowledge of her life was gone. During the eighteen months required for her recovery, Siri learned to read and walk again. When she was finally discharged from the hospital the doctor suggested that Siri be given a chore she had previously done. So, her mother sent Siri across the street to buy milk for breakfast. Unfortunately, her mother was unaware of Siri's reduced capacity for reasoning.

She stepped off the curb and was hit be a four-wheel drive. Both her legs were broken. The road to recovery was long and arduous. "Learning to read and walk again was the hardest," she stated (personal conversation, 2012). The injury left her with stress related seizures and memory loss.

Learning was completed by oral presentation, as she could, "no longer picture things in her brain" (personal conversation, 2012). She attended a special education centre and received a high school level certificate of completion. Siri entered a Patient Care Aid course, where she learned by verbal instruction and successfully completed the program. She applied for enrolment in the Certificate IV in Nursing course and was accepted. The teaching modality in the nursing course was based on traditional behaviorist methods (Aliakbari, Parvin, Heidari and Haghani, 2015, p. 3). Lectures were power point based, with some discussion, group work and group presentations. The power point slides were black and white with a few pictures or graphs. At this time, when I encountered Siri in my class, I had completed a Master's Degree of Educational Leadership, which focused on learning styles education. I redesigned the power point slides and included pictures, diagrams and colour. I implemented diagramming, as it was my personal belief that

students would learn more through the drawing process than by just visualising.

I believed that it was too soon for Siri to give up. I asked her to find YouTube lectures on Anatomy and Physiology that she could use for revision, since she required auditory input. Siri came across the Campbellteaching website. Siri explained that his lectures were easy to understand and asked if I would watch one of the videos.

I was intrigued. John Campbell took complex body systems and created simple representations that were clear and specific. He provided ongoing clear explanations that detailed all aspects of each body organ that was depicted in the diagrams (Jones, 2016). This allowed students clear visualisation and provided overall simple explanations that were easily understood. The ongoing process for the various body systems allowed students to make connections between these organs. As a result, at the beginning of each class, I handed out butchers' paper and coloured white board markers. Student interaction increased and the class culture became increasing cohesive. Siri found diagramming on butcher paper, the use of colour, and the simplicity of the presentations very helpful, as it brought 'clarity' to her learning. She stated, "Colour does it all . . . without colour you have a white piece of paper with black pen" (Personal conversation, 2012). Siri recalled that after using this technique, and at the age of forty, she began dreaming every night – "things were coming back" in her dreams (personal conversation, 2012). In addition, I utilised games that brought an element of fun and friendly competition, and relaxation techniques in the form of guided imagery to decrease pre-test stress. This was imperative for Siri, as stress induced seizures and inhibited recall.

Siri passed the weekly theory tests and her self-confidence increased, which supported further learning (Personal conversation, 2012). On the last day of class, I created a review to be delivered as a game called 'Laugh and Learn.' Siri was the first student to jump up and answer each question. The table on the following page displays Siri's weekly Theory test results.

Table 1. Siri's Weekly Theory Test Results and Final Grade

TT 1 total marks 46	TT2 total marks 69	TT3 total marks 54	TT4 total marks 50	TT5 total marks 39
Failed1st attempt 40 re-wrote	44	32.5	37	35
60%	69%	63%	76%	90%
TT6 total marks 59	All = 15% of final score	Open book test Worth 70%	Oral test Worth 15%	FINAL SCORE
44	10.2	51.1	11.3	
75%	72%	73%	75%	73%

Siri's story details important aspects about learning. She had lost confidence in her ability to learn because "Confidence comes with knowledge and I couldn't learn the way other people learn; also, I had anxiety" (Personal conversation 2011). I had introduced her to diagramming, colour and storytelling. She taught me that by engaging in the art of drawing and re-drawing with colour, then using stories to link the functions explained in each diagram, that retention and recall became easier. The diagrams provided her with clarity and allowed for consolidation and linking of the workings of various body systems. Ongoing discussion of the functions of these systems brought her a deeper level of understanding.

Stories provided a simple way of recalling the individual parts represented in the diagrams. The process was like "a key and lock" for Siri and she was able to understand (Personal conversation, 2011). During this process, cohesiveness and a feeling of safety developed within the group. Safety was paramount for Siri as she felt that conflict was beyond her capacity to handle. Siri also taught me that teaching guided imagery not only helped to decrease her stress levels, but gave her the knowledge required for self-management. The new learning methodologies provided Siri with the necessary skills to fulfill her dream of becoming a nurse, when she had previously felt there was no way forward after the accident. We visited on campus shortly after her graduation from the course. Siri was a confident practitioner whose judgements were trusted by her supervisor.

When I designed this research study, I knew I had to tie in Campbellteaching after witnessing the transformation in Siri. I contacted John Campbell, the designer of the

Campbellteaching website, and we had several skype conversations about his work and my research.

My philosophical standpoint as an educator, stems from my belief that it is my responsibility to see the potential in each student, to assist students to recognise and develop their abilities, and to support their learning. From personal experience as a former undergraduate student, I recognise that there are "crunch" times when students have multiple assignments due and tests are on the horizon. This is a very stressful time and the pressure can feel overwhelming, but if students know that teachers genuinely care about their success, they may work harder. The following student quote, cited by Northcote (2009), addresses this issue:

> Well, if you have a teacher who cares about what they're teaching and care about actually imparting the knowledge to a student (they're not here because they're being paid, they're here to actually impart the knowledge) and a student who wants to get the knowledge, then, obviously if those two come together, it's the best possible scenario. If you had a teacher that really didn't care and a student that really didn't care, you wouldn't get very far. (Kent Student) (p. 79).

The Kent student is identifying the reciprocity of teaching and learning. This study is built around a belief in the power of such reciprocity.

The Research

Internet searches uncover little evidence of research in the Diploma of Nursing course in Australia or in similar cohorts worldwide. In addition, there is no evidence of research using the integration of Quantum Learning and Campbellteaching. Consequently, I developed a research study with this combination in order to address the need for a paradigm shift in nursing education that has the possibility of decreasing the theory-practice gap. My vision for the research was to:

- See if the theory-practice gap could be decreased using a new paradigm shift
- 'Light a fire' for learning
- Inspire students to take responsibility for their learning
- Encourage a desire for life-long learning by building my skill sets as an

educator and life-long learner

Learning at the Quantum Learning Network

In order to undertake the research study, I attended a teacher's workshop at the Quantum Learning Network in Oceanside, California. The training discussed the underlying theory of Quantum Learning and major concepts that drive Quantum Teaching. Life skills training was introduced, which included the *8 Keys of Excellence, Home Court Advantage* and *Living above the Line*. Class sessions were delivered using a plethora of methods that could be easily incorporated into my research classrooms. During the week, I had the opportunity to meet with Bobbi DePorter, the Chief Executive Officer (CEO) of the Quantum Learning Network and received written permission to use the Quantum Learning Model.

Contention

The Research Question is: *When Quantum Learning and Campbellteaching methodologies are incorporated into two groups of the Diploma of Nursing course, do students improve their theory retention and recall)?*

Secondary Questions

The research entails a range of secondary questions, such as: Do these two teaching methodologies

- Increase student motivation?
- Increase student self confidence in their ability to learn the theory and practical skills?
- Increase student ability to reflect?
- Increase critical thinking?
- Does the addition of the Linking Table assist with transference of theory into the clinical setting?

I felt that the introduction of Quantum Learning, Campbellteaching and the linking table in nursing education could potentially decrease the theory-practice by assisting with retention and comprehension of the immense amount of theory that the

students were expected to learn and recall in a short period of time. In addition, the linking table provided a simple tool that showed students how to map the lesson material so that it could be easily understood. It demonstrated how to take the learning and skills and incorporate them into the clinical environment. They also learned who would be part of a multidisciplinary team looking after patients with specific illnesses or injury, what tests a doctor might order and what main medications they could expect to see for these conditions. When students could take their knowledge and have a clear understanding of what to do when they recognized the signs and symptoms specific to the patient's illness or injury, they would know what to do within their scope of practice. They would not be guessing, afraid or unsure because they would have studied and learned what was expected of them.

This was determined through clinical journals, verbal feedback and industry feedback on student readiness. Clinical supervisors were sked to participate in the research so this could be examined during clinical placements; however, they did not take up the offer making information on any closure of theory-practice gap difficult to predict.

The Diploma of Nursing

The Diploma of Nursing is a competency-based course situated in the Vocational Education and Training [VET] sector of Victoria University in Melbourne, Australia. This course offers a pathway into the bachelor's degree program situated in the higher education sector. Courses in the VET sector differ from curriculum courses, as they are delivered via training packages, which are developed and endorsed by an Industry Skills Council (Studies in Australia, 2018). The courses must also undergo accreditation, which ensures that nursing courses meet the required standards of delivery. This, in turn, ensures that graduating students can be registered to practise as nurses. This process requires a submission that is reviewed by the Australian Nursing and Midwifery Accreditation Council, to ensure that the nursing school is following correct procedures and policies as laid out by the nursing accreditation board, identified as 'The Australian Nursing and Midwifery Accreditation Council' [ANMAC] (Australian Nursing &

Midwifery Accreditation Council, 2016). The submission process is costly and requires extensive, complex documentation. Once approved, staff must follow what was presented in the design, delivery and assessment sections, which are found in the unit outlines and learning and assessment methods. The detailed prescriptiveness of a training package, with the accompanying unit outlines and learning and assessment methods, requires thoughtful preparation by the teacher (Australian Industry and Skills Council, 2016) (see Appendix A).

The Teaching Units and the Time Factor

I chose the two units that I was teaching to inform the research: HLTAP401B Confirm Physical Health Status (Anatomy and Physiology), which was a first semester unit and HLTAP501B Analyse Health Information in the Nursing Profession that was taught at the beginning of the second semester. In order for students to register for the second unit, students had to successfully complete Anatomy and Physiology.

The challenge was how to teach eleven body systems within a four-month period that did not allot time for consolidation of learning. As a nursing educator there was concern about the students' ability to learn, understand, retain and recall such a vast amount of theory in a short time frame as the pace of delivery was fast and intense for both units. The design and delivery of Nursing education at the university were well-ingrained in the traditional behaviourist theory, which entailed face-to-face lectures, largely delivered by power point presentations, some group work, role play and presentations (Chambers, Thiekotter and Chambers, 2013; Aliakbari, Parvin, Heidar & Haghami, 2015). I speculated that the implementation of accelerated learning and diagrammatic learning as offered by Quantum Learning and Campbellteaching could address the issue of the large amount of content to be learned in a restricted time period (Jones, 2016). A brief overview of Anatomy and Physiology, and Analyse Health is found below.

Tortora and Anagnostakos (1987), define anatomy as, "The structure or study of structure of the body and the relationship of its parts to each other" and physiology is the "Science that deals with the functions of an organism or its parts" (pp. G-7, G-33). The

rational for choosing Anatomy and Physiology was related to the basics of nursing: if a student nurse cannot understand how the body works in a healthy state, then how can they understand the diseased state? Campbell (2009), made the following statement that concurs with my own beliefs regarding this subject, “It is only when we understand the normal situation that the abnormal pathological situation makes any senseIf we can understand

how the body functions in health and what goes wrong in disease, we can readily apply this knowledge to the maintenance of health and the management of disease” (back cover).

The second unit, Analyse Health Information in the Nursing Profession, could not be undertaken without successful completion of Anatomy and Physiology (Jones, 2016). This thirty-hour unit required the learning of a wide range of content. An overview of factors that affected health were reviewed, specific disease processes were analysed, and situations related to patient care were discussed (Jones, 2016). Assessment included a self-directed workbook and a final test.

This research is an attempt to find ways to reduce the theory-practice gap for student nurses by examining the ways students engage with learning in the university classroom. It was located within the delivery of two units, Anatomy and Physiology and Analyse Health. The introduction of Quantum Learning – an accelerated learning program – and Campbellteaching – a diagrammatic process – aimed to address the students’ poor retention of nursing theory. As a nursing educator, who has previously worked as a clinical facilitator, the need for graduating nurses to be able to connect theory and practice in the moment of need is crucial to the well-being of patients.

Purpose Statement

The intent of this study was to examine the outcome of the incorporation of the Quantum Learning and Campbellteaching models in relation to student retention, recall and transference of theory in a dual sector university. The value of the multiphase mixed method design was the ability to collect data at different stages throughout the research and

the employability of multiple methods of data collection. This design added clarity, improved accuracy of the findings as the qualitative data informed the quantitative date and increased the validity of the research.

Thesis Chapter Summaries

The following chapters outline the design and implementation of the research, the data collected, and discuss and apply research findings.

Chapter two.

The literature review provides further aspects of nursing history and the TAFE sector that offers pathways for disadvantaged students. It frames the work by examining various aspects of learning, the relevant research involving the complex issues of learning and how nursing has responded to the call for change. A brief summary of Quantum Learning and Campbellteaching are provided; along with a section on resistance to change and how teachers' attitudes affect student learning.

Chapter three.

This chapter is the first section of the methodology that deals with the philosophies underpinning the research. It discusses the methodology, epistemology, ontology, axiology that structure the research study.

Chapter four.

The methodology section of this thesis explains the process adhered to during the development of the research study. It outlines and details the cohort and provides a description of the steps that were performed to fulfil the purpose of this research. A discussion describes the rationale for using the mixed method approach and the underlying philosophy of pragmatism. A breakdown of the steps taken to collect the data and the rationale for this process are explained.

Chapter five.

This chapter discusses the results from the quantitative and qualitative data. It identifies a disparity between the qualitative and quantitative data and discusses the outcomes of a data dig that ensued. Lastly, the themes that emerged from the qualitative data, which comprised journals, personal conversations, student reflections, surveys and

researcher observations, are determined.

Chapter six.

This chapter is a discussion of the findings regarding the implementation of Quantum Learning and Campbellteaching. The quantitative and qualitative data outcomes are discussed. It examines the research student's perspective of the multiple methods employed during the research. Student voice is incorporated throughout the discussion. A section on negative feedback, resistance to change and the importance of the teacher are included. research student's perspective. The theme and outcomes of both data sets are discussed in relation to the research questions. Weaknesses, gaps and importance of the research are deliberated. Implications for further research and improvements are acknowledged.

Chapter seven.

The summary and conclusion provide a brief discussion of the themes that emerged from the research data. Relevant recommendations are derived from the findings. The significance of the research is highlighted and its generalisability beyond nursing education is acknowledged. Gaps in the literature are noted and areas of further research identified

Chapter Two

Review of The Literature

You uncover what "is," when you get rid of what "isn't" –
Buckminster Fuller 1895–1983 (Tiwari, 2019)

In order to frame the research, this chapter examines relevant literature and provides insight into the integrated models utilised in this study. Important factors related to learning in the context of neuroscience will be discussed. A review of a wide range of concepts that have driven change in multiple education sectors will be debated. The investigation culminates with a discussion on resistance to change and deeper understanding of the Quantum Learning and Campbellteaching models.

The Theory-Practice Gap

Some researchers have indicated nurse educators as the key contributing factor for the theory-practice gap, while other researchers have considered clinical facilitators and students as the potential cause. So, where does the responsibility for the theory-practice gap lie? This portion of the chapter is a chronological set of discussions with varying views of the issues surrounding the theory- practice gap. The discussions on the theory-practice gap were arranged in chronological order starting with articles published in 1992 and ending with current studies and journal articles that attest to the ongoing debate over this issue.

Rolfe (1992) argued that the theory taught in nursing does not translate into practice and that a gap ensued as a result. He concluded that instead of theory informing

practice, practice should inform theory. Cook (1991) oriented the discussion in classroom experiences, rather than hospital contexts. He argued that there had not been enough research into classroom issues to understand the theory-practice gap. Nonetheless, he stated that it could not be closed. Allmark (1995) felt that the existence of a theory-practice gap was a perception, rather than a reality. He argued that, in fact, nursing is a practice, not a theory, and that therefore a 'gap' between practice and theory is a misnomer. Hird (1995) explained that both theory and practical skills are required in nursing and that one without the other is of little benefit.

Khatib and Ford (1999) adopted a different stance to building understanding of the theory-practice gap. They queried whether the theory-practice gap was, in fact, a negative thing, or if it was a necessary and positive phenomenon. Khatib and Ford suggested that the term theory-practice gap should be done away with because of the enormity of what it implied, and since there had been many small successes that were not recognised. However, they still agreed that there was a deficit between theory and practice and that both student nurses and practicing nurses needed to become clear on what the gap meant to them. Like other investigators of the theory-practice gap, Katib and Ford agreed that it is multifaceted and that there was no one solution, if indeed a solution was necessary.

Landers (2000), reviewed a plethora of literature, regarding the theory-practice gap. The sources defined the theory-practice as multifaceted. Varying opinions ensued as to the causation and methods required to bridge this phenomenon. Overall a major contributing factor was thought to be the student's inability to understand the theory sufficiently, in order to link it in their practice. It was also suggested that not all theory was related or relevant to the clinical setting, but allowed for further reflection and increased understanding. The literature also suggested that the move from hospital-based training to higher education had not resulted in a decrease of the theory-practice gap. Another suggestion was the incorporation of a dual practitioner. The nurse educator would also assume the role of clinical facilitator, which allowed for deeper understanding of the theory in the clinical environment. Landers (2002) surmised that classroom education and clinical instruction held equal importance. She further deduced that nurse educators required current clinical competency and a skill set that needed to implement methods that teach students how to link theory to practice. However, other literature formed differing opinions.

Morgan (2005) undertook a review of literature on the theory-practice gap and found that many students could implement theory into the clinical setting, but that insufficient practice in nursing laboratories played a significant role in maintaining the theory-practice gap. The Victorian Government Department of Human Services (2005), reached a similar conclusion after a report indicated that insufficient lab time affected students' ability to

connect theory to practice. They recommend increased hours in laboratory simulation, just prior to clinical rotations. Gallagher (2007) suggested that there were multiple factors that informed the theory-practice gap. A significant one of these factors was that students questioned the relevance of theory to clinical practice. The fact that theory was perceived as classroom-based and practice was perceived as clinically based, adds to the separation of the two components.

A second line of thought proposed by Gallagher (2007) regarding the accepted understanding of the theory-practice gap was the belief that this gap could be "manipulated, learning can be controlled and there is a right and wrong way of learning" (p.200). Cheraghi, et al (2007), discussed the cultural factors and expectations of a new work environment on a new graduate. The desire to become an accepted part of a nursing team, and/or the team's attitude towards new theory, could have negative or positive consequences. Cheraghi's study, based in Iran, indicated that senior nurses were not willing to recognize the theory of evidence-based practice and insisted on conducting their practice the old way, which left new nurses in a difficult situation. As a result, many of the graduate nurses in Cheraghi et al. (2016), followed the traditional methods and disregarded the theory. Despite the location of this study in Iran, it is possible that similar cultural values of deference to seniority, particularly in hospital contexts, could also exist in western societies. In his PhD thesis, Gallagher (2007), asserted that students played a vital role in the theory-practice gap. He recognised that students come with pre-conceived ideas about nursing, and a gap or division developed when their experiences and values conflicted. Three areas of learning were identified, classroom, practical and the student's personal beliefs or theory.

Gallagher (2007) argued that the importance of reflection in learning, and acknowledgement of the emotions that students experienced during the learning process, affected learning both positively or negatively. In his concluding remarks, Gallagher (2007), contended that nursing curriculum did not require extensive restructuring and that, "any failure to align theory and practice did not lie exclusively in factors that were external to the student" (p. 232). He proposed that nursing education must be focused on the

individual student: “Educators can continue with those educational innovations focused on external factors whilst at the same time attending to the process by which individual students learn to apply theory in practical contexts” (Gallagher, 2007, pp.210, 215-231). Ousey and Gallagher (2007), debated the existence of a theory-practice gap. Gallagher purported that practical skills and theory were symbiotic; rather than separate entities. Thus, one informed the other and they could not be divided by a perceived gap. Ousey on the other hand maintained the traditional view that a gap does exist.

Wilson (2008) argued that much of the discussion surrounding the theory-practice gap seemed to be centered on student readiness upon graduation. It did not consider whether a theory-practice gap existed in earlier years of study, or if there was a diminishing or increasing of the gaps during a student’s study. Benner (2011), graduate nurses are novices, whose abilities and understanding develop once employed. Thepurports that practical experience is a must in order to become expert. Wilson (2008) proposed that students were one of the key players in the theory-practice gap. The students’ desire to learn and to become reflective practioners must come from within. Furthermore, Wilson felt that students must take responsibility for their learning and comprehension of the lesson material. In addition, educator played a key role. Their knowledge and expertise in theoretical delivery was a key component in student learning and understanding that could be transferred into the clinical environment.

Scully (2010), approached the problem of the theory-practice gap differently; she related it to her experience as a student nurse. She discussed the value of self-reflection and personal attitude when on clinical placements. However, she believed that there was a deficiency in lab practice time and a lack of communication between educators and clinical facilitators that added to the disparity. “The theory-practice gap is arguably the most important issue in nursing today, given that it challenges the concept of research-based practice, which is the basis of nursing as a profession (Scully, 2010, p. 94).

Ussain and Osjui (2016) stated the following, regarding the theory-practice gap: “Unfortunately, it seems clinicians and educators attempt to deal with this ever-evolving situation as the new status quo reality of nursing, instead of a problem to be solved” (2016,

p.21). The ongoing debate surrounding the theory-practice gap ended in a call for change in nursing education.

Hickey, Hasnani-Samnani and Ryba (2015) stated that, “Even when students achieve competency in the classroom, these concepts and skills may not transfer to the hospital. This lack of transference is widely referred to in the nursing literature as the theory-practice gap” (p. 26). They believed the issue was education based and constructed a simulation center and employed multiple methods of instruction to determine if this approach had the ability to decrease the theory-practice gap (Hickey, Hasnani-Samnani and Ryba, 2015). Van Zyl (2014) discussed the ongoing issue of the theory-practice gap in nursing where the theory was inadequately implemented into the clinical environment. During her research she concluded that there was an issue with nursing education and that the starting point to resolve the theory-practice gap begins with the nurse educators (Van Zyl, 2014). This is the same conclusion that I formulated before I conducted this research study, which looked at a paradigm shift in nursing education (Jones, 2016)..

The multiple facets of the theory-practice gap were evident in the literature. A list of the various thoughts was discussed above are noted in the table below on the following page.

Table 2. The Multiple Factors Discussed in the Literature Regarding the Theory-Practice

Author/s	**Beliefs Regarding the cause of the theory-Practice Gap**
Rolfe (1992)	Theory does not translate into practice – Practice should inform the theory
Cook (1991)	Not enough research into how students are being taught in the classroom
Allmark (1995) Hird (1995)	Theory-Practice gap only a perception not a reality
Khatib & Ford (1999). .	Multifaceted; do away with the term – too many implications Students need to identify what a gap means to them
Landers (2002)	Multifaceted – multiple causes Literature suggested students lack understanding of the underlying theory Classroom educators and clinical facilitators held equal responsibility in assisting students
Morgan (2005) Victorian Gov. Australia(2001)	Many students could implement theory into practice but Lacked sufficient lab time; in order to consolidate their learning
Gallagher (2007)	Students did not recognise the relevance of the underlying theory Educators needed to focus on individual students There is a right and wrong way of learning
Qusey (2007)	Theory-practice gap does not exist
Wilson (2008) Scully (2010)	Students were the issue: personal attitudes, understanding of the value of self-reflection, their desire to learn and link the theory
Ussain & Osuji (2017)	Many nurses believe the theory-practice gap is the new status quo, not an issue to be resolved
Van Zyl (2014)	The theory-practice gap is an education issue
Perkins (2010)	Graduate nurses are novices and the issue will be resolved with experience
Hickey, Hasnani-Samnani & Ryba (2015)	The gap was an education issue

As displayed above, the research has suggested various reasons for the Theory-Practice Gap. This research study viewed the Theory-Practice gap as an education issue. New teaching methods were implemented that focused on how the brain learns; individual student learning preferences; culturale, level of education, age, and social differences. My personal experience as a student nurse, clinical facilitator and educator led me to conduct this study. Accelerated learning techniques, diagrammatic learning with explicit dialogue and a linking table were implemented to determine if the Theory-Practice gap could be decreased, thus creating a paradigm shift in nursing education.

A Call for Reform

A call for reform in nursing education became prominent in the literature during the 1970s and escalated steadily from that time (Landers, 2000). The theory-practice gap was an ongoing driver in the perceived need to change the nature of nursing education (Shoghi, Sajadi, Oskuie, Dehnad & Borimnejad, 2019). Researchers have answered the persistent call for reform in nursing education by trialing various methods and methodologies, and critically reviewing a variety of theorists, in order to assist the transformation of nursing education and address the issue surrounding the theory-practice gap (Penn, 2008; Billings and Halstead, 2005; Callara 2008; Young and Paterson, 2007).

The National League for Nursing (2003), related that content change within current curriculum was not sufficient and that a paradigm shift was required. They proposed student focused and flexible education was necessary to meet student needs. Callara (2008) summarised that the theory-practice gap was created by the rapidity of change in the medical and technology forums that could have immediate impact on decreased numbers of nursing staff. de Tornyay (2007), concurred with the thoughts of Callara, but went on to explain that the required change in nursing education had not occurred swiftly enough to stay current with the evolution of changes. She also believed that some nurse educators lacked the ability to execute new methodologies.

Kan and Parry (2004), in their study on grounded theory and overcoming resistance to change, stated that, “It is important to note that change resistance from within nursing is also responsible for repressing nurse leaders’ ability to move nursing toward visions of autonomy and collaboration” (p.481). Dragon (2009) discussed issues surrounding the lack of clinical educators and the increased level of illness in patients, who often had comorbidities that limit staff nurses’ ability to mentor students. Dragon (2009), also highlighted issues surrounding high rates of student withdrawals, inability to complete clinical placements and funding issues; hence the intricacies of student issues in nursing education, also plays an integral role to be considered in education of adult nursing students. The Institute of Medicine (2011) stated,

> The explosion of knowledge and decision-science technology also is changing the way health professionals' access, process, and use information. No longer is rote memorization an option. There simply are not enough hours in the day or years in an undergraduate program to continue compressing all available information into the curriculum. New approaches must be developed for evaluating curricula and presenting fundamental concepts that can be applied in many different situations rather than requiring students to memorize different lists of facts and information for each situation (p. 191).

They went to say that, "Just as curricula must be assessed and rethought, so, too, must teaching–learning methods"(Institute of Medicine, 2011, p. 191). This thesis attempts in part to address that need.

The Concept of Learning

As related by the Institute of Medicine (2011), there is a need for change in the way nursing students are educated. This section of the literature review discusses how learning occurs since an understanding of the concept of learning bears relevance to how students are taught. A basic review of the following topics are discussed in this section: the innate nature of learning; culture and environmental factors; short-term memory and long-term memory acquisition; surface learning versus deep learning and the importance of reflection in the development of critical thinking skills.

From the moment we were born, we began to interpret and understand our surroundings. Learning crosses borders and cultures, and varies in philosophical perception, but viewpoints could be brought together to enhance understanding. The immense capacity for learning in human beings could not be underestimated (Learner Knowledge Community, 2016). As Dryden and Vos (2005) stated, "The Human Genome Project has proven that we are all a *combination* of both nature and nurture. Human behaviour is, in fact, a combination of our genes, our instincts, our environment and our experiences including education" (p. 99).

Freire (2005), understood the cultural, social and personal experiences that guided an

individual's educational experience. Educators' awareness of these differences is imperative for successful student outcomes, such as the students in this research study.

In Quantum Learning, teachers orchestrate the culture of their classroom; where these differences can be expressed in a safe, supportive learning environment. (Quantum Learning Network, 2011). Then, during the learning process as knowledge increases, students can develop greater insights that expand their understanding (Learner Knowledge Community, 2016). This study provided insight into students' experiences that suggested this to be true in nursing education. Personal journal articles by students can be found in the discussion.

Dryden and Vos (2005), discussed how some educational institutions had made changes to their learning methods, in an attempt to improve student outcomes. They indicated that learning is multileveled and engages all one's senses, thoughts and emotions, and that "emotions are the gateway to real learning" (p.177). When they looked to reduce the theory-practice gap, it was apparent from Dryden and Vos's work that attention had to be paid to emotional engagement in learning, as well as to content transfer.

Short-Term Memory, Working Memory and Long-Term Memory

Boyd (2015), a neuroscientist, explained that during short term memory there was activation of the chemicals between neurons [nerve cells]. However, during the process of long-term memory activation, actual physical changes occurred in the brain. She further examined the processes of memory and application and determined that one of the most important predictors of change was implementing the practice of that change. Another study, published in 2014 on short-term memory [STM] and long-term memory [LTM], found that information a person focused on at any given time entered short-term memory, within the hippocampus. This memory was affected by disruption or non-use, such as a classmate talking or a loud noise. A memory from LTM, however, can be retrieved in these circumstances. The pre-frontal cortex and lateral cortex are involved simultaneously during both STM and LTM. It is noted that STM has limited capacity, of between five to seven items, although the capacity can be increased by chunking ideas of a similar nature (Jonides, Lewis, Nee, Lustig, Berman & Moore, 2014). Short term memory is often used

interchangeably with working memory; however, short term memory is a small portion of working memory. Working memory has multiple components and has both storage, and processing abilities. It is also associated with intellectual and aptitude capabilities (Cowan, 2008).

A memory also becomes strengthened when the pathway is reactivated through review (Sousa, 2006). Nee and Jonides (2008) found that retrieval of memory used multiple sources of information such as, auditory, sematic (mnemonics, chunking or a student's mood at the time of learning), previous schema (learning and experiences) and sensory information, such as smells and emotions.

Sousa (2006), also analysed the role of sleep in memory. He found sleep was an important factor in the consolidation of learning. What one talks about or reviews before sleep, influences the memories that are stored; therefore, studying before going to sleep increased retention of the learning. This is a significant finding for educators that they can pass on to their students.

Stress also influenced memory, but negatively (Sousa, 2006). Anxiety and stress could stimulate a fight and flight response that was brought on by the amygdala, which is found deep inside the brain. Guided imagery, aroma therapy, music and relaxation techniques such as "Ha" breathing had the potential to reduce stress, especially during exam time. "Ha" Breathing was part of the Hawaiian culture of Huna where breathing was "the energy of the universe" (James, 2013, para 8). This breathing technique brought energy, but also focused the person and caused relaxation as one learned to control the breath (James, 2013, para 8-9, 12).

Surface Learning Versus Deep Learning

Hattie (2017) explained that surface learning in schools formed approximately 90% of student tasks; however, surface learning was considered short term memory and was the formation and storage of ideas and facts. The theory garnered during surface learning becomes deep learning when processes are defined, and understanding is developed. Deep learning is the consolidation and transfer of the information to long term memory. Both

types of learning are important and work in tandem. Neurologically surface learning has fewer neuronal connections that can decay in a short period of time, but deep learning forms multiple neuronal connections when consolidation of information occurs (Hattie, 2017; University of Queensland, 2017).

The Importance of Reflection in the Development of Critical Thinking

Leaver-Dunn, Harrelson, Martin and Watt (2002) suggest that students gain critical perspective of their actions and decisions in the clinical setting when journaling is incorporated into their course. They state that reflection, "distinguishes great practitioners from their peers" and that, "classroom and clinical instructors should consistently seek to promote student reflection" (para, 21). Paterson (2007) stresses the importance of reflection and critical thinking in nursing. She believes that nurse educators who are teaching students to think critically can achieve that goal in a student-centered learning environment. Cottrell (2011) discusses important aspects of critical reflection. She explains that critical reflection involves a deep understanding of personal experience by "sifting through your reflections, selecting key insights and identifying why these are of significance to your performance in study, or work, the way you work with others, or your life generally" (p. 209). In relation to this study and the theory-practice gap, Scully has (2008) found that, "serious reflection was reported in the academic literature as being one of the best ways in which to bridge the gap between theory and practice" (p. 97).

Education – Pedagogy and Andragogy

This short section discusses the difference between pedagogy and andragogy**.** It is important part of the literature review, as the majority of students in the research cohort were mature aged students.

Education is derived from the Greek word "*educare"* and it refers to drawing out one's distinctive talents or abilities (Dryden & Vos, 2005, p.143). The term pedagogy was derived from monasteries in Europe between the seventh and twelfth centuries. The original meaning of pedagogy was the teaching of children (Sharma, 2006). The term andragogy, meaning the teaching of adults, has a varied history, which began with a German teacher,

Alexander Knapp in 1833 (Leong, 2017). Holmes and Abington-Cooper (2000) discussed how Malcom Knowles was introduced to the term andragogy in the 1980's and consequently formulated factors of adult learning and developed a case for adult education. The term andragogy became widely known (Holmes & Abington-Cooper, 2000). The table below depicts the established differences between pedagogy and andragogy.

Table 3. The Difference Between Pedagogy and Andragogy (El-Din, 2019)

	PEDAGOGY	ANDRAGOGY
Setting	Formal	Informal [not necessarily true]
Learner	Teacher – focused Responsible for what is taught and assessments	Student – focused Responsible for own learning and self-reflection
Experience	Do not come with a vast amount of life experiences, but do have some learning schema on which to build	Come with vast experiences Varies between students
Readiness	Must attend school or home school by law Told what they must learn	Ready to learn, Have a goal – generally need to learn a skill Have Self-identity
Characteristics of Learning	Is a process and sequenced by curriculum that must be achieved in order to advance School directed	Adults have a specific goal for learning It must be relevant Learning is completed around their lifestyle
Motivation	Generally thought to be extrinsically motivated	Internally motivated
These two models meet somewhere in the middle and characteristics of adult learning can be found in pedagogy		

What has been seen as teacher-focused learning in schools with a pedagogical basis is changing on some levels with teachers who are innovative and becoming more student focused (Ontario Ministry of Education, 2018).

The introduction to the concept of andragogy sparked debate in educational thinking (Loeng, 2018). Some teachers felt that pedagogy was not appropriate for adult learners and found that many adults withdrew from their courses (McGrath, 2009). However, Whitby (2013) did not feel that there were any differences between how children learn and how adults learn. Rather, he suggested the distinguishing features between pedagogy and andragogy lie in the opportunities for learning that are not afforded to children. Holmes &

Abington-Cooper (2000), discussed the slight retraction that Knowles made regarding the two teaching models. Malcom Knowles agreed that they are "two ends of the spectrum" and they actually meet in the middle somewhere (Holmes & Abington-Cooper, 2000, para. 20). In addition, Knowles agreed that in some instances pedagogy and andragogy are interchangeable (Holmes & Abington-Cooper, 2000). The distinctions are important in this thesis because the research was designed to ensure that the nursing education classroom was responsive to the ideas of andragogy, and resistant to the didactic elements of traditional pedagogy.

Influence of Teachers and Caring in Education

Hattie (2003) is a statistician, who reviewed multiple articles and surmised that teachers had the greatest influence over students, and they played a significant role in successful student outcomes. Ulg, Ozen and Eryilmaz (2014) found that teachers had the second highest influence on student development and outcomes, and that a teacher's positive attitude influenced for good, but a negative attitude caused discouragement and disinterest that could have far-reaching effects on the students. Their argument aligned with that of Hattie. According to Hattie (2003), there were three important attributes of expert teachers that attributed to student success: their belief in the student's ability to achieve success, their ability to take students from surface learning to deep learning, and their passion for teaching. He went on to explain that it was the expertise of teachers, and teachers working together that created a unified school environment based on key factors, that had the greatest impact on student learning and student outcomes (Hattie, 2013). Biggs (1999) discussed the importance of student-focused education. He stated, "Student-focused methods see the focus as being on bringing about conceptual change in students' understanding of the world, and it is what students do to achieve understanding that is important, not what teachers do" (Biggs, 1999, p. 61). An expert teacher focuses on student learning and "certainly includes mastery of a variety of teaching techniques, but unless learning takes place, they have not achieved their purpose . . . getting students so to

understand requires that they undertake the appropriate learning activities" (Biggs, 1999, p. 63). Another, important factor that was emphasized in the literature was the incrporation of care in nursing education (Hills & Watson 2011; Pajenkihar, Stislic & Vrbnjak, 2016).

Hills and Watson (2011) discussed the National League of Nursing's call for change in nursing education that had been entrenched in the behaviouralist model for over 40 years. They wrote of the need for a paradigm shift, "In nursing education from behavioursim to empiricism of human science and caring" (p. 3). They sought a curriculum that encouraged, "Critical thinking, problem solving, and learning, rather than . . . content to be transmitted" (p. 3). They hoped that graduate nurses were not only sound technically, but were, "Steeped in the values and ethics of caring as the moral obligation of nursing to society" (p. 3). In a qualitative study by Larsen (2015) students indicated the following factors as showing caring: humour, fun, sharing stories and relating to the students' lives, rigour, passion for teaching, teaching methods that address learning preferences, and responding to student needs and concerns.

Overarching Teaching Methods Employed in this Study

This section is a review and discussion of the literature on methods, which were central to the pragmatic paradigm of this study.. The rationale for the implementation of each of the following methods is discussed: the democratic classroom, holistic education, constructivism/empowered learning, active learning, embodied learning, experiential learning, metacognition and neuroplasticity.

A democratic classroom allows for a respectful classroom culture that recognises the rights, skills and previous knowledge that students bring to the learning environment (Pearl & Knight, 1999). This aspect also aligns with the *Big Me, Big You* strategy employed by Quantum Learning (Quantum Learning Network, 2011p. 4.25). Pearl (2009) argued that to be democratic does not mean that the teacher is left without respect or the ability to direct the students; rather, the students, as adults, realised that they had to take responsibility for their learning. With the teacher, the class could establish a mentoring environment, where each party shared their areas of understanding and expertise. In the democratic classroom the class set the rules and the consequences when these rules were not followed (Pearl,

2009). The teacher takes the lead in enforcing the rules. In addition, in an equal-value classroom there was absolute clarity about the rules and consequences. When consequences were enforced, the discipline is external to the person in authority (LeTellier, 2007a). Pearl's concepts aligned with Quantum Learning where the students are encouraged to take responsibility for their learning. The consequences of breaking the rules is external to the teacher as students are made to understand the outcome is a result of their decision. A democratic classroom ties into holistic education that considers all aspects that affect an individual.

Holistic education takes into account the student's life outside the traditional learning environment and caters to students as individuals. In addition, holism was founded on respect for students and staff within the education community. Teachers are focused on student success (Bradley-Levine & Mosier, 2017). Vella (2002) discussed the importance of teachers creating dialogue with their students, and the importance of teacher-approachability and supportiveness. If these characteristics were not present, the teacher lost valuable teaching opportunities. Vella drew on the Freirean framework, claiming that teachers who were inflexible and unapproachable discouraged student engagement because students are aware that the teacher will not allow critique, disagreement or student voice. Adult learners need to know that they can speak freely and voice their opinions. Fitzgerald (2011) explained that constructivism and empowered learning theories also expressed the need for the development of teacher-student relationships.

The combination of constructivism and empowered learning was seen as beneficial when working with diverse student cohorts. It allowed for a partnership to develop between the teacher and the students, who take responsibility for their learning (Fitzgerald, 2011). Briggs (1999) felt that the theory of constructivism worked for teachers as it provided a broad-basis for delivery that was easily adaptable and was student-focused. In the constructivist process, students dealt with life problems and connected these issues to their intellectual schema, which is discussed further under experiential learning. The knowledge and experience that students brought into their education, enriched the learning process and had the potential to foster engagement in an active learning environment. They were

encouraged to develop metacognition through journaling, self-reflection and critical thinking. Empowerment theory is multifaceted and focuses on personal development and power, along with social development and resources (Fitzgerald, 2011). Active learning was defined in the following study.

Freeman et al (2014) conducted a metanalysis of 225 studies that assessed the performance outcomes of undergraduate science, technology, engineering and mathematics courses that were instructed in traditional versus active learning. The culmination of their responses resulted in the following definition: "Active learning engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher-order thinking and often involves group work" (para 26). They found that incorporating active learning within multiple learning environments increased student success rates. Conversely, they found "that lecturing actually, increases failure rates by 55%" (para, 13). Lindgren & Johnson-Glenberg (2013) felt that physical activity was linked to mental constructs, such as, language. Nathan and Walkington (2017), conducted research that supported cognition- action in teaching mathematics. Embodied learning is another theory that asserts the use of action during learning.

Embodied learning is generating opportunities to learn through the body. Skulmowski and Gunter (2018) found that low levels of embodied learning limit students' learning, whereas high levels of embodied learning were effective in increasing learning. Kontra, Goldin-Meadow and Beilock (2011) discussed the influence of movement on learning. In a "pre-test torque judgement task" one group of undergraduate physics students were physically able to "manipulate a pair of bicycle wheels on an axle under various conditions" and the second group were provided an explanation of the procedure and observed the process (p. 6). The post-test showed that students who were allowed active participation in the pre-test, scored higher than the observation group. Children constantly learn through movement, but when children enter the education system, the use of movement is reduced. Theorists now purport that movement during learning enhances student outcomes (Kontra, Goldin-Meadow & Beilock, 2011). Another theory for active student engagement is

experiential learning. Johnson-Glenburg and Megowan-Romanowicssz (2017) suggested that embodied learning could be found on many levels in the learning process, such as looking at a visually captivating page, which would be considered low level embodiment. They conducted research into embodied learning using a simulated game and found that engagement increased, the student outcomes did not. Additionally, Skulmowski and Rey (2018), found that low levels of active engagement may lead to decreased student outcome, but higher levels of physical engagement have the possibility of increasing student outcome. The outcome of another research project involved gestures as an aspect of embodied learning and found that the initial post-test did not show any gains in learning; however, when a sub-test was conducted student outcomes were increased. This outcome stressed the importance of incorporating several assessments after the initial learning for retention of theory (Johnson-Glenberg; Megowan-Romanowicz, 2018).

Experiential learning emerged from John Dewey's educational philosophy. The term active learning was also derived from experiential learning. Dewey's theory stemmed from an understanding that people construct learning through experience and then integrate this experience within their environment; therefore, the best way to teach is to incorporate natural learning processes (Cox, 2010; Dewey,1915). The term "experiential learning," however, is attributed to Kolb, who defines learning as, "the process whereby knowledge is created through the transformation of experience" (p.38). He argued that learning is a holistic process and is accumulated as knowledge. There is an interaction between a person, their milieu, and objects that are found in that environment (Kolb, 1984). Building on one's previous knowledge, known as schema, is also a part of experiential learning. This is known as Piaget's theory of cognitive development.

It is from Piaget's work that the word schema is derived. Piaget described schema as the structures on which an individual builds their knowledge. In order to construct new knowledge, they attach it to their pre-existing schema, like a set of building blocks. Piaget asserted that learning occurred through active involvement in the learning process. The more recent work of Lefa has nuanced this understanding, indicating that teacher directed

activities must be age appropriate (Lefa, 2014; Piaget, 1928). Anastasia (2018) further developed the work of Piaget and noted that an individual does not operate on a single schema, but multiple schemas. Learning how to learn is an important factor when building on previous knowledge. Student success can be influenced by understanding how the brain learns. This is a vital aspect of Quantum Learning. Metacognition is the study of learning. Metacognition is about thinking about how we think, which is important to students' progress, their understanding of learning how to learn, and their understanding of self (Flavell, 1979). It is important that students took responsibility for their learning and understood the processes of thinking and reflection. Then they could implement methods that enhanced their metacognitive capacity (Sabna & Hameed, 2016). However, often students, particularly mature aged students held the assumption that their brain was set and adhering to this line of thinking could have made it difficult for them to learn (Personal conversation, 2012). Doidge (2015) explained that for 400 years it was believed that the brain was fixed and that brain cells could not be replaced. When students understood the concept of metacognition, which is linked to neuroplasticity, they garnered the self confidence that gave them the potential to increase their student outcomes.

Metacognition is an aspect of brain-based learning, which is one of the underpinning theories of Quantum Learning. Neuroplasticity explains how learning occurs on a biological level. It is the defining part of brain-based learning that allows understanding of the physical processes within the brain (Elger, 2010). The significance of brain- based learning is that it, "Refers to teaching methods, lesson designs, and school programs that are based on the latest scientific research about how the brain learns" (Great Schools Partnership, 2014, para 1). In addition, "It is motivated by th e general belief that learning can be accelerated and improved if educators base how and what they teach on the science of learning (Great Schools Partnership, 2014, para 2). The brain also has the capability of neuroplasticity and this is an important aspect of understanding how the brain learns.

Neuroplasticity is the process where "the human brain continually reorganizes itself on the basis of input" (Sousa, 2006, p. 5). The process of neuroplasticity is a continual process starting at birth and carries on into adulthood; however, it occurs rapidly in young children.

This is an important aspect for educators at all levels to understand as, “the experiences the young brain has at home and at school help shape the neural circuits that will determine how and what that brain learns in school and later” (Sousa, 2006, p. 5). Sousa (2006) discussed how teachers prepare lessons and hope that the students will retain and recall what they are teaching. He states:

> The extent that this hope is realized depends largely on the knowledge base that these teachers use in designing those plans and, perhaps more important, on the instructional techniques they select during the lessons. Teachers try to change the human brain every day. The more they know about how it learns, the more successful they can be (p. 3).

The literature identified several important factors related to the learning process (Forney, 2016; Sriram, R., 2020). Quantum Learning and Campbellteaching addressed many of these issues. The students were taught how learning occurred, and were provided with methods they could use; in addition, teacher training was offered so the process was witnessed, and the methods could then be taught in their classrooms. allowing students, the opportunity to engage in various learning modalities that address their learning preferences and strengthen other modes of learning.

The above methods were integral aspects of this study, each one aligned with Quantum Learning and Campbellteaching. Positive affirmations, celebrations of success are two examples utilised by Quantum Learning that assist with the concept of caring, increasing self-esteem and self-confidence. Biggs (1999) stated that, “Motivation is the product of good teaching, not its prerequisite"(p. 69). Holistic education, constructivism, empowered learning, active learning and embodied learning all provided activities that had the potential to promote deeper learning, which is a crucial aspect for student nurses, who have immense responsibilities when caring for individuals. Lastly, knowledge of metacognition and neuroplasticity was important for student’s self-awareness and perception of how they learned. Deeper understanding of self-had the potential to increase motivation and personal responsibility for the development of lifelong learning.

Approaches to Learning

Every student approaches education with a preconceived idea of what a classroom should look like and how they expect to learn; therefore, classrooms are diverse on multiple levels. A teacher driven classroom cannot address the verifying student cohorts, which leaves some students without proper direction or learning skills. Biggs (1999) discussed that in the past the focus was on finding the perfect teaching paradigm, but over time the focus changed to how students learn. This research was constructed to implement methods that could assist all students within the research cohorts to understand their learning preferences, how they learned and how the brain learns. Generally, in order to maximize their potential for successful outcomes with deep learning. The following section outlines the various methods that were employed during this research study and their value in addressing the diversity found in the research cohorts and their potential to assist in today's educational institutions. This section begins with looking at multimodality, which simply is the use of a broad spectrum of methods that address the learning preferences of a group rather than one individual. As the discussion progresses, the focus will shift to the individual methods.

Multimodality is the use of a broad spectrum of methods that address the learning preferences of a group rather than one individual. Mitchell, James and D'Amore (2015) conducted a research study on learning styles and preferences in nursing. They found that over the course of a first-year program individual learning preferences evolved and changed. Students were incorporating other learning styles; therefore, they felt that the use of multimodalities was the best option to address the evolving preferences. This is not only important for the changes that were evidenced in their study, multimodality also addresses the learning preferences of various students. Stirling and Alquraini (2016) conducted a research study in Saudi Arabia on learning styles in nursing education. Their research indicated a high percentage of kinesthetic learners. They concluded that application of a multimodal learning was an important factor in students' understanding of the theory,

transference into practice and the development of critical thinking skills. Carcamo, Cartes, Velasquez and Larenas (2016) surmised that the benefits of multimodality were increased motivation, enjoyment, engagement; in addition, students were more active in the learning process and drew on their prior experiences, and experienced greater success outcomes. Their research found that out of four categories of students "88% were multimodal" (Carcamo, et al, 2016, p. 145). Examples of multimodal methods implemented by Carcamo, et al (2016) were gestures, images, writing, drawings, speech and manipulation of objects.

Models also provided variety in classroom learning, which was important to maintain student attention. Most importantly, models of body organs assisted in making complex structures easier to understand (Meier, 2000). This strategy also addressed the needs of kinesthetic learners (somatic learners,) who had tactile needs to assist in their learning (Hare & Reynolds, 2011; Herrman, 2008, p.9; Meier, 2000).

West (2011) addressed the importance of visualising words. Her research traced students' problems with remembering information back to their early experiences of language and the processes of rote learning. West (2011, 8:19) identified the problem as "the inability to think with words." She incorporated visualisation in her classroom and her students achieved successful educational outcomes (West, 2011). A study about the effects of drawing in anatomy by Barrelli, Leung, Morgan, Saxena and Hunter (2018) found that retention, recall and increased student outcomes resulted when students drew. In addition, there was an element of fun and greater satisfaction among the first-year medical students. Meier (2000) suggested a reason for the impact of visualisation and diagramming. She noted that the visualisation methods, along with mind mapping, assist with encoding information and storing it in short-term memory. Furthermore, keeping a diagram simple and clear helps student understand difficult concepts that are found in the sciences; such as Anatomy and Physiology of the human body (Campbell, 2011; Novick, 2006). An important belief of Quantum Learning is that one does not obtain cognizance without visualisation (Quantum Learning Network, 2011). The use of models in the classroom

provided visualisation, hands on activities and assist in developing understanding. Dunn and Dunn (1984) also developed model for learning.

Dunn, Rundle and Bruke (2007) discussed the work of Dunn and Dunn, who were researchers who cared about the success of young students. They worked in education for many years and noticed that children learned differently, and some learning preferences affected a child's ability to learn. In response to their observations, in 1970 they developed the Dunn and Dunn Learning Styles Model. The model presented five synchronous elements that influenced learning. These elements are environmental, emotional, sociological, physiological and psychological. The Dunn and Dunn model has been accredited with being the most researched learning styles model that has the ability for transference across all sectors of education (Dunn, 1984). The Dunn and Dunn Learning Styles Model closely aligns with the four guiding tenets and the *8* Keys of Excellence that are basic to the Quantum Learning Model. These elements are discussed in the methodology chapter. In addition to the success of the Dunn and Dunn model, it has also undergone significant criticism. Lovelace's Meta-Analysis of the Dunn and Dunn Learning Model concluded that the model was beneficial for learning (Lovelace, 2005). However, Kavale and LaFever (2007) criticised Lovelace's meta-analysis of the Dunn and Dunn model, and a report conducted by Dunn and Dunn. Kavale and LaFever (2007), considered their work biased and claimed that it could not be held up to scrutiny. The problem they identified was that studies conducted by Lovelace, and Dunn and Dunn did not contain a synthesis of other learning models. However, the criticism focused on Lovelace's meta-analysis. Kavale and LaFever (2007), recognized that Lovelace conducted a well-structured study, but neglected to address significant variabilities. The study covered too broad a time period and that the literature lacked substance, due to several unpublished dissertations.

More recently, a dissertation by Daouk (2013) found that a fourth grader, who had difficulties learning, experienced a significant increase in outcomes when taught in alignment with his preferred learning style. I have found that students with a strong preference for kinesthetic learning have struggled in a traditional teacher focused

classroom (Personal conversations with students, 2011 – 2015). Once these students were engaged in active learning and understood how to apply methods that addressed their mode of learning, they experienced greater satisfaction; as well as an increased in their final scores. Vygotsky also made an important contribution to the understanding of student progress, with his work on the zone of proximal development.

Vygotsky (1978) introduced the zone of proximal development [ZPD] as a way of describing a learner's movement from incompetence to competence. This process is often referred to as scaffolding (Jones, 2016; Shabani, Khatib & Ebadi, 2010). In his book "Mind and Society," Vygotsky explained that "The zone of proximal development defined those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. These functions could be termed the buds or flowers of development rather than the "fruits" of development" (p. 86). He views the ZPD in both the area of mental age and the developmental level that can be achieved with the assistance of a teacher or peers (Vygotsky, 1978). Scaffolding is part of the process within the ZPD. When students cannot learn a task on their own, a teacher guides them through the process teaching simple concepts until the child/student gains understanding and can move onto the a more advanced concept. This continues until the child no longer requires assistance (Shabani, Khatib & Ebadi, 2010). Chunking is similar to scaffolding as it breaks down the information to be learned.

Chunking is an important technique because it allows students to input more information in their short-term memory at one time. Miller (1956) recognized the seven by seven rule. This rule maintained that short term memory could only hold and retrieve seven items at one time. Chunking allowed for increased information being coded into short term memory, as the combination of elements are viewed as a single item (Gobet, 2012). This process is perceived to be a natural part of the learning process (Gobet, 2012). However, when the chunking method was implemented, students had to understand the relationship between the various chunks. Once again this related back to the importance of students understanding of the learning process; in order for them to study, remain focused and gain maximum retention and recall (Gobet, 2012). Another practice that assisted student's

ability to code, retain and recall was the use of stories. Metaphors and stories could be used as a method for linking critical words together; in order to assist memory and recall.

Jensen (2006) discussed the benefits of metaphors in education. In his research on the use of metaphor, he identified three major concepts: metaphors help us to see things from a different perspective; they can make links to theory and they can make connections to practice.

Sousa (2006) added that connections could be made quickly and efficiently when metaphors were used in learning. Metaphors offer visualisation to enhance understanding. Meier (2000) stated that stories "are one of the best methods you could ever use to make the abstract concrete and, therefore, memorable" (p. 164). Stories have been used since the beginning of time to pass down knowledge and they continue to assist in learning (Covey, 2008; Hare & Reynolds, 2011; Harrison & Hobbs, 2010; Herrman, 2008; Jensen, 2008; Le Tellier, 2007; Sousa, 2006). Bower and Clark (1969) conducted a research study where students remembered lists of words using stories. They found that students who used stories to remember the key words, had a long term recall mean average of "99%", while the control group had a mean score of "13%" for recall (p. 181).

A sample story from their a paper is:

> One night at DINNER I had the NERVE to bring my TEACHER. There had been a FLOOD that day, and the rain BARREL was sure to RATTLE. There was, however, a VESSEL in the HARBOUR carrying this ARTIST to my CASTLE (Bower & Clark, 1969, p.182).

The research suggested that the use of stories in this manner increased student outcomes. Quantum Learning purports the use of mnemonics and stories as a means for retention and recall. This method could also be combined with other methods to enhance learning. Two such methods are humor and dramatisation.

Humor and Dramatisation support embodied learning – learning through the body rather than purely intellectually; it encouraged students to listen to intuition as well as logic, and to link these to provide insight (Cooper et al, 2018). According to Jensen (2008), dramatization formed state-bound memories; the memory is attached to the emotions,

place, and time that the memory was formed. Drama can be an effective way to instill memories in students through the power of action and movement. Humour and drama together provided students with memorable learning experiences that offered insight into patient relationships. Ekebergh, Lepp and Dahlberg (2004) conducted a research study on the aspect of caring using the stratagem of drama. The study ran over three educational terms and students were engaged in "drama games, improvisation, role- play, and forum/theater-play" (p. 626). Students found that the experience "gave them different forms of expression and enabled them to gain a greater understanding of the enigma of care" (Ekebergh, Lepp and Dahlberg, 2004, p. 627).

Cooper et al (2018) found that students enjoyed humor in science classes. They indicated that the classes felt more inclusive and students claimed to have focused more effectively on their lessons. However, if the humor had a social context, students founds this disagreeable and felt less accepted in their class. Baid and Lambert (2010) reviewed the positive and negative effects of humor, games and fun activities in nursing education. They surmised that educators had multiple resources available for the integration of these methods; however, the methods should be acceptable, respectful and appropriate. They acknowledged that there is an ongoing debate about the use of humor and games, and there may be opposing opinions. Humour can also be used as a state change to refocus attention (Hare & Reynolds, 2011, pp. 152-154).

State changes were shifts in the action and pattern of the classroom and were an important factor in maintaining a positive classroom atmosphere (DePorter et al., 1999; Drydon & Vos, 2008). Some examples of state changes are: clapping, clap-slap, turn to your buddy, a drum roll or humorous power point slide or simply asking the students to please face forward (Hare & Reynolds, 2011; Le Tellier, 2007; Quantum Learning Network, 2011). A state change catches the students' attention, and re-engages them, especially if humor is incorporated (Personal experience in the research classrooms, 2012, 2013). Another important method for enabling an effective state change is the incorporation of music.

Lozanov (1978) believed that Baroque music assisted the development of classroom

culture because of the music's effects on the human physiology: "The playing of Mozart coordinates breathing, cardio-vascular rhythms and brain-wave rhythm it acts on the unconscious, stimulating receptivity and perception" (Quantum Learning Network, 2011, p. 73). Beyond the Baroque, however, various types of music can be used for different learning situations; such as, relaxation, creating a specific mood, or enhancing learning, et al,1999; Quantum Learning Network, 2011). Sousa (2006) found that music in the classroom had some benefits. Schmithhorst and Holland (2004) identified significant differences in neural pathways linked to math processing, on neuroimaging studies between musicians and non-musicians. Musicians had stronger pathways related to mathematics, thus teaching children to play an instrument could increase their ability in math processing. In addition to music, the use of positive affirmations could also affect students' neuronal connections.

Cascio et al. (2016) conducted a study which used neuroimaging to view the effects of positive affirmations on participants. They found neural pathways were strengthened and positive external behavior, changes were observed. Hare & Reynolds (2011) commented on research conducted in the 1960s, regarding a group of students who were seen as having "high- potential." They refer to this as a 'self-fulling' prophecy, which did show an increase in the student's IQ points (p. 159). The power of positive self-belief has been indicated by many leaders to be important for personal success (Bulder, 1992).

An adult educator, Jane Vella discussed how teachers must find the positive during discussions with students and lavish positive affirmations. She goes on to state that "this is an attitude that must be taught to teachers of adults and practiced by them" (Vella, 2002b, pp. 90- 91). Hodgson (2014), attended a seminar conducted by Jane Vella. He realised that lavish praise was an action educator took in praising every effort that a student makes and providing encouragement, and continuous support (Hodgson, 2014). This aligned with celebrating every success in the Quantum Learning Model. Yet another method that has been found to influence student behaviours in the classroom is the use of aromas.

Kavurmaci, Kucukoglu and Tan (2014) found that leaving a cloth with three drops of lavender oil on students' desks prior to and during a test situation, significantly decreased stress and anxiety. Moss, Earl, Moss and Heffernan (2017) reviewed several studies that suggested the use of peppermint in adults increased cognitive abilities. They also, conducted a study of the effects of rosemary on 46 young school children. Six drops of rosemary were diffused using a high-speed fan for ten minutes prior to a test in three separate trails. Their findings indicated increased cognitive functions in young children. Meier (2000) discussed how reactions to bad smells cause negative feelings and related how the sense of smell is linked to memory. Therefore, aromas can add pleasantness to the learning environment and some fragrances are said to enhance mental alertness (173-176).

Each method discussed links back to decreasing the theory-practice gap because they all address a need for change in student learning that increases motivation, engagement, enjoyment of the learning process, retention and recall. These are all necessary in order to develop critical thinking and link theory to practice. Quantum Learning and Campbellteaching provided the multiplicity of methods necessary to meet all student learning preferences and provided explicit activities that addressed the research questions and desired student outcomes. Nurses require deep learning and the ability to reflect; in order to give rise to critical thinking that is imperative in the nursing environment where individuals lives are at risk.

Answering the Call for Change in Nursing Education

In an attempt to answer the call for change in nursing education, researchers from the nursing sector, conducted various studies regarding the implementation of learning styles into nursing education. Rogowsky, Tallal and Calhoun (2015) conducted quantitative research using Dunn and Dunn's learning style inventory. They tested for auditory (listening) and visual (word comprehension) learning styles only. The research was conducted using strict guidelines and they concluded that there appeared to be no benefits in learning, while using a supposed preferred learning style. In their conclusion, they posited that teachers were misled by prevalent misinformation regarding learning preferences. Newton and Miah (2017) conducted a survey on the use of learning styles in

education in England. They concluded that there is a decline in the use of learning styles as a way of engaging students in learning. Some teachers assert the effectiveness of teaching with learning styles, but the actual usage was less than previously indicated. Ultimately, they concluded that others may see learning styles as a myth and cease to use them. Felder (2010) concurs that learning style education is controversial; however, he also purports that students do have a preferred way of learning, taking in information, and processing information. He discussed the range of learning styles, such as preferring sequential learning, big picture understanding, and/or visual representation. Felder (2010) claimed that research suggests the benefits of learning style education and that learning style 'myth busters' base their findings on the 'meshing hypothesis,' which is actually a form of preferential learning (p. 3). Felder (2010) stated, "the point is not to match teaching style to learning style, but rather to achieve balance, making sure that each style preference is addressed to a reasonable extent during instruction" (p. 3). He further explained that students will require the use of all learning styles in their chosen professions. Alkhaswneh (2013) conducted research on 197 nursing students in a university in Jordan. The research indicated that 55% of the nursing students were multimodal as learners; in other words, they were flexible in their learning.

Alkhaswneh (2013) believed that curriculum design should incorporate learning styles, but that learning styles are not fixed and can change over the course of study. However, for optimal learning to occur, teachers should incorporate teaching styles that address learning styles. Mangold, Lunze, Quinonez, Tayor and Tenison (2018) conducted a learning style research study of nursing staff. Two thousand and seventy-one members received the ILS survey and they had a return rate of 67.55. It was found that, "learning style preference exist among practicing nurses" (p. 7). Mangold et al (2018) concluded that there was a need to include learning style preference in professional development; in order to enhance retention and recall of the nursing staff.

The Quality of Nursing Education

Lancaster, Raines and Bednash (2008) are three nursing professionals, who believed that there are not enough nurses trained in education to teach the many students who are

eager to learn, and that what is taught in the classroom is important, as it "affects patient care" (p. iv). Bartels (2008) took a different track. She explored the perceived deficiencies in nursing education. Her work focused on the use of learner-centered teaching. In particular, she identified methods, such as students building on previous knowledge; the diversity of student approaches to learning; the need to incorporate active learning; the role of experiential learning; the place of collaborative learning; and the power of picturing as teaching and learning tools. Bartels (2008) explained that learning needed to be interactive and that it was a dynamic process. She also considered the role of the educator, noting that educators need to take responsibility for how they deliver the content; in order to enable nursing students to see the connection between theory and practice. Bartel's study (2008) was of interest because of the ways in which her work and the methods utilised in Quantum Learning overlap.

Overall, the literature demonstrated that many teachers of nursing want to make a difference and have incorporated various methods to improve the quality of nursing education (Bastable, Gramett, Jacobs & Sopczyk, 2011; Billings & Halstead, 2009;

Herrman, 2008; Penn, 2008; Young & Paterson, 2007). However, no research study was found that trialed learning styles in a nursing classroom. Ulug, Ozdon and Eryilmaz (2011) argued that the quality of a nurse educator could be highly influential: they could assist students to succeed, or impede their ability to learn, and consequently, cause withdrawal from the course. A significant comment, regarding self-esteem was made in a research study on teacher and student beliefs about education (Northcote, 2009): "One participant described an 'emotional shutdown' when her sense of self-worth was at risk during the learning process" (Northcote, 2009, p. 74). Jensen (2018, August 16) affirmed this argument, he noted that students react positively to teachers who express caring and support (personal communication).

Jensen (2018, August 16) claimed that caring is the most important strategy that a teacher can implement and caring will provide the best investment outcome for student success. Teachers will benefit by letting the students know during their first interaction that

they truly care about each person in their classroom and they are there to help them succeed (Personal communication). Watson (2007) purported that caring in nursing education is twofold. In the first place, it is important for educators to care about their students and assist them through the learning process, so they can become successful and competent nurses. In the second place, by modeling caring in the classroom nurse educators are teaching students how to care, which is an important factor of nursing, as students go on to care for vulnerable patients. Watson (2007) expressed the need for selfcare, as well as the caring of others. She discussed the need for personal self-reflection and the need to understand one's own feelings: "Sensitivity to self not only leads to self-acceptance and psychological growth, but to sensitivity and acceptance of others" (Watson, 2007, p. 133). The capacity to understand one's own feelings, and to have insight into personal circumstances aligns to the metacognitive thinking mentioned above. The ability to think about one's thinking, and to identify one's own feelings is important in developing skills to manage study, disappointment, risk, and rewards.

The Quantum Learning Model

Bobbie DePorter is the CEO of the Quantum Learning Network, which she co-founded with her husband, Joe Chapman. The Quantum Learning Model focuses on developing excellence in education. It is the epitome of holistic, student-centered learning

where the teacher is a facilitator of learning. Four theorists form the main basis of Quantum Learning (Jones, 2016).

The Underlying Theorists

Georgi Lozanov – Suggestology. Dr. Georgi Lozanov was a Bulgarian psychiatrist and neurologist, who was born 22 July 1928 and died 6 May 2012 He wanted to, "bring back to children the pleasure of learning." (Radio Bulgaria, 2011, para 1). In the 1960s Lozanov articulated his theory of Suggestology, based on the transfer of knowledge through art by using suitable, non-manipulative suggestions (Jones, 2016). He proposed that, "This practice allows for the acquisition of vast volumes of information without effort and with zero stress" (Radio Bulgaria, 2011, para 1).

Suggestology was implemented in schools within Bulgaria in the late twentieth

century. In 1979, Dr. Georgi Lozanov and Dr. Gateva the co-creators of suggestopedia, an accelerated learning system, visited the United States and set up courses in Washington D.C., San Francisco and San Diego and then returned to Bulgaria. When planning a second visit to the United Sates in 1980, Dr. Lozanov and Dr. Gateva were stopped at the Bulgarian airport as the Bulgarian government did not want their work to be distributed outside Bulgaria. He was confined under house arrest from 1980–1989 (Lozanov, 2009). Bobbi DePorter heard about Suggestology and contacted Lozanov. He travelled to the United States where he spent three weeks teaching a small group of people, along with Bobbi DePorter in her California home, on how to implement Suggestology before returning to Europe and settling in Austria (Atkisson, 1991, para 2, DePorter, 1979). Suggestology articulates many aspects of what is now considered good teaching practice, in particular, the engagement of students' senses and sensitivities through the Arts; and the use of positive psychology. These key aspects that Bobbi DePorter learned during Lozanov's three-week training session where successfully implemented into the teaching at her business college and later at SuperCamps. The foundation of Quantum Learning which was based on the work of Lozanov evolved over the years and became known as Quantum Learning (DePorter, 1979)

Howard Gardner – Multiple Intelligences. In his book, *Multiple Intelligences: New Horizons*, psychologist Howard Gardner (2006), argues that humans learn through a range of 'intelligences', and individuals will have preferences for different intelligences as ways to express their learning. These intelligences include: kinesthetic, musical, environmental, interpersonal, intrapersonal, logical and linguistic. He later added existential intelligence to the list. QL draws on Multiple Intelligences by exploiting using multi-pronged approaches to learning and acknowledging the sensory experiences of learning. He later stated, "I termed the resulting categories "intelligences" rather than talents. In so doing I challenged those psychologists who believed that they owned the work "intelligences" and had a monopoly on its definition and measurement. If I had written about human talents, rather than intelligences, I probably would not have been

asked to contribute to this volume [Scientist Making a Difference]" (Gardner, p.169). "The theory is not experimental in the traditional sense . . . but it is strictly empirical, drawing on hundreds of findings from half-a-dozen fields of science. At the same time, I readily admit that the theory is no longer current, (Gardner, p. 169).

Eric Jensen – Brain-Based Learning. Eric Jenson is a former teacher and has a PHD in Human Development. He has developed the theory of Brain Based Learning, with a focus on the brain's capacity to retain memory, recall thoughts stored as memory, and its processes for learning. Jensen learning (2008) discussed the necessity for students to understand the relevance of the material; in order to care about their learning. He also stressed the need for teachers to understand how the brain learns and what methods will assist engagement, and the learning process. His work informs an integral part of Quantum Learning (Jones, 2016).

Richard Bandler and John Grinder – Neurolinguistic Programming. Richard Bandler, a mathematician and John Grinder, a linguist, co-founded Neuro Linguistic Programming (NLP) in the early 1970. They studied successful people and what made them successful. Bandler was interested in their internal dialogue. He also studied the effects of concentration camps on war veterans and found that some never recovered, while others were able to resume their lives and become successful. What he found made the difference between staying stuck in the experiences or moving forward, were the internal conversations and visions that each individual had. Those who were successful had the ability to clearly visualise their future (NLPLife, 2018). The internal messages that we give ourselves and the perseverance that a person develops makes the difference between living a successful life and being stuck in the past (Patterson, 2013). In an educational context, we acknowledge that everyone comes with their own internal beliefs, developed throughout their lifetime, as well as their customs and practices (Freire, 2005). Therefore, each student forms their own view of what is being taught and relates it back to their prior experiences (schema). Thus, each student's perspective is subjective. However, NLP purports that internal beliefs can be changed by understanding and developing new insights

and new internal dialogue (Bay Area NLP and Hypnosis, 2015). Their theory was an important aspect of Quantum Learning as students were taught to believe in themselves and this was encouraged through positivity affirmations and life skills (Jones, 2016).

What Drives Quantum Learning?

The core components that drive Quantum Learning are: foundation, atmosphere, environment, design and delivery (The Quantum Learning Network, 2011). Each of these core components are discussed in the methodology chapter. In addition, there are five tenets which provide an overview of the embedded beliefs of this model.

1. ***Experience before labelling.*** "Our brains thrive on complex stimulation. It drives the need to know. Therefore, learning happens best when students experience the information before they acquire the labels for what they learn" (DePorter et al, 1999, p.7). The essential idea here is that learning must be lived to have impact, but that the learning changes over time and concepts are changeable (Kolb, 1984). The concept of experiential learning is consistent with the need for practical skill development in nursing education, (Grace, Stockhausen, Patton & Innes, 2019). It is also an aspect of embodied learning (Skulmowski & Rey, 2018).

2. ***Everything is on purpose.*** "Everything that happens under your orchestration has an intended purpose . . . everything" (DePorter et al, 1999, p.7). Although Quantum Learning purports to be student-centered, it actually places the control of the classroom firmly in the hands of the teacher. This tenet presumes a classroom where the teacher maintains focus on specified learning. It is unclear whether the teacher may choose to alter their purpose in the course of a class in order to follow student curiosity.

3. ***Acknowledge every effort.*** In a classroom, students take risks when they join in discussions or try to answer questions. It is important to acknowledge their inputs and their attempts in a positive manner (DePorter et al, 1999). This tenet recognises risk and vulnerability and presents these as valuable assets for a student.

4. ***If it is worth learning, it is worth celebrating.*** "Celebration is the breakfast of champion learners. Celebrations provide feedback regarding progress and increase positive emotional associations with the learning" (DePorter et al, 1999, p.8). Celebrations can take

many forms. They are usually quick; nonetheless the designers of the QL program hold such celebrations in high regard in the facilitation of

learning. In this research the following forms of celebration were used: clapping for a correct answer; everyone snapping their fingers at someone's attempt; whooshes (three claps and then pushing good energy towards a person); pretending to hold up glasses in order to toast a student ; Hi5-ing a neighbouring student; or a class surprise such as handing out treats (DePorter et al, 1999). Celebrations amongst the research group also included a culture lunch day, where students brought dishes from their country of origin to celebrate the end of a unit.

The Quantum Learning Model is the combination of teaching methods, learning methods, and life skills education. It depends upon the teacher's orchestration of these elements and methods, and, most importantly, the purposeful way in which the methods a

re used. Not only do teachers need to know why they are using a specific strategy or a combination of methods, but the students also need to understand the WHY of their activities and interactions. This assists in their willingness to engage and participate and provides them with the metacognitive framework they need in order to become reflective learners. The Quantum Learning Network (2011), states: "When we apply the why to artfully orchestrate learning and life skills, and effective teaching methods, there is a shift in us as teachers that creates a shift in student learning" (p. 1.06).

Big Brain Ideas complete the principles that underpin Quantum Learning. The three Big Brain Ideas are:

- There is no ***comprehension*** without ***picturing***. An example of this statement is reading. A person can be reading a book (mechanically), but the mind can wander off; one needs to pay attention to what they are reading in order to comprehend the story. The practice of paying attention is termed picturing (Rauch, 2013).
- Students make ***meaning*** by connecting to existing ***schema***. In other words, previous knowledge informs new learning.
- Neurons that ***fire*** together, ***wire*** together. This is a highly simplified way of

expressing the physiological action of 'learning' when the brain develops new synapses. Schuldiner and Yaron (2015), have examined the growth of synapses and the development, and pruning, of dendrites in synaptic networks. QL uses the idea of neuroplasticity as a building block for success, asserting that individuals can continue to learn and through adequate and appropriate stimulation will form new synaptic pathways (The Quantum Learning Network, 2011, p. 1.08; Rauch, 2013).

Quantum Teachers

Quantum teachers follow specific directives in every teaching situation that is based on the following concept: "Theirs to Ours, Ours to Theirs," which means that "in order to earn the right to teach, relationships must be formed with the students, who are the ones who give you the right to teach them, despite the degrees one has (DePorter et al, 1999, P. 6). The Prime directives as listed in a parent's guide are:

- **Build Character:** Character promotes academic and personal excellence
- **Send Intentional Messages:** Everything speaks. Everything we say and do sends a message that is either positive or negative—there is no neutral.
- **Know Their World:** Becoming familiar with their world is an authentic and effective way to build rapport with students, leading them to be receptive to new learning.
- **Acknowledge Effort:** Student effort and perseverance demonstrate commitment to learning and are worthy of recognition.
- **Be Purposeful:** Being deliberate in everything we say and do leads to achieving desired outcomes.
- **Create an Experience:** Providing a content-related experience prior to the introduction of new material creates a common platform for connections to new content.
- **Cultivate Thinking:** Engaging students in high levels of thinking empowers them to make meaning and apply their existing knowledge to new situations
- **Celebrate Learning:** Celebrating growth and accomplishment connects learning

with positivity (QL SuperCamp. n.d., p. 2)

The stated aim of the Quantum Learning Network is to change, "the lives of 50 million children" (Big Bend Radio, 2013). To that end, the organisation has conducted super camps, aimed at improving student confidence and accelerating learning, across all fifty states in the United States of America and implemented Quantum Learning in over eighty countries. Over ten million students have experienced a Quantum Learning Super Camp (Quantum Learning, 2017).

The concept of student buy-in is another important factor utilised by Quantum Learning. This aspect was discussed in a previous paragraph on Eric Jensen, who is one of the underlying theorists of the Quantum Learning Model. Cavanagh et al (2016), conducted research on the effects of buy-in, in relation to active learning in an undergraduate science course. The data indicated some student resistance, but buy-in was "associated with each of the student's outcomes of interest" (p. 7).

Quantum Learning Statistics

Supercamps were formed before the Quantum Learning Model was introduced into schools. Students from eleven years of age to twenty years of age attend these camps, which are designed for specific age groups. The aim of a supercamp was to build student confidence and develop positivity. Students are taught learning skills and life skills with the expectation of developing lifelong learners. In a brochure regarding SuperCamp, the Quantum Learning Network (n.d.) quoted four supercamp graduates' experiences. One of the students stated:

> At SuperCamp I learned to never underestimate myself. I used to be overly modest and passive by always dismissing the true qualities I have within myself. I learned to trust my own choices and be confident enough to pursue my goals. I also learned to understand others' backgrounds and to try to accept why they may not agree with my ideas – Anna Chen, SuperCamp graduate (back page).

Although this was advertising material, certain insights can be drawn from the choice of this quote in order to advertise the program. It was targeting students with little confidence and little personal and social agency. The program was focused on

developing trust and a strong sense of identity and purpose, while encouraging the capacity to hold two or more ideas simultaneously, even if they may conflict.

DePorter and Hernacki (1992) related the story of two students who achieved dramatic scholastic success at school, as a result of attending one of the Super Camps. The first instance was a young woman who increased her grade point average (GPA) from a 1.8 to the top score of 4.0. In the second instance, a young man was able to increase his SAT scores by "a combined 390 points" (p. 6). However, it is not just the academic average that is important; it is the student's ability to achieve their best, to be internally motivated, to gain a love of learning and to become life-long learner (pp. 6-8).

The following statistics are taken from a conference paper, presented at an Advancing Improvement in Education conference. The presenter was Christine Rauch (2011), she related the following statistics:

- 97% of students feel these programs have helped them to learn better
- Over 50,000 teachers have been trained in Quantum Learning techniques, impacting over 8.5 million students

Rauch's conference paper (2011), also contained feedback from several school districts on the benefits and improvements they found when Quantum Learning was practiced in these school districts. The two comments found below are feedback that was received after The Quantum Learning Model had been implemented in these two schools. They express the value that was experienced when the Quantum Learning Model was implemented in their schools:

- "In my 23-year career as both a teacher and administrator, Quantum Learning is the most effective professional development program I've ever seen. My teachers are excited about the results they're seeing in student achievement, and I mean school-wide - not just in a few classrooms. We're experiencing growth beyond all expectations." – Ken Jones Principal, Parkside Elementary School, Powell, WY
- "This is the most effective method I've ever seen – sound science, respectful of students as learners and people, and solid behavioral principles. The techniques were embedded in the learning so that we experienced what was being taught. This is

energizing and renewing work." – Renee' De Lupp, Intervention Counselor, Union Co. Public Schools, Knoxville, TN (Rauch, 2011, p. 6).

The studies referred to above could be viewed as biased as they were conducted on behalf of the Quantum Learning Network. However, some independent studies have also been undertaken.

Singer-Nourie (1998), conducted a Field-Masters research study that incorporated Quantum Learning in a high school setting in Illinois. Six hundred students and about sixty teachers were engaged in the study. The following two sets of data were taken directly from the research article:

1. After using Quantum Learning teachers reported:
    - 100% reported being better teachers
    - 94% report more awareness of students' learning styles and needs
    - 94% have added methods to their teaching repertoire
    - 88% take more risks in teaching
    - 86% report making more meaningful connections with students
    - 83% report raised personal teaching standards
    - 67% of students believe their grades really do show how smart they are (15% increase)
    - 64 % opened their acceptance to new ideas

The second set of data is found on the following page.uantum

2. After using Quantum Learning students reported:

	Before QLN	After QLN
Higher esteem as a learner	68%.	89%
Consider themselves academic perfomers	46%	82%
Knowledge of how to interest self in class quickly	41%	64%
Ability to memorize & retain unrelated facts	31%.	63%
Give 100% in class	55%	73%
Like their teachers	44%	79%

(Singer- Nourie, 1998, 3).

The research conducted by Singer-Nourie (1998), showed students' perceptions of success increased in both test conditions and personal beliefs.

While it can be difficult to see through the marketing to the genuine impact of QL as a program, the independent work of scholars such as Singer-Nourie seemed to largely support the results claimed by those who conducted research on behalf of the QLN. The latter studies could be viewed as biased as they were conducted on behalf of QLN.

McCabe (2016) was another independent researcher who, conducted a megastudy of Quantum Learning. She reviewed twenty studies from 1991 to 201The authors included in her study and their findings are briefly described in the following table.

Table 4. Results of McCable (2016) megastudy

Name of Author	Year	Findings
Jeanette Vos- Groenendal PhD	1991	Motivation 68% Improved graded 73% Developed confidence 81% Increased self-esteem 84%
Peter Anderson	1994 - 1996	Increased GPA's 18 students – 17 A's
Jean Kerr	1997	Changed attitudes, shifted behaviours – 63% GPA 2.0 or greater
Sara Singer-Nourie	1998	Attendance – 68% increase Better behavior – 66% Following rules – 60% Enjoying learning – 68%
Heather Nolan & Elizabeth Farrall	1998	Strong ratings in areas of environment, independent thinking & creativity
Howard Stone	2000	At risk children – 98% achieved average to above average skills
Bonnie Drolet	2001	Test taking skills increased 35% Memorisation skills increased significantly
Barbara Given PhD	2002	Found the Quantum Learning Networkeducationally significant
Lisa Barlas, Ann Campbell, Heidi Weeks	2002	Brain-based strategies worked 17% of students with learning disabilities met math ISAT standards
William Benn	2003	Positive achievement in 18 schools over 4 states
Lucretia D. Peebles, Karen DeSchryver	2003	Student presentations – 68% 10/10
Kelli Myers, Pam Pedigo, Ellie Terrell	2005	Top scoring grade three in school district Reading grew 7.4 levels Math scores – 100% performed at masters level
Jannabeth Bogard	2007	80% 1st group passed test Students trained in QL outperformed those who were not trained in QL
Matt Christopher	2007	Increase in student grades in A/B range & there were few students with lower scores
Lauren Hinton, Glenn Simpson, Denicia Smith	2008	Students abilities to care out tasks and behaviours improved
Tonja Y. Trice	2011	T-test showed increased test scores

Randy Zimmerman	2011	Test scores in reading & writing increased 82% reduction in disciplinary actions
Kelly Myers	2012	Out of 500 students 3 of 4 elected officials cam form the same small 4th/5th grade QL classroom 4 years after QL – retention of QL leadership concepts
QL Research	2012	Super camp – 90% positive Confidence increased – 84% Motivation increased – 74% Family relationships – 79% Relationships up -87%
Corrine Jones	2011-2014	Final results of this thesis to be seen

In each instance, Quantum Learning showed increases in student achievement across a variety of independent research studies. There were no research studies found that had negative feedback; in regard to the implementation of Quantum Learning. This may be a reflection of the biased nature of the studies drawn on for this megastudy, despite the megastudy itself being independently undertaken. TThis study outlined in this thesis adds to the previous research by providing a voice that is not unduly influenced by the educational marketplace. It strove to understand what transpired in a Diploma of Nursing classroom when Quantum Learning and Campbellteaching models were implemented.

The Campbellteaching Model

As a nurse educator, I wanted to test the idea that the combination of Quantum Learning and Campbellteaching could form an enhanced learning process. While Quantum Learning focused on life skills education, personal preferences in learning, various methods to assist the learning and metacognition; Campbellteaching focused on the clarity of understanding the theory of Anatomy and Physiology through diagrams, models and explicit discussion. In this way it is aligned to the principle of comprehension requiring picturing and motor memory.

Dr. John Campbell is a registered nurse who taught nursing at Carlisle University in England (Campbell, 2009). During Dr. Campbell's years of teaching, he realized that students needed the lower order concepts delivered first and that these ideas needed to

build upon their existing knowledge. He developed simplified pictures of complex body organs and taught small portions of the content one at a time in order to increase understanding. In addition, when discussing the diagrams, he provided explicit ongoing dialogue (Personal conversation, 2011; Dr. John Campbell, 2016).

In response to student requests, Campbell published his classroom notes into two books. The first book contains the notes and diagrams for Anatomy and Physiology and the second book contains notes for pathophysiology. As a further means of disseminating his work, Campbell developed a webpage where his teaching videos had a platform to assist multiple students across various medical and health-related fields. Dr. Campbell states that, "Only about 1% of the feedback on the videos was negative" (Skype conversation, February 2011). John Campbell and three colleagues conducted a research evaluation on the two books mentioned above. Although, the study may have included bias, since Dr. Campbell was the author of the books. I have included the overall results as it was relevant to this research study. In their research, student nurses from England, Cambodia and Kenya completed the evaluations. The study concluded that both of John Campbell's books, "aided in the professional and clinical development of students, equipping them to provide improved patient care" (Campbell, Campbell, Longrigg & Boyes, 2015, p. 13).

Amongst the earliest diagrams for human anatomy are those contained in the Edwin Smith surgical papyrus from Ancient Egypt, dating back to seventeenth century BCE (Este 2014). Galen also used diagrams to explain human anatomy in the second century, although the drawings he used were of pigs and apes (Estes, 2014). However, Da Vinci, "was the first person to produce an accurate depiction of the human spine, and also made significant progress in our understanding of how the heart works" (Estes, para 4). Others who studied the human body during the 15th century drew poor representations of the "Astrological Man" and felt that the human body was controlled by astrological signs (Estes, para, 5).

Leonardo Da Vinci is perhaps the most famous of Renaissance artists focusing on anatomical drawings. In April of 1489, he started his inquiry into human anatomy when he began working for Ludovico in Milan (Sooke, 2014). In the following years, he dissected

over thirty corpses during his study of human anatomy (Sooke, 2014). Over two decades he drew over 750 sketches of the human body (Este, 2014). Leonardo Da Vinci's notebooks are called Anatomical Manuscript A and Anatomical Manuscript B and they form part of the Royal Collection in the United Kingdom. As well as sketches, they also contained over 13,000 words of notes (Sooke, 2014). These included an accurate depiction of the human spine; the earliest known description of cirrhosis of the liver; and the workings of the heart (Sooke, 2014). Da Vinci was set apart as an anatomist by his ability to draw (Sooke, 2014). The importance of anatomical representations has been known for centuries. It is just as important today in the teaching of nursing students.

Chen (2004) claims that "significant research has found that learning is improved by well-communicated images" (p.1). Three studies that provide evidence of this are discussed below. First, Leavitt (2017) discussed how art has been implemented, "Into medical training in order to produce more reflective, empathic, observant physicians" (p. 2). Second, Quillin and Thomas (2015) stated that, "Visual representations are a powerful tool, because they help to make the unseen seen and the complex simple" (p. 1). Third, a study conducted by Mathai and Ramadas (2006), found that a high number of students perform well with diagrams and verbal conversation. However, "for the majority of students, pedagogical practices must emphasise dual coding of content by explicitly linking text with drawings and structure with function" (Mathai and Ramadas, 2006, p. 172). The work of Chen, Mathai and Ramadas aligns with the findings of Campbellteaching, as they also found that student outcomes were increased when diagrams were explained and linked by the teacher. Mathai and Ramadas (2006), stated, "It is the teacher in the classroom environment open to receiving and asking questions, who should play an important role in facilitating picture-text and structure linkages" (p. 172). Quantum Learning also purported that students needed to visualise the content, in order to have better comprehension and that it is the teacher who orchestrates the learning (The Quantum Learning Network, 2011).

This research identifies two important factors that were implemented by Dr. Campbell. First, that the diagrams must be accompanied by explicit discussion, to enable

understanding of the structures and functions. Secondly, that the teacher is the one who points out the linkages and associations in and/or between structures. These two factors are an integral part of the Campbellteaching model.

Resistance to Change in Nursing

'People don't resist change. They resist being changed?'
Peter Senge [Van Vliet, 2010]

Ellis (2013) studied nurse education and concluded that nurse education provided guidance, encouraged reflection and critical thinking, but did not embrace student-centered learning. Young and Paterson (2007) have strongly advocated for student-centered learning, but found that there were many educators who held onto traditional teaching methods. Then there were those who had successfully implemented student-centered teaching, but did not share their methods. Lastly, they noted another group of educators who had taught student-centered learning, but met with resistance and poor managerial support. Pardue et al, (2005) discussed the need for a paradigm shift in nursing education; however, found that nursing educators tended to teach the way that they were taught. They stated that, "Faculty resistance is the primary reason for lack of innovation, and it is viewed as the major obstacle to change" (p. 56). In order to address the issue, they developed a new definition of innovation, as seen below;

> . . . innovation is using knowledge to create ways and services that are new (or perceived as new) in order to transform systems. It requires deconstructing (i.e., challenging) long-held assumptions and values. The outcome of innovation in nursing education is excellence in nursing practice and the development of a culture that supports risk-taking, creativity, and excellence (Pardue et al, 2005, p. 55).

In addition, Pardue, et al (2005) suggested the formation of a cooperative model of nursing education rather than the current competitive model.

A move to innovation in nursing education would be recognised when the following conditions are evident:

Flexible curriculum; however, it is important to understand that ANMAC is the body that oversees accreditation of nursing education curriculum, which is accredited or a 5-year period. Flexibility is limited to the approved curriculum.

- Responsive to student needs,
- Collaborative
- Context relevant,
- Evidence based . . .
- When one school can be distinguished from another based on the truly innovative and unique elements found in each (Pardue et al, p. 57).

John Kotter (1995) developed an 8-step change model (see Appendix B). He related that in order to get people to look at the need for change, an emotional context needed to accompany the discussion as people are more accepting of change when there is an emotional attachment (Kotter, 1995).

Chapter Summary

The call for change in nursing education has been consistent for many years. This literature review discussed the history of nursing in Australia and the struggle to close the evidenced theory-practice gap. An attempt to resolve the theory-practice conundrum leads back to the classroom, where students are taught their craft.

Understanding how the brain codes information into short term memory and long-term memory is another important factor that effects student outcomes. Surface learning and deep learning are related to short term and long-term memory, as short-term memory is where ideas and facts are stored, and it is only when implementation and transference occurs that deep learning and long-term memory occur. When teachers and students understand the process, methods can be implemented to assist learning.

Teachers attitudes, their ability to show caring and develop relationships with the students was important for successful outcomes as evidenced in the literature. These aspects were especially important for disadvantaged students, who often came with poor self-esteem. Learning styles education had been utilised in many schools and institutions to

assist students.

An overview of the literature had not proven the validity of Learning styles. In addition, studies have suggested that learning styles are not set and can change over time or were task dependent. Studies that implemented various learning methods, suggested that multimodalities could improve student outcomes.

The Quantum Learning Model is a holistic student-centered model that strives for excellence of teachers and students. Their research indicated that this model has the potential to improve individual outcomes. Research has demonstrated that art in education science classes has been beneficial and supported the implementation of Campbellteaching in this research study. The integration of Quantum Learning and Campbellteaching has the potential to provide the much-needed paradigm shift in nursing education.

Chapter Three

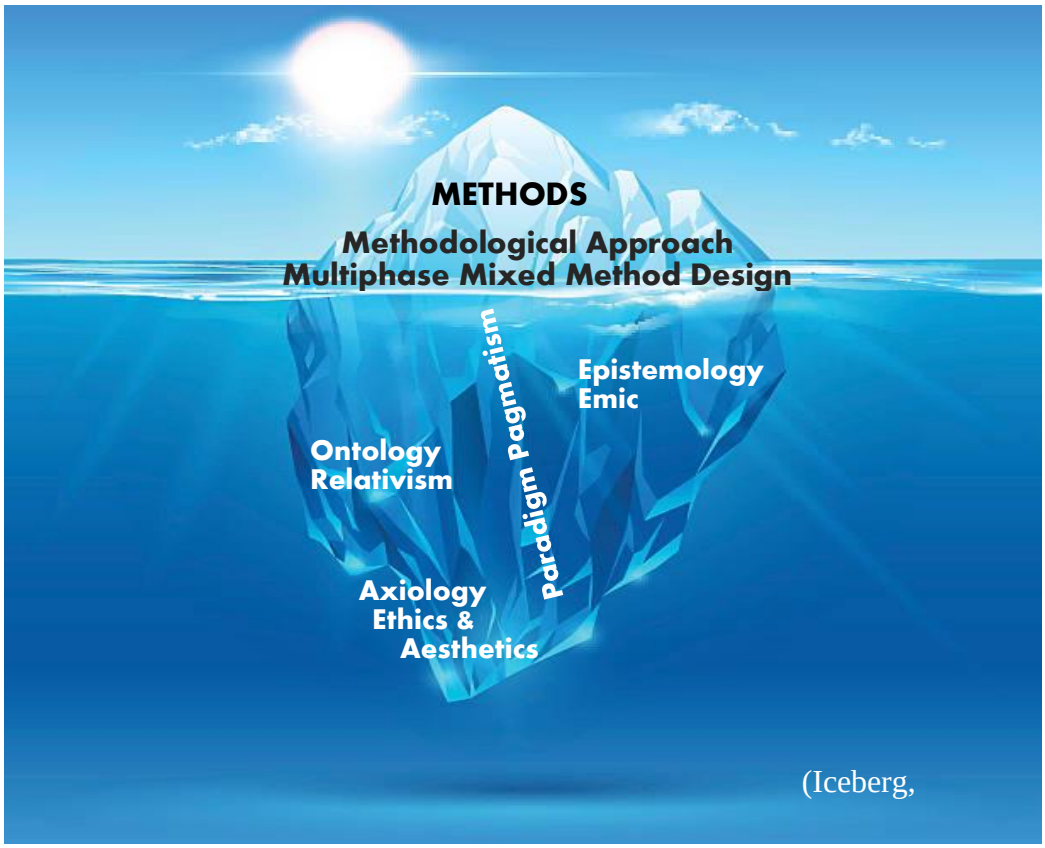
Methodology – The Guiding Philosophy

'Knowledge is fundamental to all human achievements and progress. It is both the key and the quest that advances mankind. The search for knowledge is what brought men to the moon; but it took knowledge already acquired to make it possible to get there.'
Neil Armstrong (Letters of Note, 2011).

Comprehension of the manifestations of disease processes is built upon the knowledge of how the human body is structured and functions in its optimal state. It is the responsibility of nurse educators to impart the theoretical knowledge in a way that students can understand. The belief systems of teachers and students have the potential to affect the learner's outcomes either positively or negatively (Northcote, 2009). Therefore, an understanding of the nuanced relationship between teachers, students from diverse cohorts and demographics, and course content were important factors in designing the methodologies for this research study.

Methodologies refer to the research paradigm/worldview, design, epistemology, ontology and axiology that provide structure for research. The 'ologies' are present in all research and must be carefully considered. They are interrelated and interwoven into the fabric of a study (WalesDTP, 2015). David James likened the 'ologies' to an iceberg where much of a research design lies hidden beneath the surface, but can be seen upon greater scrutiny (WalesDTP, 2015). Slife and Williams (1995) also, believed that philosophical assumptions are often hidden and not voiced, but they are important as they affect the research. On the following page is a similar picture of an iceberg as visualized by David James, which depicts the type of methodologies utilised in this research study.

Figure 1 Visual representation of



This chapter will discuss the paradigm/worldview, design, epistemology, ontology and axiology of th study and how they relate to each other. Creswell (2008) states that, "Research design, which I refer to as the *plan or proposal to conduct research*, involves the intersection of philosophy, methods of inquiry, and specific methods" (p.5). He discussed the three components of a design. These are the researcher's philosophical assumptions, also known as worldviews; the methods of inquiry the researcher has chosen and the research methods they employed. There are four paradigms/worldviews – postpositive, social construction, advocacy/participatory and pragmatic. The design or types of inquiry are quantitative, qualitative and mixed methods research. Lastly, the various research methods include the questions, data collection, data analysis, interpretation, write-up and validation (Creswell, 2008). The research paradigm/worldview, research design, epistemology, ontology and axiology utilised in this study are discussed below. Research methods will be covered in chapter four. The following section discusses the paradigm/worldview of pragmatism and how it relates to Paulo Freire.

Pragmatism and Paulo Freire

The word pragmatism is "derived from the Greek work pragma, which means work, practice, action or activity" (Jabeen, 2015, p. 2). Pragmatism is not a new paradigm. It was utilised by the likes of Socrates and Aristotle and was "first introduced into philosophy by Mr. Charles Peirce in 1878," but was not utilised for "twenty years" (James, 2010, p.18). Charles Sanders Pierce, William James and John Dewey led the pragmatic movement in the 1800s (Flair, 2017).

Pragmatism views research as a human experience, which is based on the beliefs and actions of the researcher (Morgan, 2014; Morgan, 2014a). An underlying philosophy of pragmatism is the belief that the research questions are more important than a specific method. It is of greater importance to implement what will work for the particular research. Researchers, who choose this philosophy acknowledge the value of both quantitative and qualitative data (Taylor et al, 2011). Another aspect of pragmatism is that it allows for "action and change and the interplay between knowledge and action" and is "appropriate as a basis for research approaches intervening into the world and not merely observing the world" (Goldkuhl, 2012, 12; Jones, 2016). The pragmatic worldview of this research is based on the framework of Paulo Freire.

Freire lived with poverty and hunger during the 1930s and related to those in the same situation. His parents taught him tolerance and love. There were little funds to send Paulo to school, but in one instance he was accepted because Aluizio Pessoa de Araujo, "Was committed to teaching for the sake of helping people, and this proved to be a lasting influence on Freire" (Diaz, 2020, para 6). Freire, asserted that people were programmed to live a life of conformity, due to their station in life (Macedo, 2000). His work centered around rising people up out of poverty and illiteracy through education and democracy.

As discussed in the introduction, Freire fought for the oppressed and their journey to freedom and humanisation. He likened oppression to autocratic educational practices, where teachers talked, and students listened. Students were considered empty vessels who knew nothing (Freire, 2000). Freire discussed the banking of education by many teachers, who mean well, but fail to see that they are dehumanizing people. Freire felt those

individuals would eventually see what is happening in the classroom and, "Then engage themselves in the struggle for their liberation" (Freire, 2005, p. 75). Freire's worldview was influenced by many philosophers, including Dewey (Diaz, 2020).

Dewey and Freire held similar beliefs about education. Deans (1999) stated that they built, "Their philosophies around core concepts of experience, growth, inquiry, communication, mediation, problem posing/solving, consciousness-raising, ethical social action and transformation" (Deans, p.19). Freire and Dewey believed in the importance of student experience and dialogue in the classroom. Deans (1999) stated that, "Like Dewey, Freire discussed how individuals learn through the active, collaborative tackling of complex and experiential problems, and how individuals and schools should function in society to promote a more participatory, curious and critically aware citizenry" (p. 20). Dewey and Freire had differences, but one of the most noteworthy, in the context of this research is that Freire took into consideration cultural aspects, class distinctions and race (Deans, 1999). Freire believed that when individuals reflect critically on their past they, "Begin to understand their own pasts, reaching back to discover how present realities and future possibilities link with past action" (Ronald & Roskelly, 2001, p. 613). Macedo (2020) after reading the Pedagogy of the Oppressed stated that it gave him the ability to understand, "The tensions, contradictions, fears, doubts, hopes, and "deferred" dreams that are part and parcel of living a borrowed and colonized cultural existence" (p. 11). Macedo grew up in a colonized culture in his birth country and states that when he moved to the United States, he found life very "painful" as he was, "Constantly juggling the power of asymmetry of the two worlds, two cultures, and two languages" (Macedo, 2000, p. 11). When teaching classes that are intergenerational, multicultural and at various levels of knowledge it is imperative to take these aspects into consideration and build a safe, supportive and belonging culture so that all students feel that they can participate. This is difficult to establish without a democratic setting that dignifies and respects all students, regardless of their backgrounds as advocated by Freire (Deans, 1999, Freire, 1970).

Freirean Pragmatism and the Research

In utilising a Freirean framework, I sought to see the potential of each student, provide life skills discussions and increase the students'self-belief in their ability to

succeed. In addition, I instituted a democratic classroom where I hoped a respectful, safe, supportive and belonging classroom culture would ensue. These are also underlying core values of Quantum Education, which are addressed with the 8 *Keys of Excellence*, *Home Advantage, Live above* the *line* and Big *Me Big You* methods. Moreover, the values associated with Freirean pragmatism align with my beliefs as a researcher. When considering other worldviews, I found that – they did not provide the flexibility required to meet the aims of this research study.

The pragmatic paradigm allowed me to use multiple methods that worked together; in order to answer complex questions that could not be answered within on design (Clarke & Visser, 2018). Johnson and Onwuegbuzie (2004) purport that pragmatism helps to provide insights into the use of mixed method research. They state that, "The bottom line is that research approaches should be mixed in ways that offer the best opportunities for answering important research questions" (p. 16). The use of pragmatism and mixed methods, also allowed for the use of both concurrent and sequential data streams, and triangulation, which had the ability to increase validity and credibility (Creswell, 2009).

Emic Epistemology

Epistemology comes from the Greek word episteme, which means knowledge. In research, epistemology seeks to understand how we know something: "It is concerned with the very bases of knowledge – its nature, and forms and how it can be acquired, and how it can be communicated to other human beings. It focuses on the nature of human knowledge and comprehension" of both the researcher and the participant (Kivunja & Kuyini, 2017, p. 27).

The early epistemologic beliefs of pragmatism were based on four ideas as described by (Flair, 2017; Sharma & Sharma, 2016):

- Knowledge based on experience is true. All that can be known is dependent upon experience.
- Phenomenon are constantly changing to knowledge about truth must change accordingly.
- They emphasize on functional knowledge and understanding.

- No spiritual or ultimate value (slide 8; p. 144).

Kaushik and Walsh (2019) stated that the epistemology underlying pragmatism, "Is that knowledge is always based on experience. One's perception of the world is influenced by our social experiences. Each person's knowledge is socially shared as it is created from socially shared experiences" (p. 17). The research students brought their own understanding of learning and culture into the classroom. Although, learning is unique to each person, learning is enhanced when shared and discussed. The knowledge derived from learning is then implemented in a social construct that assists the individual and others (Kaushik & Walsh, 2019). There are two approaches in epistemology – Etic and Emic. These terms were coined by Kenneth Pike in 1954 and have been used in literature since that time (Headland, Pike & Harris, 1990).

Etic epistemology is an approach where the researcher observes, but is not involved with the individuals who participate in a study. Emic epistemology is the opposite of etic. The researcher is actively involved with the participants in a study; in order to gain deeper insight into the individuals' perspectives (Headland, Pike & Harris, 1990). In 1979, psychologists found a great need for "an emic approach" (Headland, Pike & Harris, 1990, p. 6).

This study is based on emic epistemology. I was both the teacher and the researcher. I began the students learning journey by building upon the knowledge or schema that they already possessed. The theory of leaning was discussed and we debated the following questions: What did it mean to learn something? How does the brain learn, retain and recall information and what were their learning preferences? When the students developed their self-awareness of how they learn, they were introduced to accelerated learning techniques that had the potential to enhance their learning experience. Emic epistemology allowed for greater understanding through my participation and observations and allowed student voice during this process.

Ontology of relativism

Scotland (2012) defined ontology as assumptions that are, "Concerned with what constitutes reality, in other words *what is"* (p. 9). Kuyinin and Kivunja (2017) stated

that, “It is the philosophical study of the nature of existence or reality, of being or becoming, as well as the basic categories of things that exist and their relations” (p. 27). Levers (2013) states that, “The purpose of science from a relativist ontology is to understand the subjective experience of reality and multiple truths” (p.2). Ontology in research, also causes researchers to look at their, “underlying belief system . . . . about the nature of being and existence (p. 27). Relativity and subjectivity are intertwined and in relation to ontology, experience is individual and no one's reality is exactly the same an another’s reality because their worlds are seen through beliefs and life experiences (Levers, 2013).

The ontology of relativism underlying the research was the reality of a theory-practice gap in nursing, where students experience difficulty integrating classroom theory into the clinical setting. In addition, each student brought their own worldviews to the classroom. They saw education and culture from their personal perspectives. Emic epistemology subjectivity blends with the varying ontological views of the researcher and the research students. The multiphase mixed method research design ties into the underlying philosophies by allowing for multiple methods of data collection that capture the complexities of the human experience.

Axiology

Axiology is divided into two categories – values and aesthetics. Values are important in research as they influence the both the researchers and the student’s attitudes, beliefs and engagement. They play a crucial in the way research is conducted and the assumptions and inferences that are formed (Brittle & Schafft, 2015).

Brittle and Schafft (2015) discussed the importance of axiology as an underlying philosophy in mixed methods research, but noted that it is often not addressed. “Hence, the emphasis on an interpretation of pragmatist philosophy as ‘‘what works’’ in pursuit of an inquiry often tends to overshadow the questions of ‘‘what works for whom?’’ and ‘‘to what end?’’ (Brittle & Schafft, 2015, p. 323). These authors go on to say that, “Although theoretically the recursive procedure of experience and reflection implied by pragmatic

axiology is meant to both result from and encourage increased democratic dialogue, the actual procedure for engaging in such practice remains unclear within the context of contemporary mixed methods research**" (**Brittle & Schafft, 2015, p. 330). In the context of this research, pragmatic axiology both resulted and encouraged student engagement by the establishment of a democratic classroom, using a plethora of teaching methods garnered from Quantum Learning and the ongoing explicit dialogue utilised by Campbellteaching. Hill (1984) also discussed the difficulty of addressing axiology in the social context. He stated that the, "Identification of the highest axiological principles is not easy, but this does not mean that this task can be responsibly avoided" and " there are various axiological schools of thought" (p. 69). Everyone has underlying values and suppositions, both the researcher/s and the participants. In an attempt to address the difficulty of the varying personal values and belief systems of a multicultural classroom with contrasting socioeconomic circumstances several QL and CT methods were employed. A democratic classroom was established, and a culture of support, safety and belonging were encouraged by incorporating *Home Court Advantage, Live Above the Line* and the *8 Keys of Excellence;* along with the use of explicit dialogue. It is my hope that my underlying philosophies, as listed below, can add transparency as to why I strove to maintain a democratic classroom with ongoing dialogue throughout the study. Chapter four, the second part of the methodology will add increased clarity to this process.

Personal worldviews that influenced the underlying philosophies

Due to the varying backgrounds, cultures, socioeconomic situations and educational experiences the axiology will be different for each student. Everyone sees the world through

their own personal veil that was formed from birth, due to their upbringing – family values, religious beliefs and culture.

I came from a low socioeconomic background and was raised by a single parent. There were many negative experiences from childhood into adulthood that affected my values. Theism forms my internal perspectives and the manner in which I relate to others.

As an educator/facilitator of learning I believe that:

- It is imperative to discuss the differences in values with students on their first day of class. Adult students also need to be reminded that respect is important as each person's life experiences will be different. This helps create a safe, supportive and belonging classroom culture.
- Individuals who come from disadvantaged backgrounds often present with low self-esteem. They need a facilitator who believes in their ability to succeed, who is approachable, understanding, caring, kind and supportive.
- The bar needs to be set high, so they are not complacent and accepting of mediocracy.
- Students need to be taught what taking responsibility for their learning looks like, hence the incorporation of Living above the Line and Below the Line that is a core concept in Quantum Learning Education.
- No question is stupid because every student comes from a different place in their learning journey; therefore, laughing at another person's answer is not acceptable – instead they are to be appreciated for their effort and clarity provided if necessary.
- All efforts are worth acknowledging.
- Negativity should be discouraged, and positivity should be encouraged and modeled.
- When a facilitator of learning is supportive, students may open up to them and this allows the educator to gain insightful information about factors that could be interfering with learning.
- It is okay to look outside the box; in order to find new ways to create a fun, interactive learning environment.
- There should be ongoing dialogue in a classroom between the teacher and students, and between the students – students; in order to encourage ongoing engaged.
- Creativity in the classroom enhances learning and each student's creativity should be engaged and shared.

My personal values align with aspects of the Freirean pragmatic paradigm that I chose to utilise in this research study as discussed previously.

Ethics Approval/Axiology

This research study was approved by the universities high risk ethics committee. (see Appendix C). The most significant risk in this research design came from the power imbalance in the learning environment as I was both teacher and researcher. There was the potential for conflict developing because of this dual role. However the MRU Human Research Ethics Board (2012) states that, "With planning and consideration, an instructor may be able to use the students within their own class as study participants, provided the researcher addresses relevant ethical issues including avoiding both the reality and appearance of undue influence" (2012, p. 1). There were four ethical principles that needed to be addressed in this dual relationship:

- Consent shall be given voluntarily
- Consent shall be informed
- Conflict of Interest – this includes undue influence, power imbalance, coercion, any factor that could influence the students' rights
- Ethical duty of confidentiality (MRU Human Research Ethics Board, 2012, p. 2).

The ethical principles were addressed in the following ways. I did not participate in the student selection process. The students were introduced to the research by another teacher and they were given the opportunity to provide consent and participate in the research or to not take part in the research processes. Students who chose not to take part in the research were not disadvantaged in any way. They remained a part of the cohort and could choose whether or not to participate in the activities that were provided. Their grades and journals were not part of the data.

The paper-based journals and questionnaires were developed when the online system could not be utilized, due to lengthy processing issues. Confidentiality was provided for by the addition of a coding system, which gathered specific information. this is discussed in Chapter Four. Students entered their coding by following a specific formula that was created to gather various types of data. The code included the group, year, student gender,

age group and whether they were Australian, Australian with English as a separate language (EAL) or an international student who had EAL. The term EAL was later changed to English as an additional language (EAL). Here are two examples of what the code looked like: 1). Grp12012F31-40EALinternational, and; Grp22013M18-30Au.

Equity was maintained in the classroom, regardless of whether the students were participants in the research or not. They were allowed to participant in activities if they chose to for their own benefit, but they did not have to complete the journals or surveys. Students could withdraw from the research at any time without penalty or adverse effects. Students/Participants were also given the contact names of other staff, both in the course and beyond, to whom they could go for assistance. The ethics of axiology was utilised with a multiphase mixed-method design chosen for the research study.

Mixed Method Design

Mixed Methods research combines quantitative data that is instrument based, predetermined and statistically analysed that provides rigorous data without contact, in conjunction with, qualitative data that provides the human element with emerging themes and patterns (Creswell, 2013). The combination of quantitative and qualitative methods allows for triangulation, which can enhance validity; it is complementary as it, “Seeks elaboration, enhancement, illustration, clarification”; development is where one set of data informs the other; initiation where discrepancies can be recognized and questioned, and; expansion which, “seeks to extend the breadth and range of inquiry” (Greene, Caracelli & Graham, 1989 p. 259). The mixed method design also helps to capture the complexity of the classroom environment that otherwise could be overlooked (Johnson & Onwuegbuzie, 2004; McMillan & Schumacher, 2010; Morse & Niehaus, 2009). It is “methodological pluralism or eclecticism, which frequently results in superior research” (Johnson & Onwuegbuzie, 2004, p. 14). Convergent parallel and exploratory sequential are the two main types of mixed method design. Three advanced types of mixed methods research designs are embedded, transformative and multiphase (Creswell, 2013; Creswell & Plano Clark, 2011). A

multiphase design is a study that combines, “Both concurrent and sequential elements within one mixed method program” (Creswell & Plano Clark, 2011, p. 66). This research study is a sequential and concurrent data collection. It was conducted over a two-year period where the data was collected from a variety of sources at different times over the two years. Triangulation of the quantitative and qualitative data, interval plots and emerging themes were used to analyse the various data sources. Therefore, this was a multiphase mixed methods research design.

Other research designs were considered, but did not provide a way to implement creativity and multiple methods to capture the complexity or broader understanding of multicultural classrooms and low socioeconomic situations.

Multiphase Mixed Method Design

Multiphase mixed method is related to the sequencing of the data collection. There are three types of data collection 1. Sequential, 2. Concurrent, and 3. Multiphase. A multiphase design combines both sequential and concurrent strands of data collection (Creswell, 2013).

Strengths and Limitations of a Multiphase Mixed Method Design

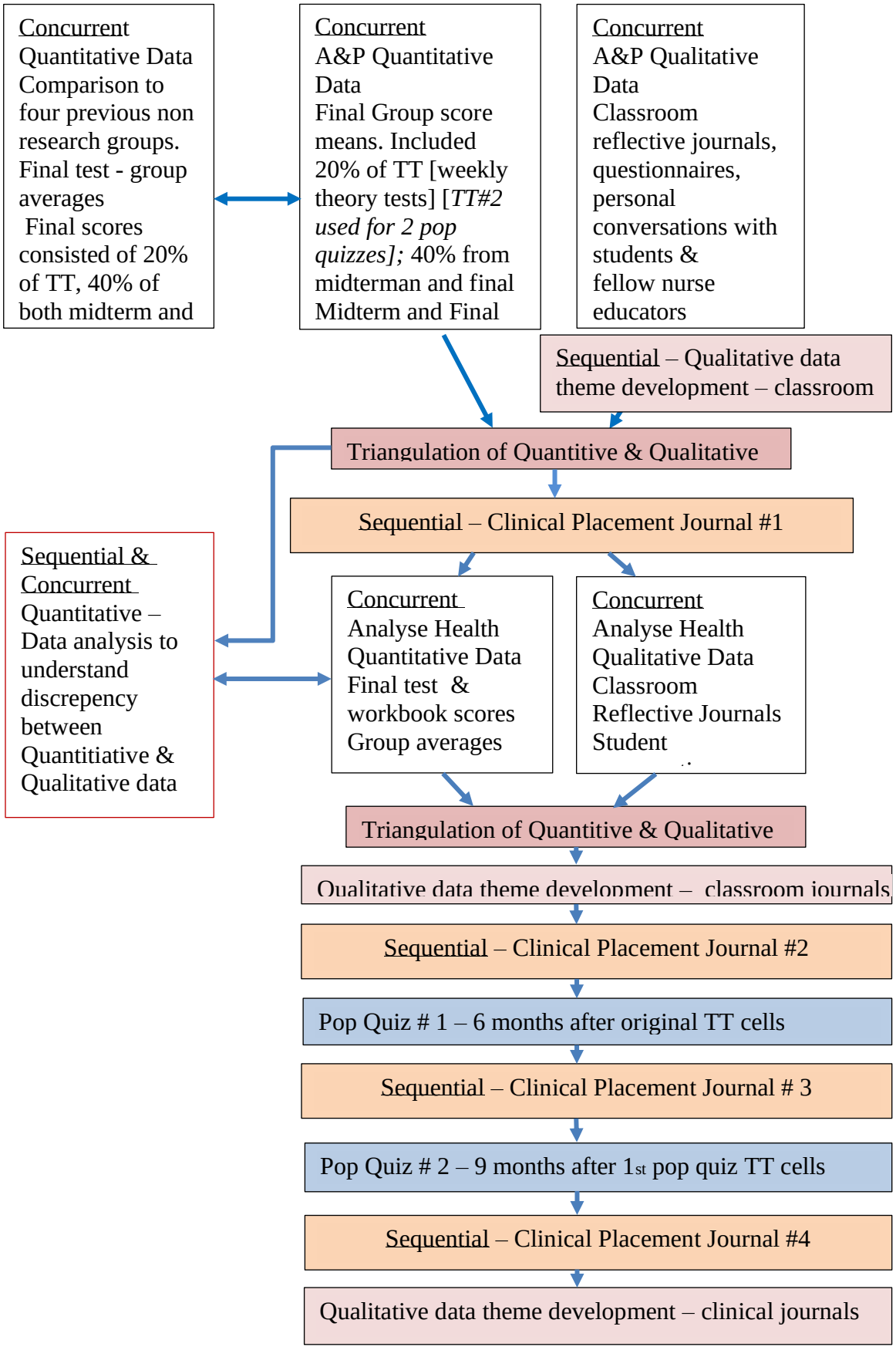
Strengths. This design allows for answering complex questions and those that may arise during the course of the study. It also allows, “Flexibility to address interconnected questions,” and concurrent and sequential strands can by incorporated (Almeida, 2018, p. 147). The researcher can compare the strands throughout the course of the study, which can increase rigor and the validity of the results (Creswell, 2011; Almedia, 2018; Zohrabi, 2013).

Limitations. The limitations of a multiphase design are the complexity of the data collection and analysis, cost and increased need for resources. This type of design is lengthy and generally there is more than one researcher. Such studies can be difficult to conduct, and evaluation of data can also be an issue (Wisdom & Creswell, 2013; Creswell, 2011; Amedia, 2018; Zohrabi, 2013). However, this was a small multiphase research study that ran over two and a half years, where I was the only researcher and the culture, and methods that I introduced where not reinforced by other teachers. The costs of books for the students was covered through my funding, but I paid for my training overseas at the

Quantum Learning Institute in California, USA. Paper resources were supplied by my department and students covered a small portion by purchasing a drawing pad and coloured pencils.

Another limitation was the classroom. I was able to obtain a dedicated classroom for the Anatomy and Physiology and the Analyse Health Information unit, which was important for the research. This had to be arranged the year before. However, these classrooms were also, utilised by other teachers in the Department of Nursing; as well as other courses. The hours of operation were from eight in the morning until eight in the evenings. On the following page is a diagram of this research studies multiphase design.

Figure 2. The Research Design



In the first chapter, I articulated a set of research questions related to this research design. They are revisited here to locate them within the methodological constructs.

The Research Question

When Quantum Learning and Campbellteaching methodologies are incorporated into two groups of the Diploma of Nursing course, do students improve their theory retention and recall?

In methodological terms this question was answered by the incorporation of accelerated learning and diagrammatic learning with explicit dialogue within the student classroom context. The methodological significance of the secondary questions listed in the introduction could be considered ontological or epistemological; however, the way they were used in this study, I consider them epistemological. The value of the multiphase mixed method design within the worldview of pragmatism allowed for various methods of both quantitative and qualitative data collection. The qualitative data not only allowed for student voice, but informed the results of the quantitative data, which is discussed in the results chapter.

The Cohort: Where the Research Took Place

The research took place in a duel sector university in a large metropolitan city in Australia. This university serves a large number of students from a low socioeconomic area within the municipality that is considerd one of the most disadvantaged in the city (Department of Planning and Community Development (DCPD), 2009; Jones, 2016). The criteria for being disadvantaged as defined by the DPCD (2009, July) included low levels of, "income; education and skills; employment; housing costs; health and geographic isolation" (p.13). These communities were also culturally diverse and had a lack of supportive functions for youth, high unemployment, several first in family to attend a university and few high school graduates. The language diversity of the people in this area meant that many students would speak English as an additional language [EAL] and sometimes as a third or fourth language. According to Messienis, Shechan and Miholicic (2008) students who attend this Duel sector University are "well below the [cities] average [and] the level of family disadvantage [is] considerably higher in TAFE courses

than in higher education courses" (p. 9). Students who left high school prior to completing grade twelve often entered training programs or other educational facilities. This is paticulary so in city and urban areas as compared to remote areas. A research project conducted by the Victorian TAFE Association (2017), found that, "Increasing numbers of early school leavers are completing their senior school certificates in TAFEs and dual sector Universities year on year" (p. 4). Many of the research students came from this low socioeconomic area. Therefore the research cohorts required empowerment, education and social activities (Jones. 2016; Morsillo, 2003). The need to shift from traditional content transfer pedagogies was even more pronounced because some students from linguistically diverse backgrounds were having trouble keeping up with a strongly linguistically based teaching and learning methodology (The New London Group, 1996). They were considered disadvantaged and non-traditional.

The Cohort: Traditional and Non-Traditional College Students

Delvin (2010) explained that traditional students were those who graduated from high school and went directly into university. They were most often from middle and high socioeconomic backgrounds. On the other hand non-traditional students, "May include: mature age students; VET pathways students; students from low socio-economic backgrounds; Indigenous students; rural students; students who are the first in family to attend university; off campus students; part-time students; and flexible entry students among others" (Delvin, 2010, p. 2). The university in which this study was conducted has developed flexible learning opportunities and offers personalised student support. Pathways have been developed into higher education for the Diploma of Nursing students.

Macqueen (2017) researched non-traditional student experiences in Higher Education over a four-year period. She found that there were higher completion rates and attendance of female students as opposed to male students. It was important for the students to feel that they fitted into the culture of the institutions that they attended. Financial issues and family issues were significant factors that increased the burden of their studies. Support was extremely important for the women, but did not appear so for the male students.

Overall, the study indicated that it was the student's personal belief that they could

succeed, and pure determination, that saw them through to completion. Delvin (2010) on the other hand, discussed the challenges of students transitioning into the higher education sector and feels that this is a critical factor for a student's success in the workplace. However, she indicates that students who are non-traditional often do not have the necessary skills to succeed in the culture found in higher education, more specifically the "hidden curriculum" defined as knowledge regarding social skills, life skills and appropriate language (Delvin, 2010, p. 3). The Australian Bureau of Statistics (2009) found that students from cities and inner urban areas were more likely to complete year twelve and attend further education institutions than those in remote areas. More females completed high school and progressed onto further education than males. The number increased in city and urban areas as compared to remote areas. A comparison table on the following page provides a representation of the statistics for Non-traditional students versus Traditional students.

Table 5. Statistics for Non–Traditional Students -VET/TAFE Versus Traditional Students – Bachelor Degree

Variances are found in the following areas	**Non-Traditional Students -VET/TAFE** – focus on their learning experience and help with their learning	**Traditional students – Bachelor Degree University/Colleges** – Have clubs, societies
Vet pathways	Both research cohorts were part of the VET pathways program; therefore, they were considered non- traditional students. VET/ TAFE Australia Projected completion rates for 2016 in a diploma program were 56.2%	Students accepted into higher education directly from high school or transfers from other universities. Universities of Australia successful completion for bachelor's degrees in 2014 was 83.48%
First in family	Lower completion rates – lack support	
Age Note: [min. ***age of acceptance into the diploma of nursing course is 18***]	26 and above Greater motivation, meet their goals Projected completion rates 2016 by age are below: 15 to 19yrs. 49.6%. 45 to 64yrs. 44.2% 20 to 24yrs. 47.2%. 65 and over 3 5 . 2 % 25 to 44yrs. 46.4%.	
Rural	Lower completion rates **Rural** Projected completion rates 2016 37.6%	**Cities** Projected completion rates 2016: 47.8% "Students from major cities are twice as likely to hold a degree than those from remote areas" (Universities Australia, 2019).
Gender – female versus male	Higher participation	Females have higher completion rates
Socio-economic	Lower socioeconomic status	Generally, mid to high socioeconomic status
Indigenous	Lower completion rates VET/ TAFE Australia Projected completion rates 2015 30.5% Data shows a 60% increase in student enrollment from low socioeconomic populations (Universities Australia, 2019).	Caucasian and international students have higher completion rates Australia Projected completion rates for indigenous students: 2015 40.7%
Environmental: finances, children, employment, transportation	More likely to have outside responsibilities and often working	Generally, have financial assistance, attending full time
Part-time versus full- time	Often will choose part-time options to allow for other responsibilities	Generally full-time options, but changing with more non-traditional students entering universities
(Australian Education Network, 2015-2019; Australian Universities, 2019; Delvin, 2010; Department of Education and Training, 2019; Grabowski, Rush, Ragen, Fayard & Watkins-Lewis, 2016; National Centre for Vocational Education Research, 2018).		

Chapter Summary

This chapter has discussed the underlying methodologies and research design that governed the study; including, the strengths and limitations of this design. The research questions were discussed in terms of ontology, epistemology and axiology. A discussion regarding non-traditional students was included; in order to provide awareness and understanding of the complexity and ity of diversity of many TAFE cohorts. The various methods included in the research design, were utilitised in hopes of addressing some of the life skill, social and learning issues that may have been presents in the research cohorts. The following chapter discusses the methods that were employed during the research.

Chapter Four
Research Methods

'education is the most powerful weapon which you can use to change the world'
Nelson Mandala 1918-2013 (Radcliffe, 2017)

Phase One – The Process

Phase One: Participant Selection

Once student applications were received requesting a place in the Diploma of Nursing course, all prospective students were scheduled to undergo a Vocational Education and Training Skills Assessment Test (VETASSESS). This test calculated mathematical ability, English writing skills and comprehension. Upon successful completion of the VETASSESS, students were scheduled to attend small group interviews. The interview team assessed each student's communication skills, ability to speak for themselves, writing skills and rational for entering the nursing program. The VETASSESS outcomes and the interview process were both taken into account when determining what students would be sent a letter of offer. Prospective applicants who were not successful and required further development of their written or verbal language skills and/or increased mathematical proficiencies were encouraged to undertake the Gateway course. This was often the case for early school leavers and students who had English as an additional language. The Gateway course was a one semester program that offered a pathway into the Diploma of Nursing upon successful completion. In accordance with ethics, I did not sit on the interview panel for students who would form research group one and group two; in order to decrease and/or eliminate personal bias. The Diploma of Nursing course was taught over an eighteen-month period. Successful applicants attended a one-week orientation prior to the commencement of classes.

Phase One: The Research Units

As mentioned in the introduction, two core units in the Diploma on Nursing course constituted the site of the research. The first unit was Anatomy and Physiology, which was the study of the structure and function of the human body. This core unit was taught during the first semester of the nursing course, as this theory provided the basis for subsequent

units and was a pre- requisite for the Analyse Health unit. It consisted of 90 hours of face to face study, which was divided into 14 three-hour sessions. Assessment was based on 20% of the weekly theory test scores and 40% of the midterm and final test scores.

The second unit was Analyse Health, which covered the underlying factors that affect health; discussed the various members of the health care team and their individual roles, and; introduced pathophysiology. In contrast to the first unit, Analyse Health was designated 30 hours for delivery. Sessions were delivered in five days over a two-week period. Assessment was determined by the outcome of a final test and successful completion of a self-directed workbook.

Phase Two - Implementation

Implementation: Research Group One – Orientation

During orientation week the department manager, conducted an information session that introduced the research study, in order to further decrease bias and coercion, as I was both researcher and teacher. The nature of the research was discussed, and students were provided the opportunity to ask questions and convey any concerns. It was explained, to the students that no one would be disadvantaged for choosing not to participate in the study. They could withdraw from the research study at any time without prejudice and withdrawal would not affect classes, assessments or any other element of their course. At the end of the introduction, students were provided the opportunity to sign a consent form.

All of the students, who formed Research Group One chose to sign the consent forms. As I was both the researcher and the teacher, I was not introduced until the last day of orientation week.

A special session was held by the Diploma of Nursing department, during orientation week; in order to introduce the PebblePad an online journaling system. It was set up for the research students by an information technology specialist at the university, who attended the special session and demonstrated how to use the online program. Student identification numbers were required to access the system.

PebblePad provided a creative personalised environment, where students could write their journals with complete anonymity. They could also, receive feedback from the researcher using technology which allowed for anonymity of journal entries, as well as providing the use of information technology in the classroom. It also created a forum where students could chat with their peers (University of Edinburgh, 2020).

I met with the students during Orientation Week, as I was provided two three-hour blocks, where I could provide more information on the research project, prior to classroom delivery of the relevant units. During this time, I answered the students' questions, and discussed the nature and aims of the research. I clarified why I considered the research to be important and how specific methods had the potential to assist with their learning process, memory retention, and recall. For part of this orientation time, students worked in groups and read through the *Quantum Upgrade Series Just for Students*, which they discussed while taking notes. The six small books that make up the series, explain important aspects of Quantum Learning. Their titles are: Quantum Learner, Quantum Note-taker, Quantum memorizer, Quantum Reader, Quantum Writer and Quantum Thinker. I donated three sets of these books to the University library, as well as four copies of Dr. John Campbell's Physiology notes**.** Students were asked at this time to complete a self-directed activity to create a visual representation of their goals.

Implementation Research Group One: Dream Boards – The Collage

During an orientation session, students were asked to make a collage – a visual representation of their final goals - and paste it on the front of their binders, as a constant reminder of their desired outcome. Farber (2012) explains that just dreaming about something won't make it happen; he suggests the artefact's name be changed from 'dream' board to action board. The collage was a form of action board. Aimed at increasing motivation, it had the potential to produce increased student outcomes. Due to time constraints, this activity was self-directed where students used f their own pictures and photos to create a collage.

Implementation: Research Group One – Number of Participants and Categories

Research Group One was a midyear intake, which started in July 2012 and completed in December 2013. The course duration was eighteen months.

The research cohort was diverse culturally, socioeconomically, in terms of educational attainment, and terms of age. Since there was a great deal of diversity the students were broken into categories; in order to determine if there were varying outcomes between the groupings. The table below depicts the categories and the number of students within each category.

Table 6. Research Group One – Cohort.

Categories – Group One	Female	Male	Female & Male
Australian	12	3	15
Australian [EAL]	8	1	9
International [EAL]	8	0	8
Total number of students	28	3	31

Implementation: Research Group Two – Orientation

This session also began with a pre-interview explaining the underlying theories and aims of the research. However, the individual who conducted the first introductory session was scheduled to teach another class, as were other staff members. As a result, the researcher had to run the information session. The same information that was relayed to Research Group One was discussed with Research Group Two, with two exceptions that are discussed below in the changes section.

Implementation: Research Group Two – Number of Participants and Categories

Group two commenced in semester one of the following year, February 2013 and completed in July 2014.

This group had the same range of diversity as the cohort in Research Group One. The same categories were implemented and can be found in the table below

Table 7. Research Group Two – Cohort.

Categories – Group Two	Female	Male	Female & Male
Australian	11	4	15
Australian [EAL]	1	0	1
International [EAL]	7	3	10
Total number of students	19	7	26

Implementation: Research Group Two – Changes

There were two important changes that were implemented as a result of difficulties experienced by Research Group One. Discussed previously Research Group One students were to journal online using PebblePad. However, students did not get their student identification numbers in time. They resorted to emailing their journal notations directly to the researcher; therefore, losing anonymity. In order to maintain anonymity, the research participant emails were copy and pasted into a secure research folder in outlook, displaying their coding. Another issue that arose was the lack of data collected with the online journal writing.

In order to avoid this situation for the Research Group Two, an information pamphlet and paper-based journals were distributed to the research participants and any of the non-participating students who wished to receive one. The latter group of students did not have to hand in their journals at the end of the unit.

The information pamphlet specified the concepts of Quantum Learning and Campbellteaching, which allowed students an opportunity to review the information prior to signing a consent form. This was particularly beneficial to younger students who resided with their parents (see Appendix D). The coding was discussed in the ethics section of chapter three.

It was explained that there were also, clinical placement journals. They were also paper-based and would be handed out at the end of the unit, just prior to their first clinical rotation. This clinical placement journals would cover all four clinical rotations and they were to be handed in at the end of the course, just after their final clinical placement.

Students had the opportunity to sign the consent forms at the end of the information session. Several students signed the consent forms before leaving the session, a few took them home to review before providing consent; however, four students chose not to participate in the research. Their decisions were based on the extra work involved in completing the journals. They were not disadvantaged for their decision and, in alignment with the ethics approval, they had the same freedom to opt into and out of activities.

Implementation: Types of Data Collected

In correlation with the mixed methods research design, both quantitative and qualitative were collected. As depicted in figure 1 both quantitative and qualitative data were collected both concurrently and sequentially. The quantitative data was gathered from several sources that are listed below:

- Group averages of the Final grade from four previous non-research groups that acted as the control
- Group averages of the final unit scores for both Research Group One and Research Group Two. The final scores were calculated by adding 20% from the weekly theory tests, and 40% of the final score for the midterm and final test papers
- Data Interrogation: The data interrogation consisted of recording all of the individual student results from the four non-research groups and the two research groups. This was a total of one hundred and thirty-seven students and the final grade scores from five different sources. This totalled finding and recording six hundred and eighty-five results, which were used to explore the apparent inconsistency between the quantitative results and the qualitative results for the Anatomy and Physiology and Analyse Health Information.
- Pop Quizzes: In the Confirm Physical Health unit students were given a weekly quiz that covered the previous lesson. They were administered for two purposes: 1. the students were able to review their understanding of the theory, and; 2. I could gauge a student's understanding and progress. In this study, retention and recall were being examined with the introduction of

Quantum Learning and Campbellteaching. Two pop quizzes were administered to test the hypothesis that Quantum Learning and Campbellteaching, in conjunction, improved student retention of information. First, the students completed a weekly quiz on the cell session. Six months later on a date and time that were unannounced, students were given the same quiz to complete. Then nine months after this quiz was written, the research students were again handed the same quiz (Jones, 2016). As the students had no preparation time, they had to rely on recognition and recall of the lesson material.

- The qualitative data was gathered from classroom journals and four clinical placement journals; two questionnaires, and; conversations with students and other nursing educators from the Diploma of Nursing department. All research participants were invited to use journals writing to reflect upon the results of their weekly quizzes, their personal competence and confidence, the effectiveness of teaching methods, the teacher's approach and qualities, and their level of learning retention. Walker (2006) states that journal writing, "Refers to any writing that students perform during either a clinical or classroom experience that challenges them to reflect on past situations, as well as consider how they might perform differently should similar situations arise in the future" (p. 217). It was hoped that students would see this as added support and opportunity rather than as a burdensome task.
    - Journal writing was an important element in developing deep reflection that could give rise to critical thinking. Deep reflection and critical thinking are imperative if the theory-practice gap is to be decreased. The classroom and clinical journals formed the basis of the qualitative data that provided student voice.

- One questionnaire and one checklist were placed at the back of the classroom journals; in order to gain further student insight, during the course of the research study (see Appendix E). One additional questionnaire was delivered towards the end of the unit, which also had the potential to provide important data related to the research (see Appendix F).

The quantitative and qualitative data for the anatomy and physiology units, was collected and analysed at the end of the first semester for both research groups. The analyse health unit quantitative and qualitative data was collected and analysed by the middle of the second semester. However, the pop quiz data was collected throughout the course. The clinical journals were also implemented to develop deep reflection and critical thinking skills, and gain perspective from students.

Themes that arose from the qualitative research data were garnered by reading through all of the classroom and clinical journals from both research groups.

The research question was answered utilising the data derived from the all the data sets, which allowed for a deeper understanding of the complexities that underlie the education process of adult learning. The qualitative data was the source for answering the secondary questions, which could only be understand and ascertained through student voice.

In terms of the worldview of Pragmatism based on the Freirean framework, the types of data collected allowed for student expression that was experienced in a democratic classroom where students could ask questions and engage in dialogue. Emic epistemology deals with how knowledge is gathered, coded, retained and transferred (Kivunja & Kuyini, 2017). The implementation of accelerated learning methods and the subsequent collection of both data types had the potential to garner in-depth understanding of the underpinnings of the student experiences with the learning process. The Ontology of relativism looks at the varying realities of learning that exist in complex cohorts. Once again utilising a multiphase mixed-methods design allowed for a variety of data that could be collected at different points during the study. This gave the researcher an opportunity to deliver two

questionnaires that provided further insights gathered from student past experiences within the education system compared to their experiences within an accelerated learning program.

Implementation: Research Group One and Research Group Two

Implementation: First Day of Class

After orientation week, students began their classes. The Kaleidoscope Classroom signage opened the doorway into a room bathed in light and bordered with positive affirmation posters, a welcoming sign, a couch, lamp, coffee table, painting and plants. The 8 Keys of Excellence were physically placed over the whiteboard. An ice breaker activity allowed for introductions and increased familiarity of fellow classmates. Then the business of the day was presented.

As per departmental protocol, a class supply list, the unit information package, and the unit outline were distributed and discussed in detail. This included information regarding course expectations, weekly quizzes and the midterm and final test dates. A table for theory test results was created, so that students could monitor their progress. Forms were signed indicating receipt of the unit outline. In addition, a unit supply list was handed out. The research specific supplies included an A3 drawing pad, coloured pencils, eraser, highlighters and a zipper pouch. In order to keep cost low for the students, each student was given a copy of *Campbell's Physiology Notes* by John Campbell. This book formed the basis of the Anatomy and Physiology lectures; however, as it was not a complete text, the students were also advised to purchase the scheduled unit text 'Visual Anatomy.' This textbook was chosen, as it was laid out similarly to the teaching methods that I was using during the research.

After the introduction to the Anatomy and Physiology unit, the *8 Keys of Excellence, Home Court Advantage* and *Live Above The Line were discussed. The 8 Keys of Excellence* and *Live Above the The Line* were components of life skills. It was necessary to include all life skills training and accelerated learning techniques during classroom hours due to times constraints. Methods for brain-based learning were taught as required throughout the course.

Implementation: Learning Styles Questionnaires

Within the Diploma of Nursing it was standard practice for all new students to complete the Myers Briggs personality type indicator questionnaire, which was delivered in the unit titled, *Practice in the Nursing Profession.* This was selected by the nursing department. It provided students with insights into their personality types and the various types of personalities that they could encounter during their nursing career. Kennedy, Curtis & Waters (2014), conducted research on personality and choice of specialty in the nursing profession. They concluded that personality was an important factor for nurses entering specialties; when a personality fits specific criteria there were better patient outcomes and greater nurse satisfaction.

In the context of the research, as part of metacognition, to enhance students' personal insights into how they learn, a variety of learning style questionnaires were provided. This allowed students the opportunity to identify their learning preferences and areas of strengths, according to various theorists' constructs of learning paradigms. Due to time constraints this was a self-directed exercise intended for their personal benefit.. A list of the various learning style questionnaires that students completed are found below:

- VAK (visual, auditory and kinesthetic) the VAK. This system purports that people have a preference for one modality for learning, but that this can change over time; some people prefer to use all three modes (Nidi S K, S., & G Tay, C. H. (2017).
- Kolb: Kolb developed experiential learning: learning by doing or engaging in the learning process. Students learn by progressing through the four cycles of learning: concrete experience, reflective observation, abstract conceptualisation and active experimentation (Kolb, 1984; McLeod, 2013).
- Honey and Mumford: Honey and Mumford believe that a person learns best when they understand how they learn. They claim that there are four distinct styles of learning: activists, reflectors, theorists and pragmatists (Roswell, 2005).
- Howard Gardener's Multiple Intelligences: He stated: Multiple Intelligences . . .pluralizes the traditional concept. An intelligence is a computational capacity–

a capacity to process a certain kind of information that originates in biology and human psychology (Gardner, 2006, p. 6). He described 8 intelligences: personal, interpersonal, kinesthetic, visual, linguistic, rational, musical and environmental (Gardner, 2006).

Micro-Methodology

Incorporated into the research classrooms, were micro elements of Quantum Learning that were guided by their mission. The prime directive of Quantum Teaching "rests on this concept: *Theirs to Ours and Ours to Theirs*" (DePorter et al, 1999, p.6). This refers to building a relationship with the students that will earn you the right to teach them from their perspective. Once the teacher has gained their trust, they are able to *really* teach. Then the students gain knowledge from the teacher that they can take out into the world and apply (DePorter et al, 1999). A teacher becomes a "fellow learner, a model, a guide, a facilitator – indeed the orchestrator of student success" (DePorter et al, 1999, p. 11).

Micro-Methodology: The Five Tenets of Quantum Learning

The tenets are a list of the underlying beliefs that guide the QL model. They are:

- everything speaks
- experience before labelling
- everything is on purpose
- acknowledge every effort
- if it is worth learning, it is worth celebrating.

These concepts were explained to the students at the beginning of the research and posters of the five tenets were placed at the front of the classroom as a reminder.

Micro-Methods: Five core components of Quantum Learning [FADE]

The five core components are *foundation*, *atmosphere*, *design* and delivery, and *environment*. Each aspect will be discussed below.

Foundation

Foundation is the first of the core components and is described in the context of a classroom. "The classroom is the setting that aligns teachers and students towards a common

vision of an effective, positive learning experience" (Quantum Learning Education, 2018a, para 2). This alignment, "is achieved through defined procedures, rules goals and clearly defined expectations" (Quantum Learning Education, 2018b, para 3). The *8 Keys of Excellence* are an important element for building the foundation of a classroom as they inform behavioural expectations and help to develop life skills as discussed below:

- Integrity – saying, doing and behaving in the ways that we value
- Failure leads to success – provision of feedback to help students grow and succeed
- Speaking with good purpose – think before you speak, intention is positive, words are sincere
- This is it! – focus on the present moment and stay positive
- Commitment – Take positive action – follow you vision without wavering
- Ownership – Be responsible for your thoughts, feelings, words, and actions. "Own" the choices you make and the results that follow
- Flexibility – Be willing to do things differently
- Balance – Be mindful of self and others while focusing on what's meaningful and important in your life. Inner happiness and fulfilment come when your mind, body, and emotions are nurtured by the choices you make (Learning Forum International, 2018)

An explanation of the *8 Keys of Excellence* was posted beside the front door of the classroom and keys shaped posters were hung over the top of the white board as a reminder.

Atmosphere

The second core component is atmosphere. According to Quantum Learning, the feel of the classroom is an important aspect of the learning environment (DePorter et al, 1999). A positive learning atmosphere is initiated by the teacher and creates a place of safety, belonging, and support. When students feel safe, they are more likely to participate in class groups and discussions. Home Court Advantage and Living Above the

Line are methods that help to form a safe, belonging, and supportive learning environment and teach students to take responsibility for their learning. They are vital components of a classroom (Quantum learning network, 2011). They were discussed in the literature review.

Environment

The third core component is environment. This refers to the physical setting of a classroom. How the room is arranged can impact the students' desire to learn, their motivation, and their readiness. The Quantum Learning program asserts that poor quality lighting, desk arrangements in lines, and bare walls with bleak coloured paint, can all impact negatively on students' motivation and engagement. In contrast, clean, light walls with inspirational posters, which depict a positive place for learning, can make a significant difference. Including a plant, sofa, or comfortable chairs to relax on during short breaks, helps students feel calm and welcomed in the classroom environment. Music also forms the environment and can assist with focus and relaxed mood, which is important for learning (DePorter & Hernacki, 1992; Lozanov, 1978). In addition, aromas were added to increase relaxation and alertness in the classroom. Diego, et al (1998), used ECG results to determine the effects of aroma therapy. The results suggested that certain aromas could cause drowsiness while other such as, rosemary could enhance alertness.

Welcome to the Kaleidoscope classroom was posted on the classroom door and I greeted each student as they entered the room. The desks were placed in a semi-circle. There was a painting on the wall, a couch, a coffee table and lamp in one corner. Inspirational signage was placed at eye level around the room and the *8 Keys of Excellence* where attached to the wall above the white board. A plant was strategically placed on the front desk.

Design

Teaching sessions were developed that took into consideration brain-based learning, accelerated learning and multiple methods for teaching and learning. The multimodality allowed students to build on their existing schema in order to engage learning preferences,

Quantum Learning explains that the design assists students' ability to comprehend

complex theory and transfer this knowledge into realistic circumstances, such as nursing students' clinical rotations where the supervisor can assess their abilities.

Design forms the Quantum Learning Cycle of Learning. This is a process for developing content and methods for its delivery. The Quantum Learning Cycle is:

- Enroll – teacher moves that capture interest, curiosity and attention
- Experience – creates or elicits a common experience to which all learners can relate
- Label – Provides key words, concepts, models, formulas, methods; the input
- Demonstrate – provides opportunities for the learner to "show that they know"
- Review – provides the learner with ways to review the material and solidify that, "I know that I know this"
- Celebrate – An acknowledgement of completion, participation and acquisition of skills and knowledge.

The learning cycle was incorporated into the lesson design and delivery.

Delivery

Delivery refers to how teaching sessions are delivered**.** This important element depends on the strengths, ability and expertise of the teacher to establish an engaging and fun learning environment that enables retention and recall of lesson material.

Key aspects of Quantum Teaching include providing clear instructions; following principles of brain-based learning and active learning; utilizing multiple methods for student engagement and attention; explaining the WHY behind the methods; voice modulation, and; positive word choice (Quantum Learning Network, 2011).

In the Kaleidoscope classroom, the meaning of schema and concepts of memory coding and retrieval were explained, then discussed. Three note-taking methods were demonstrated and the role of the amygdala during stress explained. The use of various methods was explained as they were incorporated into the teaching and learning sessions. The first set of methods discussed below were important in attaining the student's interest

or buy-in also referred to as what-is-in-it-for-me. They were important in forming the classroom culture.

Micro-Methodology: Methods Used in Forming Classroom Culture

Life Skills Education

The 8 Keys of Excellence. The 8 Keys of Excellence were reminders for personal behaviours and personal conduct. They were blue tacked onto the wall above the white board at the front of the classroom where they could be seen as a daily reminder.

Live Above the Line. *Live Above the Line* provided a pictorial representation of what it looked like when students chose to take responsibility for their learning and the benefits of doing so. Students learn that when they live above the line, they make a commitment to their learning, which can provide them with personal power in their learning journey. Students learn to recognise when they are blaming others, making excuses for themselves, and wanting to quit (DePorter et al, 1999; Quantum Learning Network, 2011). But this is not just for students, as teachers also benefit from living above the line.

Home Court Advantage. Home Court advantage is a term coined by the Quantum Learning Network and is implemented in order to encourage a safe, supportive and belonging classroom (Jones, 2016; Quantum Learning Network, 2011). LeTellier (2007b) discusses the importance of creating a positive learning environment that establishes cohesiveness within an organisation. Clapper (2010) believes that a learning environment requires physical, psychological and social safety, as an unsafe classroom can inhibit participation and learning. It was also, important that all students valued the classroom and knew that they were valued and an esteemed member of the group.

The above mentioned methods assisted in building high standards of behavior and respectful conduct (Deporter, Reardon & Singer-Nourie, 1999). They set the bar high. The following methods were incorporated to build a cohesive classroom culture, to support a sense of belonging and to increase self-belief. In addition, life skills were incorporated to encourage professional behaviours and attributes.

Class Tradition. In the Quantum Learning system, tradition helps to form classroom culture. The tradition helps create a sense of belonging, provides structure and has the potential to decrease fear and stress by providing an expectation and a cohesive group (DePorter et al, 1999). I chose an unconventional approach, based on two personal experiences that showed me the power behind self-belief, group support and motivation. I incorporated ideas from Brain Gym and put them to music. Paul Dennison, developed Brain Gym and found that children who struggled with visual and special issues overcame their difficulties with specific exercises (Vida Kinesiologia, 2012). Musicalite (2020) uses a combination of music and brain gym in day care centres to increase the following aspects of development in young children: language, cognitive skills, motor skills and spatial orientation, attention and learning, mathematics and abstract thought, body memory, expressiveness and emotions, adaptability, imagination and creativity and sense of belonging.

The activity was designed to increase activity between the cerebral hemispheres, increase oxygen flow while having fun. Towards the end of the exercise, while the music was still playing, I implemented the class tradition as seen below:

I asked the students a series of questions

beginning with: Are you smart?

They were to answer: “I am smart”.

I then asked, “how smart?”

They were to answer: “very smart”.

This was followed by, “what are you here for?”

They were to answer: “Success”

What are you going to give?

They answer was: “200% YES!!!

An example used by a college teacher, also included the question, “are you smart” (DePorter et al, 1999, p. 53). Students with poor self-esteem require methods that will build their self-belief and self-confidence (DePorter et al, 1999).

I wanted the students to feel the positive personal power that could be derived from this process as I had experienced this personally. The activity lasted no more than three to five minutes. According to Le Tellier (2007), a tradition used at the beginning of each class is a strategy that sets the tone for the day in a positive context. In this study, the tradition incorporated brain gym, music and an element of fun. Meier (2000) links the importance of music and memory to their effects on the limbic system, then associates the limbic system with long-term memory. He states that, "Music and memory are physiologically connected in the brain" (pp. 117,118).

Buy-in. Jensen (2016), the founder of brain-based learning discussed how all students come into the educational setting with a personal belief. Their stories are based on past experience and their belief about their potential to succeed. Jensen (2016) goes on to state that, "For many of your students to succeed, you will have to shift the student narrative and provide a better story for them to buy into" (p. 2).

The buy-in comprised of two aspects. Why was this class relevant and important to their career, and why was it important to listen and embrace new methods? To accomplish this, I began by telling the story of my personal journey of learning, which spanned several years. The message was that they needed to have desire, perseverance, grit and put in the hard work necessary to be successful. Duckworth (2013) and Dweck (2007), developed concepts that linked grit and positivity as central to learning.

In addition, I dramatized a story of young man in search of treasure, which contained a concept lesson on the importance of learning all that we can, when given the opportunity. Then each student chose a coloured glass stone to remind them of the moral of the story. Additional methods that were utilised during this research study found in the table below.

The table below explains the methods and methodologies incorporated to assist in learning, retention and recall. Quantum Learning has 206 methods that can be utilised when teaching. As one of the research methods, I developed the following table in consultation with my supervisor. The table explains various methods that formed a multimodal, student centered approach in the Diploma of Nursing Course. In addition,

the students classroom journals were designed to capture the rich qualitative data, on the usefulness of each method in the table below.

Table 8. Methods Used in the Kaleidoscope Classroom

Source	Methods	Explanation
QL	Big Picture	The Big Picture relates to how the brain can see the whole or part of a whole at the same time. At the beginning of a class session, an overview of the lesson is given which connects to what students have already done and then builds on their existing knowledge or schema. (DePorter, 1999).
QL	Celebrations	Celebrating students' successes creates a positive sense of learning and provides a safe, supportive and belonging classroom. During class celebrations the students learn to acknowledge each other's success. With celebrations come good feelings and this is what I wanted students to experience on a daily basis. Meier (2000) states, "There is nothing that accelerates learning more than a sense of joy" (p. 36). This positive acknowledgment lifts students to a higher level and influences their desire to continue achieving. In addition, it serves as a motivator and empowers students. Celebrations are part of Quantum Learning as they promote the desire to learn and they form aspirations for success (DePorter et al., 1999, p. 31). According to Jensen (2008), celebrations are vital aspects of learning and should not be discarded. They induce fun, relaxation, time for integrating relationships, joy and love of learning. Celebrations can also assist memory by increasing dopamine levels (Jensen, 2008. p. 124). The world is full of celebrations. In relation to learners, they are provided with their significant moment of success and this needs to be enjoyed, whether it is formal or informal recognition (Wlodkowski & Ginsberg, 2010, p. 162).

QL	Set expectations high	On the first day of class, the expectations for learning, behaviour and classroom culture were set. The bar was set high, so students could work to achieve their goals. If the bar for learning is set low, then that is what many students will aim for (Student conversation, 2012). The research discussed by Coyle-Rogers (2008) concluded that increasing rigor, positive attitudes, high expectations and enthusiasm increased student outcomes (pp. 127-129). During this study, any inappropriate behaviour was addressed through the *8 keys of Excellence, Home Court Advantage* and *Living Above the Line*, mentioned above.
QL	Personal story	In order to help students', understand that I knew what it takes to complete a course and that I would help them to learn, if they put in the work, I used my own story to encourage buy-in from students. I was their role-model. Fitzgerald (2011) discusses that there are a variety of situations where the actions, enthusiasm, or methods of a role model can influence students (p.440).
QL	Mnemonics	Mnemonics attached to stories and body motions were frequently utilised to assist in encoding memory and recall. Motion mnemonics can be used with words or stories, or as classroom anchors, specific to the theory. They help to lock specific concepts into the student's short-term memory. When the mnemonic is reviewed thirty seconds later, and at intervals throughout the day, especially prior to sleep, retention is more likely to occur, as short-term memory converts to long term memory during sleep (Hare & Reynolds, 2011; Quantum Learning Network, 2011). In nurse education, Herrman (2008) used mnemonics to teach students how to remember facts about diseases (p.87-88).

QL	Call backs	Call backs were used frequently throughout the teaching sessions. They require students to repeat words or phrases back to the teacher. This strategy assists in encoding working memory, also referred to as short-term memory (Dubuc et al., 2014; Harrison & Hobbs, 2010; Quantum Learning Network, 2011). Call backs also assist in maintaining focus and changes the students state of learning (Le Tellier, 2007, p. 153; Quantum Learning Network, 2011).
QL	Buddy talk	Information in class is broken down into sections or chunks. After a small portion of the lesson material has been taught, students are asked to 'Buddy Talk.' This technique is also sometimes referred to as partner recaps, reality checks, rave review sessions, or paired learning. During 'buddy talk,' students repeat to each other in their own words what was just taught. In order to do this, they must activate the language centres of the brain. This assists in the encoding of information. Once this strategy has been introduced, students often request buddy talk. (Hare & Reynolds, 2011, p. 67; Le Tellier, 2007; Quantum Learning Network, 2011)
QL	Memory pegs	Memory relies on a person's mental, physical and emotional state to 'bind up' information (Jensen, 2008). Therefore, information that is learned when a person is anxious, depressed, happy, curious, experiencing joy or sadness is bound to that emotion and can be triggered by that emotion. The use of memory pegs is a type of state-dependent memory that can assist in recall (Jensen, 2008). Other methods that are state-dependent include: "simulations, case studies, role-plays, and drama performances" (Jensen, 2008, p. 160). Memory pegs also help students to learn lists and recall them easily (DePorter et al., 1999; Paul, 2009, p. 67; Quantum Learning Network, 2011).

QL	Mind mapping/ note taking	Students have different ways of note-taking, but teaching a range of styles can provide them with opportunities to increase their note taking effectiveness, and the learning experience. This in turn can increase retention and recall (Buzan & Buzan, 1996). Quantum Learning suggests two ways of notetaking. The first is called TM, The T indicates note taking which requires the students to write down the information and make it more meaningful. The M indicates note making, which is writing down the thoughts and feelings experienced as the student takes the notes. Student are encouraged to personalize their notes by using symbols such as happy faces, as it is important to connect emotions to learning. Emotions that are attached to learning make the learning more memorable (DePorter, 2007). The second method of notetaking is mind-mapping. This is when all the lesson material is drawn as a map connecting ideas and comments, colour coded, and on one page. Interconnections and associations are easily recognised, and the information becomes important as it is personalized. Both aspects assist in retention and recall (DePorter, 2007; Buzan & Buzan, 1996).
QL	Action to words	When actions are put to words or simple concepts are used to remember a section of theory – the students' retention and recall increases (DePorter, 2009, p. 154). For example: I walked into the first research group to talk to them, just before their third clinical placement. One of the students laughed and said, "DJIT' I will never forget it. The mnemonic stands for the three sections of the small intestines, which are the duodenum, jejunum and ilium. In teaching this however, I did not just use the mnemonic, but I added a small dance step and hand movements as if I were a DJ.

		The students laughed; I laughed; we all relaxed, had fun and learned
QL	Role play/ classroom activities	Activities in the classroom support learning by generating actions and the examination of concepts that have been taught previously. Such activities consolidate learning, allow for peer teaching to take place, and are excellent for kinaesthetic learners. For example, students make a taped drawing of a heart on the floor. Then they can walk each other through the blood flow and electrical function of the heart. Dunn (1984), found that students who were taught in their strongest style of learning achieve better.
QL	Relaxation techniques	Memory recall and learning is difficult, if not impossible, if students are highly stressed. Therefore, teaching students how to relax, self soothe, and put themselves into Alpha state [a state of relaxation as evidenced by a certain type of brain wave] is beneficial (DePorter et al, 1999). Once they learn the technique, students are encouraged to take a few minutes before a test or an exam to put themselves in 'the zone'. Meier (2000) postulates that playing meditative music while the students relax helps them to feel the mood; however, he believes different types of music are beneficial during learning and that teachers should avoid 'dogmatism' when choosing music (p. 119).
QL	Journals/reflection	Journaling gives the students a forum for self-evaluation, a place to summarise their learning, and an opportunity to experience deep reflection, which gives rise to critical thinking. Thus, deep reflection can assist in the consolidation of learning. It can also give rise to new ideas and creativity. Developing critical thinking is essential in nursing and teaches students how to become good assessors. Also, it lets teachers know

		how the students are progressing and what they need help with.
CT	Models	These provide visualisation, hands on activities and assist in developing understanding. They also give students variation in classroom learning. Most importantly, models of body organs assist in making complex structures easier to understand (Meier, 2000, p. 162).
Other	Self-directed learning	In nursing it is imperative that students learn to be self-directed. One way to assist in the development of this important nursing attribute is to give students opportunities to take on self-directed learning activities (Penn, 2008, p. 6). According to Bastable, et al (2011), self-instruction assists students to tap into their "cognitive and psychomotor domains" (p. 440).
Other	Power point presentation	Ppt presentations can be an appropriate teaching strategy in some situations; however, they need to be colourful, clear, concise, and contain pictures and state changes. nor should they be used constantly. Herrman (2008), believes that power points must be used wisely and that the success of a class depends on the skill and knowledge of the teacher. She states that, "PowerPoint is an instructional tool, not a crutch to get teachers through unfamiliar material" (p. 289). Students have often commented that they feel that power point usage in tertiary classes is 'death by power point' and 'it is just black words on white." In these circumstances interest is lost, and some students will leave when they get too bored or feel that they cannot understand the lesson. For this reason, I incorporate the white board, questions, diagramming, and state changes that show

		some relationship to the theory being taught. This adds fun, laughter and re-focuses student attention.
Other	Technology	Technology can be beneficial to classroom learning as it opens the doorway to a plethora of information, relevant to the theory (Bastable, Grament, Jacobs, & Sopczyk, 2011, pp. 535,536; Billings & Halstead, 2009, pp. 355-363; Dryden & Vos, 2008, pp. 242-255; Herrman, 2008, pp. 143,144). In today's technological culture, most students own a mobile. They can be used sensibly and there are apps that assist with learning; e.g. Anatomy 4D.
Researcher	Linking Table	I developed the linking table to provide a clear process whereby students could learn to understand and make connections between what happens in a healthy body to cause each sign and symptom that manifests during a disease process or injury. They learn to understand this process at the cellular level. Students then research what the appropriate response is, treatments they would expect to see, and who would be on the disciplinary team. This process encourages reflection, discussion and the development of critical thinking skills. It also guides the students from surface learning to deep learning.

The above methods were employed in the kaleidoscope classroom as part of the research methodology. They are grounded in the principles of QL, although not all of these methods come from QL. Some methods, particularly those employing visualisation, are drawn from Campbellteaching; some were developed by the researcher in order to apply the principles of QL specifically to nursing. Together, these methods formed the methodology of the teaching component of the research.

Micro-methodology: Anatomy and Physiology

Quantum Learning formed the basis of the classroom culture and teaching methods, and Campbellteaching was used in tandem as an effective means for managing the content. Each student received a free copy of Campbell's Physiology Notes.

Anatomy and Physiology was a first semester unit and a pre-requisite for Analyse Health. It was ninety hours in duration and delivered over fourteen teaching sessions. There were two three-hour sessions per day, each covering a different body system. In total the students were expected to learn the basics of eleven body systems over one semester.

Classes started the in first week in February and finished in the second week of June or in July and finishing in December. Three power point presentations were used, during the first three teaching sessions. They were visually presented with highlighted words and pictures. Appropriate YouTube links were added. The slides were paused for discussion and role play was utilised if appropriate; in order to clarify meaning and create muscle memory.

The remaining lessons were taught through the diagrammatic teaching of the body systems. Students drew and labelled representations of the diagrams as seen on a white board, creating a mind map. They were colour-coded and broken into small chunks of theory. The representations progressed from a simplistic view to progressively more complex structures and functions. The drawings were accompanied by ongoing explicit, detailed discussion between the students and the. teacher After each diagram there was a short pause where students summarized the theory with a peer. I called this 'buddy talk,' as does Quantum Learning. This process allowed for greater comprehension, reflection, the recognition of connections, and the development of critical thinking skills. If students were unsure of an explanation, I deemed it imperative to review that portion again with the class. Also, during 'buddy talk' I did a 'teacher walk' (also a QL term): I went to each set of desks and asked again if they understood the theory. This allowed the quiet students a chance to speak to me individually. If necessary, I re-worded the material and explained it again individually. Often a peer would ask if they could describe the process, which

assisted in building support systems within the group. This process was repeated throughout the teaching session. Near the end of the lesson, YouTube videos specific to the theory were used to reinforce and consolidate the lesson material.

Micro-Methodology: Analyse Health Information

The underlying principles of Quantum Learning formed the basis of

classroom delivery in this unit. However, this unit is significantly different from the Confirm Physical Health Unit [A&P], where students are taught the structure and function of healthy body systems, while touching briefly on disease processes. In contrast, the Analyse Health Information unit covers disease processes and factors that affect or cause disease, both external and internal. The focus is on pathophysiology This was a short 30-hour unit and teaching sessions were three hours in duration. It was taught in four days, two sessions per day. Despite the limited delivery time, this unit provided an opportunity to implement a crucial factor in the research. As discussed previously in this thesis, students struggle to incorporate theory into practice. In order to address this issue, I developed what I termed a 'linking table'. It set out a simple, clear process to identify signs and symptoms of specific disease processes or conditions. Once identified, the next step was to explain what happened in the body [at the cellular level] that caused a particular sign and/or symptom. The next step is to ask what interventions the nurse needs to implement, within their scope of practice, to address that sign or symptom, in order to obtain an optimal patient outcome. The next three columns of the table identified multidisciplinary teams specific to the disease or condition, and tests and medications that a doctor would order. The methodological conceptualization underlying this was the hypothesis that if the students could visualise the theory and their response to manifestations of disease, through the steps listed in the linking table, then they may gain understanding and the ability to apply the theory to practice (see Appendix G).

The morning sessions were either discussion and white board or PowerPoint-based learning with explicit discussion incorporated. During the afternoon sessions, the students worked in groups to complete the linking tables. Some students stayed in the classroom, while others preferred to get a designated study room at the university

library on campus. During the last half-hour, students returned to the classroom. This provided an opportunity to clarify that they were completing the assignment correctly and it also allowed for questions to be addressed. According to the Association for Psychological Science (2012), this strategy has the ability to enhance retention and recall, but there may be cognitive bias.

There were two graded assessments for this unit. The first was a take-home workbook that was handed in on the last day of class, prior to sitting the final test. The linking table incorporated the disease processes that were included on the final test. Therefore, the final test provided an opportunity to determine if the students were able to identify and recall the signs and symptoms of a specific disease, explain what happened in the body to cause that sign or symptom and finally, list the steps that they would need to take to ensure a positive patient outcome. The disease that was used for the linking table in the final test was heart failure. There was a request from industry that heart failure be taught, as there is a high incidence in the population. Both the workbook and the final test were worth 50% of the final score.

Micro-Methodology: Clinical Placement Reflective Journals

The students attended four clinical placements throughout their educational preparation. Each placement was two weeks in duration. When students were on clinical placements, they are under the supervision of a qualified clinical supervisor. They worked alongside a staff member from the facility. The supervisor provided them with opportunities to practice the skills they learned previously, in simulated nursing labs at the university. Clinical placement provided workplace experience that assisted in consolidating practical skills and the opportunity to understand how theory and practice were related. This was also, the time for students to ascertain their retention of theory and their ability to implement the theory in the clinical setting. In addition, this experience also provided opportunities to meet and engage with other members of the multidisciplinary team, who work together for successful patient outcomes.

The aim of the clinical placement journals was to capture the students' ability to self-reflect about their weakness and strengths, to determine their ability in connecting theory

to practice, and consider how they could improve their practice (see Appendix H).

Research Group One

Research Group One had been set up to journal electronically with Pebble Pad. However, as this was largely unsuccessful, little qualitative data was collected from this group in the form of journals.

Research Group Two

Research Group Two had paper-based journals developed for writing their thoughts about clinical placements. The students were provided with codes in order to retain anonymity. Students handed in the journals at the end of the clinical placement. The paper-based journals increased the amount of qualitative data collected.

Micro-Methodology: Post Discussion and Celebration

At the end of the unit, a class cultural celebration took place. Students brought in traditional dishes from their home or ancestral countries. It was a time to celebrate the completion of Confirm Physical Health (A&P), which was a difficult unit. The students had an opportunity to relax. They mingled with colleagues and staff and discussed their feelings about the research and their personal learning journeys. One of the tenets of Quantum Learning is "If it is worth doing, It is worth celebrating" (Quantum Learning Network, 2011, p.1.14).

Micro-Methodology: Post Questionnaire for Clinical Facilitators[Supervisor}

There were four separate clinical placements, which totaled four hundred hours. The placements consisted of aged care, mental health, acute care and IV medications. A typical day included receiving a report from the previous shift by one of the staff nurses, regarding the patient's conditions, concerns, treatments and medications. Each student then works alongside an enrolled or registered nurse on an assigned ward. They carried out nursing skills that they had been deemed competent to perform, while practicing in the nursing laboratories at the university. A clinical facilitator, which was either a registered nurse or an enrolled nurse, oversaw the diploma of nursing students during each shift and supervised their skills. Each student had a list of skills and during each of the four rotations a specific set of skills had to be deemed satisfactory by the clinical supervisor.

This was also the time when students could gain an understanding of how the classroom theory linked in the clinical setting.

I developed a survey that had specific questions related to the research, as I was trying to gather data on retention of theory and the student's ability to link that theory within the clinical setting (see Appendix I). The administration staff in the Diploma of Nursing department sent emails to all the clinical facilitators, who were overseeing the research groups. The emails explained the research and the rational for the survey. When no one replied, a second, shorter one-page survey was developed. However, none of the clinical supervisors chose to participate in the research. Therefore, all information regarding the clinical placements and their ability to link the theory to their practice came from the students' clinical journals where they provide a self-assessment. The potentially fruitful area of clinical facilitators' perceptions of student nurses on placement is unfortunately untapped in this research.

Data Analysis

Data Analysis: Quantitative Data Collected

The quantitative data was formed by the following scores, as seen in the design layout in chapter three. Firstly, the final grade for the Anatomy and Physiology unit was formed by combining 20% of the weekly quiz scores, and 40% of the midterm score and 40% of the final test score. The combined total then formed the final grade for the unit. All the student scores for each of the research groups were totaled and the average calculated.

The control groups [previous non-research groups] were formed from four previous cohorts in the Diploma of Nursing course. Each of the 4 previous non-research group scores were totaled and the mean calculated. These were then compared to the two research groups final scores, which were totaled and had the mean calculated. Secondly, the final grades for the Analyse Health unit was formed by combining 40% of the score for the workbook and 60% of the final test score. The group scores were totaled, and the mean average calculated. Thirdly, the various test scores from the data interrogation formed another set of the quantitative data. The data interrogation scores differed from the

mean averages, as this set of data looked at the spread of individual scores; rather than group mean scores. The data was formed into Interval Plots. Lastly, the mean test scores for the pop quizzes were gathered totaled and the mean calculated; in order to ascertain retention of theory over the eighteen months of the Diploma of Nursing course.

Data Analysis: Qualitative Data Collected

Qualitative data was garnered from the classroom journals for both the A&P unit and AH unit; as well as the student clinical journals, which covered the four clinical placements. As mentioned previously, there was comparison table pre and post Quantum Learning and Campbellteaching, a Checklist of methods used by students and one questionnaire.

In both Research Group One and Research Group Two, student conversations formed a third layer of qualitative data and personal conversations with colleagues added a fourth layer to this data set. The qualitative data was developed into themes and entered onto Microsoft excel spreadsheets.

Data Analysis: Statistical Package for the Social Sciences (SPSS) Software

Data Analysis: Quantitative Data

Analysis of the quantitative data was carried out using the Statistical package for the Social Sciences (SPSS) software. Arkkelin (2014) explained that SPSS is widely used for data analysis due to its popularity and versatility. It provides several analytical tools and allows for more objectivity and accuracy when entering large amounts of data. One of the types of analysis that is calculated by SPSS is the t-test.

A t-test "Is used to compare the values of means from two samples and test whether it is likely that the samples are from populations having different mean values (University of West England, 2020, para 1). A t-test was used to develop a chart which depicted the comparison between the four previous non-research groups [control groups] and the two research groups.

The data interrogation was analysed using interval plots. Interval plots represented the spread of individual student scores, rather than group mean scores. They can "assess and compare groups" using individual grades (Minitab, 2019). Confidence Intervals are

investigated using interval plots (Minitab, 2019). Dr. Ian Newbegin developed the interval plots. The Quantum Learning Institute analysed

Data Analysis: Qualitative Data

Qualitative data from the journals and the questionnaire was examined for emerging themes and entered onto excel spreadsheets. The checklist regarding the usage of Quantum Learning and Campbellteaching was mentioned previously. Results from the checklist were converted numerically and entered onto an excel spreadsheet as per Dr. Newbegin's specifications. In addition, the five questions were also entered onto the spreadsheet and aligned with the matching numerical entries. This initial data was developed into tables by Dr. Newbegin, who used SPSS (see Appendix I). Te was in the process of reformatting the data into colour coded charts, when he sadly passed away. The percentages were calculated from Dr. Newbegin's initial colour coded charts. Microsoft Excel spreadsheets were used to convert them into new charts that included the percentage, as seen in the results section.

Data Analysis: Bias

In-regard-to qualitative data, objectivity refers to the absence of bias (McLeod, 2017). Katina (2015) is a qualitative user experience (UX) researcher for Meet Up, Twitter and Four Square. She explained that there is always bias in qualitative data and that there are times when biased data is valuable. When we are dealing with people there is going to be some form of bias (Katina, 2015).

According to Sarniak(2015, August), there are nine types of bias as listed below:

Respondent Bias

1. Acquiescence bias – this can happen during interviews where participants yes agree with the researcher. This can be avoided by asking questions that "focus on the respondent/s true point of view" (p. 2)
    - This study: Researcher was not involved in the interview or selection process
2. Social desirability bias – Respondents will answer in a way they think will be "accepted and liked" (p. 2). This can be avoided by "phrasing questions to show

it's okay to answer in a way that is not socially desirable. Indirect questioning – asking about what a third-party thinks, feels and how they will behave – can also be used for socially sensitive questions.

- This study: Questionnaires where varied in their questions and focused on participants individual experiences and beliefs; also, they were anonymous.

3. Habituation bias – In this instance a respondent may answer similar questions the same way. This can be avoided by varying the types of questions asked and keeping the "engagement conversational" (p. 2).
    - This study: In class the questions where related to various aspects of the human body. Their journals were on self-reflection about their personal progress or their feelings about the methods utilised in the classroom.
    - There were no specific questions
4. Sponsor bias [teacher bias] occurs when respondents know the sponsor, they may have a negative or positive feeling towards the sponsor which will affect their responses. This can be avoided by "moderators . . . maintaining a neutral stance, limiting moderator reinforcement to positive respondent feedback" (p. 2).
    - This study: There was a possibility that a student could have been affected by their opinion of the researcher, who was also their teacher. This was minimised by treating all participants equally, respecting the various cultures and not allowing discrimination.

Researcher Bias

5. Confirmation bias occurs when researchers only consider the positive data and dismiss the negative data. This can be avoided by "continually reevaluating impressions of respondents and challenging preexisting assumptions and hypotheses" (p. 2).
    - This study: All data was considered and addressed. Qualitative data was

not summarized but entered onto the excel spreadsheets in the student's own words.

6. Culture bias occurs when a researcher judges another culture based on their own cultural values. This can be minimised by moving, "toward cultural relativism by showing unconditional positive regard and being cognizant of their own cultural assumptions" (p. 2).
    - This study: The class culture was formed using the 8 Keys of Excellence, Home court advantage and live above the line. It was hoped this would assist in creating a positive classroom environment where all students were treated as equals. Students were also informed that there was 'no tolerance' policy for bullying with the classroom. In addition, the students seating was changed during some class sessions to enhance interaction with other groups of students in the classroom.
7. Question-order bias if similar products are clustered together and respondents may provide a similar answer or response. They can be avoided by, "asking general questions before specific, unaided before aided and positive before negative will minimize bias" (p. 2).
    - This study: The questionnaires contained specific questions only.
8. Leading questions and wording bias occur when the researcher elaborates on a respondent's answer. It is like 'putting words in their mount" (p.2). This can be avoided by abstaining from summarising student responses into one's own words, "use the respondents' language and inquire about the implications of a respondent's thoughts and reactions" (p. 2).
    - This study: Only open-ended questions were used.
9. The halo effect occurs when a researcher or respondents focus on a positive aspect, but do not see the whole picture. This can be avoided by reflecting on one's personal assumptions about every respondent, as decisions about an individual can be affected when only a positive aspect is taken into

consideration.

- This study: This was minimised by looking at each student in a positive light, encouraging all students, not giving special treatment to one particular student or group of students.

Chapter Summary

The over-riding paradigm of pragmatism informed the mixed-method approach. A plethora of quantitative and qualitative data was generated. Student voice informed the qualitative data through the use of journal reflections and personal conversations. In analysing this data, the underpinning question was: what does this data tell us about students' learning, and students' capacity to build bridges between theory and practice? The use of Quantum Learning and Campbellteaching challenged traditional nursing education classroom methods. This pragmatic mixed-method style of methodology is therefore, nuanced in response to the unique circumstances of this researcher, and the nature of the cohort with whom the study was undertaken.

Chapter Five

Data Results

'education is not the filling of a pail, but the lighting of a fire'
William Butler Yeats – June 13 1865 - January 28, 1939 (Patterson, 2013)

This chapter contains the results of the mixed-method study on the combination of Quantum Learning and Campbellteaching in the Diploma of Nursing. The chapter is divided into two main sections, with subsections. The first section is the presentation of the quantitative data, commencing with the subsections. This is a comparison of the groups mean scores from both the Anatomy and Physiology, and the Analyse Health units with four previous non-research groups. Second, the results of the pop quiz that tested for retention and recall of the theoretical data from the Anatomy and Physiology unit are presented. Third is a subsection, which covers the data interrogation results.

The second main section addresses the qualitative data. First, fifteen charts and one table display the results of the Quantum Learning and Campbellteaching checklist that was found on the last page of the classroom journal. Secondly, a comparison table was developed that displays the results between previous classroom experiences and Quantum learning, and Campbellteaching. This comparison section was also included in the classroom journal. The last sub-section discusses the emergent themes from the qualitative data that came from classroom and clinical journals, as well as personal conversations. This is followed by the chapter summary.

Quantitative Data

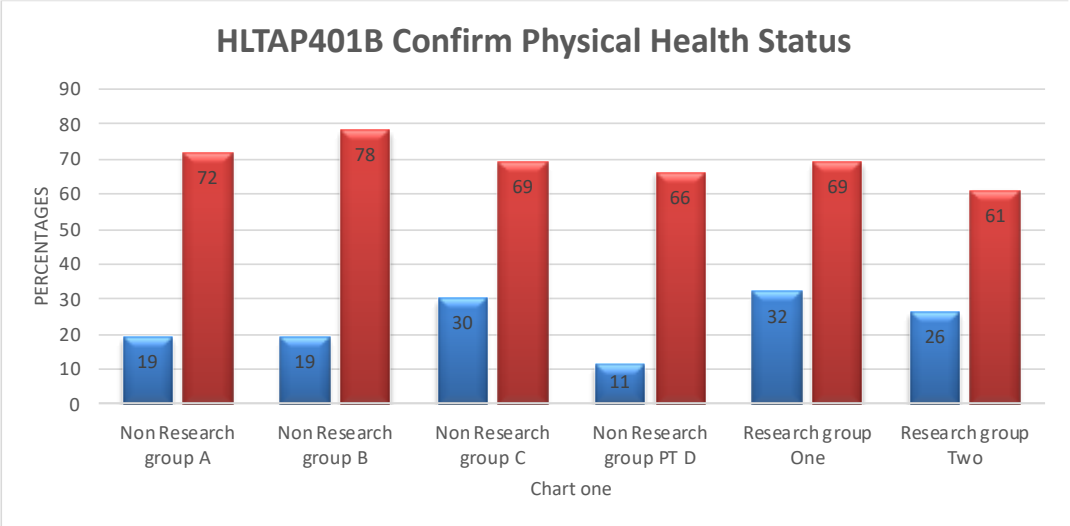
This first section is the comparison to four control groups, which are referred to as the four previous non-research groups. Each of the previous groups were Diploma of Nursing students. The first chart below depicts the mean for each group, which was analysed using the final test results, for the Anatomy and Physiology unit [Confirm Physical Health Status].

The Quantum Learning Institute based all their research on individual progress after the implementation of their program (Quantum Learning Education, 2018). However, initially this research project generated group data as time constraints did not allow for the monitoring of students within the research cohorts.

Sub-section: Anatomy and Physiology– Group Comparisons

The raw results of the *four* previous non-research groups and Research Group One and Research Group Two in the Anatomy and Physiology unit, across a five- year period are found in Chart 1 below.

Chart 1. Raw Data Results Anatomy and Physiology over a 5-year Period



The smaller columns represent the group sizes:

- Group A 19 students – mean of 72%
- Group B 19 students – mean of 79%
- Group C 30 students – mean of 69%
- Part-time group 11 students – mean of 66%
- Research Group One 31 participating students – mean 64%
- Research Group Two 28 participating students – mean 60%

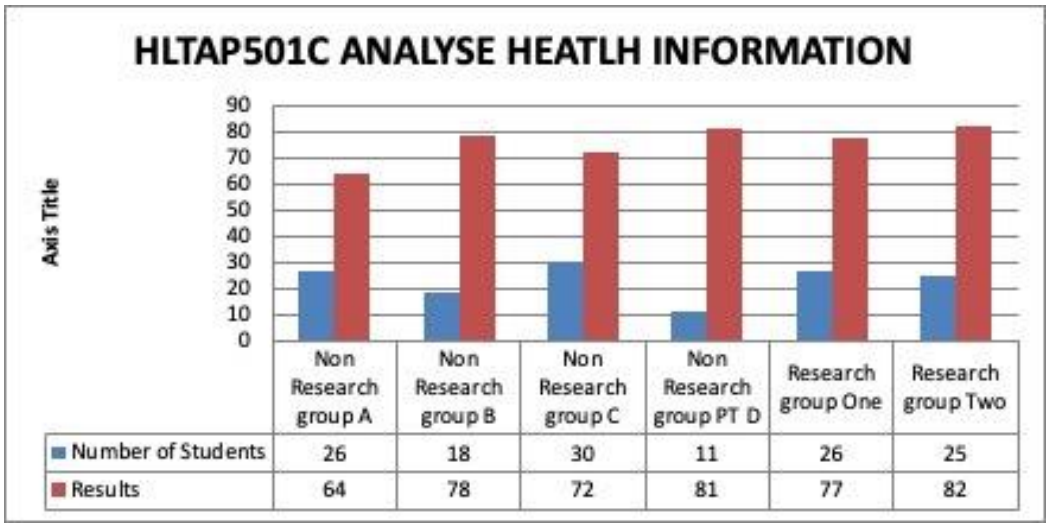
As shown in the above data, group size did not appear to affect student outcomes. Overall, the mean of the final group scores from the Anatomy and Physiology [Confirm Physical Health -CPHS] final test, did not show any significant difference. In fact, both Research Groups had the lowest mean score. The incorporation of the Quantum Learning and Campbellteaching models did not appear to improve student outcomes.

Sub-section: Analyse Health Information – The Second Research Unit

The second set of quantitative data is displayed in Chart 2 below. This data was formed from the final test mean scores for the Analyse Health Information Unit from the four previous non-research groups and Research Group One, and Research Group Two

over a five- year period.

Chart 2. Raw Data Results Analyse Health Information over a 5-year Period



The variation in student numbers in some of the groups following the Anatomy and Physiology unit were due to any of the following reasons: 1. unsuccessful in completing the Anatomy and physiology unit, which is a pre-requisite for the Analyse Health Information unit; therefore they were not able to continue into the second semester subjects and had to re-enroll in the Anatomy and Physiology unit; 2. students who were held back to repeat the Anatomy and Physiology unit and were subsequently successful would now join another group to undertake the rest of their training; 3. Withdrawal of students from the course; due to unsuccessful completion or personal reasons, and; 4. A student could be transferring and had already successfully completed the Anatomy and Physiology unit elsewhere, so could automatically join a group in the Analyse Health Information unit.

The student outcomes were fairly similar across all *six* groups, with the widest gap difference *18* points occurring between previous non-research group A and Research Group Two. However, the outcomes were similar to the raw data for the Anatomy and Physiology unit, but slightly higher outcomes overall. Once again, the results appear to indicate that there was not a significant difference between ‘traditional’ teaching methods and the combined teaching methods found in the Quantum Learning Model and the Campbellteaching Model.

Sub-section: Anatomy and Physiology Unit – Pop Quiz Results

As discussed in the methodology, there were two pop quizzes administered to the research students; in order to test retention and recall of Anatomy and Physiology after the implementation of Quantum Learning and Campbellteaching. The theory test on the cell was selected as the pop quiz: the first pop quiz was given six months after the original theory test. Nine months after that the second pop quiz [15 months into the course – 2 months before completion] was given. Students who were unable to write both pop quizzes were not included in the data. Once again, changes in student numbers were, due to withdrawals from the course or unsuccessful completion of a unit; repeating students continued with a new group.

Research Group one

The results for each research group are presented in three separate charts – Chart 3a, Chart 3b, and Chart 3c. Chart 3a – represents international students, with English as an additional language; Chart 3b – represents Australian students with English as an additional language, and; Chart 3c – represents Australian students English speaking only. Each chart is further divided into age groups and gender. The bars are grouped in threes, each pairing represents one student. Each bar represents a quiz, and they are in order of delivery – original, first pop quiz and second pop quiz. Each has chart is categorized by age and gender.

Chart 3a. Research Group one International – English as an Additional Language [EAL]

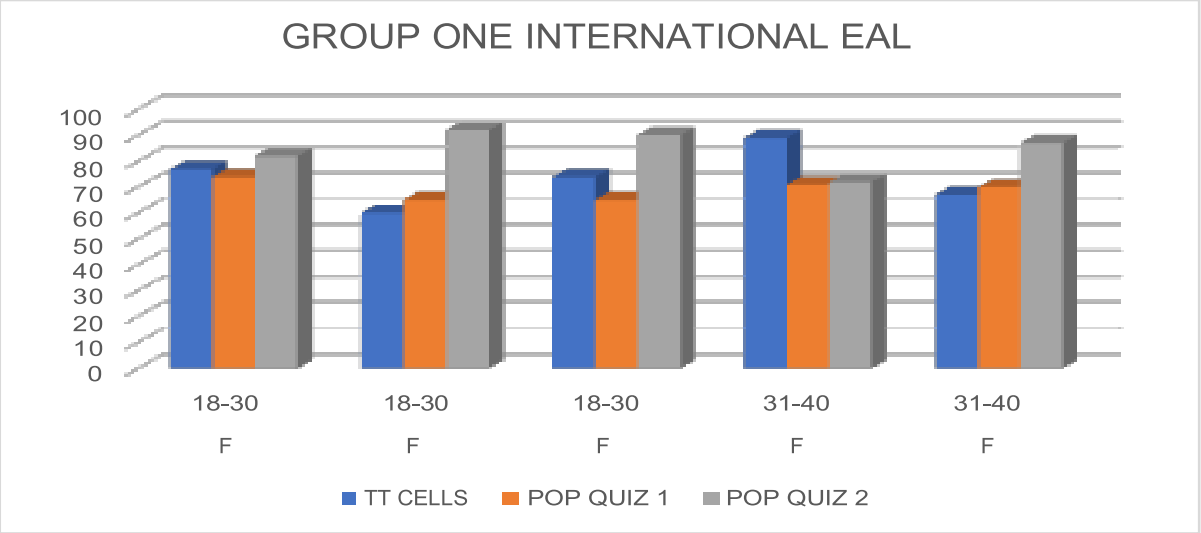


Table 9. Explanation Chart 3a – Research Group One International EAL

GENDER	*AGE*	*< 50%*	*50-60%*	*60-70%*	*70-80%*	*>80%*
Females	**18-30**					**4**
	31-40				**1**	
	41-55					
Males	**18-30**					
	31-40					
	41-55					

This chart shows that one female international student aged 31 – 40 scored 70% - 80%. The younger cohort of 4 females aged 18 – 30 scored > 80%. The results suggest that the strategies utilized helped with retention and recall of theory over an extended period of time. The first quiz was taken at the beginning of semester one and the last pop quiz was written at the end of semester three.

Chart 3b. Research Group One: Australian – English as an additional language [EAL]

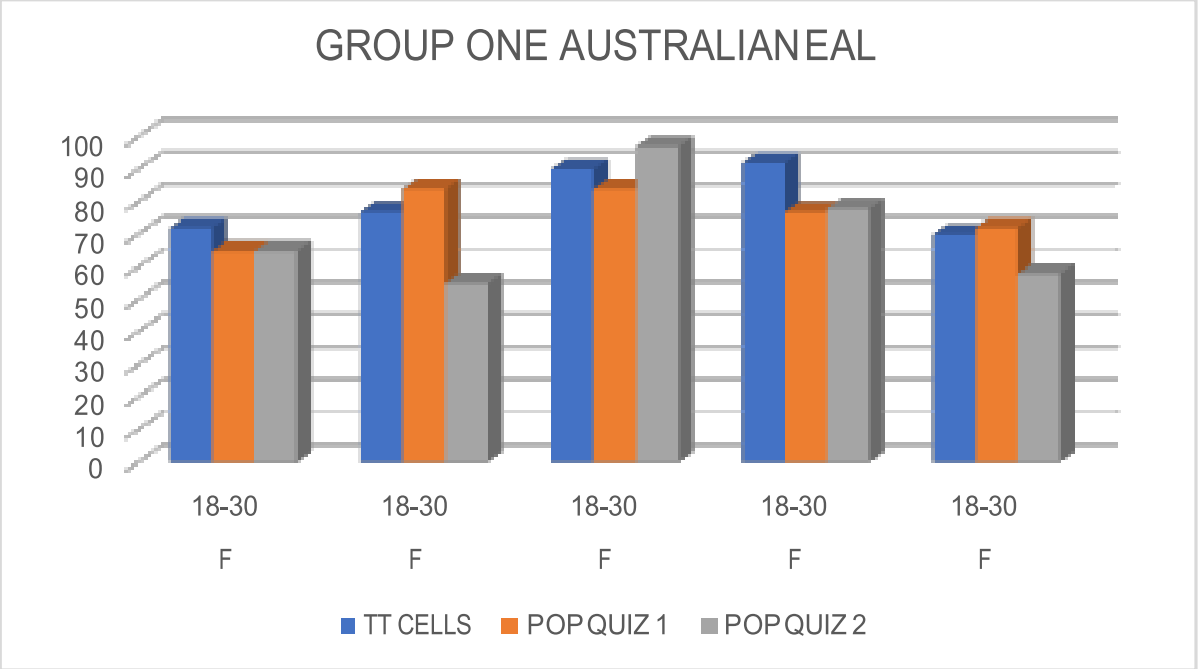


Table 10. Explanation Chart 3b – Research Group One Australian EAL

GENDER	*AGE*	*< 50%*	*50-60%*	*60-70%*	*70-80%*	*>80%*
Females	***18-30***		***2***	***1***	***1***	***1***
	31-40					
	41-55					
Males	***18-30***					
	31-40					
	41-55					

This chart depicts the results for Australian students with English as an additional language. All were aged 18-30. Only two of the students scored 70% and above. Whereas the international group of four females all scored 70% and above. However, one student scored 60% to 70% and two scored 50% to 60%. Over an extended period of time all students maintained a minimum of theoretical recall.

Chart 3c. Research Group One: Australian Students English Only

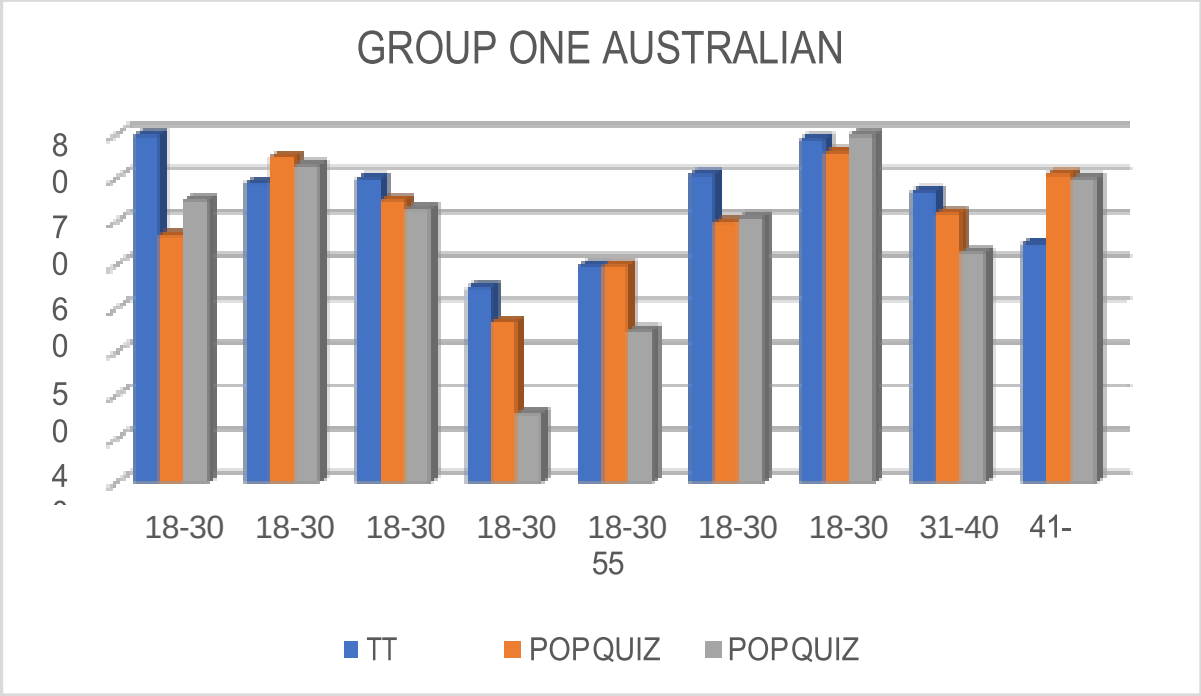


Table 11. Explanation Chart 3c – Group One Australian Students English Speaking Only

GENDER	*AGE*	*< 50%*	*50-60%*	*60-70%*	*70-80%*	*>80%*
Females	***18-30***	***2***		***2***	***1***	
	31-40		***1***			
	41-55				***1***	
Males	***18-30***			***1***	***1***	
	31-40					
	41-55					

This chart 3c – Australian English speaking only students displays varied levels of achievement. Two female students aged 18-30 scored < 50%, which indicates poor levels of recall. A female student aged 31-40 scored 50% to 60% of recall over an 18-month period. One female student aged 41-55 scored 70%-80%. Both male students were aged 18-30 – one scored 60% to 70% recall and the other scored 70%-80%. Overall the data indicates that international students achieved the highest level of recall over an 18-month period.

Research Group two

It is important to note that Research Group Two had four substitute teachers, who were not familiar with accelerated learning techniques nor the Quantum Learning class culture. The charts relevant to Research Group Two are: Chart 4a, Chart 4b, and Chart 4c. Chart 4a – represents international students, with English as an additional language; Chart 4b – represents Australian students with English as an additional language, and; Chart 4c – represents Australian students English speaking only. The charts are laid out and organised in the same way as for Research Group One.

Chart 4a Research Group Two: International – English as an Additional Language

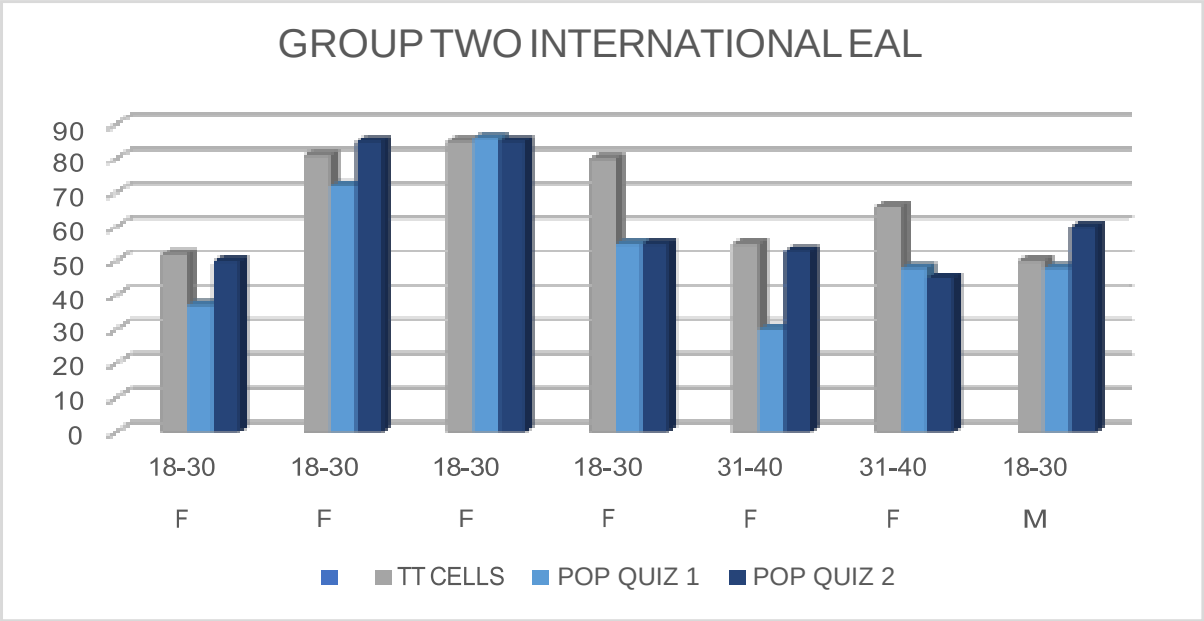


Table 12. Explanation Chart 4a – Group Two International EAL

GENDER	AGE	< 50%	50-60%	***60-70%***	***70-80%***	***>80%***
Females	18-30	1	1			***2***
	31-40		2			
	41-55					
Males	18-30		1			
	31-40					
	41-55					

In this chart the majority of students achieved 50% to 60% retention and recall. One was below 50% and two female students scored over 80%.

Chart 4b. Research Group Two: Australian – English as an Additional Language

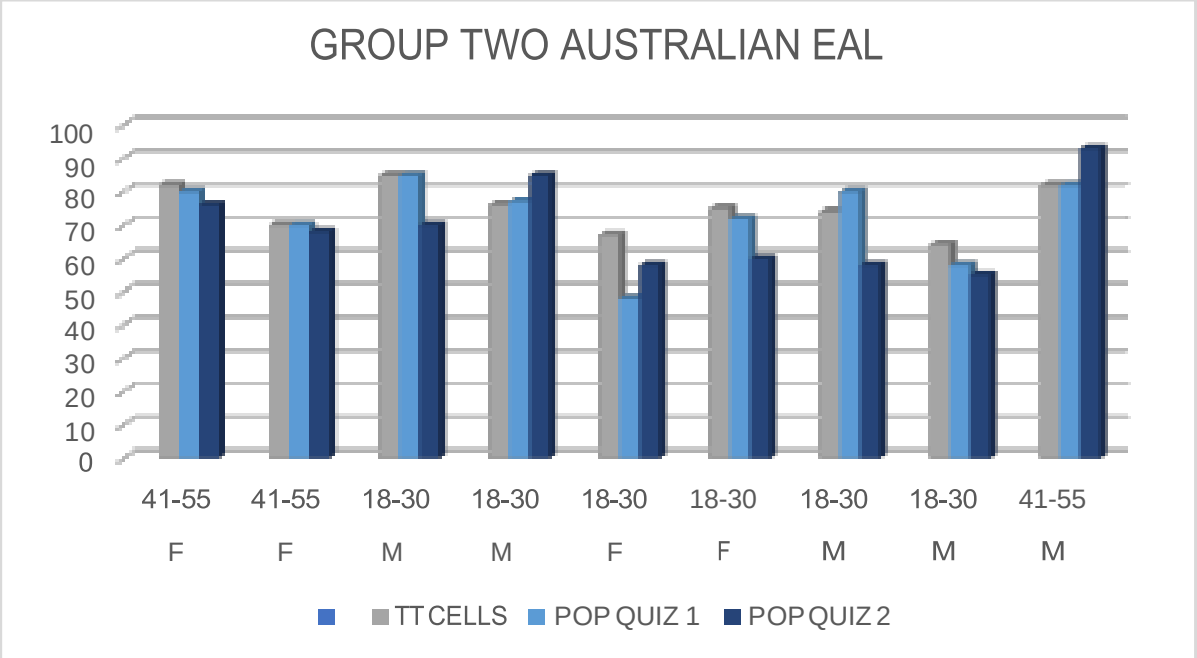


Table 13. Explanation Chart 4b – Group Two Australian EAL

GENDER	***AGE***	***< 50%***	***50-60%***	***60-70%***	***70-80%***	***>80%***
Females	18-30		2			
	31-40					
	41-55			1	1	
Males	18-30		2	1		1
	31-40					
	41-55					1

Two female and two male students aged 18-30 scored 50%-60%; one female and one male student aged 18-30 scored 60%-70%. One female aged 41-55 scored 60%-70% and two males one aged 18-30 and 41-55 scored >80%. Overall all students had at least 50% recall of theory over an 18-month period. Students aged 41-55 had higher levels of recall.

Chart 4c. Research Group Two – Australian Students English Speaking Only

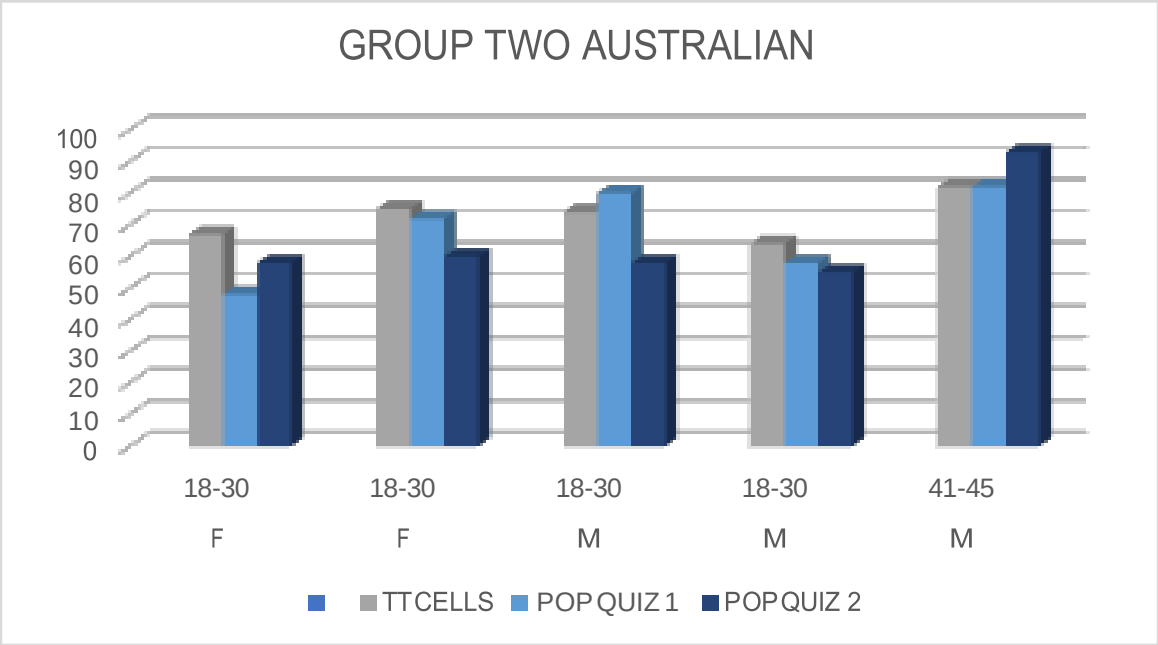


Table 14. Explanation Chart 4c – Group Two Australian Students English Speaking Only

GENDER	***AGE***	***< 50%***	***50-60%***	***60-70%***	***70-80%***	***>80%***
Females	*18-30*		2			
	31-40					
	41-55					
Males	*18-30*		2			
	31-40					
	41-55					1

This chart shows that the male student over age 41 scored the highest for retention and recall. The remaining four students aged 18-30 demonstrated 50% to 60% on retention and recall over an eighteen-month period.

The last sub-section in the quantitative data is the data interrogation that was undertaken; in order to identify where a discrepancy lay between the quantitative data and the qualitative data found in the group mean comparisons.

Sub Section: Anatomy and Physiology Unit – Data Interrogation

Research student journals indicated positive experiences with the Quantum Learning and Campbellteaching integrated models. As indicated in the qualitative data section, the research students frequently stated that they approached their work with more confidence and could make stronger connections within the units and across contexts than they had previously done. However, the quantitative data did not appear to display increased outcomes for the two research groups. The quantitative data and qualitative data did not align.

In order to examine this inconsistency, I undertook a data dig. I re-examined specific areas of the quantitative data, to determine if there were significant differences between cohorts that were missed. If this was the case, I was keen to identify what methods and methodologies had impacted student engagement. The specific aspects of the study that I focused on were lessons that employed explicit methods. This consisted of two weekly theory tests from Anatomy and Physiology (the cell and the cardiovascular system), and a linking table on congestive heart failure, found in the Analyse Health units final test. These particular sections were chosen to dig into the data for explanations because: 1.They contain important theoretical content that students should be able to recall, 2. They do not represent many marks in the final grades of students because of the way the assessment was designed, and 3. The teaching of each of these areas involved a specific Kaleidoscope classroom strategy. The initial outcome was group focused, but the data investigation probed test results and diagram scores of all the class groups, rather than group means – the scores of each student was plotted into Interval plots [whiskers graphs] represent the distribution of individual outcomes across subsections of the Anatomy and Physiology Unit and the Analyse Health Information unit.

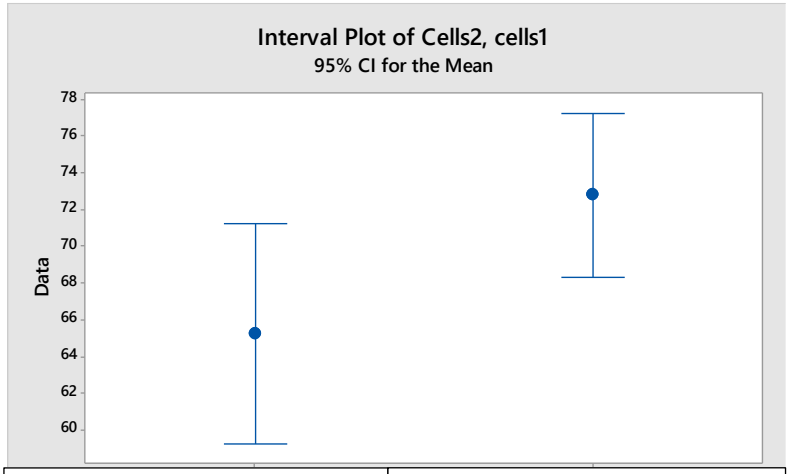
The Cell

The first set of interval plots were developed from the teaching session on the human cell. This content was taught using simple diagrams of the cell, colour-coding, chunking, scaffolding, explicit dialogue, buddy talk, teacher walks, models and a video. Results from the theory test on the cell and the diagram of the cell within the same theory

test are seen on the following pages. The interval plots on the following pages compares the combined scores of the 4 previous non-research groups to the combined scores of Research Group One and Research Groups Two.

Chart 5a The Cell – Interval plot 1 test score

The interval plot below represents the distribution of marks for research groups one and two, compared to the combined scores of the four previous non-research groups, taken from the weekly theory test on the cell (Jones, 2016).



Please note: *that the **order is switched in this first graph.** Research group one and two are on the right. The 4 previous non-research groups are on the left*

Table 15. Explanation Chart 5a – The Cell Interval Plot 1

Score Ranges	Research Group Cell 1	Non-Research Cell 2
Highest scores	77.5%	71.5%
Lowest Scores	69%	58%
Difference in Mean scores	7.5% higher	
Distance between highest score Cell 1 & lowest score Cell 2	16% higher	
The research groups attained higher percentages with the lower scoring students performing at the level of the higher performing students in the previous groups. This was not identified in the original quantitative data, when all scores were considered together, but becomes apparent when assessing individual scores on this theory test.		

The second interval plot for the cell, was developed from the diagram of the cell, found in the weekly theory test on the cell (Jones, 2016). Students had to label the seven major organelles [structures] inside a cell and match their functions.

Chart 5b The Cell – Interval Plot 2 diagram score

The interval plot below represents the distribution of marks for the combined research groups one and two, compared to the combined scores of the four previous non-research groups, taken from the cell diagram found in the weekly theory test on the cell. The diagram was chosen to show the impact of diagramming on student outcomes.

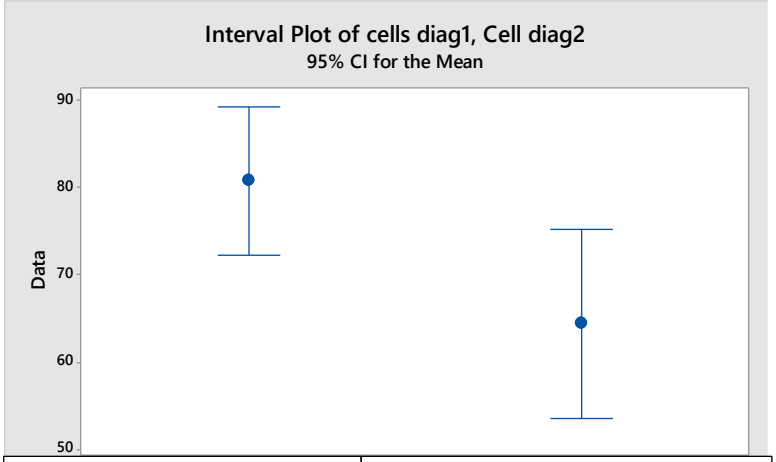


Table 16. Explanation Chart 5b – The Cell Interval Plot 2

Score Ranges	**Research Group Cell Diagram 1**	**Non-Research Cell Diagram 2**
Highest scores	89%	73%
Lowest Scores	75%	53%
Difference in Mean scores	16% higher	
Distance between highest score Cell diagram 1 & lowest score Cell diagram 2	35% higher	

The research group again attained higher scores, with the lower scoring students from the research groups performing at the level of the higher scoring students in the previous groups. Here are two comments about diagramming from the research cohorts: Grp1F18-30IntEAL – "Memorising became very easy for me – colour coding and diagramming. The simplified diagrams and explanations of systems they helped me a lot. I will use Campbellteaching in the future." Grp1midyr2012M 35+AUEAL – I absorbed more with diagrams and colour. I really agree with "No comprehension without picturing." Grp2F18-30Int'lEAL– "Very effective & easy, now use colouring & picturing most of the time – it helps me to remember better."

The Cardiovascular System

The second set of intervals plots was taken from the results of the weekly theory tests for the Heart [cardiovascular system]. To assist the students' learning I taped the basic structure of a heart onto the classroom floor. Students participated in active learning during class, by walking each other through the heart structures, while discussing the blood flow, blood pressure and the electrical conducting system.

Chart 6a Heart [Cardiovascular system] – Interval plot 3 test score

The interval plot below represents the distribution of marks for research groups one & two, compared to the combined scores of the 4 previous non-research groups.

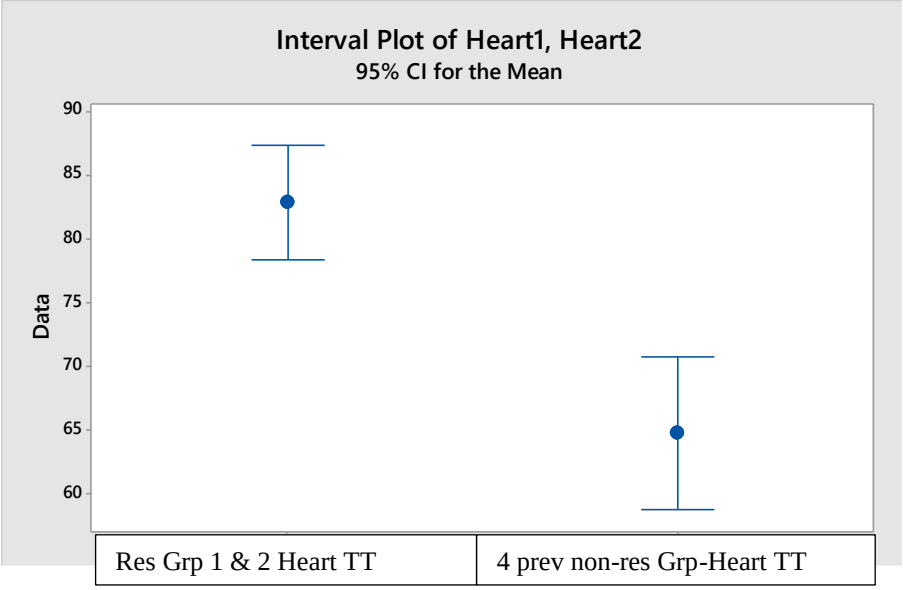


Table 17. Explanation Chart 6a – The Cardiovascular System A&P Interval Plot 1

Score Ranges	**Research Group Heart 1**	**Non-Research Heart 2**
Highest scores	87%	71%
Lowest Scores	78%	58%
Mean score variance is what %	18% higher	
Distance between highest score Heart 1 & lowest score Heart 2	29% higher	
The research group attained higher percentages, with the lower scoring students in the research group, performing above the highest performing student in the four previous non-research groups by 7%. The importance of individual comparison is demonstrated once again.		

Chart 6b Heart [Cardiovascular system] – Interval plot 4- diagram on floor

The interval plot below represents the distribution of marks for research groups one & two compared to the combined scores of the four non-research groups, taken from the heart diagram found in the weekly theory test for the cardiovascular system. The diagram was chosen to show the significance of diagramming and active learning on student outcomes.

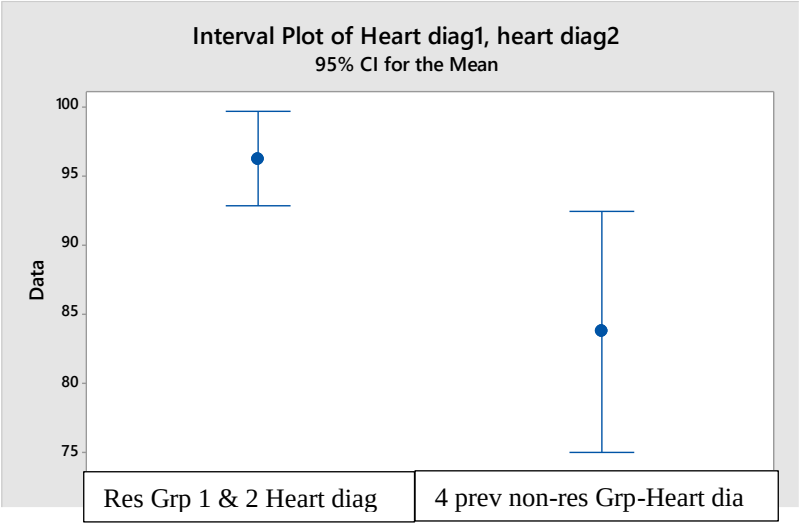


Table 18. Explanation Chart 6b – The Cardiovascular System A&P Interval Plot 2

Score Ranges	**Research Group Heart Diagram 1**	**Non-Research Heart Diagram 2**
Highest scores	99%	92%
Lowest Scores	93%	74%
Difference in Mean scores	12% higher	
Distance between highest score Heart diagram 1 & lowest score Heart diagram 2	12% higher	

The research group has attained higher percentages with the lower scoring students performing at the level of the higher performing students in the previous groups. Of significant importance is that there is only a 6% percent difference between the highest and lowest scores in the research group versus the 18% difference in the previous groups. The 6% difference meant that all students scored above the 90th percentile.
Grp22013F41-55Au, "*It is great, interesting and fun – 1st time I understood the cardiovascular system and how it works."*

Sub Section: Analyse Health Unit – Data Interrogation

The last interval plot was taken from the second unit in the research study, Analyse Health Information. Methods used in the Anatomy and Physiology unit focused on life skills, how to learn, how to study, understanding of the theory, retention, recall and the development of critical thinking skills. However, the focus for the Analyse Health unit was to teach students how to develop deep learning, critical thinking and linking [transference] of theory to their practice. It is well documented that the ability to link theory to practice is vital to decreasing the theory-practice in the nursing profession (Corlett, 2000; Htlevik, 2012; Rolfe, 1998; Scully, 2012).

Methods used in the Analyse Health classroom included, Power point presentations used in tandem with the white board. Mind-maps were developed from the information contained on the slides as the information was discussed. The students colour-coded and completed the mind-maps on the white board. Diagramming, scaffolding, chunking and explicit dialogue were also utilised. The most important strategy was the linking table that allowed students to organise the theory in a simple clear manner where they could visualise the connections between the theory component taught in Anatomy and Physiology, and the diseases processes they learned in Analyse Health. The students worked independently or in small groups to research the information they required to complete the Linking Tables.

The last interval plot below displays the student outcomes after the incorporation of the Linking Table.

Chart 7 Congestive cardiac failure [CCF] – interval plot 5 linking table score

The interval plot below represents the distribution of marks for research groups one & two, compared to the combined scores of the 4 previous non-research groups, taken from the linking table on congestive cardiac failure found in the final test for the Analyse Health unit.

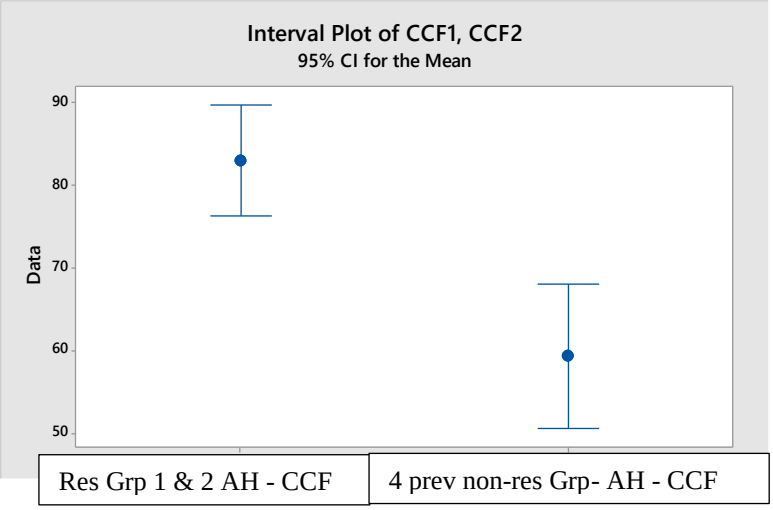


Table 19. Explanation Chart 7 – Congestive Cardiac Failure Interval Plot 5

Score Ranges ***Linking Table***	**Research Group CCF 1**	**Non-Research CCF 2**
Highest Scores	90%	69%
Lowest Scores	76%	51%
Difference in Mean Score	23% Higher	
Distance Between Highest Score & Lowest Score for CCF1 And CCF 2	16% Higher	

The Individual Scores in The Research Groups Were Higher Than Those in The Previous Groups. The Lowest Student Score in The Research Group was 11% Higher Than the Highest Student Scores in The Previous Groups. Two student comments regarding the linking table: Grp1midyear2012F41-55Au Stated, *"I was so glad that I brought the spreadsheet [linking table] with me at we prepared in Analyse Health information class. It was so handy and useful, provided a quick guide to assessing the client, and identifying interventions/actions plans in client's charts."* Grp2F201318-30Au stated, "You don't just learn theory and then practical. It means that you learn the theory that is related to the practical on clinical placements you could do a task and understand the theory behind, and it consolidated the information."

Summary of the Quantitative Data

As noted previously, a comparison of the groups means for the four previous non-research groups [control groups], the Anatomy and Physiology group means, and the Analyse Health Information group means found similar results across all the groups. Suggesting that the implementation of the Quantum Learning and Campbellteaching models made no difference to student outcomes. However, the Qualitative data did not coincide with the quantitative data. Therefore, a further interrogation of the data was undertaken. Four particular sections of theory tests from the Anatomy and Physiology unit and two from the Analyse Health Information unit were chosen. They were picked due to the different methods that were employed during the teaching of each topic. It was found that there were significant increases in the research students' scores as compared with the 4 previous non-research scores. Factors that could have affected the initial comparisons as discussed previously were: the same teacher for all units, who was utilizing learning styles methods and was experimenting with a range of methods; in order to increase student outcomes. In addition, students often experienced personal issues that interfered with their studies.

In the pop quiz results 92% of the students scored 50% and above on the pop quizzes over an eighteen-month period. The five female international students from Research Group One had the most consistent high scores, one scored 70%-80% and the other four scored >80%. Across both groups, those 41-55 tended to have higher scores. Overall, the data results suggest that Quantum Learning and Campbellteaching were effective in assisting with retention and recall of theoretical information in both the Anatomy and Physiology unit and the Analyse Health Information unit. The data also, suggests that the use of the Linking Table helped students to organise the theory in such a manner that was beneficial for understanding and recall of theoretical information of disease processes, and their responsibilities as nurses in response to the signs and symptoms that could be manifested.

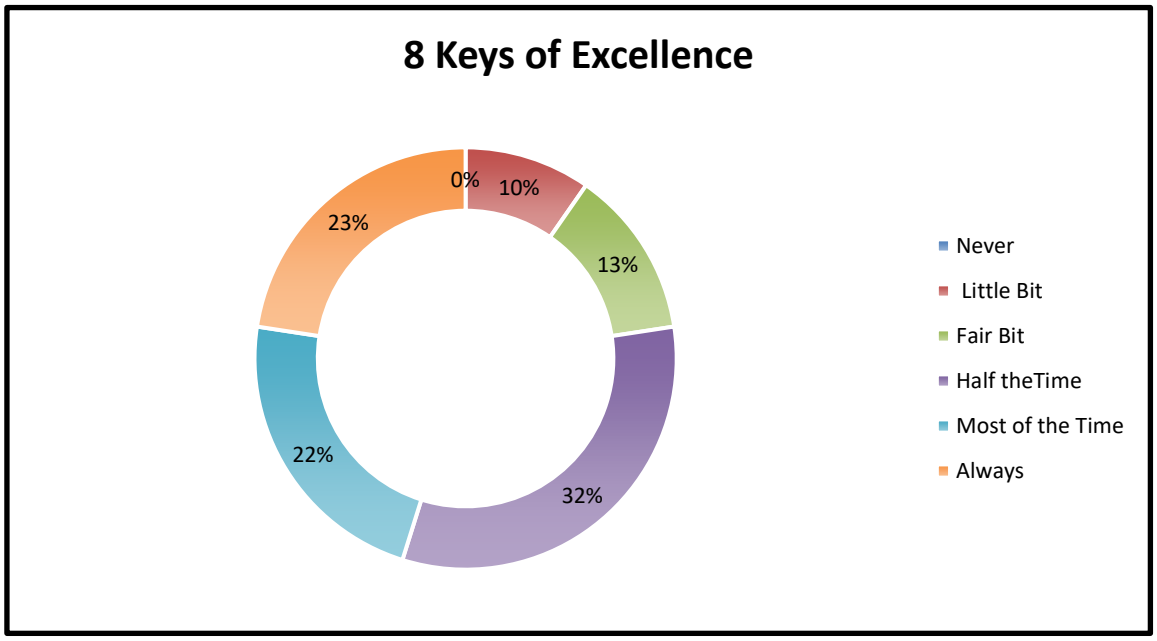
Qualitative Data

Several of the Quantum Learning and Campbellteaching methods were used consistently during the classroom sessions. Overall, the data suggests that students used multiple methods with varying combinations. However, there are some methods that were used consistently by a number of the research students. The data suggests that the research students could easily define the best methods for their learning preferences. Different tasks also required the use of other methods that were not necessarily an individual's preference. Forty-seven students filled in the checklist that formed the last page of the Anatomy and Physiology classroom journals. This checklist allowed for a clearer picture of student perceptions, regarding the usefulness of each strategy.

The percentages found in the charts below, are the combined results for Research Group One and Research Group Two. Each chart depicts the percentage of usage for a particular method and they are placed on separate pages for ease of viewing. There are 15 charts. They are: The 8 Keys of Excellence, Home Court Advantage, Living Above the Line, Big Brain Ideas, Diagramming with Colour, Positive Affirmations, Story Lines, Motions to Words, Atmosphere, Summarising with a Buddy, Memory Pegs, Celebration of Successes, Relaxation Techniques and Listening to Baroque/similar Music when Studying.

As discussed previously, the *8 Keys of Excellence* formed the basis of the life skills component of Quantum Learning. They assisted in the formation of classroom culture and set high standards for behaviour. The *8 Key of Excellence* are integrity, failure leads to success, speak with good purpose, this is it, commitment, ownership, flexibility and balance (The Learning Network, 2011).

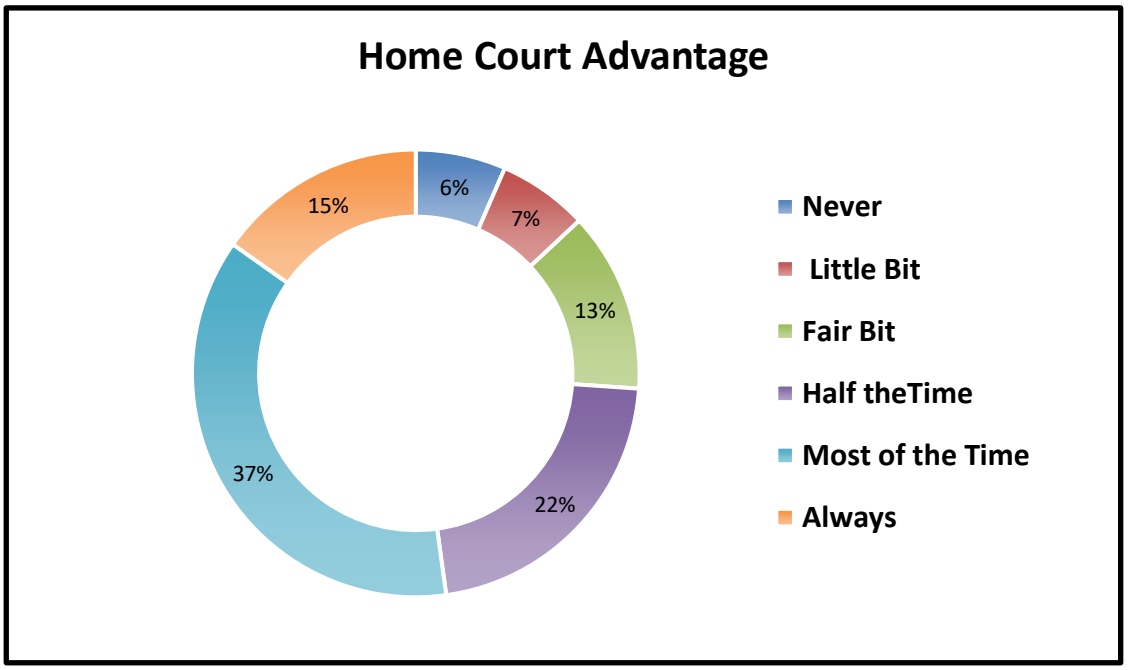
Chart 8. Key Finding: Student usage of the 8 Keys of Excellence



The chart above represents the students' use of the *8 Keys of Excellence* in their learning. Twenty-three per cent of the students indicated that they use the *8 Keys of Excellence* all the time; 22% most of the time, and; 32% half the time. In total, 77% of the students were frequently implementing the *8 Keys*. No one indicated that they never used the *8 Keys of Excellence.* Overall, 87% indicated that they used this strategy half the time or more. One student commented in their journal that: "*8 Keys of Excellence* good way of living & studying" (Journal notation, 201

Home Court Advantage is part of the life skills component of Quantum Learning. This strategy is used in the classroom to form a safe, supportive and belonging learning environment (The Learning Network, 2011; Jones, 2016).

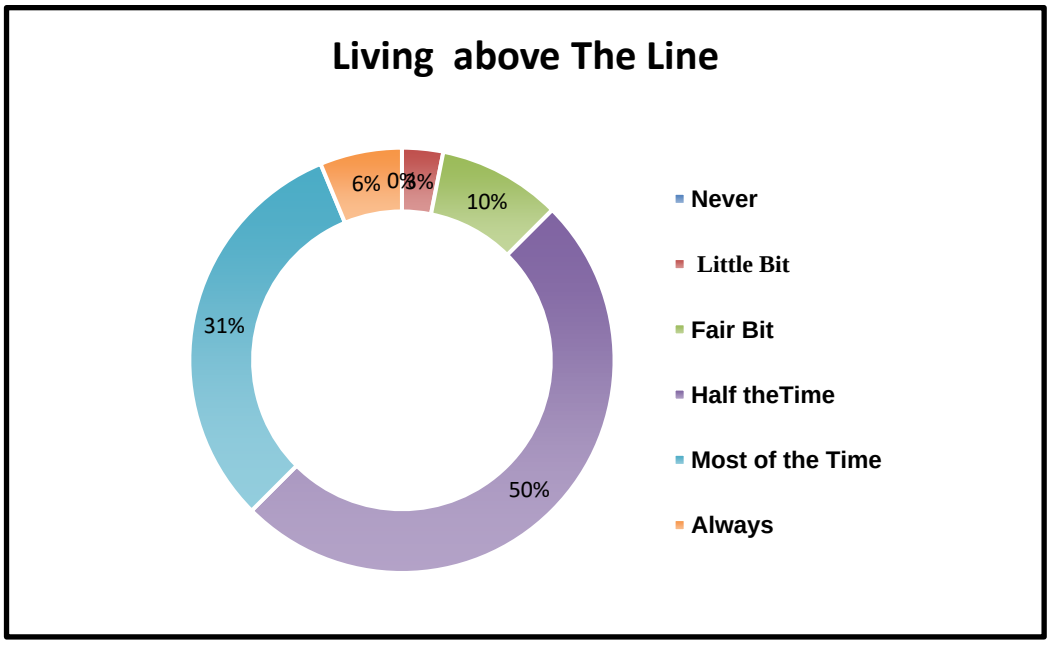
Chart 9. Student usage of Home Court Advantage



Fifteen per cent of the students indicated that they always used this strategy; 37% use it most of the time; 22% used it half of the time. Only 6% of students never used *Home court advantage* as a strategy. Overall, 77% indicated that they used this life skill and learning strategy half of the time of more. One student claimed that they felt safe with home court advantage as it generated a trusting environment.

The concept of *Living Above the Line* is another aspect of life skill education that is utilised in Quantum Learning. *Living Above the Line* refers to students taking responsibility for their learning and personal conduct. It requires them to not make excuses or assign blame, but to deal with situations in a positive, resolution-focused way (The Learning Network, 2011).

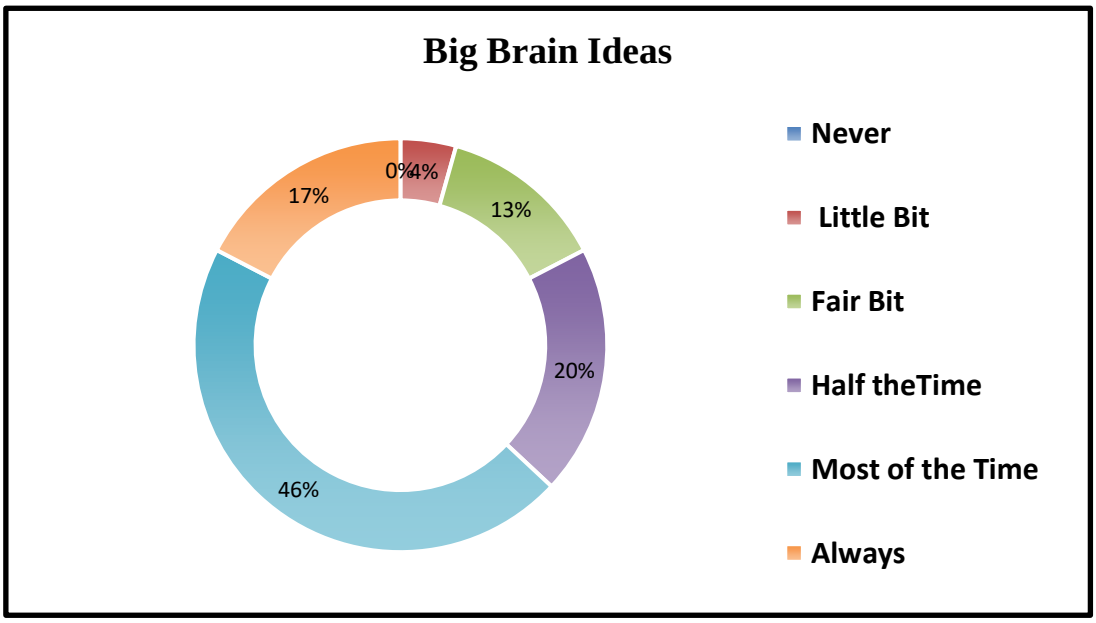
Chart 10. Student usage of Living Above the Line



Six per cent of the students reported using this concept all the time; 31% used it most of the time; 50% indicated they implemented living above the line half the time; 10% used it a fair bit, and; 3% used it a little bit. Every one of the respondents indicated that they did use this strategy. This outcome suggests that students wanted to take responsibility for their learning and were implementing this life skill, as 87% of the students were utilising live above the line half the time or more frequently.

An underlying theory of Quantum Learning is brain-based learning, by the theorist Eric Jensen. Three key Big Brain Ideas are the importance of picturing what is being learned to enable understanding; meaning is made when it is built upon what students already know and; when methods are put into place neurons can become wired and stronger (The Learning Network, 2011). These concepts were taught in order for students to increase their understanding of how to learn.

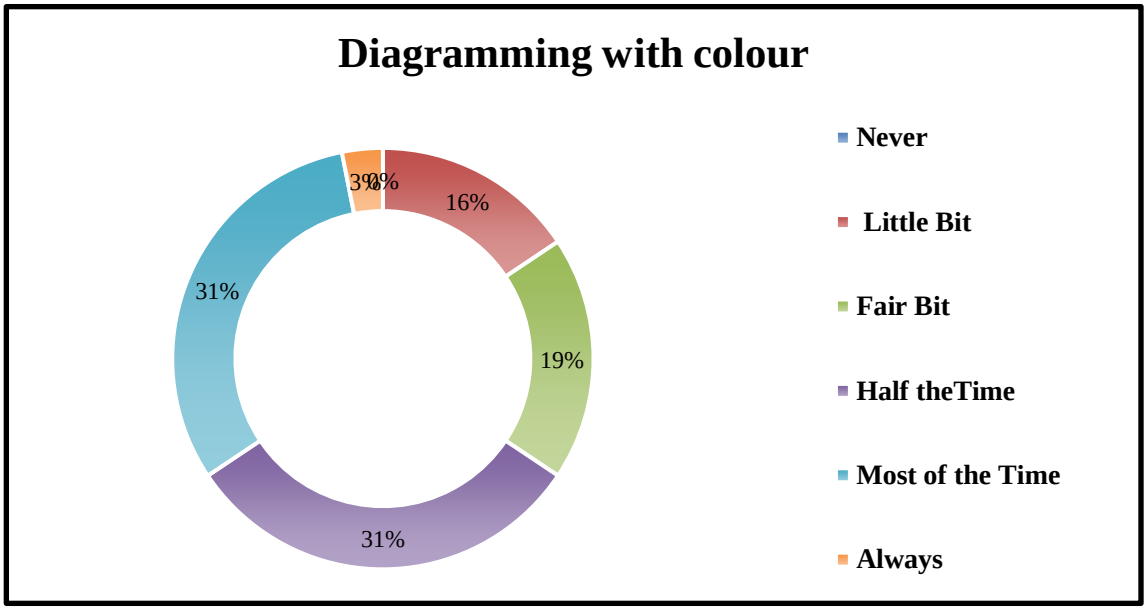
Chart 11. Student usage of Big Brain Ideas



Seventeen per cent of the students indicated that they used brain-based techniques all the time; 46% of students used these methods most of the time; 20% half the time. Four per cent of students claimed to use them a little bit. No students indicated that they never used these methods. Overall, 83% of the students indicated that they incorporated brain-based learning methods half of the time or more.

Diagramming is a Campbellteaching strategy. John Campbell takes complicated diagrams of body systems and draws simplified versions that can be easily understood. The researcher added colour coding to the process in order to provide clarity to the distinct aspects of each internal structure. Students formed a review book as they drew and labelled each diagram on an A3 drawing pad.

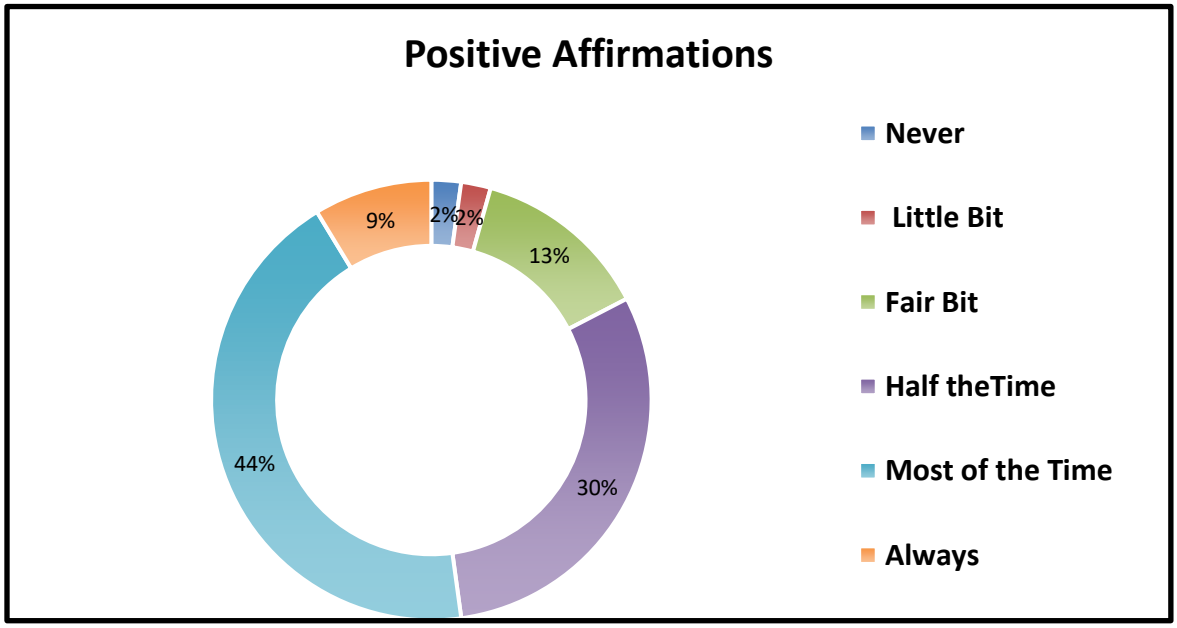
Chart 12. Key Finding: Student usage of Diagramming with Colour



As indicated in the chart above only 3% of the students used this strategy all the time. However, 31% indicated they used diagramming with colour most of the time and a further 31% indicated that they used it half the time. Once again, all students used this strategy at some time. Overall, 65% of students used this strategy half of the time or more. A student journal comment in relation to Campbellteaching was: “Absolutely love John Campbell’s way of teaching. Read his book first then use his YouTube videos, like a second class for review without the distractions” (Grp2F2013InternationalEAL).

Positive affirmations also form a significant role in building life skills. They are another aspect of Quantum Learning. Signage containing positive affirmations was placed around each classroom to provide constant positivity and encouragement (Quantum Learning Network, 2011). Students were encouraged to use positive affirmations amongst themselves, and to use positive self-talk.

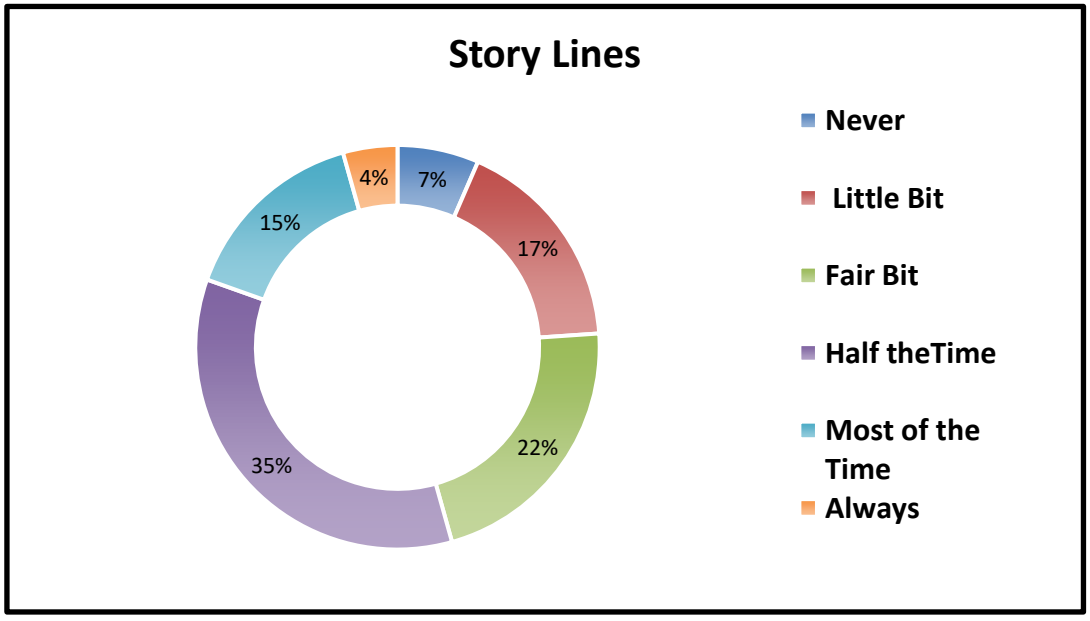
Chart 13. Student usage of Positive Affirmations



Nine percent of participants indicated that they used this strategy all the time; almost half the research participants (44%) used positive affirmation most of the time. Two percent of students indicated that they never used positive affirmation. Overall, 79% of participants indicated that they used positive affirmation half of the time or more. One journal entry (2013) stated that this student they could be, “Extremely negative towards myself.” She then stated that her goal was to stay positive, maintain clear perspective, and “decrease self-doubt.” Low self-esteem was a consistent theme in the journals and students perceived this as a significant hurdle during their study (Personal conversations, 2012 – 2013).

Story line in this research is a term used to describe the mnemonic process of creating stories to link facts or ideas in order to aid memory. When used in conjunction with body actions, memory and recall have the potential to be increased as the process is repeated throughout the lesson. This is another strategy employed by Quantum Learning (Quantum Learning Network, 2011).

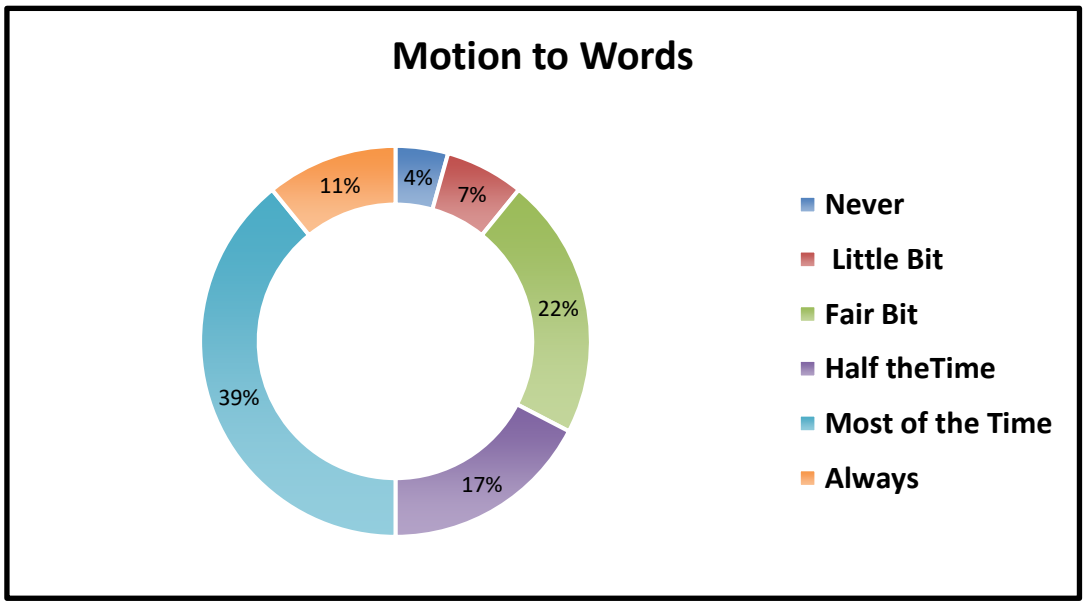
Chart 14. Student usage of Story Lines



Only four per cent of the students indicated that they used story lines all the time; 15% most of the times; and 35% half the time. Seven per cent never used story lines in their study. Overall, 54% of the students indicated that this was useful half the time or more. The number of students using story lines, and the number who did not, indicates that story lines worked well for some students, but not for others. This was a strategy where learning preferences became apparent. One student journaled that, “Story line has been very effective” (2013).

An aspect of accelerated learning is learning by putting actions to words. Simple actions attached to ideas or words assist in memory and recall. Students reported finding this way of learning to be very effective.

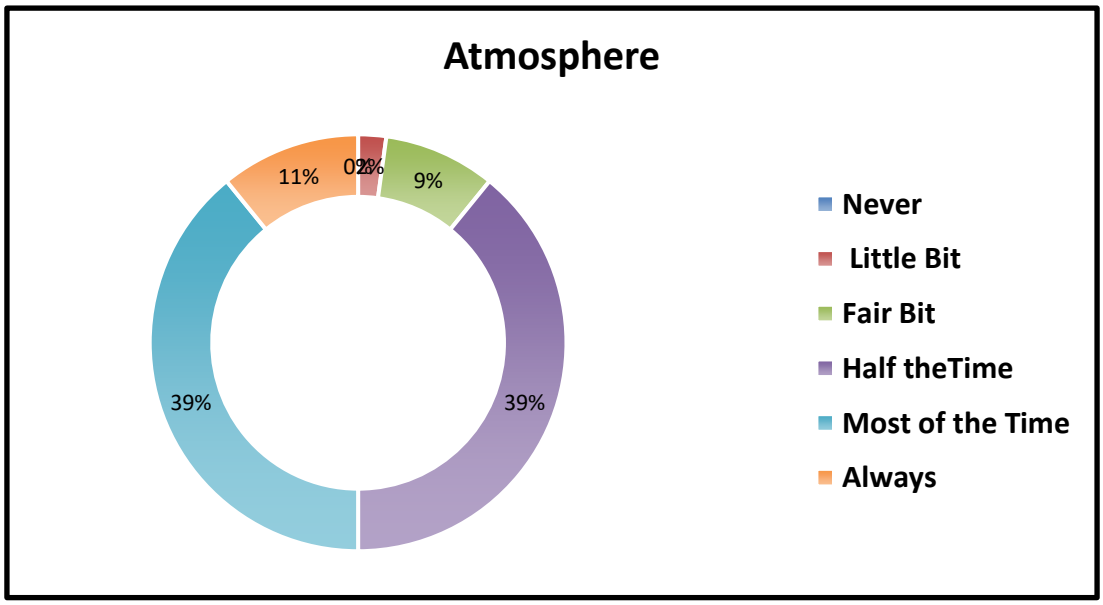
Chart 15– Key Finding: Motion to Words - students found this strategy very effective in retaining and recalling their theory



Eleven per cent of the students who participated in this research found associating actions and words very useful. A further 39% indicated they used this strategy most of the time; 17% half the time; and 22% a fair bit. Although 4% never used this strategy, 67% of the students felt that this was valuable half the time or more during their learning. One student noted, “Using body motions helped me a lot – remember key things through test” (student journal,2013). Another student associated this type of learning with pleasure: “Learning about the 4 different cells of the pancreas was fun, because we got to act out Alpha, Beta, Gamma and Delta” (Student journal, 2012). This strategy was also useful for students when their task was to link different parts of the body: “It helped when [our teacher] got up and linked movements and actions to the musculoskeletal system” (student journal, 2013).

Creating a positive, supportive and safe learning atmosphere is an underpinning principle of Quantum Learning. Students were asked to rate the importance of the atmosphere in the classroom to their learning.

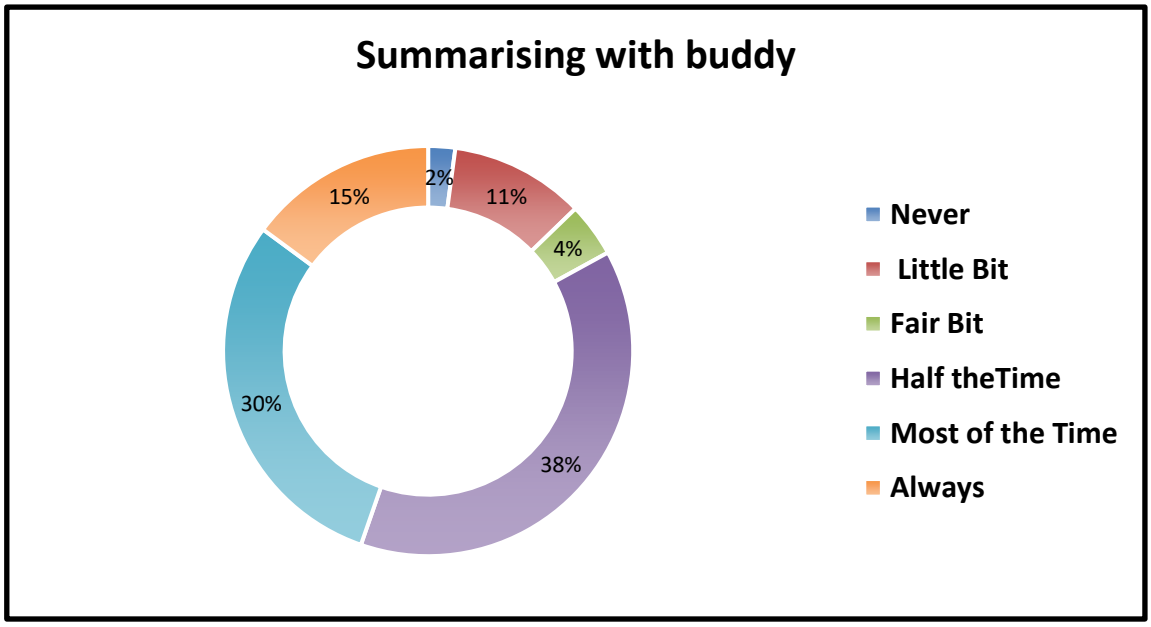
Chart 16. Key Finding: Students indicated Atmosphere as the most important



Eleven per cent indicated that the atmosphere in the classroom always impacted their capacity to learn. Thirty-nine per cent indicated that it was important most of the time; and a further 39% said it was important about half of the time. A very small percentage felt that it was only a little bit important, but all students felt it was important sometimes. Overall, 89% of the students felt that the classroom atmosphere was important half of the time or more.

Students were given the opportunity to stop, summarise and discuss a portion [chunk] of the lesson with a person near them – a buddy.

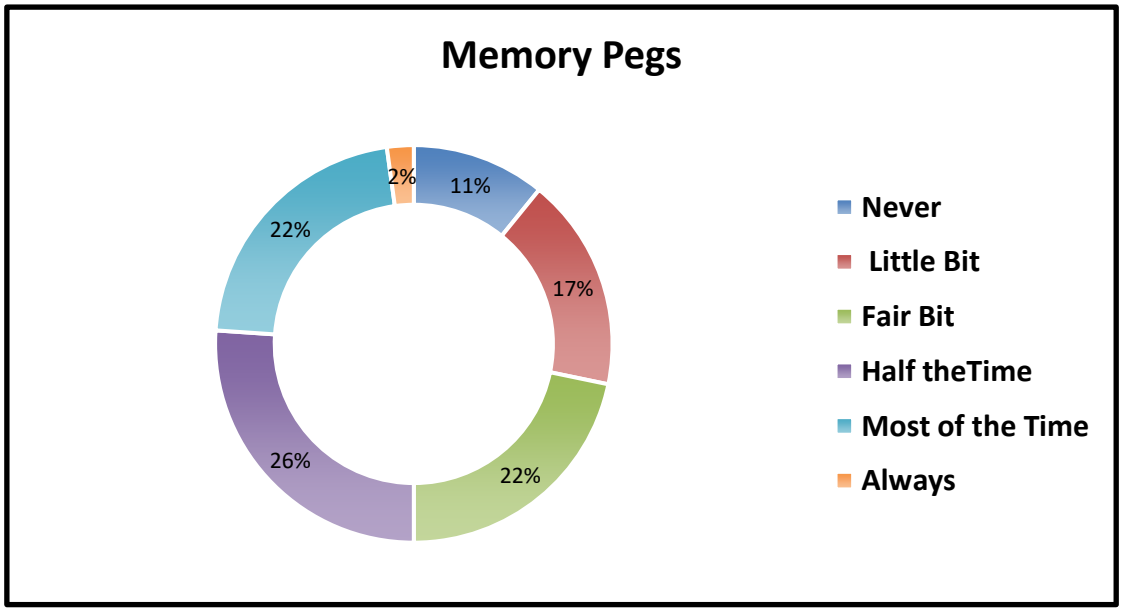
Chart 17– Student usage summarising with a Buddy



Fifteen per cent of students indicated that they used this strategy at every opportunity; 30% took advantage of this strategy most of the time, and 38% used this approach about half the time. Overall, 83% used summarising with a buddy half the time or more, although a significant number, 13% used it infrequently, or never.

Memory Pegs assist in remembering and recalling lists of information or ideas by attaching information to a peg.

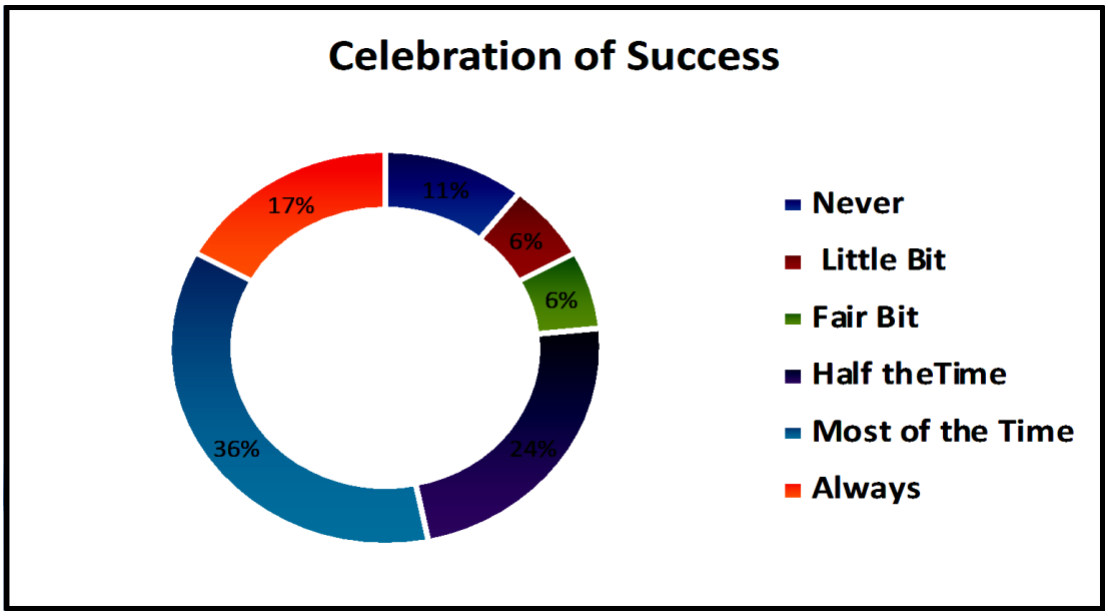
Chart 18. Student usage of Memory Pegs



Only a small number of students, 2%, used the strategy all the time. However, 22% used memory pegs most of the time; 26% half the time; and 22% a fair bit. Memory pegs were infrequently used, or never used by 19% of students. Overall, 50% of students indicated that they used memory pegs half the time or more. For those students who did use memory pegs, they were found to be very useful. One Student commented on their capacity to link theory to clinical practice after utilising memory pegs: “Yes, I was able to link theory to the clinical rotation, the use of pegs and exercises we did during class . . . were very useful” (student journal, 2013).

Celebrations of success may be large or small. They can occur in class, initiated by the teacher or other students, and in private, when students congratulate themselves on milestones along their study journey.

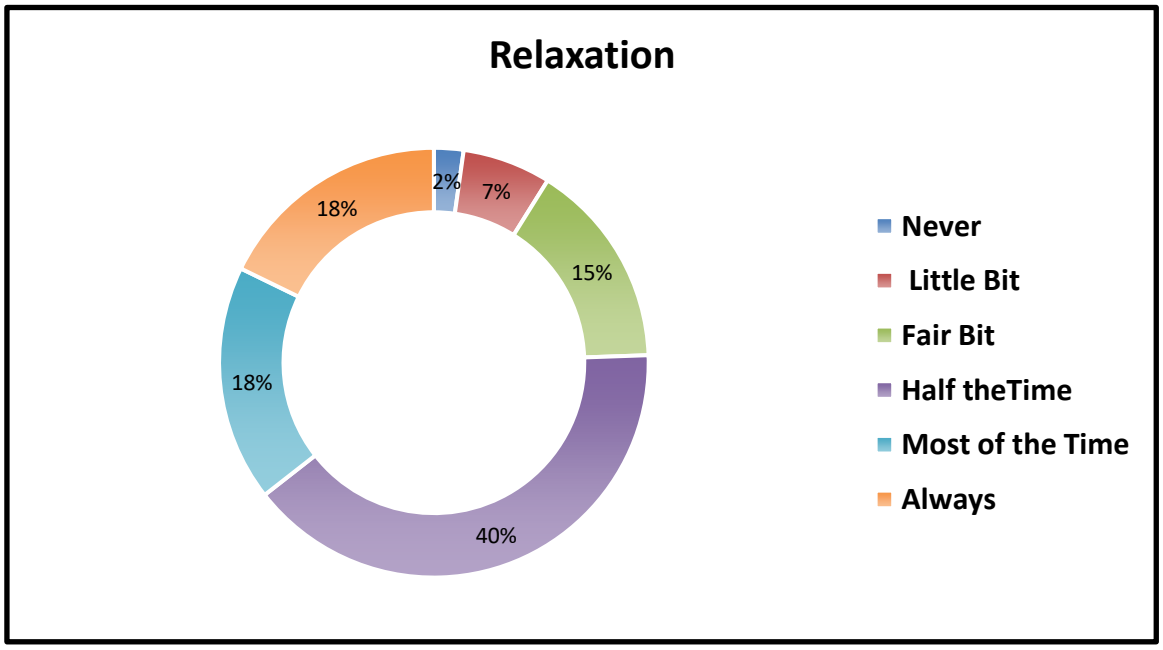
Chart 19. Student usage celebration of Success



Seventeen per cent of the students indicated that they used celebrations all the time; 36% celebrated successes most of the time; and 24% half the time. Notably, 11% of students never celebrated success, and a further 6% only celebrated infrequently. Overall, 77% of students used celebrations of success to enhance their study. However, 23% rarely acknowledged their successes.

Several students spoke of anxiety, especially before a test. From precious experience with Siri (Chapter One). I implemented relaxation into the research classrooms prior to tests. Vidic (2019) stated that, “By embedding mindfulness interventions within the academic curriculum, students can improve their overall health and well-being, and at the same time, meet their academic goals and make progress towards their degree” (p. 139).

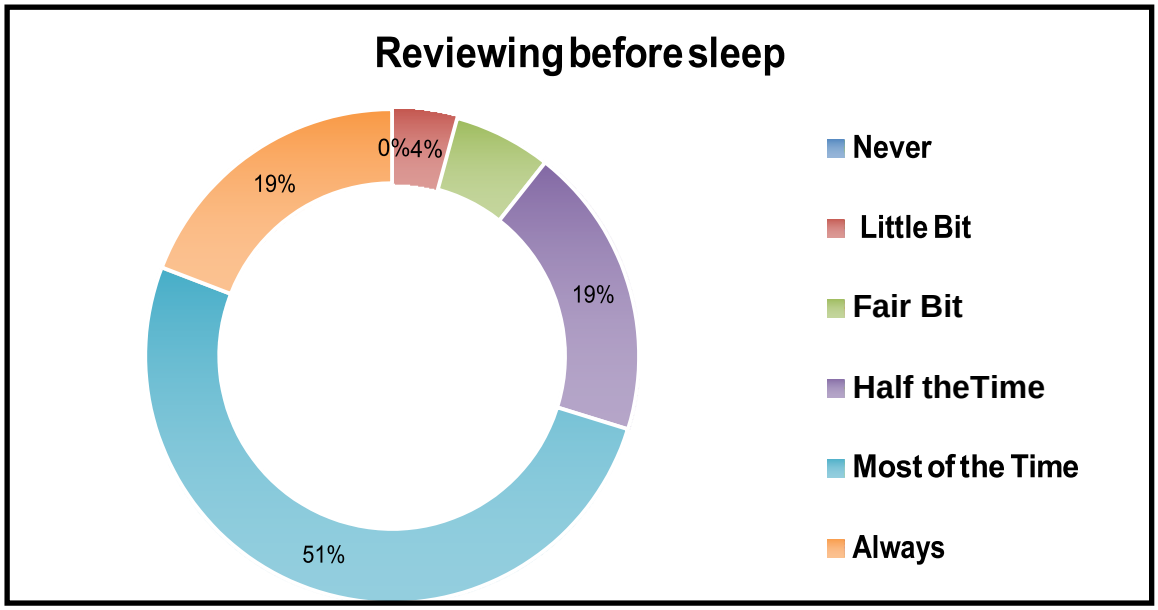
Chart 20. Student usage of relaxation



In this chart, 18% indicated that they used relaxation techniques all the time; 18% used relaxation techniques most of the time; 40% half the time; 15% a fair bit; 7% a little bit, and; 2% never. Overall, 75% of the students indicated that they used relaxation techniques.

Reviewing after class and again before sleep is a Quantum Learning strategy for retaining theoretical information.

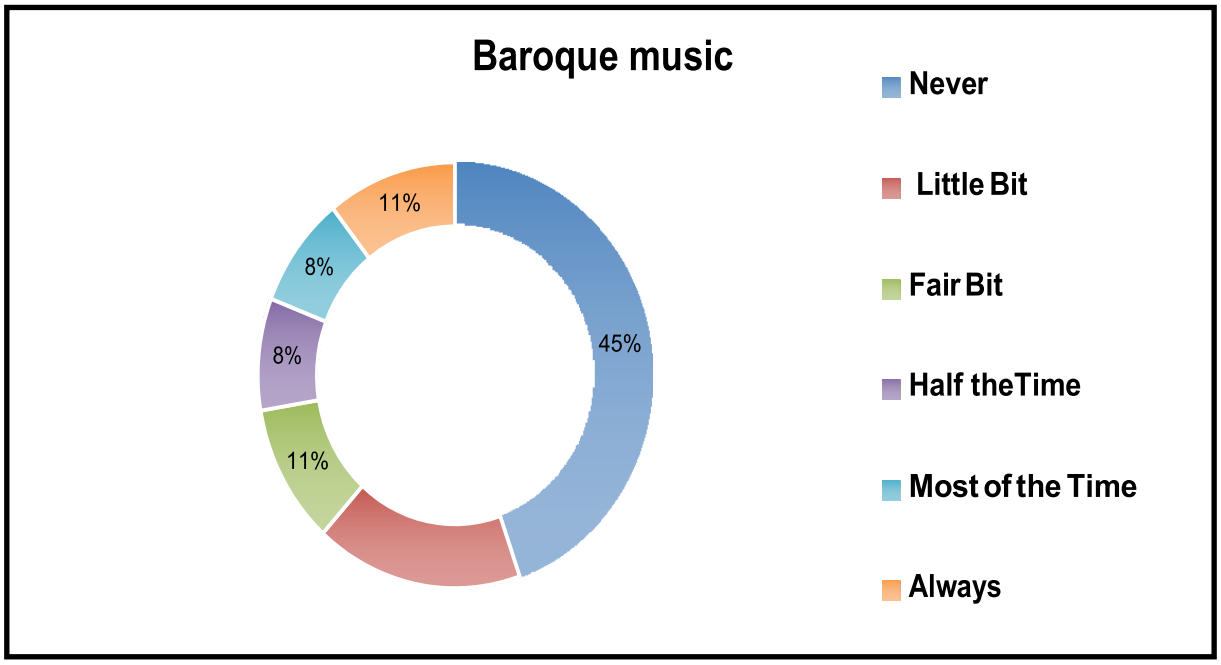
Chart 21. Key Finding: Students found Reviewing Before Sleep very helpful



Nineteen percent of the students always used this strategy; 51% most of the time; 19% half the time; 7% a fair bit of the time; four percent a little bit, and 0% never used this strategy. Eighty-nine percent of the students used this strategy consistently half the time or more frequently. Every student used reviewing before sleep at some point during the research study.

The Quantum Learning program suggests that listening to Baroque music improves academic performance because of its effects on physiology and emotions.

Chart 22. Baroque Music



This was not a strategy that many students adopted. It was the only strategy that less than half of the research students rarely used or did not use at all. Overall, only 27% of students indicated that they used this strategy half the time or more, whereas 73% indicated that they rarely, infrequently, or never used this strategy. This was the least used strategy

Most Used to Least Used Methods

Methods found in the qualitative data charts above, have been ranked from most used to least used and the results are found in the comparison table below. The table indicates what methods the students felt were important and what percentage of the students used each method. A combined total of forty-one students from Research Group One and Research Group Two completed the checklists and are represented in the data below.

Table 11. Methods Ranked by Student Usage

NAME OF METHOD	**The Most Used** *Top 3 categories combined Half/most/always*	**NAME OF METHOD**	**Least Used** *Top 3 categories combined Half/most/always*
Atmosphere	89%	Celebrations	77%
Review before sleep	89%	Relaxation	76%
8 Key of Excellence [Life Sills]	87%	Motion to words	67%
Above the Line [Life Skills]	87%	Diagrams with colour	65%
Big Brain Ideas	83%	Story Lines	54%
Peer Review	83%	Memory pegs	50%
Positive Affirmations	79%	Baroque Music	27% [**45% never]**
Home Court [Life Skills]	77%		

Those methods associated with life skills (i.e. The 8 Keys, *Home Court*, and *Living above the Line*) rank high in usage. All but one strategy, are used 50% of the time or more. Baroque is the least used strategy with 45% of students indicating that they *do not* listen to Baroque music while studying

Traditional Teaching versus Quantum Learning and Campbellteaching

The comparison of traditional teaching to Quantum Learning and Campbellteaching that appears below was formed from randomly chosen student reflections, which were taken from a selection of forty-one student participant surveys asking them to compare previous classroom experiences to the Kaleidoscope Classroom. The left-hand column is a student's comment on traditional learning. The right-hand column is the same student's comment on their experience in the Kaleidoscope Classroom. The emphasis in the right-hand column identifies data that pertains to the research questions.

Table 20. Traditional versus Quantum Learning & Campbell teaching

Qualitative data – from a random selection of a student survey	
Former classroom experience	After implementation of Quantum Learning and Campbellteaching
Text Heavy! Boring classroom lectures. A lot of memorizing – always memorizing . . . Exams were nerve wracking Learning was spoon fed and students were expected to understand and apply. Forgotten about all previous learning.	I **understand and retain** what I have learnt and apply to everyday conversation/ It's great! interesting and fun! Tests and exams are not as nerve wracking and stressful. Trying to be disciplined enough to apply with other units.
I found myself never remembering the information that I learnt and feeling very anxious when it comes to test time. Feel like I didn't do well. Study technique was just reading and writing it over and read it over in the morning.	Quantum learning has helped me be more **confident** and **remembering the information** that I studied and feeling more **positive** after the test because I'm revising and reading before, I go to sleep and when I'm writing and also reading aloud.
Before QL I study by memorizing my notes. I make visual aids – stick to wall, door, dresser. Post	I started to draw while studying or look at my drawing in class. It makes it **easier to understand** the human anatomy that way. I

it notes & stick in front of my book so when travelling to school I can review my notes. I also study late at night before I go to sleep because that's the time I can focus on my notes and I can absorb most of what I am reviewing during that time.	still study before I sleep which is also introduced in Campbell teaching. One thing that doesn't apply to me is the story line. I get confused with the stories and I forget the medical terms and its spelling. None the less, quantum learning is **really helpful in retaining** what was taught in class.
I find other classroom techniques quite dry. It's easy enough for a teacher to stand at the front of the class and go through power point presentations and often find myself drifting, sometimes even wanting to fall asleep.	. . . allow for other ways in which to study. Have found it very effective in terms of **self-esteem** given that my self-worth and self-esteem are quite low it was good to say it out loud "I am smart." It is fantastic to have a teacher who is passionate about this and I find it very inspirational . . .
Dull and boring Sit & listen to teacher talk and go thru power points word for word. I didn't feel like I was learning anything and that I could do just as well by myself at home.	Much more interactive. I feel like I am **learning a lot more**. Class is fun and interesting. The colorful diagrams are **a great way to learn** and even going over them at home later in the week helps a lot. I feel like [the teacher] actually **cares** and wants us to do well.
My previous classroom experiences were basically boring, tedious, and lacked interest. Most days are the same, the teachers aren't really sure how to make their students interested in their subject, they over-use power-point presentations after a while you realise no one is listening. It is a lot like high school but a different atmosphere.	With this class (A&P) at first, I was kind of stunned with the teaching methods used and was embarrassed to be here, but after a while I started to get more involved and even have fun, I was pleasantly surprised with how much the overall feeling in the classroom changed in comparison to my other classes. Never a dull moment, always different thinking methods and methods of learning. Constant **positivity** radiates the Kaleidoscope classroom and every lesson brings new ways to learn. Easily one of my fave classes.

I didn't like studying. I always wanted to learn what I thought was necessary. I only read the notes without putting it into practice.	Putting words into pictures and actions have helped me to **put things into practice.** I don't just study, but I learn to put things into practice by drawing and acting it out. With Anatomy and Physiology, I used my body parts to understand them.
It used to be lectures, group work & homework. Very systematic but boring; very mundane, no colours or picture or pegs to associate what needed to be remembered in order to apply.	Lectures are more lively and activities are entertaining at times. Making full use of the different methods of learning. **I learnt better with association of** colours, pictures, peg. **I do remember better** as I tried to review before going to sleep.
We did not use visualization, you tube recording. It was more like memory mapping and memorizing the topic. We had other things like discussion in group and sometime made up stories.	Campbell teaching was very good and **easy to understand,** concepts were very clear in simple language. I really like the idea of introducing Quantum learning, especially reviewing at bedtime. Visualization, audio and writing made it **easy to remember** the topic easily and I believe it would be for long term. I also appreciate the idea of writing reflection journal.
Traditional teaching . . . BIG TEACHER, LITTLE ME; therefore, easily understood and therefore to conform to.	Inviting yet challenging from previous 'Norms.' Sometimes became confused with drawing diagrams as my skills are not great; therefore, when it came to the tests did not recognise the parts! Group work was challenging. Understand the need for it, but found it frustrating and unsatisfying
Did not provide a comment for the traditional classroom	**Motivated to learn**; great environment**/atmosphere** /respect for everyone/**positive and supportive** classmates; good/extensive knowledge of topics

Work is straight forward; usually based on self-studying and work ethic; it's equally useful as Quantum Learning	*8 Keys of excellence* is very important/ a lot of work, but it **pays off** in the end/ very interactive
Dull, boring, not a lot of interaction with the teacher. Teacher would read off the notes and we'd listen and take notes. This applies to lectures too, sitting in a big room, in a tiny seat, staring at the power points on a large white screen.	Much much more interesting and interactive/ definitely **easier way of learning**/ I was skeptical about all the drawing/diagrams, but now I miss it when we have a sub teacher
We used to learn with notes being dictated or written on the board. This helped us to understand because as one writes that's how it sticks in the brains. The picturing were not of diagrams but they were of lecturers standing in front of us defecting [sic – dictating] notes and explaining.	Quantum learning **taught me most to explore more on my own.** I loved to follow Campbell teaching because of the **well explained** diagrams. It encourages the idea of exploring more and discourages spoon feeding. The 8 keys to success helped me to **grow** and have **passion** in whatever I do even if it is not schoolwork. **Balancing,** the **eighth** key of excellence, is the other technique that helped me to be successful in my studies. Most students were above the line because of the review before bed. It was quite interesting that in the morning before the exam most students will be like "singing" what they read. It was quite **encouraging**.

The findings from the comparisons above, indicate that the majority of the research students found the combined learning models, Quantum Learning and Campbellteaching to be an effective way of teaching.

Negative Feedback on Quantum Learning and Campbellteaching

Several students found Quantum Learning and Campbellteaching to be very different from the traditional classroom. One student found that they were able to learn more and that most of the time learning was fun, then discussed how they preferred the traditional way of learning. and how they did not like to feel that they were being told what to do,

even though they willingly signed a consent form to participate in the research (Grp1midyr2012F18-30AU). Another student felt that, "*This new way of learning to be a little weird and resisted the new approach to learning. This is only due to us being used to the old-fashioned learning and overall I feel this new way is an improvement"* (Grp1midyr2012F18-30AU). She recognized her actions and behaviours, but in the end was engaging. Another student felt that Quantum Learning and Campbellteaching was not beneficial (Grp1midyr2012F18-30AU). Grp1midyr2012F18-30AuEAL this student stated that her former classroom experience was a, "Good learning environment; like the way I do my own notes/study. Don't like to be told what or how to learn – I'm stubborn sorry."

Then goes on to make the following comments about the Quantum Learning and Campbellteaching models, "Was able to learn more efficiently; help was always given; most of the time class was fun; group work was not the best as not everyone helped & contributed." Even when students had negative attitudes towards the new learning models, they also had positive comments about how it helped them. Only one of the above students found the new models to be of no value.

Emerging Themes from Qualitative Data

Seven key findings emerged from the data. They are addressed briefly below in random order:

1. Forty-one students out of forty-seven ranked *Atmospher*e as the most important aspect of the learning experience during the research. Classroom atmosphere is formed by the life skills components of Quantum Learning: The *8 Keys of Excellence*, *Home Court Advantage*, *Live Above the Line* and *Big Me Big You*.
2. A *democratic classroom* where there is mutual respect is important to adult learners. This ties in with the *Big Me Big You* concept found in Quantum Learning. This democratic classroom was purposefully established by building teacher-student relationships.
3. Active learning, and particularly the acting out of ideas and the linking of ideas and words or concepts through action, was identified by students as important

in their building of capacity as learners. It made it easier for them to retain and recall information.

4. *Multimodality* – Students used a range of learning styles and responded positively to multimodal learning.
5. *Reviewing work before sleep* is valued by students as an effective tool for aiding recall. Students' readiness to engage with this, and note its value, is an indicator of their metacognitive awareness.
6. The *Linking Table* helped students to organise the vast amounts of theory in the course into a step-by-step process that allowed students to form associations and transfer the theory into the clinical setting.
7. *Teacher attributes* were key to classroom culture and student learning.

The outcomes of the quantitative and qualitative data, and the identified themes will be discussed in the following chapter.

Chapter Summary

This chapter looked at the results of the quantitative data and the qualitative data. The qualitative data was gathered from student classroom journals, clinical journals and two surveys. This information was transcribed onto excel spread sheets and pie charts were generated. The pie charts were indicative of the most frequently used methods in the classroom. Student feedback suggested how often students used the methods. All the methods incorporated into the research study, except one, were used 50% of the time or more. Ten of the methods were used 75% of the time or more. The results suggest that students employed important aspects of the Quantum Learning and Campbellteaching models.

Of the Quantum Learning methods, the creation of a positive classroom environment, reviewing before sleep, life skills and brain-based learning were considered important for their personal development and learning needs. An important observation is the use of multiple methodologies during the research as evidenced by the pie charts. The results found in the interval plots suggest that the distribution of individual scores offers greater insight into students' outcomes, than the means of tests which disguise individual progress

Chapter Six

Interpretation of Findings

'an understanding heart is everything in a teacher, and cannot be esteemed highly enough. One looks back with appreciation to the brilliant teachers, but with gratitude to those who touched our human feeling. The curriculum is so much necessary raw material, but warmth is the vital element for the growing plant and for the soul of the child' – Carl Jung - 1875 – 1961 (The Quotations Page, 1994 – 2018)

The purpose of this mixed-method study was to examine the potential of Quantum Learning and Campbellteaching's impact on students' ability to retain and recall theoretical information; in order to decrease the perceived theory-practice gap in nursing education. This chapter provides a discussion on the outcomes of the quantitative and qualitative data results that addressed the research questions as presented in the introduction. The quantitative findings are related to the overarching question of retention, recall and linking of theory to practice, in order to decrease the theory-practice gap.

Quantitative Data

The initial design of this study reviewed two sets of quantitative data. The pop quiz results, and the research groups mean outcomes that were compared to the non- research groups mean outcomes. Below is a discussion on the findings from the unexpected quizzes that were delivered throughout the course.

Pop Quiz: Retention and Recall

The overall outcome of the pop quizzes suggests that the implementation of Quantum Learning and Campbellteaching has the possibility to enhance retention of learning and recall. The element of surprise may have decreased anxiety, as there was no time to worry about an upcoming quiz. In addition, retaking a test has the possibility of reinforcing learning. Paul (2015), reviewed studies on retrieval practice and found that those who were quizzed frequently on a portion of theory outperformed those who simply reviewed. The difference was c+ average compared A- average with the retrieval method.

The research students demonstrated both increased learning and retention over an extended period of time. One student made the following comment, ". . . she'll [the teacher] push you to understand and have a grasp on each topic which she explains very

well! That's why I am able to connect it with the rest of the units" (Grp22013F46and aboveAu). Another student stated, "The teacher always made sure we understood what she was teaching before moving on. She kept the class interesting and fun" (Grp22013F18-30Au). The data suggests that the teacher could have impacted the student's ability to learn, retain and recall the theory over a long period of time by the use of multiple methods and ensuring the students understood the theory from each session. However, previous students indicated that they could not recall the anatomy and physiology during their last semester as they were too busy with other subjects (Personal conversations, 2012).

In addition, when the two research groups were in their final semester and out on clinical placement, industry contacted the Diploma of Nursing Department to inform the manager of how impressed they were with the students' work performances and indicated that they were work ready. No other groups had received that kind of feedback from industry.

Comparison of Group Means

Analysis of the groups' mean scores suggests that there was little difference between the non-research and research groups.

Possible Influencing Factors for the Similarities

Factors in the Anatomy and Physiology unit that could have caused the similarity in outcomes for the research and non-research groups are discussed below:

I incorporated diagramming, colour and story-telling methodologies into all subsequent groups after Siri's experience, which was discussed in the introduction. This means that these methods were also used in the non-research groups, but without the added support of the other aspects of the kaleidoscope classroom which came from Quantum Learning. Maries and Singh (2013) found that having students' diagram in their math class produced better outcomes. The process of drawing a diagram, which is part of the conceptual analysis of the problem, helps improve students' scores even if their chosen approach to proceed further with the problem-solving process does not explicitly require a diagram (p. 34). Bobek and Tversky (2016) conducted research on the effectiveness of

student diagramming in learning. They found that when students create their own representations their motivation, creativity, ability to see deeper connections are increased.

The data results for this study found that 65% of the research students found diagramming with colour an effective methodology, which supports the suggestion that the four previous non-research groups may have benefitted from this process. Drawing was not part of traditional teaching in the nursing program. It may be that drawing was significant in impacting students' results in all groups.

Another similarity in teaching and learning methods between one of the 4 previous non-research groups and the two research groups was the use of peer teaching. In nursing education active learning is not the norm, but has been gaining momentum (Bristol et al., 2018). This same group of researchers conducted a research study where 536 educators responded to a survey on active learning versus lectures in nursing education. They found that, "Most faculty lecture to students anywhere from 26% to 75% of the time" (Bristol et al, 2018, p. 95). It was felt that lectures were effective for several reasons; delivering multiple source content; "up-to-date content" that was not necessarily in their textbooks; allowed educators to "explain complex context" and "clarify confusing" information (Bristol et al., 2018, p. 95). However, in one of the 4 previous non-research groups, a student with a teaching background organised study groups and implemented various teaching methods, which included multiple active learning methods and buddy talk [peer review]; in order to assist her classmates in the Anatomy and Physiology unit. They played games and had activity posters hung up around the classroom. The Kaleidoscope Classroom also had multiple methods in place to assist learning and retention.

However, buddy talk [peer review, summarising with a buddy] was purposely scheduled during teaching sessions for the two research groups. After each chunk of information, students were asked to summarize what they had just learned with each other. In chart 17 in chapter five, 85% of the students indicated that they used buddy talk 50% of the time or more. Buddy talk and explicit dialogue was also incorporated into four sessions that were conducted using power point presentations. The theory was chunked. buddy talk, activities, YouTube videos and discussions were slotted into the power point slides to

allow for these methods to be included. These same strategies were utilised in the Analyse Health Information Unit, along with the Linking Table that was specific to this unit.

When asked the following question: How do you think the [linking table/chart] could assist in decreasing the theory-practice gap (what you learned while in class and linked to the work you did while in the clinical environment)? One student stated: *The charts were good because they helped us work co-operatively with other students in class and to share our findings. Through group discussion we understood about diseases and shared ideas (Grp22013M41-55Au).* This was an example of peer teaching as a social experience.

Peer teaching can be an effective social learning experience, where students might feel more at ease talking to their friends and other students than they might be talking to their teachers. This may also help students to identify what they know, and what requires further review, and consequently can increase retention and recall (Billings & Halstead, 2005; Herman, 2008; Meier, 2000). Peer learning engages one of the strongest links to increased learning and critical thinking – the student as teacher. In a peer discussion group, each student can take on the role of teaching and thereby increase their own knowledge (Clark, 2011; Mazur Group, 2011). While there may be some limitations to peer teaching, students quickly form reciprocal relationships and are inspired by their ability to empower others (Arrand, 2011 Blowers, Ramsey, Merriman and Grooms (2003) implemented a "Peer Mentor-Tutor Project" that offered tutoring outside the classroom. They recognised seven types of peer tutoring patterns and surmised that each had benefits and disadvantages, but all were specific to nursing education. However, scheduled buddy talk during teaching sessions is not the norm in nursing education, but can beneficial especially when the information is complex. An example of this was demonstrated during an Anatomy and Physiology class session. In the middle of a discussion one student grabbed both sides of her head and said, "Please can we stop and buddy talk . . . I need a break and time to make sense of this" (Student comment, 2013). The discussion ended briefly; in order to allow students to talk about what had just been discussed. After approximately five minutes, the student indicated that she now understood the concept and class discussion resumed. This example demonstrated the importance of buddy talk in

consolidating complex theory. It also revealed the importance of a safe supportive learning culture.

Lastly, resistance to the new teaching methods may have impacted student results. While some students embraced the experience of the kaleidoscope classroom, a few gradually became involved, a handful did not sign consents, but still utilised the methods offered during class sessions. However, a few of the students found the change in teaching practice uncomfortable. One student made the following comment, *"Traditional teaching BIG TEACHER, LITTE ME; therefore, easily understood and therefore to conform to"* (Grp1midyr2012F41-55Au). Another student stated, *"I have developed a pretty standard way of studying and memorising things that I feel works for me. It wasn't really taught the way that the Quantum Learning* set *up a system for you to learn. I still use a lot of these old ways to study as I find them more comfortable, though I do like some of the Quantum Learning techniques"* (Grp1midyr2012F18-30Au). Oremann (2015) stated, "Nursing students in many settings still prefer being passive leaners" (para 5). Overall, when comparing the group means, there was no distinction made between the outcomes of those who embraced the experience, those who participated despite hesitancy, and those who remained resistive, but participated in some of the activities.

An important variable that may have affected the group mean score of Research Group Two was the need for three different substitute teachers, as the researcher became ill. None of these teachers were trained in Quantum Learning or Campbellteaching. They covered seven of the ten body systems found in the second half of the Anatomy and Physiology unit. These classes covered the following major body systems: respiratory, special senses [eye, ear & tongue], cardiovascular, blood, lymphatic, digestive and nutrition. Although, some students journaled that they went home and drew out the body systems as they had done with the researcher. Other students wrote the following comments in their journals, about having a substitute:

a. *This topic was discussed thoroughly. Everybody seemed sleepy and only few of us came back after lunch (GrpMF18-30 Au).*
b. *Skimmed through eye, ears & tongue. By this time, I could feel less*

enthusiasm amongst the class and with the substitute teacher. Half of the class left after lunch and did not return (GrpMF41-55Au).

c. *Sup teacher he made it easy and enjoyable to learn about nutrition. Missed [researchers]style of teaching though (GrpKF18-30Au).*

d. *I thought that the way we learn in the class by drawing, discussing functions, activities were very helpful then [sic] just studying. That's what happened today, our [sup]teacher went through slides, but did not discussed [sic] more in depth. So the whole time we were very sleepy and nothing really went into my brain. I thought I had to do lots of studying myself. I was everywhere and thought it was very complicated" (GrpMF18-30Int'lEAL).*

It appeared that the students were not well engaged in the learning process and felt it was not going to benefit them to stay, so some left, while others tried to stay focused. This next student, who was also struggling with some personal issues stated: "*Hard to focus and wasn't learning anything with the sub teacher so wasn't much point of me being there today [blood and cardio session]" (GrpMM18-30Au).* For the most part, the student experience with substitute teachers was not considered beneficial to their learning. Although, the Analyse Health Information unit did not require the use of substitute teachers, the outcomes were similar to those of the Anatomy and Physiology units.

Once again, the group mean scores for Research Group One and Research Group Two in the Analyse Health Information units appeared to show little difference when compared to the four previous non-research groups. However, there was a significant workload. In addition, to the final test and prescribed workbook, the research students were required to develop a complex linking table that covered six common illnesses. This entailed substantial effort for a 30-hour unit. The fact that students' scores were similar with the increased workload, lends credence to the methods utilised in the study.

Despite the above considerations, the quantitative data did not align with what student journals were revealing. Therefore, a deeper examination of the data – a data interrogation was undertaken to explore individual outcomes. The two weekly theory tests from the Anatomy and Physiology unit, and the linking table found in the final test for the

Analyse Health Information unit were chosen for the data interrogation, due to the specific teaching methods that were employed.

Data Interrogation

Individual scores from the Data Interrogation were formed into five interval plots that represented the distribution of individual scores within the groups. Each interval plot has two sets of scores. One is the combined individual scores for all the students in the four previous non-research groups compared to all the students' scores from Research Group One and Research Group Two.

Anatomy and Physiology: Interval Plots – What Made the Difference*?*

The Cell – Distribution of Test Scores

Chart 5a The Cell – Interval plot 1 test score. On average the research students performed higher than the four previous non-research groups. The lowest student scores were close to the highest scores for the four previous non-research groups. The outcomes of the data interrogation for the cell suggested that what students were saying in the qualitative data was reflected in the quantitative data when individual scores were evaluated. The individual scores from the test on the cell were on average 16% higher for students taught in the Kaleidoscope classroom. The qualitative data reported that Campbellteaching was a vital component as diagramming with colour and explicit dialogue assisted in retention, recall and associations between body systems. The research students felt better about their learning; had increased confidence, better recall of theory and outperformed the 4 previous non-research groups. However, the 4 previous non-research groups also diagrammed with colour, so what else made a difference? One research student stated that with the incorporation of Quantum Learning and Campbellteaching that the teaching sessions were: *"Lively, activities are entertaining at times, full use of different strategies for learning, learnt better with association of colours, pictures, pegs: I do remember better = reviewing before bed"* (GrpKmidyr2012F31-40Inter'lEAL). Therefore, the qualitative data indicated that there were multiple factors that influenced students' successful outcomes. These will be referred to in greater details as the other interval plots are discussed.

The Cell - Distribution of Diagram Scores

Chart 20b The Cell – Interval Plot 2 Diagram scores. This was data was taken from the diagram scores found within the theory test on the cell. The distribution of scores are tighter for the two research groups. The highest score was 89% and the lowest 75%, while the 4 previous non-research groups had a with spread with the highest score of 73% and the lowest score of 53%. The research groups had a tighter distribution of only 14%, while the previous non-research groups had a distribution of 20%. Once again this set of quantitative data clearly aligns with the qualitative data that indicated the positive impact of Quantum Learning and Campbellteaching methods. *"Campbellteaching very much better; explanation are simple just the use of diagrams to explain is awesome. Able to picture and understand – learned better with use of diagrams* "(*Journal entry, GrpKmidyr2012F18-30Inter'lEAL).* However, the journals also indicated that there were other possible influencing factors for the higher level of achievement at play.

These included the life skills component of Quantum Learning, where students were held accountable for their learning, the supportive, safe and belonging classroom culture, the positivity environment, high expectations and the ongoing encouragement through celebrations of all successes. This aspect was one of the major themes that came from the qualitative data. One student commented in their journal as noted in table 12 in Chapter Five that the class tradition increased her self-esteem, *"Due to low self-esteem it was good to say out loud "I am smart" (Grp1midyr2012F-31-40Au).* Another factor could have been the students' increased awareness of metacognition, as implied by the 83% usage of big brain ideas found in the comparison chart in the data chapter. Big brain ideas such as atmosphere, colour, all our senses, a safe learning environment, music, smell are all incorporated in the Quantum Learning model and Campbellteaching. All of these methods scored above 50% usage, most in the 70 and 80 percentiles except baroque music, but some students related in personal conversations that they were using music they liked instead of baroque.

Noushad (2008) stated that, "Relating metacognition to developing one's self-knowledge and ability to 'learn how to learn' resulted in metacognition being awarded a

high status as a feature of learning" (p. 1). This factor was noted in several of the journals as research participants became aware of their own learning processes and applied methods for retention and recall that worked best for them. Consequently, it was apparent that multimodality was a factor in the improved student outcomes seen in this interval plot. One student journaled that, *"QLN taught me most, explore on my own. I love Campbellteaching well explained, clear diagrams – discouraged spoon feeding. 8 Keys of excellence helped me to grow & have passion. Balancing helped me be successful in my studies" (Grp22013F31-40Inter'lEAL).* Another student made the following comment about the benefits of Quantum Learning and Campbellteaching*, "Relaxation before tests, thoroughly explained, more reviewing, visual learning, story lines, better note taking, diagrams were easier to remember" (Grp22013F18-30Au).*

Each of the methods mentioned in chapter three, Table 8 were used consistently throughout the unit. The influence of these methods on student learning are noted by the research students as discussed in chapter 5, which compared students' experiences in a traditional classroom to that of the kaleidoscope classroom. Key words that students used in that comparison table [table 12] were: *understand, retain, confident, remembering, positive, easy, helpful, learning, motivated, great, teacher cares, overall feeling of the classroom has changed in comparison to other classes, better association with colours, pays off, helped me grow, balancing, encouraging and supportive.* Each comment alludes to an enriched learning environment where students enjoyed learning and engaged in the learning process**.**

The Cardiovascular System – Distribution of test scores

Chart 6a Heart [Cardiovascular system] – Interval plot 3 test score**.** Once again the research groups outperformed the 4 previous non-research groups. The test score showed a marked increase for the two research groups. Their top score was 87% and the lowest was 78% with a 9% difference between the two scores. However, the 4 previous non-research groups highest score was 74% and lowest score was 58% that is a 13% difference in distribution. Thus far there the 4 previous non-research group have seen a difference with

the lower performing students farther apart than in the two research groups. This will be discussed further after the discussion on the next interval plot.

The Cardiovascular System – Distribution of Diagram Scores

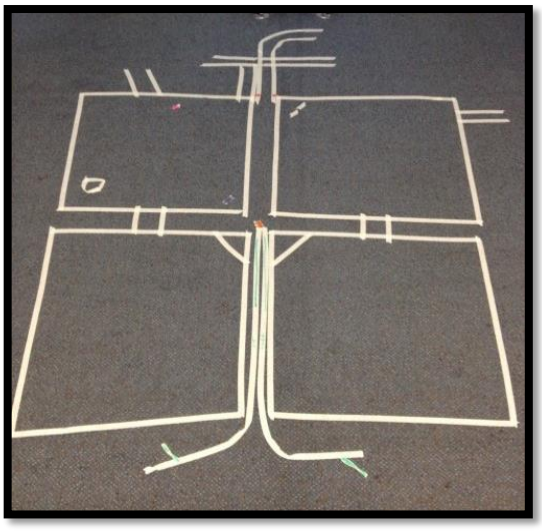
Chart 6b Heart [Cardiovascular system] – Interval plot 4 Diagram of heart on floor.

Once again the two research groups outperformed the 4 previous non-research groups. Their top score was 99% and the lowest score was 93% with a 6% distribution. The 4 previous non-research groups had a top score of 92% and a bottom score of 74% with an 18% distribution. The mean score was 12% higher than the 4 previous non-research groups. The data indicates that the methods taught in the cardiovascular system unit assisted student, learning and retention.

This activity was not pre-planned; rather the idea came suddenly on the morning of the class, after I had mulled over what I could do to better engage the students. I grabbed the masking tape from my drawer and went into the classroom and designed a heart on the floor. I wanted the element of SURPRISE.

The theory component of the class required the students to understand the structures and functions of the heart. Therefore, instead of just drawing and discussing the theory, the students experienced the heart in new way. This activity consisted of peer teaching, active learning and embodied learning as students problematised their walk through the heart, identifying the processes and experiencing the movement of the blood through this imagined space (Jones, 2016). Active learning required the students to complete the activity and think about the processes; whereas embodied learning looked at the emotions involved during an activity (Swiderski, 2017; OECD, 2018). Both of these methods engaged muscle memory, which is important in recall and promoted higher order thinking and the development of critical thinking skills (Odom. Glenn, Sanner, & Cannella (2009). Gifkins (2015) discussed the benefits of active learning; such as engagement, deeper understanding, improved retention and recall, and engages multiple learning preferences. A picture of the heart diagram taped on the classroom floor is shown below.

Figure 3.
A diagram of the heart taped on a classroom floor.



Finding a heart diagrammed on the floor of the classroom was not what students expected. Luna (2013), stated that, “surprise literally stops us in our tracks and plugs us into the moment” (1:58). Surprise challenges our complacency as learners. When students are faced with a surprise moment in teaching, they have to choose to be vulnerable and be able to say, “I don’t know – I wonder” (Luna, 2013, 13:16). When the diagram was taped on the floor in the research classroom one or two of the students held back and only participated when encouraged by their peers. During her TedTalk, Luna (2013) explained that surprise can cause fear and uncertainty, but when one says ‘I wonder’ they allow themselves to become vulnerable and that is when learning can happen. During this research class activity, the majority of the students were curious. They crowed around the diagram. One student observes, *“I … found one thing very interesting during this lecture … the heart taped out on the floor. Think so not only [for] me, but [for] my every other classmate enjoyed it as much as I did,”* (Grp1midyr2012F18-30Au). Another student commented,

> *I would like to thank [teacher] for doing all those efforts to draw a heart on floor with tape. We practiced the flow of blood in heart and then in lung and systemic flow. All class participated till every student got an idea. Also, polarisation and depolarisation. We learnt about theory of blood pressure. I really enjoyed it!!!!!!!!!!!!* (Grp1midyr2012F18-30Au).

The positive test results on the heart suggest that the students moving through the chambers of the heart, as they talked through the various structures and processes affected their capacity to learn and retain the theory. The high level of participation, despite some initial hesitancy, indicated that active learning and the element of surprise can have positive effects on engagement and student outcomes. The follow comment provided further insight into the impact of this activity: *"In the morning we went over the heart at the back of the room on the ground with sticky tape. It was really really helpful and it was the first time I really understood the heart" (student journal 2013).* The activity worked as planned and became a valuable teaching method. The other important factor was peer review.

Zarifnejad, Mirhaghi and Rajabpoor (2018) discussed the popularity of the peer teaching strategy, where students teach each other. Their research findings support the idea that peer teaching can promote learning. However, they also find that peer teaching groups do not perform higher on their final tests. Stone, Cooper and Cant (2013), however, found that peer teaching is efficacious: it can increase learning, decrease anxiety, and can be readily accepted by students. This data indicated the value of peer teaching to increase learning and understanding in science-based subjects.

The other issue which is evidenced from the interval plots is the wider distribution of student scores in the 4 previous non-research groups. The following students' comments suggest that the teacher was an important factor in assisting all students with their learning. *"I understand that not everyone has the same level of understanding. Whenever asked to, she [teacher] is very willing to go back to the topic to be discussed again to make sure everyone gets it"* (GrpM2013F18-30Int'lEAL). "She [teacher] was thorough and taught in a variety of different methods that all people could understand" (GrpM2013F18-30Au). The fact that the teacher ensured that all of the students understood the theory could explain the tighter distribution found in the results of two research groups. In addition, to clarifying the theoretical information during discussion, she also retaught while doing teacher walks when the students were having their buddy talks.

Analyse Health: Interval Plot – What Made the Difference?

Chart 7 Congestive Heart Failure [CCF] – Interval plot 5 Linking table scores. Again, the scores for the two research groups outperformed the 4 previous non-research groups. The highest score for the two research groups was 90% and the lowest was 76%, while the 4 previous non-research groups scored 69% as the highest score and 51% as the lowest score. The mean score for the two research groups was 23% higher than the 4 previous non-research groups. This was a significant difference. The earlier groups did not have peer review as a planned method during their studies. Data results suggest that the linking table and peer teaching were effective methods for learning.

Analyse Health Information concentrated on teaching the students how to link their theory to practice; in order to decrease the theory-practice gap. The ability to link theory to practice is vital and assists in decreasing the theory-practice gap. This is well documented in the nursing profession (Corlett, 2000; Htlevik, 2012; Rolfe, 1998; Scully, 2012). In the Analyse Health unit students covered a breadth of literature on factors that influence health, nursing in the community, and pathophysiology of six disease processes.
The morning sessions for the Analyse Health unit were three hours of class theory and discussion, but the afternoon sessions were specifically designated for completion of the linking table using self-directed peer learning and teaching, but the teacher was always available for consultation.

Understanding a complex subject and what it entails is important for critical thinking: “Competent professional practice requires not only psychomotor skills and affective skills, but also sophisticated thinking abilities” (Levett-Jones et al, n.d., p. 19). Knowing the theory, recognizing signs and symptoms, and understanding how to respond promptly and appropriately are important factors that can alleviate fear in the student nurse, encourage confidence, and instil credibility in new graduates (Duchscher, 2009). Rischer (2018) stated:

> With great power comes great responsibility. The bedside nurse must embrace this responsibility and recognize what is at stake when a nurse fails to think like a nurse.

> Failure to rescue can occur, and a patient can needlessly die as a result. Help your students to embrace this responsibility by empowering them with practical knowledge and assessment data that must always be recognized as relevant and to include this as part of their [morning] checklist to ensure safe patient care (para 23, 24).

Kitchie (2011) posits that it is the responsibility of the nurse educators to implement effective methods that will allow students to incorporate theory into their practice. She believes that addressing the students' needs, readiness to learn, and preferred learning styles is imperative for positive patient outcomes. The linking table was designed to assist students in their ability to think like a nurse.

The Linking Table

ThinkLikeANurse (2016) discussed the need for nursing students to be taught step by step in order to fully understand processes. In his YouTube video, KeithRN an experienced emergency room nurse and nurse educator, emphasized the need for students to have a deep understanding of physiology – the Anatomy and Physiology component of this study. He listed eight factors that students must be aware of when looking after patients (ThinkLikeANurse, 2016). They are listed below:

1. Identify the primary problem and what the underlying physiology is – the nurse must have a deep understanding of the underlying physiology.
    a. The first three columns of the Linking Table that are relevant to the primary problem. Column one and two = identify the signs and symptoms presented by the patient; column three = explains the underlying cause of the sign or symptom to the cellular level. In other words – nurses must understand what has changed in the patient, and why.
2. Clinical data – the nurse must understand the significance of any blood work, urinalysis or other test results that a doctor orders. They must then be able to identify the relevant data – so what do nurses focus on, amid a range of data?
    a. In column five of the Linking Table – The students were asked to

identify the tests nurses they might expect to see requested. It was beyond the scope of my class to teach the norms and variances, but this would be addressed in future classes.

3. What nursing priority captures the essence of the patient's problem and will guide the nurse's care?
    a. *Columns one, two and three of the linking table assist in identifying the priority; however, this was an introductory class. The students were encouraged to continue using the table in upcoming units that would address this question.*
4. What nursing interventions will you identify as your initial priority?
    a. *Once again, a student nurse would use the first three columns to assist with this question and will become more proficient when they have more advanced units in diseases.*
5. What body system will you focus on because of the person's problem?
    a. *Students were reminded that they must focus on the primary problem – the primary body system involved. Once again the first 3 columns of the linking table would assist in answering this question.*
6. What is the most likely, worst complication that the nurse can anticipate based on the primary problem?
    a. *The Analyse Health Information unit is an introduction to health issues and this information would be taught later in the course.*
7. Students must be aware of potential life-threatening complications, such as sepsis.
    a. *Once again The Analyse Health Information unit is an introduction to health issue. However, column five of the linking table asked students who is on the multidisciplinary team and what is their role. If they understand the person's role, they should know who to ask for assistance.*
8. Must know what interventions that a nurse will implement if they recognise

a change in the patient's condition, for example the most common post-operative complication is sepsis. Therefore, if a patient's heart rate is elevated for what appears to be no reason – what does the nurse do?

a. *Again, this introductory unit would not provide the necessary theory or skill, but the table could be utilised in other units where the process could be laid out step by step*.

KeithRN concluded his presentation with his concern that failure to respond to changes in a patient's status could result in a patient's death. This correlates with the concerns of Rischer (2018) as discussed in the previous paragraph. The students were taught this concept, in order to instill the imperative nature of their knowledge and skill levels.

Teaching nursing students, what is meant by linking theory to practice can be taught by using this simple tool as it provides a step-by-step process that allows students to take a plethora of information and organise it in a specific manner that offers clarity for what they are expected to recognise, and how to tie their theory to patient care. It was developed based on the researchers experience as both a student nurse and graduate nurse. However, linking of theory to practice is rarely taught in nursing classrooms where the focus is on learning about disease processes or injuries. This is the gap that this research has tried to fill with the development of the Linking Table. The importance for structed knowledge is related by Duchscher (2009), who discussed how knowing the theory, recognizing signs and symptoms, and understanding how to respond promptly and appropriately is an important factor that can alleviate fear, and encourage confidence and credibility in new graduates.

The development of the Linking Table was influenced by the Quantum Learning principle that 'everything speaks'; it aligns with holistic learning and holistic care. It's correlation with Campbellteaching is associated with the linking tables ability to assist students with drawing connections between body systems, signs, symptoms, interventions, patient well-being and safety; as well as understanding the potential treatments that could be implemented by other members of the health care team.

However, a few students found the linking table difficult to complete, which may have stemmed from the following; complex ideas, understanding cellular levels and medical terminology, especially for students with English as an Additional language. One student made the following comment, “I think that in order to link you needed to understand the basics. I believe that sadly I don’t always gasp the basics” (Grp1midyr2012F4-=55Au). The issue could have been a difficulty understanding science subjects. Subjects within the sciences are often complex and this may not have been an area of strength for this student.

Despite the difficulties expressed by some students when engaging with this complex task, the data as viewed in Chart 7 – Interval plot 5 suggests that they were able to demonstrate critical thinking and responded appropriately to signs and symptoms.

Three student comments revealed the value of the linking table:

1. *The visual aids (drawing, maps, acronyms) helped me to retain knowledge and link theory to practice. The chart [Linking table] that was used in analyse health was really useful in understanding disease/condition because it focuses on cellular level, where signs and symptoms are clearly defined . . . A great help* (Journal notation, 2013).
2. *I was glad that I brought the spreadsheet [Linking table] with me that we prepared in Analyse Health info class. It was so handy and useful, provided a quick guide to assessing the client and identifying interventions/action plans in client’s chart* (Journal notation, 2013)
3. *Having diseases on the chart [Linking table] made it easier on clinical as quick to compare one condition from* another (Journal notation, 2014).

Billings and Halstead (2007) stated that, “Preparing nurses of the future requires educators to guide students to higher-order learning: the deep and applied learning that prepares students for the complex health care settings in which they will be employed” (p. xiii). As discussed previously, the Linking Table was designed to be instrumental in the development of higher-order learning. Most of the students worked in groups where peer teaching took place, but a few students preferred to work independently. One student from

Research Group Two explained how their group met in the cafeteria to work on their assignment [The Linking Table]. In fact, degree nursing students overheard their discussions and asked if they were also from the degree program. They were surprised when they learned that they were Diploma of Nursing students, but asked if they could join their group (Personal conversation, 2013). As discussed previously, peer teaching and group work assists students in retention, recall and the development of critical thinking skills (Billings & Halstead, 2005; Herman, 2008; Meier, 2000). Similarly, when students have to research information on their own, they tend to read more material that gives them a broader knowledge base; they learn to be self-directed learners (Hattie & Donoghue, 2016). A mega study conducted by Hattie and Donoghue (2016) found that deep learning occurred when students were self- regulated and sought assistance from their peers.

In nursing it is imperative that students learn to be self- directed. One way to assist in development of this important attribute is to provide opportunities for self-directed learning (Penn, 2008). According to Bastable, et al (2011), “Self-instruction assists students to tap into their cognitive and psychomotor domains” (p. 440).. Reflective, interactive processes, such as this, are important for understanding and the transference of knowledge into a skill-based context within the clinical setting. Journal notations suggested that students were making important connections when writing down their experiences and thoughts. One student stated, "*My client has heart failure. The Confirm Physical Health class helped me to understand which part of the heart was affected and why those signs & symptoms were there”* (Grp1midyr2012F18-30Au). The Linking Table was one of the major themes that emerged from the qualitative data.

When considering the wider distribution of scores for the 4 previous non-research groups found in the interval plots, it could be an indication that the poorer achieving students in the two research groups were given extra assistance during the teaching sessions. This occurred when the students were having ‘Buddy Talk’ and the teacher was going around the classroom [teacher walk] asking every student if they understood the theory that had just been presented. It provided an opportunity for those, who may have felt insecure in putting their hand up during a class discussion. By doing a teacher walk, I

had an opportunity to identify students who were struggling. Then I reviewed the theory with each student, who indicated they needed further assistance; however, at times a classmate offered to review it with them.

Deep Reflection in the Development of Critical Thinking Skills

Deep reflection gives rise to critical thinking and enables retention and recall of knowledge. Kleson, Berglund and Gustavsson (2016) discussed the importance of the development of critical thinking in nursing education, as classroom theory informs nursing practice. They believe that journaling can assist student nurses to develop the critical thinking skills that relate to practice and assist in professional development. Scully (2010) discussed the outcomes of research by Jerlock et al (2003) and Baille (2001), who found that reflection should be an integral and purposeful aspect of nursing education. With reflection, they contend, nurses will want to change their practices. Jootum and McGarry (2014) identified the common student nurse perception that clinical practice is the place where real learning occurs in nursing education. However, the underlying theory is required for the practice to take place; it is only with theory that one can become a highly skilled and competent nurse. The classroom and clinical journals assisted in the development of deep reflection, as did the explicit dialogue and buddy talk that formed a major part of the learning process.

Quantitative Data Informed by Qualitative Data

It was evident from the data interrogation and the subsequent Interval plots that the qualitative data informed the quantitative data and provided a richer understanding of how Quantum Learning, Campbellteaching and the Linking Table have the possibility of enhancing deep learning, reflection, retention and recall of theory. The following section discusses the various methods that were implemented during the research and why they have potential to assist nursing students during the learning process.

Life Skills – Creation of Classroom Atmosphere and Culture

Buy-In

As discussed previously in Chapter 4, buy-in is essential for student engagement. It is the What's-in-it-for-me question [WIIFM]. Deporter, Reardon and Singer-Nourie (1999) stated that:

> "Without the WIIFM, they won't buy-in. As experts on the human brain tell us. If there's no emotional engagement, there is no learning. When you understand students' interests, desires and thinking and you let them know you understand, you enter their world" (p. 84).

This discussion on Buy-in is related to student feedback and the researcher's findings. Some students bought in to the methods, but others found them so foreign that they resisted. Getting resistive students to buy-in was challenging and data indicated that some never fully engaged. For example, one student noted, *"Like the way I do my own notes/study. Don't like to be told what or how to learn…I'm stubborn sorry"* (Grp1midyr2012F18-30Au). This student came across as if resistive to authority, and I'm not doing it. Didn't appear to understand the advantages of understanding her own metacognitive processes. Her attitude was a block to her ability to learn. However, this same student stated, *"I was able to learn more efficiently, help was always given, most of the time class was fun"* (Grp1midyr2012F18-30Au).

There was a constant need to find fun and interactive ways to maintain interest, especially with the younger students; however, I came up with stories or actions that were anchored and had the student's make-up their own stories and share them. They were successful. There was very little time to prepare the students for the research and what to expect. This could have caused the resistance, especially when they knew that Anatomy and Physiology was a complex subject and difficult subject. The second aspect of the research classroom was setting up the class culture.

Atmosphere

As discussed briefly in the methods chapter, Atmosphere in the Quantum learning model refers to the social environment. The *8 Keys of Excellence*, *Home Court Advantage*, *Live Above the Line*, *Big Me Big You* [a democratic classroom] form the life skills component that helps to establish a classroom culture that is conducive to learning for all the students (DePorter, Reardon & Singer-Nourie, 1999).

It is the teacher who orchestrates the culture and atmosphere of a classroom. When teachers form a respectful foundation for their classes, and provide for a safe, supportive, belonging environment, while setting the bar high and establishing expectations of behaviour, they are in a position to establish mutual respect where facilitation of learning becomes the teacher's goal (Hattie & Donoghue, 2016). The following mini discussions address each of these components.

The 8 Keys of Excellence

The eight keys of Excellence were discussed in the methods chapter, but this chapter will discuss the student's comments regarding this foundation concept. Eighty-seven per cent of students found the 8 Keys of Excellence important and more than half of all research participants used the *8 Keys of Excellence* frequently. According to De Porter, the founder of Quantum Learning, the Keys are "a set of guiding principles that we adopt that guide our behaviour" (DePorter, 2016). As described in the methodology, the *8 Keys* are: integrity – match your behaviour with your values; failure leads to success – learn from your mistakes and try again; speak with good purpose – speak kindly and honestly; this is it, – stay focused and make the most of every moment; commitment – make your dreams happen; ownership – take responsibility for your actions; flexibility – be willing to do things differently, and; balance – live your best life and be mindful of self and others (Learning Forum International, 2019). These *8 Keys of Excellence*, high expectations, and personal development, helped form the basis of classroom culture during the research.

The *8 Keys of Excellence* were placed above the white board at the front of each classroom. One student commented, "*The 8 Keys of Excellence helped me to grow and*

have passion in whatever I do, even if it is not schoolwork. Balancing is the other technique that helped me to be successful in my studies" (Journal notation, 2013).

One of the keys states, "Failure leads to success" (Learning Forum International, 2018). This key was stressed throughout the unit, as on multiple occasions students discussed their anxiety and disappointment over a weekly theory test result. Teacher support, encouragement and positivity are important to assist students during these times. This could be a motivational talk after class, in the hallway or an appointment to come and discuss their concerns. It was important for the student to be reminded that being unsuccessful in this instance, did not mean that they would not be successful in the future. This way of guiding students has become more mainstream since the positive psychology movement (Ackerman, 2019) and the increasing popularity of Carol Dweck's work on growth mindset (Dweck, 2007).

The life skills that form the *8 Keys of Excellence* are also important for the development of a professional persona, and the capacity to work in an environment consisting of teams of people. The list of personal skills required for successful employment are identified as "loyalty, honesty and integrity, enthusiasm, reliability, personal presentation, common sense, adaptability and ability to deal with pressure" (Australian National Training Authority, 2003. P. 2). As the Diploma of Nursing is a vocational course, the acquisition and development of these skills must be concurrent with the learning of academic content. In the workplace the capacity to apply content knowledge is impacted by the development of these skills. I suggest that part of closing the theory-practice gap lies in teaching these skills, so that students can operate successfully in a professional environment and have the confidence and agency to put their knowledge into practice. The *8 Keys of Excellence* packages this development of professional attributes in a way that makes it accessible to students.

The *8 Keys of Excellence* does not only provide the packaging of professional attributes, it influences the ways in which students interact in the classroom with each other and with the teacher. When students work with these keys, they learn to engage with each other in a professional manner where individual responsibility to oneself and to

others, and an individual sense of purpose, direct the choices that are made in terms of behaviour and process. It is noteworthy that students rarely commented on the impact of the *8 Keys of Excellence* on their learning, and yet, the data indicates that they were the third most frequently used strategy across both research groups. One student commented in their journal that they were, *"motivated to learn, positive, supporting, great environment & atmosphere, and respect for everyone"* (Journal notation, 2013). Another student stated that *"Quantum Learning taught me most, to explore on my own. The 8 Keys of Excellence helped me to grow and have passion – balancing helped me be successful in my studies"* (Journal notation, 2013).

Home Court Advantage

As noted in the methods chapter, Home Court Advantage is a strategy for creating a safe, supportive and belonging environment. This section deals with student feedback regarding Home Court Advantage.

Class safety includes emotional, physical and mental. It is not student specific, but includes a safe environment where the teacher feels respected and is able to deliver the lesson material. Support is aligned with positive influences that alleviate negative stimuli. Belonging is associated with the desire for students to want to fit into the group. A sense of belonging has the potential to improve engagement and desire to do better (The Quantum Learning Network, 2011).

Home Court Advantage was not mentioned often in journals; however, the word 'safe' was recorded frequently. The cohesiveness of the groups and their ability to work together was apparent, as observed in the classrooms. One strategy that assisted was the ice breaker on the first day of class and the occasional mixing up of students during class sessions. The students would be asked to form groups with others who had birthdays in the same month or who were wearing sandals versus runners. These students then sat together during the morning or afternoon session. In relation to one instance where this was employed, a student commented that the students from the Philippines were really nice and fun. Students did not consciously make the effort of getting to know others outside their circle of friends. Teachers need to employ methods to encourage

interactions, this is particularly important when there are international students in the classroom, who are at risk of isolation. This was apparent by the number of international students who spoke of their struggles with low-self-esteem and being alone, and their feelings of being insecure in a foreign country (Personal conversations with Students, 2012- 2013).

Live Above the Line

This is the third of the life skills embedded in Quantum Learning as briefly described in chapter four. On the following page is the visual representation of *Living Above the Line*. Students were taught this concept using the visual image on the first day of class. It is found on the following page.

Figure 4.

A visual representation of *Living Above the Line*

LIVING ABOVE THE LINE
"if they have never seen it – they don't know how to model it = we are their models – model it"

Ownership

*Ability to **respond positively** in any situation*

***CHOICE** – helps students realise that they have a choice*

*– gives them **their power back***

Freedom – continually send positive experiences – get physical freedom

POWER

Where are you living?

"sometimes there is a point in our lives that puts us below the line"

Below the line responses:

Whatever you are doing – *even wearing at any given moment **is sending a MESSAGE** to the people and the world around you **about who you are***

Do not get us what we want in life

V I C T U M

Lay Blame – ***pointing finger*** at someone else I **am not** in control of my life

JUSTIFY – I ***was just*** keeping up with the traffic
I am ***just like*** everyone else I **am not** an **individual**

DENY – I am a **LIAR** & **cannot** be trusted

QUIT – I **don't** try
I **don't** fail
I **DON'T** have what it takes

(Quantum Learning Network 2011, p. 2.09)

This life skill appears to have had a positive influence on some students, as the data indicated that 50% of the students employed this skill half the time. One student wrote, *"Today I am making a pact with myself . . . Live above the line. Review my work!!!!! I don't have to like it; I just have to do it"* (Grp1midyr2012F31-40Au). Clearly, some of the students were implementing this strategy into their lives. I encountered one student waiting outside the nursing lab and we had a brief chat. I asked her how life skills have affected her. She paused, then quietly commented on how she now stopped and thought before she spoke or acted – that it had changed the way she thought (Personal student conversation, 2013). The data found in Table 11 indicates that life skills training was ranked at 87% usage 50% of the time and above.

In some instances, those who indicated that they used the life skills in Quantum Learning, may have already valued personal choice and commitment. For other students, this may have been a new concept, but they were making an effort to change their personal habits. Change is a personal journey and habits are not easily broken. Sarah McKay (2018), explains that habits are hard wired into our neuronal connections. In order to break bad habits, one must recognise what triggers them and put new thought processes in place that link to the bad habit and over-ride it. She also explains that bad habits are never eliminated, just over-ridden. Once again, data implies that students found the life skills aspect of the research valuable.

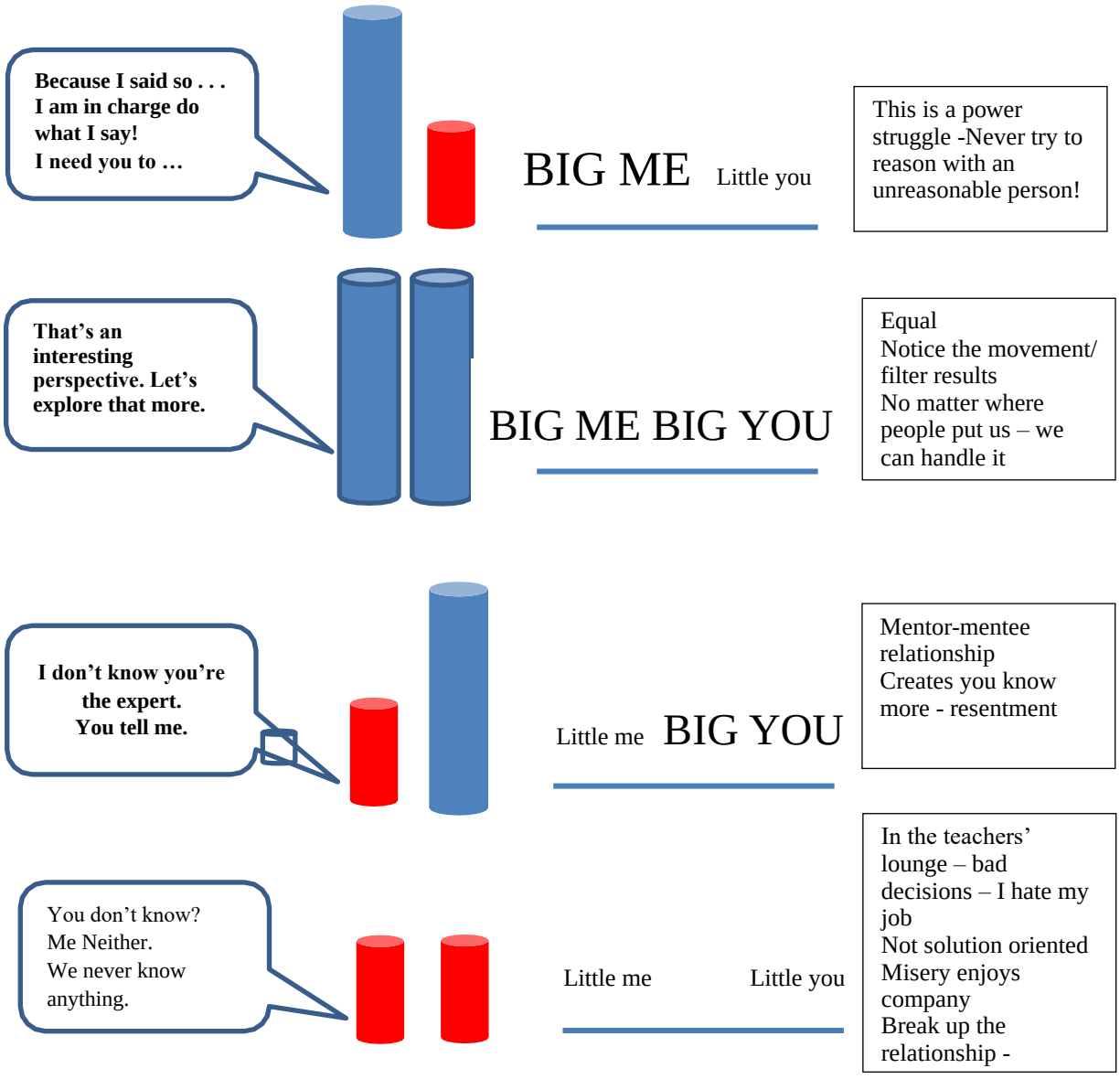
Big Me Big You

Big Me Big You is part of life education that is concerned with building effective relationships. It is taught through visualising a process that may assist in understanding. Below is the diagrammatic representation of *Big Me Big You* as taught to me at the Quantum Learning Network in 2011.

Figure 3.

A visual representation of *Big Me Big You*

Valuing Relationships – being purposeful – goal equal relationships



(Quantum Learning Network 2011, p. 4.25)

The only negative response to Big Me Big You in the student journals was from a young student who commented, *"Traditional teaching . . . Big Teacher, Little Me: therefore, easily understood and therefore to conform to"* (Journal notation, 2012). Education is about the learning process, the ability to grow and to take ownership and be self-regulated within parameters. This student's comment about conformity suggests she would prefer to be disempowered rather than take responsibility for her own learning. It could be that she did not understand the implications of the different forms of relationships underpinning Big Me Big You, or that she did not understand the connections being made with this analogy. As in teaching connections between theory and practice, it appears that life skills' education may also require a breakdown of the processes to add clarity and understanding. A nurse must be able to form relationships within a large community – a multidisciplinary team and families. A nurse must also be able to act independently and engage respectfully in a range of relationships, in order to be a safe practitioner. The Australian National Training Authority (2003) believes that generic life skills need to be taught and that this is the responsibility of "the learner, education and training providers, and the workplace" (p. 2). These skills include employability skills, such as "self-management, teamwork, communicating, planning and organising, using technology, problem-solving, learning skills, and initiative and enterprise skills" (Australian National Training Authority, 2003, p. 1). In conclusion to the life skills component, one student from Research Group One made the following comment about the Kaleidoscope classroom and life skills learning*, "Great environment to learn in, love the way Ethics has been taught"* GrpKmidy2012rF18-30Au).

This method was also used to manage behaviours, such as excessive talking. When asked, Are we a Big Me Big You or a Big Me Little You? The shift in the classroom was noticeable as students focused forward, sat up in their seats and talking ceased. Another important method for preparing the students each day was the class tradition.

Class tradition

The opening class tradition was also discussed in the methods chapter; however, this discussion focuses and student comments. Quantum Learning claims that having the entire class participate in a physical and/or vocal opening tradition unifies the class and sets a positive tone for the day. Whether it's a series of call backs, a short all-class activity, or something the class recites together, opening traditions orchestrate a classroom atmosphere based on a sense of belonging (Quantum Learning Institute, 2011). In the Kaleidoscope classroom student opinions of the class traditions varied from great fun to weird. One student stated, *"It is more inclusive [Quantum Learning] and even the dancing, as . . . weird as it is, does pump you up to learn and the whole self- boosting thing works as well"* (Journal entry, 2013). Another journal entry (2013) stated, *"The dancing to music and motivational methods are more engaging"*. *"I find it very inspirational"* was recorded in another student journal (2013).

The mantra or chant, which can be seen in the methods chapter formed the last part of the mantra, focused on developing student self-belief and positivity as many students in the VET sector had reported issues with low self-esteem (Various student conversations, 2010–2013). One student's journal notation (2013) stated, *"Have found it very effective especially in terms of self- esteem. Given that my self-worth and esteem are quiet [sic] low it was good to say it out loud. 'I am smart."* Initially, I experienced student resistance to this activity, which required students to state, out loud I am smart. Two students felt it was too babyish, others felt uncomfortable standing up and doing brain gym exercises to music then having to say that they were smart; even though the purpose [the why] had been explained. However, another student stated, *"It is more inclusive even the dancing, as . . . . weird as it is. It does pump you up to learn, and the whole self-boosting thing works well" (* Grp22013M18-30Au).

Over time more students willingly joined in and the second research group would stop me when the lesson material was too difficult and ask if they could have a dance break. The dance portion of the tradition would be repeated, so the students could relax and refocus.

As indicated by the students comment above, the data indicates that the class tradition benefited some of the students, who embraced the activity.

A Democratic Classroom

A democratic classroom is where mutual respect is evident in shared power and where students and teachers engage in the learning process together (Knight, 2000; Pearl, 2009). A democratic classroom combines with the life skills' components, positive affirmations, plants, aroma therapy, quiet music, and an element of fun and surprise, to form an empowering culture. Eighty-nine per cent of students felt that the classroom atmosphere was essential, *87%* indicated life skills were significant to their learning, and *77%* believed that developing a safe, supportive and belonging culture was important. One student wrote, *"I was pleasantly surprised with how much the overall feeling of then classroom changed in comparison to my other classes"* (Journal notation, 2012). Another stated that they were "*Motivated to learn, positive, supporting, great environment & atmosphere, good extensive knowledge on topics and delivery, and respect for everyone"* (Journal notation, 2013). These student reflections suggest that learning was enhanced, and respect was noticeable; this leads me to believe that respect, for this individual, was important and possibly not realised in all classrooms. This was implied by another Journal Notation (2013), "*The Big Me – Big You environment is good as it is a respectful method of teaching."* The identification of respect with this method of teaching suggests this notion of mutual respect is often overlooked in classrooms, where students can be grouped as a cohort, and lose their individuality in the eyes of the teacher (Pearl & Knight, 1999).

In their journals students also identified the set-up of the classroom as having impact: *"Liked the way the classroom was set up with plants on windowsills and the 8 Keys of Excellence* on the walls." (Journal notation, 2013). The impact of atmosphere on classroom practice and its implications for engagement were also identified: "The atmosphere in class was good today everyone got involved in the group activity and it was fun (cells)" (Journal notation, 2014).

Meier (2000) states, "A bright room is not going to make you an instant genius,

and a dim room is not going to make you an idiot, but a properly lit environment, together with many of the other A.L. [accelerated learning] touches, can contribute to physical and emotional health and make a positive contribution to learning" (p. 171). Previous research and student feedback attests to the importance of creating an atmosphere of support and democracy based on mutual support, respect and engagement.

Positive Environment

Positivity is linked to atmosphere and democracy. Solis and Turner (2017) state, "Caring instructors understand that student learning is affected by negative student attitudes and disruptive behaviour; therefore, they set the tone for the class early in the semester" (p. 29). Positivity establishes a healthy learning, student-centered environment, which can assist in student interactions, classroom management and successful academic outcomes. Setting the bar high, encouraging class interaction and creating a visually appealing environment also helps to create positivity (Wilson-Fleming and Wilson- Younger, 2012.). One student journaled that positivity created a *"good learning environment, I was able to learn more efficiently, help was always given and most of the time class was fun"* (Journal notation, 2013). However, maintaining a positive atmosphere is more complex than looking at a 'class half full.' Acknowledging and celebrating efforts, and successes are important aspects of a positive classroom environment. Responses to students' comments or questions are carefully formulated. I avoided saying "No, that is not correct." Instead I would explain that it was a good try or an interesting comment . . . now what if you look at it from this perspective? I felt that it was important to never embarrass a student for a comment; rather encourage them to keep thinking about it. This way students would not fear engaging in discussion or answering questions. This provided emotional safety.

Many students confided in me that they struggled with poor self-esteem (Personal conversations, 2013-2014). In a study that reviewed the effects of positive affirmations on student outcomes, Cohen and Sherman (2014) suggest that positive affirmations increase coping skills, and assist with self-appraisal, especially in situations that were perceived as stressful or threatening. They surmised that positive affirmations are a form of self-

protection. Similarly, Rastegari and Shafer (2016) found that teachers who modelled positivity in their classrooms could assist the students' development of self-belief and their ability to take responsibility for their learning. This was especially evident when the teachers were from a Caucasian background and the students were multicultural. The following comment coincides with the outcome of their study. "I can be extremely negative towards myself. But her goal was to stay positive, clear perspective decrease self-doubt" (Journal notation, 2013). Although there were few journal comments regarding low self-esteem, there were several personal conversations. Data outcomes in this study suggest that the methods employed helped to increase self-belief, engagement, and a student's determination to succeed.

Motivation

The importance of motivation was another crucial finding, as students often referred to methods that motivated them. Two important methods were incorporated to assist with motivation and countering low self-esteem. One of these was the story that ended in giving each student a glass stone. Several students indicated through conversations (2012-2013) that they kept these stones as a reminder in their pencil cases, bag packs or purses. One of the research students visited with me after completion of the course: "I still have the stone in my purse – darn you," she laughed. This strategy accomplished the desired outcome of supporting students in developing an understanding of the need to take responsibility for their learning.

Celebration of Success

Seventy-seven per cent of students claimed that celebrating successes was important. Celebrations were displayed in various ways, such as: finger snaps, hand claps, sprinkling happiness, patting yourself on the back. This type of "State Management" was effective. Writing for Quantum Learning, Le Tellier (2007, p. 150) defines the purpose of state management: "the objective of state management is to consistently move students to resourceful learning states" (Le Tellier, 2007, p. 150). This means the students are engaged, motivated and listening: state changes refocus students.

They provide a simple, effective way of managing a class and maintaining interest

in large amounts of content (Le Tellier, 2007). Celebration is a form of state management that focuses on the positive learning taking place.

Neuroplasticity

Neuronal Connections

Neurons are cells that send electrical impulses to connecting cells and/or groups of cells. During the learning process new neuronal connections are established and as information is reviewed these connections strengthen. This concept of neuroplasticity has been discussed in the scientific world for 120 years. Plasticity is when the brain rewires the neural networks, so when the neurons fire together, the pathways are strengthened; hence, the saying, “Neurons that fire together, wire together” (Markam, Gerstner & Sjostrom, 2011; Quantum Learning Network, 2011).

Willis (2012) identifies the impact a teacher with knowledge of neuroplasticity can have in the classroom:

> There is no more critical life supports than passionate, informed teachers who can resuscitate students’ joyful learning. When educators learn about how the brain appears to process, recognize, remember and transfer information at the level of neural circuits, synapses and neurotransmitters, and when they share that knowledge with students, they share empowerment with their students (para 12).

Neuroplasticity is implied in the data where students record a change in habit or behaviour, and when they talk about habit-forming as a process to improve their study (Mueller, 2017). A mature-aged student, who was concerned about passing the Anatomy and Physiology unit as they had been unsuccessful in a previous attempt, was in one of the research groups. She was despondent and explained to me that she was just too old (personal conversation, 2012). An explanation about neuroplasticity and the brain’s ability to change and form new neuronal connections at any age gave this student increased confidence in her ability to be successful in the unit. Anderson (2012), explains that the notion of the brain being static has changed and the brain is now considered to have plasticity – the ability to change. Anderson (2012) states:

A surprising consequence of neuroplasticity is that the brain activity associated with

a given function can move to a different location; this can result from normal experience and also occurs in the process of recovery from brain injury (Doidge, 2015). Neuroplasticity is the fundamental issue that supports the scientific basis for treatment of acquired brain injury with goal-directed experiential therapeutic programs in the context of rehabilitation approaches to the functional consequences of the injury (para 18).

Verma (2015) identifies the need for more rigorous research into teaching with reference to neuroplasticity as "[teachers] have no tradition of applying neuroscience findings to the practice of teaching" (para, 22). However, it is not the purpose of this study to go into depth regarding neuroplasticity. It is sufficient to say that it appears to be an important concept for teachers to understand, and that it has the potential to assist students with their learning – in the sense that they understand their potential to learn. The myth that the brain cannot change is important to dispel, especially in mature-aged students.

Big Brain Ideas

This strategy was ranked at 83% usage for 50% of the time and above. This suggests that the students in the research groups found that the three big brain ideas assisted in their ability to learn, recall and transfer information. One student exclaimed, *"I studied all day for eight hour and I can't remember a thing!"* (Personal verbal conversation, 2012). The researcher reviewed the following brain-based techniques with this student: chunking the information into small portions; the importance of taking frequent breaks; eating well; drinking enough fluids; getting enough sleep and reviewing the lesson every night for a least seven days just before going to sleep. After implementation of these methods, this student stated: *"I don't know how it happened, but I got up and I can remember everything – everything!"* (Personal verbal conversation, 2012). This suggests that brain-based study techniques can assist with retention and recall. The following student comments relate what it was like prior to implementing brain-based methods in the research. *"Before Quantum Learning I study by memorizing my notes"* (Grp22013F18-30Int'lEAL). Another student commented, *"My experience in the previous class has been really different, as the*

way I used to learn was different. I used to memorize things without understanding. I would only study during exam [sic]" {Student Journal notation, 2013). Other students related how they felt after the implementation of Quantum Learning and Campbellteaching.

One young woman commented*, "I felt encouraged to take responsibility for my own learning"* (Student conversation, 2012). A mature aged student declared, *"I have to take responsibility for my lack of preparation and accept the consequences of not fully studying"* (Student conversation, 2012). These students became of aware of their metacognitive processes and gained the personal insight.

Metacognition

Metacognition, as discussed in the literature review, is the process of recognising one's own thinking processes. Noushad (2007/2008) asserts: "Relating metacognition to developing one's self-knowledge and ability to 'learn how to learn' resulted in metacognition being awarded a high status as a feature of learning". An important factor in Quantum Learning is teaching students how to learn and how to take responsibility for their learning. In addition, if students do not understand how memories are formed and transferred from short term to long term memory how can they improve the process? Marzano et al, (1988) stated:

> The more students are aware of their thinking processes as they learn, the more they can control such matters as goals, dispositions, and attention. Self-awareness promotes self-regulation. If students are aware of how committed (or uncommitted) they are to reaching goals, of how strong (or weak) is their disposition to persist, and of how focused (or wandering) is their attention to a thinking or writing task, they can regulate their commitment, disposition, and attention (para, 7).

The process of metacognition is that it is built upon previous experience and learning, which is called schema.

Schema – Students Make Meaning by Connecting to Existing Knowledge

Schema are the ways that we build our concept of the world; we can build our

understanding and plan ahead for our future using schema as ways of storing information. McLeod reflects upon Piaget's work, saying "Piaget called the schema the basic building block of intelligent behaviour – a way of organizing knowledge" (McLeod, 2018, para 13). Schema can be likened to a filing system of different experiences in life that can be changed and refined (Wadsworth, 2004). All that we have learned in life, both life experiences and formal learning, become our schema, upon which we build and rearrange our thinking throughout life. Students enter nursing with a range of different schema. Finding ways of connecting new learning to existing schema in ways that make that learning easily accessible when in a clinical setting is critical in reducing the theory-practice gap. The focus in Quantum Learning on democratic learning found the concepts of *Big me, Big you* and in *Living about the Line* is relevant here because these concepts open up ways for students to communicate their schema and understand their personal responsibility as learners. In other words, students must acknowledge their personal responsibility to recognise and develop the schema they use, in order to become better learners.

The use of visuals and embodied learning is important because they can offer different 'keys' into schema and provide students with a range of ways of accessing and developing their schema.

Picturing – There is No Comprehension Without Picturing

Sousa (2000) explains that the brain is an 'image processor' and can capture various kinds of images, which are concrete and easy to remember. He explains that the portion of the brain for visualisation is larger than the auditory areas. Throughout life our brains take in images and automatically store information related to those images: "That's why image-rich experiences can teach you much more in less time with less effort than words alone ever could." (Sousa, 2000, p. 159). Diagramming in the Anatomy and Physiology unit assisted student learning as they created their own pictures that they labelled and colour-coded. In addition, they were able to manipulate models and watched YouTube videos related to the body system. One student wrote, *"I absorbed more when I learnt the lectures with*

diagrams and colours. I really agreed with the tenet that 'there is no comprehension without picturing' based on my experience" (Journal notation, 2013). Another student remarked that *"There is great improvement in the lecture delivery. Subject is broken down into simpler terms for great understanding and use of simple diagrams which are easy to capture and master"* (Journal notation, 2013). They conclude: Bobek and Tversky (2016) stated that, "Creating a visual explanation is an excellent way to learn and master complex systems" (p.

Reviewing Before Sleep

Eighty-nine per cent of the research students found reviewing before sleep helped with retention and recall of the theory. All students used this strategy to some degree. Sousa (2006) explains that learning will only stay in working memory [short term] for 18- 24 hours after a teaching session; if it stays in short term long enough it will be put into long term memory. Doidge (2010) states, "Scores of studies show that sleep affects plastic changes by allowing us to consolidate learning and memory. When we learn a skill during the day, we will be better at it the next day if we have a good sleep" (p. 239).

Although it has been known since 1885 that sleep helps in retention of learning, students often do not realise that reviewing the day's work before going to sleep has better outcomes than learning earlier in the day and then going to sleep in the evening without reviewing (Payne et al, 2012). Not only does research suggest that reviewing before sleep is beneficial to retention, but no research could be found that questions or refutes the practice of reviewing before sleep. One student commented "I still study before I go to sleep which is also introduced in Campbellteaching' (Student journal, 2013). Although, this strategy was not mentioned a lot in the student journals, personal conversations with the students and the graph of usage indicate the benefit students received.

Focused Discussions on Quantum Learning and Campbellteaching Methods

Quantum Learning Methods

Motion to Words

The data suggests that 67% of the research students utilised action to words as a

means of remembering and recalling portions of theory. Once again, results indicate that students have preferences in the way they learn, as not all students found this strategy beneficial. However, 67% is a large portion of the combined cohort data that found it useful. The findings of this research concur with the work of Freeman et al (2014), which indicated that active learning improved student outcomes. This finding is evident in both the qualitative and quantitative results. In Personal journals, students noted a number of ways in which active learning was effective:

- *Using body motions helped me a lot – remember key things through test–* (Student journal, 2013).
- *Learning about the 4 different cells of the pancreas was fun, because we got to act out Alpha, Beta, Delta and Gamma* (Student journal, 2012).
- *It helped when Corrine got up and linked movements and actions to the musculoskeletal system* (Student journal, 2013).
- *However, best thing about this class was when we came up with words and sentences to make it easy to remember - like connective tissue: Mr. White stepped on a loose board, and an elastic hit him in his fat belly, meanwhile Mrs. Lymph carted a bone covered in blood. I would say all those activities that we did in the class were very helpful along with those drawings with colour and body movements. I think it is the best technique for studying. One thing I noticed was if you don't review every now and then you will forget it. So, as this study is getting harder and harder, I need to put more effort into it* (Journal notation, 2013).

This last notation also included anchoring as each descriptive word was located at one spot at the front of the classroom. Therefore, if I stood at that position the students could tell me if I was Mr. White or Mrs. Lymph and so on. In this last notation, the student not only identified the learning preferences that worked for them, but they also recognised their role and the need to study. They were self-monitoring - *Living Above the Line*. Overall, the data suggests that the utilisation of active learning has the potential to improve student outcomes, develop critical thinking skills, and assist with retention and

recall.

This is an area where teachers can incorporate their creative abilities. One has to think on the spot, when students are struggling to understand or having difficulty recalling. This was the ongoing situation for me; I came up with motions to words or anchoring stories on the spot. One journal entry above spoke of the hormones in the pancreas. This was anchored, in other words, I gave one name and an action at a certain spot at the front of the room, then I went to another area at the front of the room and used another action and story and repeated this for all four of the hormones. When I went to each area and asked what it was, students could tell me the name of the hormone and what it did. This simple strategy can be implemented easily in any situation.

Memory pegs

Memory pegs are a useful and easy way to recall lists of items quickly. The Memory Institute (2018) states, "The peg system gives you the ability to remember the numerical position of items in a list in sequence or out of sequence. The technique has several variations ranging from the very simple to the more advanced" (para, 3). During the research, students learnt twenty pegs that were represented as pictures.

Actions were incorporated to assist in recall of the pegs. Fifty per cent of students used memory pegs as a tool to recall lists or names. One of the students was an artist. He drew and coloured the twenty pegs and they were photocopied and handed out to all his classmates. One student stated, "Memory pegs are … very useful for me" (Journal notation, 2013). A student from group two explained that one of the nurses on placement explained how useful memory pegs were in learning medications. She was surprised that the students knew how to use pegs. Some of the research students used memory pegs during the medication unit to assist in remembering frequently used medications (Journal notation, 2013). In addition to using memory pegs in other units, they also utilised the linking table to assist with understanding medications and drug interactions (Personal conversations, 2013-2014). This indicates that students were using Quantum Learning and Campbellteaching methods in other units, in order to assist their learning. [perr

Story Lines

As per data Chart 15, overall 54% of students used story lines half the time or more frequently. The usage of this method suggests that student had different learning preferences and Story lines worked for just over half the students.

Storylines as an active learning strategy were developed in Scotland and used as a progressive learning process throughout an entire lesson, based on questions and fictional characters. This strategy was supported by research that indicates that story lines can support improved student outcomes (Mitchell-Barrett, 2010). For the purpose of this research a storyline was an impromptu story that linked various processes together in order to make separate aspects easier to understand, and to make transparent the connections between different functions. The shorter and easier the story that was constructed, the more effective it was. When learning the conduction system of the heart and the layers of the skin, for example, students were asked to come up with stories that assisted with recall. Students were encouraged to share their stories, and all were celebrated. The students worked in small groups and then acted them out or told them to the class. I also made up my version, and students then chose the one that worked best for them. The usefulness and applications of storylines for some students was apparent in their journals: one student journaled that, ‘storyline has been very effective’ (Journal notation, 2013).

Relaxation

Aroma therapy, music and relaxation techniques, such as guided imagery and “Ha” breathing were explained and taught in the Kaleidoscope classroom. Before tests students were asked to put themselves into the “Zone” a state of. relaxation using the techniques that were taught. My observation was that the vast majority of the students utilized this technique before each test, as they sat in silence with closed eyes performing “Ha” breathing techniques, while Baroque music played faintly in the background. One student stated that, “I enjoyed listening to music whilst I was studying and the aromatherapy part. I try to employ these techniques, particularly the aromatherapy, as I find it relaxing” (Grp1midyr2012F18-30Au).

The data suggests this was an important as 76% of the students indicated they used this strategy half of the time or more. Another 13% said they used it a fair bit. Many students indicated during personal conversations with the teacher that they suffered pre-test stress and/or stress prior to presentations.

Baroque music

It is evident that very few students used baroque music when studying. Almost half the participants in the research claimed never to use Baroque to support their study. Only eleven per cent of the students always used Baroque music to assist focus when studying. The data indicated that males were more apt to listen to Baroque music than females.

Baroque music was produced in Northern Europe between 1600-1750 A.D. It has between 50 to 70 beats per minute and coincides with heart rate which, according to Tong (2014) is ideal for 'enhancing learning efficiency', as it positively impacts learning capacity, due to the influence of alpha waves in the brain. Sousa noted, 'Music can affect a person's heart rate' (Sousa, 2006.p. 235).

Baroque music was played very quietly in the Kaleidoscope classroom during study groups and tests. It was to assist with maintaining focus and relaxation. However, a complaint was made regarding the music in the classroom by a student who did not like the music selection. Consequently, I reduced the use of background music in the classroom. Loveless (2013), in his thesis, found that music in higher education was a beneficial pedagogical tool but was an uncommon practice. He asserts that the barrier to music in education is caused by a lack of discussion among colleagues regarding the benefit of music as a pedagogical tool, negative views held by colleagues, the challenge of providing something different in the classroom, and lack of equipment. I found Loveless's findings to be correct, as I experienced negativity within the department to my use music in the classroom; even though students often requested the music.

The low usage of Baroque music amongst the participants could have stemmed from lack of understanding about the rational for this type of music or they preferred their own music. Some may have considered it too old fashioned. Other may have considered the practice inappropriate for a classroom.

Learning Preferences and Multimodality

Bhagat, Vyes and Singh (2015) examined the effects of students' understanding of their learning preferences on their academic performance. Their student participants were encouraged to explore learning styles other than their preferred style and implement them in conjunction with their preferred learning style. Their data implied that 78% of their study group experienced increased outcomes on exams when they used a variety of learning styles. Fifty-eight percent improved their test scores, even when they were unable to identify the best combination (Bhagat, Vyes and Singh, 2015). Unlike the participants in Bhagat, Vyes and Singh's study, Journal entries from this research study indicated that the students were able to identify preferences that worked for them. For example, one student stated,

> *Using body motions has helped me a lot in remembering key things through tests. I do not like memory pegs or story lines as I may easily forget. Summarising with a buddy isn't my thing. I rather do independent study* (Journal notation, 2013).

Another student stated:

> *When I started to use Campbellteaching, I started to draw while studying or look at my drawing in class. It makes it easier to understand the human anatomy that way. I still study before I sleep, which is also introduced in Campbellteaching. One that doesn't work for me is the story line. I get confused with the stories and I forget the medical terms and its spelling* (Journal notation, 2013).

Newton and Miah (2017) discussed the lack of empirical data for the effectiveness of matching teaching to learning styles. They discuss the emergence "of the related theme of Styles of Learning rather than Learning Styles…. This leads us to urge caution and clarity in the continued 'debunking' of the 'myth' of learning styles. Learners obviously have preferences for how they learn" (p.7). Their conclusion concurs with the students' comments as noted above. However, Willingham (2005) purports that there in not enough evidence to support learning styles' theories. He agrees with earlier research that does not support the implementation of learning styles and he stated:

> It's important to be clear that *learning styles is not a theory of instruction*. It is a

> theory of how the mind works. So, when I say "there's no evidence for learning styles" I am making a claim about the mind, not about instruction. Lots of stuff aside from learning styles goes into the practice of teachers who ask me this question: their knowledge of kids, their emotional sensitivity, their knowledge of the content, their knowledge of pedagogy, etc. (Willingham, 2005, para, 12).

The majority of the research students did not know their learning preferences [styles] prior to this research study; therefore, the students were given several questionnaires to determine their learning preferences. They were Visual, auditory, kinesthetic learning, Howard Gardner's theory of Multiple Intelligences, Modality survey, Honey and Mumford learning styles questionnaire, a quantum thinker quiz, and a quantum reading comprehension quiz. Due to time constraints this was a self-directed activity for the students benefit. The results were for their personal development of metacognition, but were not for use in the research. In addition, throughout the teaching sessions, the students taught about the learning process – how the brain learns; in order to increase their ability to learn, how to retain and recall their theory. A student from Research Group One made the following comment on the comparison table, they found that Quantum Learning and Campbellteaching were more effective because they were, "Making full use of the different strategies of learning" (GrpKmidyr2012F31-40Int'lEAL). This student went on to say that, "I learnt better with the association of colours, pictures, pegs", thus identifying three preferences (GrpKmidyr2012F31-40Int'lEAL). Another student identified the following methods that assisted in their learning, "I really like the idea of introducing Quantum Learning, especially reviewing at bedtime. Visulization [sic], audio and writing made me easy to remember (GprKmidyr2012F31-40Int'lEAL). In these instances, the students identified more than one learning preference. Overall, as indicated in the data students found the use of learning preferences beneficial.

Felder (2010), stated:

> Contrary to the claim of learning styles debunkers, however, sensing and intuitive learners do tend to respond differently to certain teaching approaches, as do students with opposite preferences on all other common misinterpretation of learning styles, as every teacher discovers, no two students approach learning in exactly the same way. Some get more from visual imagery while others prefer verbal explanations; some tend to try things out and see what happens and others are more inclined to think things through first; some reason in a relatively sequential manner and others have a more holistic orientation; some are most comfortable with concrete ("real-world") information and others are more drawn to abstract theories and symbolism, and so on " (para, 1).Research student journals concur with the use of learning styles education, but through the use of multiple methods; in order to address the various learning preferences within the classroom. The data indicated that the student cohorts had a wide range of preferences and that there was not a best way to learn. Felder (2010) commented that as unique individuals, we all have different learning styles and preferences.

Keeley (2011) stated,

> In the course of our lives, we must adapt to a wide range of learning situations - and it is highly likely that some of these situations will not conform to our strengths. The trick is to continually to build on our strengths while developing other methods and skills (para 1).

Kitchie (2011) discussed the need for nurse educators to incorporate multiple teaching methods in order to meet the needs of various learning preferences, so that all students can achieve success. In this study, multimodal methods were employed. This allowed for the strongest preferred styles to be catered to, and the weaker styles to be strengthened. The qualitative data indicates that students were more engaged in the learning process when they understood the underlying theory of learning preferences and study techniques. The charts of the various methods showed differing amounts of usage,

which indicates that students were using what worked for them. This clarifies the need for multimodal teaching methods that captures the interest, engagement and individuality of students. The main methods have been discussed above, but it is important to reaffirm that all classes incorporated videos of each system; in order to provide an overview of how each body system functions. This added to the consolidation of the learning. When the research students were asked if they could link their theory to their practice, one student made the following comment: "I tried to link what was being taught in class and self-study to my clinical practice. The diagrams of A&P especially. The actions, the different programs from you tube that I watched. Experiences we shared from one another. With knowledge and understanding adds to practice. It builds up my confident about a topic. The weekly tests really helps me a lot. Sometimes we just need a push to help us boost. Heheh…I would suggest that medication subject should be made the same ((Grp1midyr2012F31-40Int'lEAL).

Teacher Attributes

Le Tellier (2007) discussed the importance of developing a caring relationship with students. Nurse educators and teachers from other sectors often put in extra time to assist students. This is termed "educational charity" and these small acts of kindness assist students on their pathway to success. Le Tellier goes on to talk about "educational grace" when students may not appreciate the effort being made on their behalf, but the teacher has seen an ability in, or possibility for, the student. To offer charity and grace is a choice that educators make (Le Tellier, 2007). The recognition of the student's efforts is valuable to disadvantaged students and can make the difference between success, failure and retention of the students who form this cohort. Simmons and Cavanaugh (1996) believe that caring environments in nursing education facilities are strong predictors of students developing a caring attitude towards their patients (p. 240). Teachers who emulate caring in nursing education assist students with their learning and their development of a caring attitude towards those they will look after. One student commented*, "I feel like [our teacher] actually cares and wants us to do well"* (Grp1midyr2012F 30-40Au). The importance of

the role of the teacher as someone who students perceive as caring about their outcomes, and about them personally, is evident in the research students' journals, as well as in the literature. When asked what a caring teacher looks like, one student stated that she was *"helpful and approachable, easy to communicate with and was well prepared, she always feels inviting and supportive which makes it easier to learn"* (Student notation, 2013). Other teacher attributes that were deemed important by the research students were to be: passionate, respectful, enthusiastic, positive, available, approachable, patient, innovative, creative and fun. One student journaled, *"She was dedicated, has the passion, enthusiasm, she was so into the subject teached [sic] it with her heart and loved what she was doing. This is very important as it gives students to be at the same level with the teacher. She rubs off her good spirit onto us"* (Journal notation, 2012). In his research, Hattie (2003) found that the teacher was the second most important factor in student success, next to the student themselves.

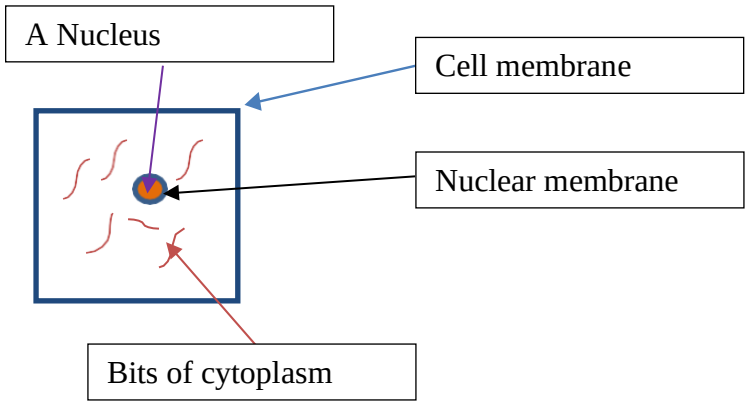
Campbellteaching Methods

Campbellteaching was incorporated into the research study for its ability to offer content specific methods. I recognised the potential of this model by the successful outcome of Siri and her classmates. Therefore, I designed the research in a manner that would allow for the combination of both models; in order to see if they could increase student's ability to learn at a deeper level, develop critical thinking, recognise connections between body systems and recall the theory.

Sixty five percent of students indicated that they used diagramming with colour 50% of the time or more. One student stated, "Campbellteaching and Quantum Learning allow for other ways in which to study. I have found it very effective especially in terms of self-esteem" (Journal notation, 2013). In the following section on diagramming with colour, the process of learning with through diagramming and explicit explanation will be discussed in terms of student acquisition of knowledge with both surface and deep learning. This process was vital to the research and the ability to link theory to practice and ultimately, assist in decreasing the theory-practice gap.

The diagram below represents a simplified version of one human body cell. A variation of Campbellteaching (2009, p. 3).

Figure 4



This is a very basic outline of a cell: each of the components or structures is explained. Students then have an opportunity to summarise what they just learned with the person next to them through ‘buddy talk.

Explicit Dialogue

Figure 5, below, illustrates the next level of complexity. It is the same cell as in Figure 4, but more structures have been added. All structures are named with an emphasis on students learning the names. Each structure is drawn separately, its function explained, and the interaction of the various parts of the cell is explored. Each of the structures inside the cell is drawn individually and explained and discussed. The diagrams become more and more complex in content, while remaining simplified in representation. This diagram includes the functioning components of the cell – the organelles.

Once students learned the names of the organelles, they were taught the functions separately, then the connections were taught, and how they functioned as a whole. This process is the chunking- scaffolding and explicit discussion that students found easy to understand, remember and connect to other body systems. This allowed for surface learning, which meant just knowing the names of the structures,. The students then transitioned to deep leaning when the understood the functions of each organelle and how they all worked together. Surface learning is required before deep learning can take place

(Hattie & Donoghue, 2016). A diagram of a more complex cell is found below.

Figure 5.

The diagram here represents one human body cell with the organelles. It has added complexity but is still simply represented [a simplified version of Campbell, 2009, p. 7).

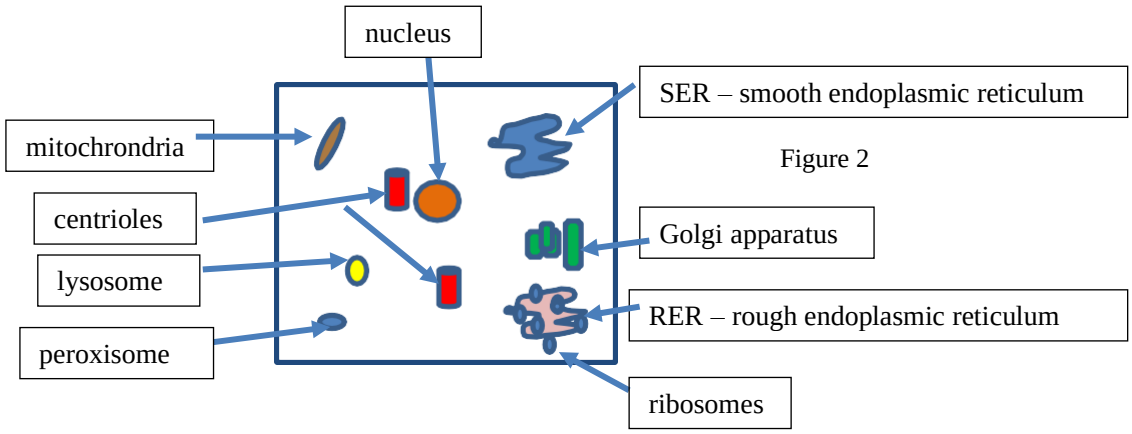


Figure 2

This next step broke the learning down further. Each organelle was drawn, colour coded and discussed. After each organelle was the students had Buddy Talk. After the process was complete an animated video was shown. It depicted the inter-related processes within each cell.

In Research Group One all the students were diagramming during class. However, in Research Group Two three students were reluctant to engage with the diagramming process. They made small outlines in their notebooks. They did not purchase the drawing pads as requested. The students who opted out of the research engaged in all the classroom activities, including diagramming. Some students in Research Group Two explained that they liked to do a rough drawing in class and preferred to do a better drawing at home while they studied. Student comments in relation to Campbellteaching were: *"Absolutely love John Campbell's way of teaching. Read his book first then use his YouTube videos, like a second class for review without the distractions"* (Journal notation, 2012). Another student made the following comment as they were leaving the classroom, *"I don't have to study – well I mean I study, but I know it when I leave class"* (Personal conversation, 2013).

As mentioned previously in the methods chapter, each student received a free copy of Campbell's book, *Campbell's Physiology Notes*. The students engaged positively with *Campbell's Notes.* One student commented in their class journal: *"Campbell's Physiology Notes … always comes to the rescue as this book gets to enlighten everything and makes it easily understood* (Journal notation, 2013). Another student made the following comment: *"Nervous system: The lecture was well delivered though I had a few questions here and there, but I was always happy that Campbell would do the magic and help me understand"* (Journal notation, 2012).

The students articulated that it was the visual elements of Campbell's approach that they responded to. The accessibility of his work on You Tube further supported their learning. As this student stated, *"I do… love John Campbell. He has an amazing way of teaching and I often go online to review YouTube. It's fantastic"* (Journal notation, 2012). However, one student required more detail and colour, so preferred the Visual Anatomy Textbook, which was the prescribed text. I chose this text for Anatomy and Physiology as it was laid out and presented with clarity, mind-mapping principles and had similarities to Campbellteaching. The student journaled (2013): *"I didn't like using Campbell's book because it wasn't as detailed and had no colour, so I used Visual Anatomy which was great!"* Another student's comment affirms the qualitative data previously presented. *"I was skeptical about all the drawings/ diagrams, but now I miss it when we have a sub teacher. Definitely an easier way of learning"* (Journal notation, 2013).

Another finding emerged from the research that has potential to assist students with dyslexia, as well as some previous brain injuries as demonstrated with Siri. A student explained that they had dyslexia and found diagramming, colour and explicit dialogue was very easy to understand. During a skype interview with Dr. John Campbell, I related her story. He explained that he has dyslexia and he wondered if he had developed the lessons in a way that he found easier and conveyed clarity. The International Dyslexia Foundation (2017) concurred that individuals with dyslexia can benefit from clear, simple instructions, a combination of verbal and visual information, explicit teaching, chunking of material and working with a partner. This is an area that could be explored further.

Liz's Comparison Table – What She Discovered

Liz is Australian and English is her first language. She was born in England, to an English mother and Latvian father. Both parents lacked formal education, but Liz describes them as very aware. Her mother felt Liz was a difficult child and sent her to a Catholic convent. The education was authoritative, and she experienced difficulties that left negative impacts on her learning, especially having her pigtails continuously pulled and receiving negative feedback about herself. At age ten she was moved to various schools and her only joy of learning came from her father, who discussed politics and life with her. In one school the children were frequently threatened with a strap and referred to as "A bunch of snotty nosed kids!" As a result, she became rebellious, but managed to achieve average grades.

Over the years that followed Liz had an eclectic education that at times was interrupted by unfortunate personal circumstances. She worked in several areas, but stayed working as a Youth & Child Officer for some time. This is where she learned the 'realities' of life. Liz was not one to back down on her principles, which resulted in disputes with lecturers upon her return to education to become a nurse. She was amazed by *"The amount of information overload that we have to wrap our heads around . . ."* (Liz's comment, 2012) in the Diploma of Nursing course. Liz experienced positivity and negativity during her time in the course. It is widely known that adults come with a wealth of knowledge and experience that can enhance learning (Taylor and Hamdy, 2013). The research data from this study indicates that mutual respect in the classroom is important, as evidenced by the life skills ratings of 87% and 77%. However, Liz did not experience all classrooms at university as respectful of the knowledge that students bring, or of relationships within and beyond the classroom. The following table is a comparison of Liz's experience with traditional learning and Quantum Learning and Campbellteaching.

Table 21. Liz's Comparison Traditional versus Quantum Learning and Campbellteaching

Learned Blocks	***Quantum Learning & Campbellteaching***
* Lack of trust – e.g. Teacher who lost patience because she did not understand the concept as taught and so had her pigtails pulled and ended up in tears *Math is difficult – Lifelong difficulty *The study of Anatomy and Physiology presents difficulty when discussed in abstract terms *Found difficulty with the flow of body systems – complexity	*****Feeling safe in class *Diagramming with colour made it easier to comprehend *YouTube video clips assimilated the learning *What set the learning in concrete was the use of mnemonics *Rhyme and rea
Blocks to Learning	***Quantum Learning & Campbellteaching***
*The classroom was no*t always a safe place* – ridiculed, frightened by the black strap *Students had *no choice* (there was no democracy in the classrooms of a democratic country) *Teaching was authoritative	*The importance of knowing my learning style, personality type and how I was already smart *Liz's personality type = activist *Researcher set expectations

*It is not acceptable to challenge a teacher about the content *She was going to get into trouble for standing up for herself *talking out in class can make one look stupid	*How she would assist the class in understanding how the brain learns and methods that could assist us to improve our ability to learn and retain the theory *Home Court Advantage = belonging, safety and support *Living above the line *Democratic classroom – mutual respect
Structure of Learning *What is required for students to learn is unrealistic and does not match the reality of the workplace e.g. there is a vast gap between the tools we needed and the reality of their idealism when one enters the workforce with all these idealistic tools the shock of reality when one needs to apply the years of learning can resonate resentment . . . *Learning is boring – power points are boring *Power points contain too much information	***Quantum Learning & Campbellteaching*** *Scaffolded learning *Blocked learning where students had 'buddy talk' time to summarise what they had just learned *During the 'buddy talk' the teacher would walk around the classroom and ensure that everyone understood the content *Simple diagrams and simple explanations *Diagramming with colour and taking time to do it well – can comprehend the theory and pull the material together – so without realising it your learning *Learning is embedded with the addition of a mnemonic to lock it into memory *I experienced satisfaction

Dynamics to Learning *Huge classrooms *Ppts. with a lot of information *Teachers do not allow time for students to learn, but just keep moving forward, which encourages students to ask each other what was just said, and both lose information and causes irritation *Fear of making a mistake	***Quantum Learning & Campbellteaching*** *Open discussion Interactive – use of motion to words to lock in memory *Can often feel silly when using the motions, but it is an added bonus if one can laugh at oneself *Feeling silly in class is much healthier than being bored and missing out on valuable learning and time *It was okay to be wrong "Failure leads to success" *A negative experience is turned into a positive experience, it's okay to be wrong turn things around and learn from it – once again a safe environment
Retaining Information *Realms of information and rote learning falls into a fog of soup that becomes harder to access when needed *Only memory is fear of forgetting" (student table, 2012) *Learned resentment not theory *Experienced in both high school and university	***Quantum Learning & Campbellteaching*** *Storytelling and narrative enhanced memory of theory *Learning was fun and pleasant *Example: In order to remember the division of the spinal vertebrae, see below: *Neck = 7 cervical = breakfast at 7am *Ribs = 12 thoracic = lunch at 12 *Lower back = 5 lumbar = dinner at 5 *Sacrum 5 fused bones = 5mins later dessert *Tail bone = 1 coccyx = 1 min later a cuppa

Academic Text & Lectures	***Quantum Learning & Campbellteaching***
* Language specific to disciple e.g. terminology, jargon * Medical textbooks – require dictionary to follow meaning – confusion * Past experience or lack of experience with new material * Theory information overwhelming * Lectured without explaining medical terminology – lost concentration * Frustration, lack of enjoyment in learning * Sadness seeing many classmates failing – high failure rate	* Campbell's Physiology Notes were clear and simple * Campbellteaching website with YouTube videos of all the class lectures assisted in learning * A positive attitude was encouraged this established a bond between the teacher and the students
Opening New Pathways to the Brain	***Quantum Learning & Campbellteaching***
*Life experiences condition the way we regard learning *Have expectations that are considered acceptable by the experts – can lead to student apathy *Nursing instructor indicated that nursing *Was taking a holistic approach to patient care; however, students did not have the ability to present an opinion on the subject *Caused barrier to learning	*Researcher discussed neuroplasticity and how one can establish new neuron connections *There was a discussion on how learning can go from short term memory to long term memory, especially during sleep *Pegging was taught to assist in learning lists e.g.: Sun cranium and place hands on head (must picture in your mind and you say and do the actions)

Summary of Liz's Experience

Liz's final comment sums up her feelings towards Quantum Learning:

> I have written the attached document [shown above] with the view to improving the status quo in education, I thank . . . my Quantum Teacher, for the return of the joy of learning … where theory is empowering and can be implemented with the 'commoners' sense of social justice."

When Liz attended a previous university, she registered for an Anatomy and Physiology course. She was unsuccessful. After enrolling in the Diploma of Nursing Liz told me of her previous experience and expressed her concern about her inability to learn science. After I explained brain-based learning and neuroplasticity, Liz developed a positive outlook and engaged in the research. Her belief in her ability to learn increased. On following page is a table depicting Liz's weekly theory tests (TT) results. The top row provides the number of each quiz, which covers two teaching sessions. The second row is the score and the percentage. Re-sits were placed in the yellow row. Theory Tests formed 20% of the final grade, the orange row is the calculated worth of each test score.

Table 22. Liz's Weekly Theory Test Results and Final Grade

TT 1		TT 2		TT3		TT4		TT5		TT6		TT7	
26.5	66%	29	76%	23	57%	33	84%	58	95%	41	91%	32.5	88%
				24hr shift									
	1.18		1.36		1		1.51		1.71		1.63		1.58

TT8		TT9		TT10		TT11		Total	Midterm		Final		Final
29	90%	26.5	88%	21.5	52%	39	86%	T Tests	80	80%	93	76%	Grade
				weekend nights									
	1.62		1.58	Shift	0.93		1.54	15.64		32		30.4	78%

The two lower scores were related to external factors, a clear indicator in this case, that personal issues can affect student outcomes. This factor will be discussed later in the chapter.

The thoughts expressed in Liz's table correlate with the emergent themes that arose from the qualitative data. Her thoughts support the importance of life skills and multimodality within nursing education. The qualitative data suggest a noticeable gap between a traditional learning classroom and the Quantum Learning-Campbellteaching classroom. Holmes and Lindsay (2018) state:

> If the nursing profession is genuinely committed to the well-being of people, it must ensure that the education of nurses goes beyond the narrow confines of a standardized, prescriptive training and accommodates opportunities to encourage creativity, insightfulness, and critical thinking (p. 6).

The ongoing concern with the theory-practice gap as previously mentioned emerges from the need for graduate nurses to be capable of performing duties to a specific standard ensuring safety of self and those they care for. This requires confidence, a sound knowledge base, practical skills, linking of theory to practice, and an ability to think critically. Have I just repeated myself? – probably, but this is a critical issue and needs to be at the forefront of the minds of decision makers and educators. Rolfe (2015) believes that the scientific model of nursing needs to shift into human science. He discusses the crisis of nursing in the United Kingdom that has led to reported deaths that were attributed to substandard care. I do not believe that this is specifically an issue for England, but a worldwide concern that highlights the immediate need for a paradigm shift in nursing education to be embraced by those in leadership positions. Without leaders on-board and embracing and encouraging and putting policy in place – it will not change.

Difficulty Transitioning Students Back into Traditional Classrooms

The research created a noticeable difference between the traditional classroom and the Kaleidoscope classroom. Students recognised the gap, as they engaged with the life skills, multimodalities, democracy, respectful interactions and the fun classroom culture, where they were taken to a deep level of learning. The factors that Liz indicated as barriers to her learning may also, have been issues for other students. One student summed up their experience with the following comment:

> It is a lot of work, but it pays off in the end; and Quantum Learning [made me] more confident and [had me] remembering information, feeling more positive after tests. Revising and reading before I go to sleep. I am writing and reading out loud (Journal notation, 2013).

The following section on student experiences with substitute teachers provides additional insight.

Change of Teacher – Substitute Teachers

Comments from student journals provide insight into the what students perceived to be the differences between a traditional classroom and the Kaleidoscope classroom. This came about as I was ill when teaching Research Group Two Anatomy and Physiology and three substitute teachers were called in to teach my classes. The substitute teachers were experienced and experts in their fields; however, they were not trained in the delivery of the Quantum Learning and Campbellteaching models. They were skilled in traditional theory delivery, which included power point presentations and some discussion. One student highlights their understanding of the pedagogies and aims of the classroom:

> Another day without [researcher], and because I was there this time, I could see the difference for myself. It was very dull 'Old School' like. It started well, but unfortunately it didn't last and neither did my interest! It wasn't the fill in-teacher, she seemed very nice, but I can't remember her name. Maybe that says something. I actually missed the diagrams and the drawing. I never thought I would say that! I really do like learning about the cardiovascular system though, after the CNS and cell, it's definitely my favourite. Unfortunately, today it was just slide and slide after slide. The words just seem to run into one another, after a while and they don't make sense. Thinking about it now, this is just typical classroom learning isn't it? From years 7 – 12 it's the same style in every subject. I wonder what difference it would have made if [the research teacher's] style was taught from the beginning of the High School years. During pre-school and even primary school with learning drawings and songs. When does that change and why? (Grp22013F30-40Au).

Other students from this group commented on how they had gone home and diagrammed and colour-coded the lessons after class (Personal Student conversations, 2013). When I returned to work, I retaught the cardiovascular system at the students request. The heart diagram was taped onto the classroom floor and they were taught how to guide each other through the heart while discussing the structures and functions. The heart stayed on the floor for a couple of weeks so that students could practice at their leisure. This comment, other journaled notions and personal conversations with students indicate the positive affect that the Quantum Learning and Campbellteaching models had on student outcomes and the classroom culture. Unfortunately, it dissipated over time as the methods were not maintained throughout the department. One student explained how the feel of the group was changing and that it no longer felt safe and cohesive. For the students to maintain the higher standards and life skills the whole departments needs to be involved and re-enforcing the culture.

Disadvantaged Students

Research has shown that disadvantaged students who come from backgrounds of repeated abuse – physical, sexual or emotional, and have experienced neglect, trauma, parental mental illness, alcoholism or substance abuse – experience structural changes in their brains (Harris, 2015; Bostick, 2018). These children will experience life-long issues and are at three times the risk of developing lung cancer, heart disease and a life expectancy of twenty years below the norm. Conversations with participants in my study revealed that several had experienced childhood trauma, and some were currently in abusive situations. Knowing students' backgrounds can assist teachers, as they can offer the appropriate support and services necessary for positive student outcomes.

Swanston (2017) discussed the issues surrounding disadvantaged students. She stressed the need for socialisation and increased support from teachers and schools. Swanston (2017) identified the need for teachers to make connections with students, and show caring and compassion in their teaching, as disadvantaged students need to feel included, cared for and assisted – not labelled. In addition, she indicated the need for

rigorous curriculum, which pushes students to succeed. Preiss (2013) a newspaper reporter in Melbourne, Australia wrote an article about the outcomes of a study conducted by the National Centre for Vocational Research. Their findings indicated that students from disadvantaged backgrounds could achieve academic success if the educational requirements were set higher, teachers had positive attitudes towards these students, treated them well, and supported them through the learning. The complexities of teaching in multicultural and diverse classrooms require skilled, expert teachers who care about the student's success and provides a safe, supportive and belonging classroom culture where all students can reach their potential.

Variance in Student Performance Attributed to External Factors

As mentioned previously, there were external factors that students identified as affecting their grades and successful completion. Some were garnered from personal conversations with students from both research groups, as I built relationships and strove to understand and support them through the Anatomy and Physiology and Analyse Health units. Other influences were mentioned in journal entries during the research from July 2012 to December 2014. A brief list of personal issues that interfered with student learning are listed below:

- illnesses
- weddings
- deaths
- childbirth
- accidents
- mental health issues.

A mind map of the other issues that were identified over the course of the research study are found in the appendices (see Appendix K). Such

events in students' lives have the potential to impact their capacity to learn and stay focused on their studies. These situations can affect anyone at any time and can be a combination of factors. Often these students withdrew from the course until they could sort out the situation; in some instances, the student was able to return and continue their studies. However, some variance in student outcomes is the result of personal choices. Two examples from research group one provides insight:

- A single mother explained to me that it was okay if she did not achieve a high grade because her son was her priority, so she was satisfied where she was at (Personal student conversation, 2012).
- A young man, who had a significant drop in score on a weekly theory test, explained that he had been out partying all weekend (Personal student conversation, 2012).

In both instances, a sense of priority and personal choice influenced their scores, affecting the class mean score. Across all groups, family priorities generally were rated of greater import than the students' studies; on the other hand, some family issues were the reason for returning to school. In these instances, that was the motivating factor. International students often struggled with the English language and then faced the challenge of understanding medical terminology.

Resistance to Change – A Significant Barrier

This research may have some limitations. First, the student sample consists of two smaller cohorts in one university. What we learn from this data may not be transferable to other situations and locations. However, extensive studies of Quantum Learning SuperCamp

suggest that Quantum Learning methods for accelerated learning are effective. This study suggests that they may also have the potential to assist nursing students in acquiring large amounts of information, retaining that information, and being able to apply it in clinical settings. Diagrammatic learning with explicit discussion, such as that in Campbellteaching, similarly has a proven impact on the retention of theory by nursing students. When it and Quantum Learning are combined, they have the potential to be a powerful game-changer in nursing education. Because this study was relatively small scale, it is conceivable that similar results could be found in other contexts.

Limitations

First, the student sample consisted of two smaller cohorts in one university, but extensive studies on Quantum Learning and SuperCamp results suggests that the model has the potential for transference across multiple levels of education. This is also true for nursing education; however, the teachers need to have taken some training in quantum learning methods. They would also need to be expert in the unit of delivery and learn how to implement diagrammatic learning with explicit ongoing dialogue. Campbellteaching had a web site where students from multiple sectors utilised his videos.

Secondly, the qualitative data could be subject to cultural bias as the cohorts were multicultural and some students were international. They may have come with specific expectations of educational processes. Some resistance was observed from both international and Australian students and three student journals indicated resistance, while a select few students opted out of the research, but engaged in all class activities related to the research. In addition, the internal pop quiz results for group one were all 70% and above and these students were fully engaged.

Thirdly, the qualitative data relied solely on student feedback, which could have contained bias or have been influenced by myself - the researcher as teacher; although, as stated, I was not part of the student selection process and paper journals were coded for autonomy. I consciously retained objectivity with the data results. Clinical facilitators were invited three times to participate in this study, in order to gain insight into the students' abilities to transfer their knowledge from a professional perspective. However, the clinical facilitators did not take up the offer to provide feedback, leaving this aspect of the thesis weak. However, there was positive feedback from industry that these students performed well and were work ready.

Lastly, as noted in previously in chapter three, the students had a dedicated classroom for the Anatomy and Physiology unit, but it was shared across multiple departments and room usage could be from 0800 hours to 2000 hours [8 a.m. to 8 p.m.] each day.

Possibility of the Hawthorne effect

In 1924, the Hawthorne plant of Western Electric located in Chicago conducted a study to investigate the outcomes of different incentives on workers productivity. This telephone company employed approximately twenty-nine thousand people (British Library, 2017, pp 2-3/8). Elton Mayo became involved with the Electric plants research while working at Harvard University. Key factors that emerges from his research were:

- bias was created when the workers knew that they were being observed as they changed their behavior or improved their behavior (British Library, 2017, p.2-4/8; Kenton, 2018).
- "workers job satisfaction increased as workers were given more freedom to determine the conditions of their working environment and to set their own standards of output;"
- "intensified interaction and cooperation created a high level of group cohesion;"

(British Library, 2017, p.4/8).

McCambridge, Witton, and Elbourne (2014) conducted a systematic review of thirty studies which indicated some degree of a Hawthorn Effect. They found evidence to support its existence, but no generalised knowledge of the conditions in which it could occur (p. 276). They suggested, "that unqualified use of the term be abandoned" and that "the label should be restricted to evaluations in which conformity and social desirability considerations are involved" (McCambridge, Witton, and Elbourne, 2014, p. 276).

Chapter Summary

This chapter discussed the data, drawing connections with literature, and interpreting the data in the light of the research questions in order to determine whether the Kaleidoscope classroom impacted students' capacity to retain, recollect and apply nursing theory. It examined the influence of Quantum Learning and Campbellteaching on student confidence to learn and on their development of metacognitive practices. It acknowledged the possibility of the Hawthorn Effect, where students' behaviours may have been influenced as they were aware of being observed. However, the presence of some student resistance and the fact that four students opted out of the research, indicates that students felt free to engage or not with the research, and that some students, at least, were not concerned about the implications of their resistance for the research.

The apparent discrepancy between the qualitative and quantitative data was discussed. Although, the initial data that compared the non-research groups and the research groups were similar, the pop quiz results, and qualitative data suggested that the Kaleidoscope classroom did impact student learning. Factors that could have influenced the similar outcomes for the quantitative data for the research and non-research groups have been discussed. One major factor was that I was the teacher of all the non-research groups and I had incorporated Campbellteaching as a result of Siri's experience with learning prior to the research commencing. A deeper analysis of the data (a data dig) was undertaken, which displayed significant differences in student outcomes. This analysis looked at the testing associated with specific forms of teaching in the Kaleidoscope classroom – embodied learning, the linking table, and diagrammatic learning, and indicated that the

research groups had markedly better recall and retention of information than the non-research groups for these tests. The data dig also involved looking at the distribution of student test scores, rather than the average for each class. In addition, the data from the pop quizzes demonstrated that students were able to retain and recall material over a substantial length of time. Both quantitative data and qualitative data suggest that the combined models have the potential to address the research questions in the affirmative. In addition, the linking table which formed part of the data dig results, implies that students could be taught how to link theory to practice, through a step-by-step process.

Qualitative themes that emerged from the data were discussed in relation to the research. The life skills' components were scored highly during data analysis, indicating that students found them relevant. It is possible that some of the life skills were culturally embedded in some students prior to the research; for other students this may have been the first time that life skills were taught. These skills are important for the development of professional behaviour in the nursing sector. Other key factors were identified and discussed, such as the importance of reflection, metacognition and its relevance in the development of self-awareness, and learning to learn; the concept of brain-based learning; and learning styles and multimodality.

Teacher attributes was a key finding in the study (see Appendix L). Students indicated the following teacher characteristics as important: caring attitude, being supportive, engaging, passionate, respectful, approachable, knowledgeable and communicative. These attributes align with previous research (Larson, 2015). Allied to teacher attributes are the conditions of the democratic classroom, where students are respected for their knowledge and what they bring to education. These students enjoyed being in a classroom culture that was based on mutual respect and that was supportive, safe, and where they felt like they belonged. In addition, the expectations for their behaviours and commitment to their work was set high. The teacher's belief in their ability increased their self-belief, which in turn provided motivation, encouragement, positivity and desire within the students to succeed and do well.

Quantum Learning methodologies that students found useful for retention and recall were motion to words, buddy talk, memory pegs, celebrations, and reviewing before sleep. The benefits of Campbellteaching in combination with Quantum Learning were discussed. This model was specific to the Anatomy and Physiology unit. A brief step-by-step example of working from simple to complex was described, in order to provide clarity and deeper understanding of this vital process of learning. A comparison of traditional education with Quantum Learning and Campbellteaching by a mature-aged student provides insight into, and clarity of, the gap between traditional teaching and this new paradigm. This was followed by a small section that discussed obstacles that students face in their learning.

The final portion of this chapter was related to resistance to change that was identified during the research. Lastly, the limitations of the study were identified and discussed

Chapter Seven

SUMMARY and CONCLUSION

'who dares to teach must never cease to learn'
John Cotton Dana (Bartleby.com,2020)

The Australian health care system is "a multifaceted web of public and private providers, settings participants and supporting mechanisms" (Australian Government, 2016). This extensive system is a vortex of continual change with new medical breakthroughs affecting the work of nurses in multiple areas of employment. As a result, there is an increase in the complexity of care. This requires nurses to be highly skilled,

competent and confident, with explicit knowledge of disease processes and the ability to apply critical thinking in response to manifestations of disease or accident related issues. In order to meet the Australian Nursing and Midwifery Accreditation council (ANMAC) practice standards required of nurses in today's environment, nurse educators must embrace a paradigm shift in nursing education. Such a paradigm shift must include new teaching methods and methodologies in order to provide students with the necessary theoretical knowledge and skill sets. Since students require this knowledge to be forthcoming on demand in a clinical setting, they need a learning system that teaches them how to learn, develops necessary life skills for working within the public domain, and methods that assist with the retention and recall of information and the development of critical thinking skills (de Tornyay, 2007). In addition, the theory-practice gap cannot be decreased or closed without better understanding of the learning process that supports students in developing their ability to transfer theory from the classroom into the workplace.

This research aimed to discover if Quantum Learning and Campbellteaching could

decrease the theory-practice gap by increasing retention and recall of theoretical material. This process was threefold:

1. The first step was to implement Quantum Learning, an accelerated education model, that provided three important methods: firstly, a student-centered learning environment; secondly the incorporation of life skills' education; and

thirdly, the interweaving of theory and the use of multiple methods aligned with brain-based learning.

2. The second step was the incorporation of Campbellteaching into the Anatomy and Physiology unit. This added diagramming with colour-coding, chunking, scaffolding and explicit dialogue to the base formed by Quantum Learning.
3. The third step was the inclusion of the linking table in the Analyse Health unit; this built upon the foundation provided by Quantum Learning and Campbellteaching. This blending of two models, and additional researcher input via the linking table, developed an enhanced model for Learning.

A number of key findings emerged from the research. They are outlined below. Each is accompanied with a recommendation

Keys Findings that Emerged from the Data

Atmosphere

Atmosphere was considered by research participants to be the single most important factor in their learning. It had the highest percentage of importance as indicated in the qualitative data: 89% of those surveyed listed it as important. The participants' focus on atmosphere as a factor in their learning is indicative of their need for an emotionally and physically safe learning environment. In this study the development of a positive learning atmosphere was based on the life skills' components of Quantum learning**,** which includes *the 8 Keys of Excellence, Home Court Advantage, Live Above the Line,* and *Big Me Big You*.

Imagine yourself anxiously walking the down the hallway towards your first day of class. You don't know anyone, and you are told that this is the worst class of the semester. Anxiety is gnawing at your insides but what's this? You are greeted at the door by a smiling and welcoming teacher. The room is bright, there are positive affirmations on the walls, a welcoming poster, a sweet smell lingers in the air as you gaze at the palm tree tucked into a corner by a deep cushioned couch. Atmosphere stage one – set. Students responded to a

place of learning that was welcoming, safe, supportive, colourful and encouraged a sense of belonging. Within this context, students are responsive to the teacher's delivery of theoretical material. These threads were interwoven with fun – a sense of pleasure and appreciation in learning, to generate a holistic learning space. Like the kaleidoscope, where pieces of coloured glass come together to form patterns that are pleasing, even exciting, to look at, the interwoven strands of pedagogy and practice come together to form a strong, reflective and powerful learning environment.

Recommendation: Institutions place greater emphasis on the student experience in Higher Education classrooms; this should include classroom design and fittings. Teachers in Higher Education to reflect upon their classroom practices, model holistic education, and caring and include motivating practices. To be trained in the implementation of Life Skills training that assists with class discipline.

Democratic Classroom and Recommendation

Adult learners come with complexity related to their roles in their personal lives and situations. They have specific and sometimes significant challenges, such as being single parents, marriage breakdown, being part-time workers, looking after siblings, and so forth. They also come with expectations, varying educational levels, cultural differences and a code of ethics that they live by, but which may not be shared by others in the group. Entering a new learning environment can often be challenging. Mutual respect, motivation and belief in these individuals is important for successful outcomes (Smith, 2000). It is important to create a classroom that is culturally safe, friendly, warm and inviting, where adult learners know they are respected for the life experiences and the knowledge that they bring to a learning environment (Ulug, Ozden & Eryilmaz, 2011). The Big Me Big You concept from Quantum Learning assisted in forming the democratic classroom, along with the life skills learning. Seventy-seven % of the students felt that a safe, supportive, belonging culture was important, which included the formation of a democratic classroom where all students were respected.

Qualitative data in this study implied that this was a key motivating

factor in the Kaleidoscope classroom.

Recommendation: Professional development be offered to Educators about the needs of Adult learners who come from diverse multicultural backgrounds. Provide theoretical Information on creating democracy in the classroom, while facilitating the learning.

There should be emphasise on the students' responsibility for their own learning by teaching live-above-the line and engagement within the class by teaching the concept of Home Court Advantage.

Review Before Sleep, Metacognition and Neuroplasticity

The qualitative data indicates that review before sleep and atmosphere were equally important in the learning process. Each scored 89% relevancy by the research students. Both of these elements come under the umbrella of metacognition, where students come to understand how to learn and how the brain learns. Journal responses in this study, as well as students' responses to explicit metacognitive learning, suggest that when students understand their learning preferences and how the brain learns, and are taught appropriate methods, they engage in learning on a higher level and take responsibility for their education. Moreover, students' confidence in their capacity to learn, as well as their metacognitive processes around learning, impacted the quality of their learning. When students believed they were able to learn, it appears that they could. This is not unlike Carol Dweck's growth mindset (2007). However, as these students were studying nursing, they were particularly responsive to the idea of the brain itself being capable of growth and repair. When students also understood theories of neuroplasticity, they gained self-confidence in their ability to succeed. Consequently, retention and recall appear to have increased in the Kaleidoscope classroom, as suggested by the pop quiz and the data dig results.

Chunking the theory into related pieces, and the review of material before sleep, supported retention and made recall easier for students. What students reported as happening with their learning, and what was observed, and what is supported by the data, is that students were storing information more efficiently than they had previously. The knowledge about what was happening in the brain in order to support retention seems to

have actually assisted in that retention taking place. However, it is unclear that learning methods alone increased student outcomes, as these results could be indicative of the life skills' training. Students' personal growth and belief may have empowered them to take control of their learning, especially when they began to interpret 'failure' as part of the process of becoming successful. This personal endeavor to succeed, and the acceptance of intellectual risk-taking as important in controlling their own learning, along with a range of learning methods, appear to have been significant influencing factors in students' successful outcomes. In addition, the teacher's passion and belief in the students' ability to succeed was reported as impacting student engagement and outcomes. Therefore, while it is impossible to determine if any single factor influenced student learning, it is clear that a range of factors, working in conjunction, did influence student learning. The quantitative results indicate that learning was positively impacted, and the qualitative data identifies these as the factors that students ascertained as significant. Students of nursing need to understand how they learn and how the brain learns.

***Recommendation*:** Create professional development opportunities that enhance Educators understanding of the importance of teaching metacognition and how all

Learning is built on previous knowledge [schema]. Incorporate, motivation and methods that will increase students' confidence in their own capacity to learn. This understanding of the process of learning should underpin the teaching in all units.

Multimodality and Learning Preferences

Quantum Learning utilises a plethora of methods to engage student learning, referred to as Multimodality. Methods utilised during this research were garnered from Quantum Learning, Campbellteaching and the researcher. They are big picture, buy-in, story-lines, call backs, dramatisation, colour, picturing, high expectations, personal story, memory pegs, mind mapping, role play, celebrations, mnemonics, buddy-talk, teacher walks, action to words, models, journaling, reflection, self- directed learning, power points accompanied with white board activities, videos, state changes, relaxation techniques, aroma therapy, music, class tradition, diagramming, explicit dialogue and the linking table to name a few. Even though students determined their specific learning preferences, the

data suggests that they employed multimodalities.

The data suggests that students used several methods to assist with their learning and tried methods they were not necessarily au fait with. In the charted data, which surveyed fifteen methods, all but one strategy was used at least 50% of time, and many of the methods were employed over 70% of the time. Atmosphere, life skills, brain-based learning, peer review and reviewing before sleep were indicated by students as the most important methods that influenced their learning. The key to implementing any strategy is to understand how it is used, but most important is to know WHY it is being used; otherwise the classroom can become disjointed and ineffective. The WHY needs to be understood by the teacher and the *students, in order to encourage buy-in because if the students do not engage, learning is not* happening (Jensen, n.d.). In the Kaleidoscope classroom both the teacher and the students understood the Why and the How. This not only assisted with buy- in, but motivation and personal self-development as students learned how to take responsibility for their learning. They were no longer solely dependent on the teacher; rather, teacher and student worked interdependently to build knowledge.

Recommendation*:* Design professional development to demonstrate new methods that can be easily incorporated into course development. Especially methods that the research students have indicated as having assisted them in retention, recall, deep learning and critical thinking skills.

Diagramming and Explicit Dialogue – Deep Learning and Reflection

The ability to understand the theory and implement that knowledge in a work environment is the transference of learning to practice. This requires deep learning, which builds on surface learning. Understanding of functions and processes leads to a deeper understanding of the how and why, so that reflection and critical thinking can evolve. (Hattie UQx: LEARNx, 2017). The Research students indicated 65% usage of this method. The act of diagramming with colour aided retention and assisted in making connections to other body systems. Diagramming does not require artist skills, only the willingness to learn fundamentals. The process of drawing the anatomy in a stylistic

fashion assisted student learning of anatomical features, aided retention and recall.

Recommendation: Diagramming, explicit dialogue and buddy talk should be incorporated into Anatomy and physiology classes and/or biology classes. Nursing educators should be supported to develop appropriate skills in diagramming and explicit dialogue, the necessity of developing course material that will take the students from surface learning to deep learning; in order to develop critical thinking skills.

The Linking Table – Decreasing the Theory-Practice Gap

If students are not developing the deeper learning processes, how can they implement the required knowledge in a work environment? Regardless of what is taught in the classroom, if students do not see the connections between one piece of information and another, they cannot apply that knowledge. Student journals indicated that students felt they had previously been expected to know how information connects, or it had been assumed that they understood certain associations. Rather, linking needs to be taught as students do not always have the skill to take copious amounts of material and organise it in such a way that they can see the connections. If tools are developed that provide a step by step process, whereby students can work through the theory and form the links, they have the potential to learn how to transfer the information. This transference of information and making of associations is evident in the data on congestive heart failure. This drawing of connections was scaffolded through the use of the linking table.

The linking table was developed by the researcher to create the bridge between the students' knowledge and their application of it. It was specifically designed so that students could take large amounts of theoretical knowledge and form appropriate associations. Using this table, they were able to organise the theory into processes that developed understanding and displayed visible connections. The students' journals from when they were on clinical placement indicate that the system helped students connect theory to practice. Students related that they recognised signs and symptoms of specific diseases, were able to refer to the tables for recall of the underlying physiological processes and increased their understanding of the interventions they saw being implemented.

The linking table is a tool that assisted the research student in the development of deeper learning because it required students to explain *why* changes happen, and to indicate the interventions that needed to be employed. The process it scaffolds is consistent with the data that indicates the need for students to understand the *why* and *how* of their learning, and to then apply this thinking to addressing professional situations.

Recommendation: To implement the linking table into various units as it provides a clear process that students can employ to organise and understand the vast amounts of theory that they are required to understand. The Linking Table can be adjusted to meet the needs of multiple units.

Time Restraints

Student learning in the diploma of Nursing course was impacted by time constraints: limited time within training packages did not allow for consolidation of learning. This uncovers a major systemic problem: pressure on teachers; pressure on students created by time. Training packages are not pedagogical or andragogical choices for education and the packages do not provide adequate time for students to establish deep learning. The Anatomy and Physiology unit is a prime example, as it forms the basis for other units and includes large amounts of complex content. Prior to this research study, Nursing Educators in the Diploma of Nursing course complained that students couldn't remember the theory from the Anatomy and Physiology unit. The time constraints force students to learn a plethora of information across a number of units scheduled for completion in one semester. Even with the implementation of accelerated learning, covering all the content was a challenge. The pop quiz results indicated that the research students had acquired retention over a long period of time; however, the heavy course load makes recall more difficult, especially when the theory was taught in just one semester.

Recommendation: Educators in the Diploma of Nursing (and similar courses) could assist student recall and retention by preparing a review package of the anatomy and physiology that is related to their units. Such a review package will serve two purposes: it will reinforce students' learning, thus paving the way for greater understanding of new material and it will also be a practical representation of teachers'

understanding of the complexities of their lives and learning. This positive approach has the potential to enhance learning within each classroom, as the data has clearly indicated that students responded well in a classroom where they felt the teacher cared about their success and was supportive. This self-directed review could be handed out prior to the start of a class and should be handed in on a specified date to prove that it has been completed. It could also, be considered a small percentage of the units final score.

The Teacher is the Key

A teacher's knowledge, expertise, accessibility, support and ability to build relationships with students has significant impact on their learning experience and outcomes. Qualitative data from student journals implies that the teacher's caring attitude and belief in the students' ability to succeed was paramount. Implementing Quantum Learning and Campbellteaching is a sign and representation of teacher commitment. Quantum Learning purports that the teacher orchestrates learning, but it is more than orchestration. Teachers fulfil many roles within a classroom (see Appendix J).

After reviewing a study of excellent qualities of the very best teachers in America, Hattie (2003) made the following comment: "The focus is to have a powerful effect on achievement, and this is where excellent teachers come to the fore – as such excellence in teaching is the single most powerful influence on achievement" (p. 4). Even with two successful teaching models, Quantum Learning and Campbellteaching, if students do not feel safe in the classroom, the whole room shifts. A teacher's negative attitude or lack of belief in their students' ability to succeed, has the potential to decrease student outcomes in their class and in future undertakings. Teachers are the key that opens pathways to student learning.

Recommendation: Management and teachers within departments commit to holistic care of students and seek to demonstrate a belief – to every student that [no matter their background or socioeconomic circumstances] they have the capacity to succeed. In cases, where unforeseen circumstances are identified these students are kindly counseled and provided with more suitable options.

Resistance to Change

There is usually an element of resistance to change when practices that have been in place for some time are questioned or challenged. When proposing changes in education, resistance can be found within student cohorts, within management, and among colleagues. Salam and Alghamdi (2016) claim that it is nurse educators who drive change and that change is blocked at the transition phase by those who have established beliefs and practices. Bailien and De Witte (2009) found that change is accompanied by negativity, as people are comfortable with old habits and procedures. Change will take time, especially when the culture of an organisation is affected. Nurse educators who institute change must develop change plans that relate the relevance and benefits of the modification (Salam & Alghamdi, 2016). This can also apply to students, as well as educators: if students cannot envision the benefit of changing their ways of learning for themselves, then their ability to embrace a change of behaviour or practice will be stymied. Kotter (1995) discusses the need for change agents to: establish urgency; gain support from heads of the organisations/departments who can imagine the outcome of the change; create a team; communicate; remove obstacles; have a systematic plan; avoid celebrating too early when resisters can block continuation, and; embed the change within the organised culture. For the sort of change to take place in nursing courses that can reduce the theory-practice gap, nurse educators need the support of the institutions they work in, in order to create a paradigm shift in nursing education.

Recommendation: Institutions offering Diploma of Nursing courses provide space and time to support nurse educators and create the best possible environments for their teaching. This includes agitating for training packages that allow more time for students to undertake complex units with large amounts of content information and becoming the drivers of pedagogical/andragogical change. It may be beneficial if undertaking a similar study to have students self-select to participate in the research; in order to get buy-in at the start of study. This could allow for a clearer picture of the possibilities of usefulness of Quantum Learning and Campbellteaching in the Nursing Education sector.

Closing Comments

This study has explored a new paradigm in tertiary education created by the integration of Quantum Learning, Campbellteaching and the linking table. Together, they formed a learning environment that created an Enhanced Learning Model (see Appendix M).

As indicated by this study, it was not a single factor that affected student outcomes; rather a combination of methods that created a culturally safe learning environment where students felt respected and took control of their learning. They demonstrated the development of personal growth and critical thinking skills.

The Linking Table provided students with a tool that allowed them to organise the theory in a simplified, step by step process. They were able to recognise the connections between the theory and their role in the workplace. However, in this work, the teacher is the key that unlocks the pathway to learning. Success lies in the teacher's attitude, expert knowledge, skills, passion, caring, ability to motivate and instil self-belief in students, and their ability to orchestrate the learning environment.

The research demonstrates the complexity of the learning environment. There is a need for ongoing professional development that encourages teachers to engage creatively with the content they are teaching. Dialogical teaching and learning needs to be recognised and catered for. Teachers must be prepared to draw on multiple resources to commit to student success. To this end, commitment to outcomes must be embraced by the team of educators. Classrooms are not islands unto themselves, students travel between many ports, and classrooms must be linked in terms of expectations, delivery and culture. This can only happen when everyone in a department of learning, from management down, embraces new research-based models that have the possibility of improving student outcomes and work readiness. When this happens, there is an opportunity to decrease the theory-practice gap in nursing education. Together, if nurse educators see the vision, embrace the possibilities and enjoy the journey – learning becomes a deeply enriching process.

Learning is a journey, each road you travel is specific to you and how you respond to challenges and opportunities will define, who you allow yourself to become –

Corrine Jones (2020)

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Appendix A

Ethics Approval

HUMAN RESEARCH ETHICS COMMITTEE RESEARCHER ANNUAL/FINAL REPORT

Project No: HRETH 11/272

Project Title: 'A Kaleidoscope Journey: Integrated Andragogies in the Diploma of Nursing Program Quantum Learning System and Campbell teaching'

Principal Investigator: Mary-Rose McLaren

Date of Original Approval: 16/2/2012

What was the anticipated date of commencement at time of approval? May 2012

What was the anticipated date of completion at time of approval? Dec 2014

Please indicate the type of report:

ANNUAL REPORT x☐ FINAL REPORT ☐

HREC Application Approval Details

Select the Committee that approved your ethics application:	
Victoria University Human Research Ethics Committee	☐
Low Risk Human Research Ethics Committee	☐
Faculty of Arts Education & Human Development HREC	X☐
Faculty of Business & Law HREC	☐
Faculty of Health Engineering & Science HREC	☐

A. Has the project commenced?	X☐ Yes	☐ No	☐ Abandoned
B. Has data collection commenced?	X☐ Yes	☐ No	
C. Is data collection complete?	☐ Yes	☐ No	
D. Date of completion: 2014			
E. If the approval was subject to certain conditions, have these conditions been met? (If not, please give details - question 2)	X☐ Yes	☐ No	
F. Data Analysis	☐ None	X☐ Proceeding	☐ Complete

A. Have ethical problems been encountered in the following areas? Study Design Recruitment of Subjects Finance Facilities, equipment (If yes, please give details – question 3)	 __ Yes __ Yes __ Yes __ Yes	 x __ No x__ No x__ No x__ No	
B. a. Has an approved protocol been modified? b. Have all modifications been notified to the Committee (question 4)	__ Yes __ Yes	x__ No __ No	
C. Have participants withdrawn?	__ Yes	x__ No	
D. a) Have all participants signed consent forms b) Are signed consent forms available for inspection?	x__ Yes x __ Yes	__ No __ No	__ N/A __ N/A
K. Has the thesis been completed? &/or has a report been published in a Refereed Journal?	__ Yes	x __ No	
L. Has approval expired? If Yes, do you require an extension? (please give reasons – question 6) Until when?	__ Yes __ Yes	x__ No x__ No	
M. a. Have there been any adverse events? (question 7) b. Have there been any negative unpublished results?	x__ Yes __ Yes	__ No __x No	
N. a. Have research data and records been managed in line with relevant legislation and/or policy (If no, please give reasons – question 8) b. Has there been a security breach of research data and records? (If yes, please provide details – question 7)	x__ Yes __ Yes	__ No x__ No	
O. Any other comments (question 9)			

1. Give a brief statement on progress to date (maximum 200 words in length). Please include:

- **summary of findings to date**
- **details of any publications accepted or in press**
- **details of any presentations given**
- **whether participants involved in the study have been informed of the results**

Findings to date indicate that use of Campbell teaching strategies has a significant impact of student retention of critical information. Quantum learning appears to benefit some types of students. Readiness to risk take is emerging as important factor in student learning and development of professional behaviours. Presentations have been given to nursing staff at VU. Participants have not been informed of results as data is still being collected.

2. If the conditions for approval were not met (question E), please give reasons.

---

3. Please summarise any problems encountered in the ethical conduct, study design, recruitment, finance or equipment (from question G).

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4. Please summarise any modifications to the protocol that have not been notified to the Committee (from question H). Please include the number of amendments, a summary of substantial changes to the protocol or the Plain Language Statement and latest dates and version numbers. For any modifications that have already been notified to the Committee, please give the date of the notification.

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5. If subjects have withdrawn from the project (question I), please give reasons.

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6. If you require an extension (question L), please give reasons.
Note that if you require an extension to the program you MUST apply separately to the Committee

---

7. Please give details of any adverse events (from question M or N).

---

8. Please give details of any noncompliance or breaches regarding the management of research data and records.

---

9. Any other comments

I confirm that this project is being conducted as originally approved by Victoria University's HREC (and subject to any changes subsequently approved) and that all adverse events are reported to the Committee according to the Committee's guidelines for reporting of adverse events and the NHMRC National Statement on Ethical Conduct in Research Involving Humans (1999).

SIGNATURE:Mary-Rose McLaren **DATE: 13/12/13**

TITLE: Dr FIRST NAME: Mary-Rose LAST NAME: McLaren

SCHOOL/CENTRE: education CAMPUS: S

TELEPHONE: 2066 MOBILE NUMBER: 0437 041 406 EMAIL ADDRESS: mary-rose.mclaren@vu.edu.au

Please complete and return to the approving HREC's Ethics Officer, Victoria University Human Research Ethics Committee at the Office for Research, Footscray Park Campus or via email at:

Victoria University Human Research Ethics Committee: **researchethics@vu.edu.au.**
Faculty of Arts Education & Human Development HREC**: lrethics@vu.edu.au**
Faculty of Business & Law HREC: lrethics@vu.edu.au
Faculty of Health Engineering & Science HREC:. lrethics@vu.edu.au

Document Title:	Human Research Ethics Annual/Final Report		
Date & Version:	16/07/2013	V.1	
Status:	Approved	Review Date16/07/2016	

Appendix B

Sample page unit outline and Learning plan for the Confirm Physical Health Unit [Anatomy and Physiology]

9	19/04/16	***Knowledge Review 4 Tissues & Integumentary*** **Skeletal system** - structure - label - Functions - Types - Joints - Briefly discuss fractures **Readings and Study Helps for sessions 9 & 10** **Read the following pages and complete the chapter questions** - Campbell's Physiology Notes: pp. 271 - 289 - Read Marieb: Pp. 158 -201 - 203 – 243 - Complete the 'Did you get it questions' in the chapter. Answers are available in the book.	Continue to revise, do the readings and chapter questions
10		**Muscular system** - structure - label - Functions - Types	Continue to revise, do the readings and chapter questions
11	20/04/16	***Knowledge Review 5 Musculoskeletal*** **The nervous system** - Divisions - Brain – layers, - Structures, lobes, functions - Briefly discuss stroke **Readings and Study Helps for sessions 11 & 12** **Read the following pages and complete the chapter questions** - Campbell's Physiology Notes: pp. 109 - 137 - Read Marieb: Pp. 247 - 299 - Complete the 'Did you get it questions' in the chapter. Answers are available in the book. -	Continue to revise, do the readings and chapter questions
12		continued - Neuron - synapse - Spinal cord, - Vertebra - Reflex arch	Continue to revise, do the readings and chapter questions

Sample page from a learning and assessment plan for Anatomy & Physiology

Units of Competency	Learning Content (Topics)	Delivery Methods	Assessment Information	Physical Resources Required
1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4	The ear - External - Middle - Internal - Structures - Functions/locations - Briefly discuss ruptured eardrum - https://www.youtube.com/watch?v=DpZbF_mloJI Written Knowledge review The eye, ear, tongue at end of class	Classroom based, face to face delivery - Diagrammatic learning - Students to draw in their drawing pads with colour and label as teacher explains - YouTube - model – ear - buddy talk - music - spot quizzing - call backs - group work teacher moves	Written closed book Midterm test - Includes information from the Introduction to the Special Senses - Then a two week break. - Upon return you will sit the Midterm. - It is 2.5 hours – closed book Written :closed book Final test - Includes Respiratory system to the Urinary (Renal) system - It is 2.5 hours – closed book	- Marieb text book: Anatomy and Physiology - John Campbell Physiology Notes (Book from England) - Class room - Overhead Projector - Whiteboard - Coloured whiteboard markers - Model – ear - Computer with YouTube access Students can bring laptops/androids, but it caught looking at websites or pictures not related to the subject material –they still be asked to turn them off.

Appendix C

Kotter's 8-Step Organisational Change Model

Stage	Actions Needed	Pitfalls
Establish a sense of urgency	Examine market and competitive realities for potential crises and untapped opportunities. Convince at least 75% of your managers that the status quo is more dangerous than the unknown.	• Underestimating the difficulty of driving people from their comfort zones • Becoming paralyzed by risks
Form a pow- erful guiding coalition	Assemble a group with shared commitment and enough power to lead the change effort. Encourage them to work as a team outside the normal hierarchy.	No prior experience in teamwork at the top Relegating team leadership to an HR, quality, or strategic-planning executive rather than a senior line manager
Create a vision	• Create a vision to direct the change effort. • Develop methods for realizing that vision.	• Presenting a vision that's too complicat- ed or vague to be communicated in five minutes
Communicate the vision	Use every vehicle possible to communicate the new vision and methods for achieving it. Teach new behaviors by the example of the guiding coalition.	• Undercommunicating the vision • Behaving in ways antithetical to the vision
Empower others to act on the vision	• Remove or alter systems or structures undermining the vision. • Encourage risk taking and nontradition- al ideas, activities, and actions.	• Failing to remove powerful individuals who resist the change effort
Plan for and create short-term wins	• Define and engineer visible perform- ance improvements. • Recognize and reward employees con- tributing to those improvements.	• Leaving short-term successes up to chance • Failing to score successes early enough (12-24 months into the change effort)
Consolidate improvements and produce more change	Use increased credibility from early wins to change systems, structures, and policies undermining the vision. Hire, promote, and develop employees who can implement the vision. Reinvigorate the change process with new projects and change agents.	• Declaring victory too soon—with the first performance improvement • Allowing resistors to convince "troops" that the war has been won
Institutionalize new approaches	Articulate connections between new behaviors and corporate success. Create leadership development and succession plans consistent with the new approach.	Not creating new social norms and shared values consistent with changes Promoting people into leadership posi- tions who don't personify the new approach

Appendix D

Information package Quantum Learning: Kaleidoscope Classroom

CONGRATULATIONS AND WELCOME TO AN EXCITING LEARNING ADVENTURE – THE KALEIDOSCOPE CLASSROOM

So tell me, what is a Kaleidoscope Classroom?

The Kaleidoscope Classroom is an accelerated, brain-based learning environment, which is based on the Quantum Learning Network (QLN) system and Campbellteaching. QLN is a researched based education system, which is used in schools and summer camps for teens. Campbellteaching is a methodology which used delivers clear, simple, explanations and diagrams to assist in the teaching of science, such as Anatomy and Physiology. Campbellteaching is incorporated into the design and delivery of the QLN system.

The Quantum Learning System is based on the 8 Keys of Excellence and FADE. Foundation, atmosphere, design & delivery and environment from the acronym FADE. Bobbi DePorter the CEO and founder of QLN formulated the 8 Keys of Excellence, which both Bobbie and her staff follow. She had read many books about becoming successful in life and business, but she felt that people did not apply the principles they learned into their daily lives, so Bobbi developed the 8 Keys of Excellence. She states that, “These Keys have constantly propelled me forward, helping to bring purpose, meaning and fulfillment to my life and my work” (DePorter, 2008).

In using the 8 Keys of Excellence in the Kaleidoscope classroom, it is hoped that both the teacher and the students will be motivated towards developing a “positive future full of confidence,

motivation, creativity, teamwork, leadership and valuable life principles” (DePorter, 2008).

Schools and districts that create a culture of student success based on the 8 Keys and Quantum Learning - report these improvements: More motivated students - More positive student behavior – Fewer discipline referrals - More time on task - Increased effectiveness of instructional time. Building character in students through the 8 Keys of Excellence helps them realize their greatness while creating schools that achieve better results. Contact us at 800-527-5321

AN OVERVIEW OF THE 8 Keys of Excellence

LIVE IN INTEGRITY
Align your actions with your values
Live what you value.
If you value honesty, be truthful.
If you value keeping your word, follow thorough.
If you value being fair, do what you expect others to do.

FAILURE LEADS TO SUCCESS
View failures as information for learning
The only real failure is not learning from your mistakes.
Ask yourself:
What have I learned from this experience?
What value can I find in it?
What will I do differently next time?

SPEAK WITH GOOD PURPOSE
Give positive, honest and direct communication
Speaking with Good Purpose is the cornerstone of healthy relationships.
When you give someone honest, direct feedback with good intention, what results?
You cut through the "chatter."
You build trust.
You make people sit up and listen when you speak.

THIS IS IT! — LIVE IN THE NOW
Make the most of every moment
By making something else IT, you miss what's going on around you in the moment. Each moment, each task, counts.

AFFIRM YOUR COMMITMENT
Do whatever it takes
By being willing to do whatever it takes, you can literally change the world.

TAKE OWNERSHIP
Be accountable and responsible
Be someone who can be counted upon, someone who responds.

STAY FLEXIBLE
Change to get your outcome
Get off what's not working. Shift perspectives.
the ability to change what you're doing to get the outcome you desire.

KEEP YOUR BALANCE
Life a fulfilled life by aligning your mind, body and spirit

Create balance in your life by apportioning your time according to your highest priorities.
Published Mar 18 2008, 09:54 PM by admin

Invest a few minutes with the Keys now and if you find that they bring a few rays of sunshine into your work and life, the investment will be well worth your while (DePorter, 2008)

The Quantum Learning System has been instituted to provide a model that is simple, yet powerful. Going hand in Hand with the 8 Keys of Excellence is FADE, which assists teachers and managers to, “Build a strong foundation of policies, procedures, and purpose, and an empowering atmosphere” (DePorter, 2013). It is in this type of foundation that an atmosphere of safety and belonging can be formed. Feeling safe to speak out in a new class is important for student’s self-esteem, confidence and continued class interactions.

FADE

1. Starts with the **FOUNDATION**

a. It is important to get to know each other, so that you are able to become a team that mentors each other and works towards success and a positive outlook; hence icebreakers are used to assist you in this important step.

b. As a group you form class rules and consequences that are agreed upon by all

c. The 8 keys of excellence will guide you in how to interact with each other and the teacher

Just think . . . in the Kaleidoscope Classroom it is a

BIG ME AND - A BIG ME BIG YOU.

This means that we are equals and the teacher is here to assist you in your learning and share of her/his expertise and knowledge. A classroom based on respect and equality.

The teacher will explain her expectations and what you need to accomplish. She will give you a set of new tools to assist you in your learning, but remember ‘YOU’ are responsible or taking charge of your learning.

QLN's Living above the line.

LIVING ABOVE THE LINE

Responsibility
Ownership
Choices

Freedom

LIVING BELOW THE LINE

Justifications
Laying
Blame
Denial
Giving up – quitting.

Living above the line = means taking ownership and in ownership there is power. This power can assist you in successfully accomplishing your goals, whether they be school, professional, money issues, personal, social or family: 'You begin to make things happen' (QLN administration business, 2005).

In essence you stop all the negative and self-defeating behaviours and take control of your life. Now your personal growth can begin . . . for taking control gives you power, your voice and your freedom to choose wisely.

Here is an example of <u>living below the line</u>:

A student rushes into class.

"Oh teacher, I am so sorry that I am late. I missed the train

and had to wait 20 minutes for another one!"

They rush to their seat and chat quickly with their classmates

before settling down to listen to the lesson, which has been

interrupted by their late entry and rushed explanation.

Same student <u>living above the line:</u>

A student knocks lightly on the door and waits for the teacher

to answer it:

"Hello Miss, I am very sorry that I am late as I missed the train and had to wait 20 minutes for another one. I would like to apologize to my fellow students for disrupting the class. I knew I was running late and next time I will get up earlier so that I have enough time to get to the train."

He apologizes to the class and quietly takes his seat and prepares to listen to the lesson.

Question:

How would you react to the first scenario?

How would you react to the second scenario?

ATMOSPHERE

In the Quantum learning system 'EVERYTHING SPEAKS' and your classroom atmosphere sets the culture of your class. Learning is key to your final goal and it can be fun and enjoyable. For this to occur the classroom must be a safe place having respect for each other, feel welcoming and motivating for your learning and personal growth.

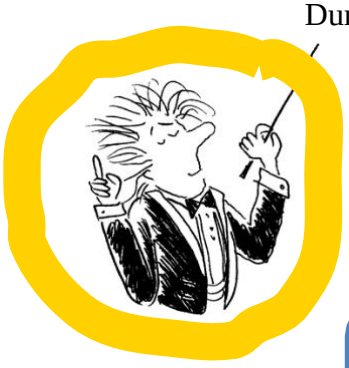
HOME COURT ADVANTAGE [HCA]

Home Court Advantage and acknowledge every effort:

No question is a stupid question and as a group we assist each other to understand the new and often difficult concepts. Therefore, there is no laughing and joking about each other that may be embarrassing and humiliating thus preventing that individual to continue to grow personally and professionally

Acknowledge Every Effort – hand clapping, finger snaps, whooshes of success are a few of the ways that a fellow classmate can be recognized for coming up with a good answer or question, a skit or funny rhyme that helps others to remember something.

DESIGN & DELIVERY



During this phase of FADE, it is all about building on your existing schema. What is your reality and your former knowledge of the subject material? As you learn the theory, your mind will link to your prior knowledge. You will make new neuronal connections as you learn!

New neuron connections will be added as you learn new information. This will be linked to your existing SCHEMA - your **existing knowledge** – your reality

Multiple methods will be used to assist you to retain what you are learning – discussion and group interaction is an important aspect. You will be bringing a drawing pad and coloured pens or pencils to class with you – the activities connected to the use of these materials are strong methods that will assist you to understand, link and recall your theory

This is where ***Campbellteaching is integrated with QLN***. His clear, simple explanations and diagrams form the basis of teaching Confirm Physical Health Status (A & P).

During this phase we can develop respectful interactions with each other, assist your colleagues with their learning, engage in discussions and laugh. Learning can be fun! Here we celebrate each other's efforts as we learn.

ENVIRONMENT

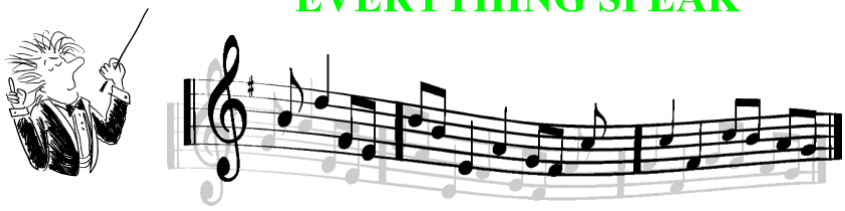
Students generally appreciate a comfortable and welcoming learning environment. The Kaleidoscope Classroom has been set up to be inviting and stimulating. Where students can experience different types of learning.

Posted around the classroom you will find **positive affirmation** posters to enhance your self-belief and motivation

Music will be used to help relax you, to enhance the right brain and left brain and to invigorate your senses.

Aroma therapy is also used to stimulate your senses – remember:

“EVERYTHING SPEAK

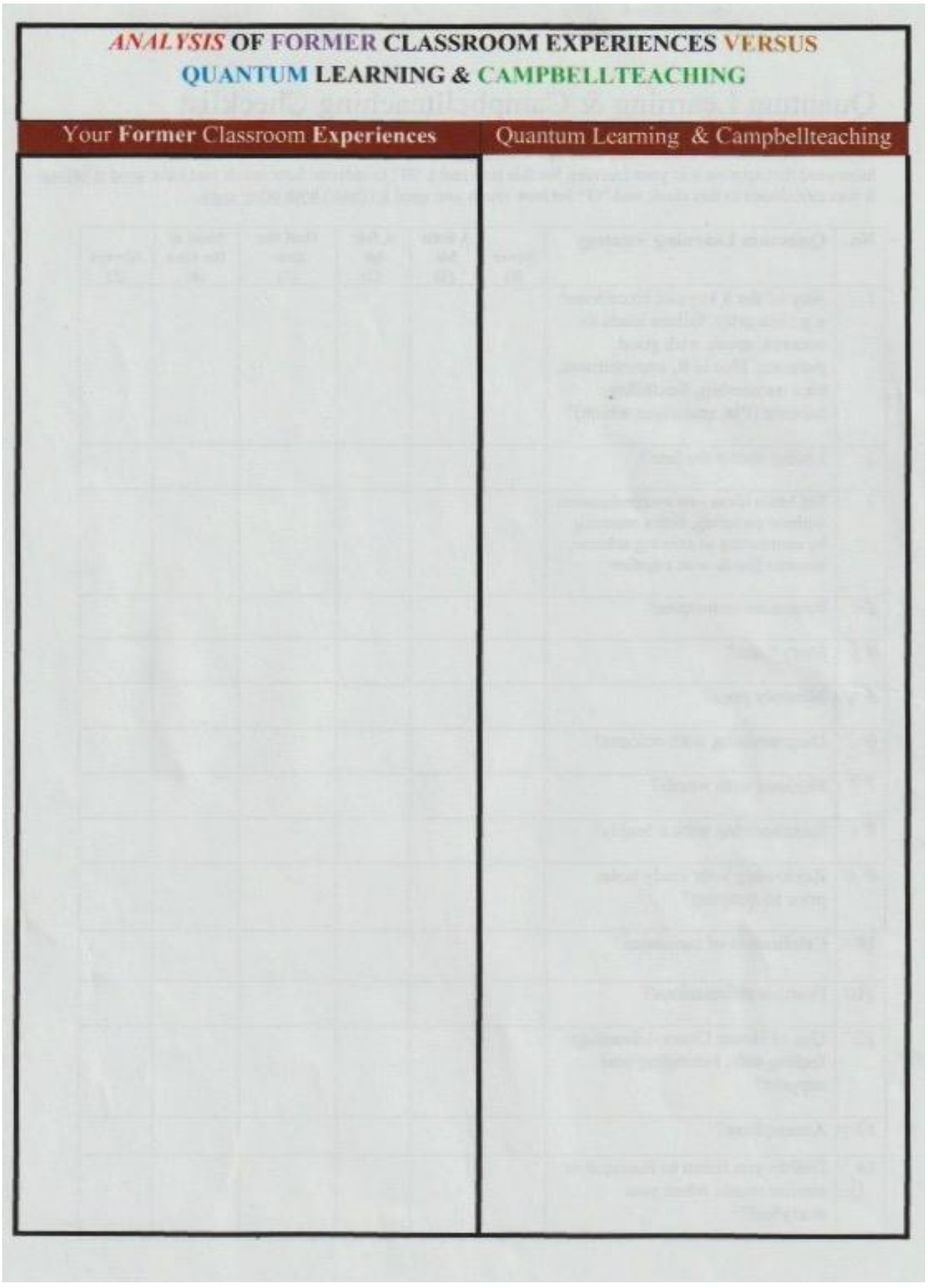


I look forward to teaching you in the Kaleidoscope Classroom. You see the semester just got better because you are here! Corrine Jones Doctorate of Education candidate and full-time teacher at Victoria Universe

Experience before you label

Appendix E

Comparison Table Pre and Post Quantum Learning and Campbellteaching



***ANALYSIS* OF FORMER CLASSROOM EXPERIENCES VERSUS QUANTUM LEARNING & CAMPBELLTEACHING**

Your **Former** Classroom **Experiences**	Quantum Learning & Campbellteaching

Quantum Learning and Campbellteaching Checklist on usage

Quantum Learning & Campbellteaching Checklist

Instruction to student: Below is a list of the learning strategies that have been used in the teaching of Confirm Physical health Status. Please read each one carefully, put an "X" in the boxes 0 - 5 to indicate how much you have used that approach in your learning for this unit and a "B" to indicate how much you have used it before it was introduced to this class, and "O" for how much you used it (them) with other units.

No.	Quantum Learning Strategy	Never (0)	A little bit (1)	A fair bit (2)	Half the time (3)	Most of the time (4)	Always (5)
1	Any of the 8 keys of Excellence e.g.: integrity, failure leads to success, speak with good purpose, This is It, commitment, take ownership, flexibility, balance (Pls. underline which)?						
2	Living above the line?						
3	Big brain ideas –no comprehension without picturing, make meaning by connecting to existing schema, neurons fire & wire together						
3	Relaxation techniques?						
4	Story lines?						
5	Memory pegs?						
6	Diagramming with colours?						
7	Motions with words?						
8	Summarizing with a buddy?						
9	Reviewing your study notes prior to sleeping?						
10	Celebration of successes?						
11	Positive affirmations?						
12	Use of Home Court Advantage: feeling safe, belonging and support?						
13	Atmosphere?						
14	Did/do you listen to Baroque or similar music when you study/ied?						

Appendix F

Questionnaire

Information about the WHY of this questionnaire:

This short questionnaire was developed, as result of a conversation with Dr. John Campbell.
It was not mandatory to answer the questions. There were no penalties for negative comments or decisions not to participate.

Part A

These questions were to get a sense of what subjects the students liked and what made them special. It gave them an opportunity to ponder the differences between their earlier experiences and the research. They would be filling in the questionnaires at the back of their classroom journals around this time.

Part B

This section also gave the students a chance for reflection. How did they feel before they started the research unit . . . many had heard that the subject was very hard, I will not be quoting here, but just providing a brief summary: some students were nervous, others were scared and there were a few that had questions about anatomy and physiology and they wanted to find the answers.

Lastly, the teacher played an important role in student outcomes . . . so what did students like or not like her personally, her teaching methods, etc. Now the first thought that comes to mind could be bias because the researcher was the teacher; however, by this time the teacher and the students had formed a relationship. If students gave negative feedback, then this would have been important for future teaching – how could she improve? This was important data.

Group 1 & Group 2

Part A.

1. Looking back over all of your previous school years from grade one upwards–what was you most favourite class?

2. What made it so special?

3. What would you be thinking before you went into that class?

Part B.

1. What were you thinking before you came to the Confirm Physical Health Status classes?

2. What was the most important aspect about your teacher and the way she taught? Please explain your answer:

Appendix G.

Linking Table

Information for Analyse Health Unit: HOW TO LINK YOUR THEORY TO YOUR PRACTICE

Signs: what we see & measure	Symptoms: What the patient tells you	What happened in the body to cause the S&S – go to the cellular level [aetiology]	What is your role & responsibility as a Diploma Nurse to the assessment you make?	What tests might you expect to see in the patient's chart?	Who would be on the multidisciplinary team & what is their role?	Top 2 to 3 medications used to treat this condition & why they are used

The following conditions covered in this unit that the students are required to study and learn as per the table outlined above are:

ESSENTIAL KNOWLEDGE

- Asthma including a diagram of asthma first aid
- Congestive Heart Failure CHF/Heart Failure
- Diabetes Type 1 and Type II
- Osteoarthritis and rheumatoid arthritis – For these two conditions you are required to do up a table comparing the differences between the them e.g. onset, location etc.

Appendix H

Sample Page from the Clinical Placement Journal

Clinical Journals had a set of questions set at the beginning for students to consider when entering their thoughts. Here is a list of the questions:

1. State the goals for each clinical rotation.
2. Did you achieve them, if not what happened?
3. Each day you go into the clinical environment:
    a. How do you feel?
    b. Who was present?
    c. Who did you meet during the day? For example: the head nurse, the nursing team, doctors, respiratory therapists, etc.
4. Experiences and/or situations – Reflect on the actual experience:
    a. What happened, what was the feeling at the time?
    b. Who was present?
    c. What was your role?
    d. What were the actions taken and the results of those actions?
    e. What did you learn?
    f. Would you do anything differently?
5. Was your clinical teacher available?
6. Did she/he encourage you to consolidate your learning?
7. Did you experience and '**Light Bulb'** moments if so, explain what and how you felt about the moment?
8. What was your best experience of the day and why?
9. *Discuss your experiences, in relation to your ability to recall your theory and relate it to your practical experience, in relation to Anatomy and Physiology and Analyse Health. <u>You must include this in your reflections.</u>*

Each page had one of the 8 keys of Excellence or a motivating statement placed at the top.1

<table>
<tr><td rowspan="2">WEEK 1: Day 1 Date: _____

Go through the list of questions and provide your answers here. Must Answer: Discuss how you were able to link your theory (knowledge) of A & P and Analyse Health into your practice.</td><td>Questions and/or Thoughts</td></tr>
<tr><td>Goals I accomplished today</td></tr>
<tr><td colspan="2">Summary of your day: [Did you feel competent in the practice environment, if yes, why?]</td></tr>
</table>

Appendix I
Survey: Clinical Supervisor

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

Survey: Clinical Supervisors

As discussed previously, I am studying for a Doctorate Degree in Education in the Diploma of Nursing Program at Victoria University, St. Albans campus. As part of the Degree I am required to conduct a research study. The title of the study is: A Kaleidoscope Journey: Integrated Andragogies in the Diploma of Nursing Program – The Quantum Learning System and Campbellteaching. My supervisors are Dr. Mary-Rose McLaren and Dr. Antony Owens.

The study will examine the effect of the Quantum Learning System and Campbellteaching Andragogies on the student's abilities to retain their theory, think critically and link the theory to their practice. As part of the research you have been asked to participate by filling in a short survey in regards to the students' progress.

Survey Questions:

Part One: Clinical facilitator Information

How many years have you been a nurse?_____

How many years have you worked as a clinical facilitator?_____

What facility was the clinical rotation held at?_____

How many students did you have on the placement?_____

What clinical rotation was this for the students? Please circle the answer below:

First Second Third Fourth Fifth

Part Two: Student Information

a. In teaching anatomy and physiology, I incorporated two methodologies that are supposed to help students retain their theory and aid them in implementation during clinical practice. Have you noticed any difference in these students to previous groups? Please explain you answer.

a. From your observations were the students confident and able to understand and link their theory of Anatomy and physiology in the clinical setting?

b. Please share any observation that you have about these students or a particular student that you feel would be of value to the research.

I would like to thank-you for your willingness to add to the research. The Knowledge gained will be passed on to influence the delivery of the Diploma of Nursing Courses.

APPENDIX J

Quantitative and Qualitative Data Analysis

Statistics. The Campbell-Quantum Learning Checklist was administered to n= 46 students who were in two groups. Group 1, semester 2, 2012 had n=20 students and group 2, semester 1, 2013 had n=26 students.

The Campbell-Quantum Learning Checklist was administered to each group after they had experienced the teaching using the style suggested. To determine whether there was any difference in response between the two groups, an independent t-test was performed. Similarly, an independent t-test was performed to determine whether there was a difference in response between gender and age.

This Checklist is scored between the values of 0 and 6, giving a mean score for the inventory of mean= 3

Groups 1 and 2 together

The mean and standard deviation for n=46 students was measured to determine whether the group scored above the item mean (=3), suggesting that the students used the item as suggested by its meaning. Standard Deviation (SD) determines how far from the mean the scores vary. One SD either side of the mean represents 60% of the students scoring within that range.

Table 1: Mean scores for both research groups

Q'aire item	Mean (n=46)	Standard Deviation
8 keys	3.48	1.01
Above line	3.35	1.18
big brain ideas	3.61	1.08
relaxation	3.31	1.16
Story line	2.54	1.31
power peg	2.37	1.36
Diagrams/colour	3.36	1.23
Motions/words	3.13	1.31
Peer review	3.26	1.24
Review before sleep	3.74	1.00
celebration	3.17	1.54
Positive affirm	3.35	1.06
HCA	3.20	1.42
Atmosphere	3.51	0.87
Baroque	1.48	1.79

The mean values above, suggest that many students scored above the mean item value thus utilising the item as suggested with the exception to ‘story line’, ‘power peg’, and ‘Baroque’.

The smallest deviation from the mean was for the item, Atmosphere, where SD=0.87 suggesting an upper limit of 4.38 and a lower limit of 3.64 suggesting that ‘Atmosphere’ was scored similarly by everyone in the study. The greatest deviation was for item, Baroque, where SD=1.79 suggesting an upper limit of 3.27 and a lower limit of zero. The mean of 1.48 suggests that the item, ‘Baroque’ was rarely considered by the students, but the large SD suggest that some students do score above the item scale mean of three.

The groups were broken down to three subgroups to determine whether the grouping made any difference to the mean scores. The groups were: Student groups, K and M, Gender and age. These studies are reported below.

Table 2: Mean Score for groups 1 and 2

Q’aire item	Mean, K (SD)	Mean, M (SD)	Diff in mean	t-test score	Significance p=
8 keys	3.50 (0.95)	3.46 (1.07)	0.04	0.13	0.90
Above line	3.55 (1.05)	3.19 (1.27)	0.36	1.02	0.31
big brain ideas	3.70 (0.98)	3.54 (1.17)	0.16	0.50	0.62
relaxation	3.20 (0.95)	3.38 1.30)	0.18	-0.53	-0.60
Story line	2.45 (1.43)	2.62 (1.24)	0.17	-0.42	-0.68
power peg	2.65 (1.35)	2.15 (1.35)	0.4	1.24	0.22
Diagrams/colour	3.25 (1.16)	3.42 (1.27)	0.17	-0.47	-0.64
Motions/words	3.25 (1.37)	3.04 (1.28)	0.21	0.54	0.59
Peer review	3.30 (1.13)	3.23 (1.34)	0.07	0.19	0.85
Review before sleep	3.85 (1.09)	3.65 (0.94)	0.20	0.66	0.52
celebration	3.25 (1.29)	3.12 (1.73)	0.13	0.29	0.77
Positive affirm	3.35 (1.04)	3.35 (1.09)	0.00	0.01	0.99
HCA	3.60 (1.31)	2.88 (1.45)	0.28	1.73	0.09
Atmosphere	3.95 (0.69)	3.19 (0.85)	0.76	3.25	0.00#
Baroque	1.55 (1.82)	1.42 (1.79)	0.13	0.24	0.81

#Significance $p<0.05$

The mean score for each item on the checklist is close to three, with the exception for the item labelled, ‘Baroque’, above which has means of mean K = 1.55, mean M = 1.42,

suggesting that the members in each group did not listen to Baroque music to enhance their learning.

The standard Deviation, SD, for each group varied from 0.69 to 1.82. Again, the item ‘Baroque’ scored the largest SD giving 60% of the students surveyed, scores ranging from 0 to 3. The item, ‘Atmosphere’ scored the lowest SD of SD= 0.69 which gave a 60% response rate of the students mean score ranging from mean K= 3.3 to mean K= 4.6. Both scores measured here were obtained my using the formula, range mean = mean +/- 1SD. The reader can obtain the range for each item by using the formula.

A t-test for difference in mean scores for each item between groups K and M was performed to determine whether the scores were significantly different (significant at $p<0.05$). With the exception to the item, ‘Atmosphere’ ($t=3.25$, $sig=0.00$), there was no significant difference between the scores for each item, suggesting that there was no difference between the two groups on these scores.

Difference in Gender

The Campbell-Quantum Learning Checklist was tested for differences in mean score values for gender. Since the study had significantly more females than males, it was decided to study an equal amount of males, n=10 and females, n=10.

Table 3: Campbell-Quantum Learning Checklist mean scores

Q'aire item	Mean, male	Mean, female	Diff in mean	t-test score	Significance p=
8 keys	3.50	3.70	0.20	0.65	0.53
Above line	2.90	3.70	0.80	1.41	0.18
big brain ideas	3.60	4.10	0.50	1.30	0.21
relaxation	2.90	3.50	0.60	1.18	0.25
Story line	2.90	3.10	0.20	0.35	0.73
power peg	2.50	3.60	1.10	3.16	0.01#
Diagrams/colour	2.40	3.50	1.10	2.54	0.02#
Motions/words	3.00	4.10	1.10	2.70	0.01#
Peer review	3.30	3.50	0.20	0.37	0.72
Review before sleep	4.00*	3.90	0.10	-0.22	-0.10
celebration	2.10	3.50	1.40	2.02	0.06
Positive affirm	2.90	3.70	0.80	1.58	0.13
HCA	2.40	4.20	1.80	2.93	0.01#
Atmosphere	2.90	4.30	1.40	4.00	0.00#
Baroque	2.60*	1.60	1.00	-1.16	-0.26

*Males scored higher. #Significant at p<0.05

Notice that for all items except two, females scored higher than males. Gender difference is significant for five items in the scale.

- Power peg, mean difference = 1.10, p=0.01
- Diagrams/colour, mean difference = 1.10, p=0.02
- Motions/words, mean difference = 1.10, p= 0.01
- HCA, mean difference = 1.80, p= 0.01
- Atmosphere, mean difference = 1.40, p= 0.00

The highest mean scores (> 3.80) are:

- Big brain ideas, mean = 4.10
- Motion/words, mean = 4.10
- Review before sleep, mean= 4.00
- HCA , mean= 4.20
- Atmosphere, mean = 4.30

Suggesting that these activities are likely to be practiced. Note that the scale mean =3.00. scores above this score are likely to practice the item represented, though mean = 3.80 was chosen since this represents a higher likelihood of the item being used.

Difference in Age

The students were put into two age groups, those between 18 and 30 years (n=20) and those older than 30 years (n=10)

Q'aire item	Mean, 18-30	Mean, 30+	Diff in mean	t-test score	Significance p=
8 keys	3.37	3.70	0.33	-0.92	0.36
Above line	3.23	3.60	0.37	-0.89	0.38
big brain ideas	3.71*	3.10	0.61	1.62	0.11
relaxation	3.26	3.30	0.04	-0.10	0.92
Story line	2.60*	2.20	0.40	0.85	0.40
power peg	2.46*	1.90	0.56	1.16	0.25
Diagrams/colour	3.14	4.00	0.86	-2.02	0.05#
Motions/words	3.11	3.20	0.09	-0.18	0.86
Peer review	3.26*	3.20	0.06	0.13	0.90
Review before sleep	3.69	3.80	0.11	-0.32	0.75
celebration	2.91	3.90	0.99	-1.84	0.07
Positive affirm	3.17	3.80	0.63	-1.72	0.09
HCA	3.06	3.50	0.44	-0.87	0.39
Atmosphere	3.40	3.80	0.40	-1.34	0.19
Baroque	1.77*	1.30	0.47	0.21	0.84

#Significant at $p<0.05$, *18-30 years scored higher

Notice that students over 30 years were more likely to try the item suggestion than the other students, though not significantly so. The item, Diagram/colour was significant at $p<0.05$where students (18-30) scored mean = 3.14 and students (30+) scored mean = 4.00, suggesting that diagrams and colour helped the over thirties students more.

None of the items for the age group (18-30) scored a mean greater than, 3.80, whereas, for students (30+), five items were scored where the mean was greater than or equal to 3.80. These items were:

- Diagram colour, mean = 4.00
- Review before sleep, mean = 3.80
- Celebration, mean = 3.90

- Positive affirmation, mean = 3.80
- Atmosphere, mean = 3.80.

Story line, power peg and Baroque were least likely to be used by both groups since their mean scores were below 3.

Table G. Difference between EAL and Australian Students

The difference in mean scores on the Campbell-Quantum Learning Checklist was tested between the EAL (n=23) and Australian students (n=23) for groups K and M combined. A t-test was performed to determine the significance of the difference between the two groups and is listed below.

Table: Difference in Mean and t-test between EAL and Australian students.

Q'aire item	Mean, EAL	Mean, Australian	Diff in mean	t-test score	Significance p=
8 keys	3.52	3.43	0.09	0.29	0.77
Above line	3.00	3.70*	0.70	-2.08	0.04
big brain ideas	3.78	3.43	0.35	1.09	0.28
relaxation	3.43	3.17	0.26	0.76	0.45
Story line	3.04	2.04	1.00	2.77	0.01
power peg	2.74	2.00	0.74	1.90	0.06
Diagrams/colour	3.22	3.48*	0.26	-0.72	0.47
Motions/words	3.57	2.70	0.87	2.36	0.02
Peer review	3.52	3.00	0.52	1.45	0.15
Review before sleep	3.87	3.61	0.26	0.88	0.38
celebration	3.17	3.17	0.00	0.00	1.00
Positive affirm	3.57	3.17	0.60	0.47	0.27
HCA	3.52	2.87	0.65	1.58	0.12
Atmosphere	3.78	3.26	0.52	0.82	0.04
Baroque	1.57	1.39	0.17	0.33	0.75

Significant at $p<0.05$. *Australian students scored higher.

Note that on all scoring except two (see *), the EAL students scored higher than the Australian students though only significantly so for four scores listed below.

- Above the line, p=0.04. Australian students scored highest.
- Story line, p=0.01. EAL scored highest.

- Motions/words, p= 0.02. EAL scored highest.
- Atmosphere, p=0.04. EAL scored highest.

The highest mean score for EAL students is 3.87 (Review) and for Australian students is 3.70 (Above the line).

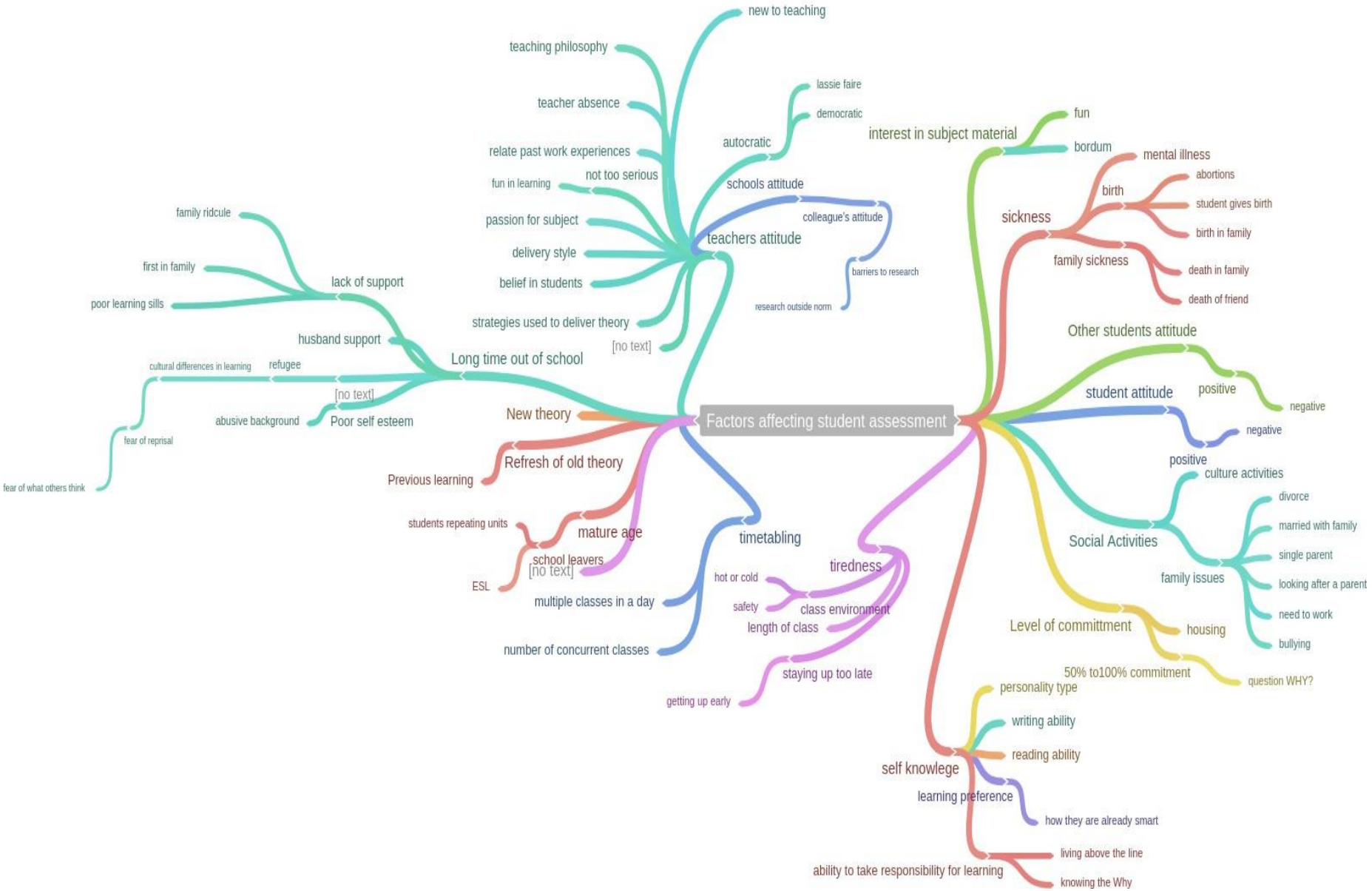
The lowest score for EAL students is 1.57 (Baroque) and for Australian students is 1.39 (Baroque) suggesting for both groups that they did not play Baroque music while studying.

It is interesting to note that for the item, ‘Celebration’, both groups scored the same mean value of 3.17 suggesting equal interest in this item, though not necessarily high usage of this item.

Review before sleep scored relatively high for both groups, EAL students mean = 3.87 and Australian students mean = 3.61 suggesting that the students review work before sleep with the EAL students more likely to do so.

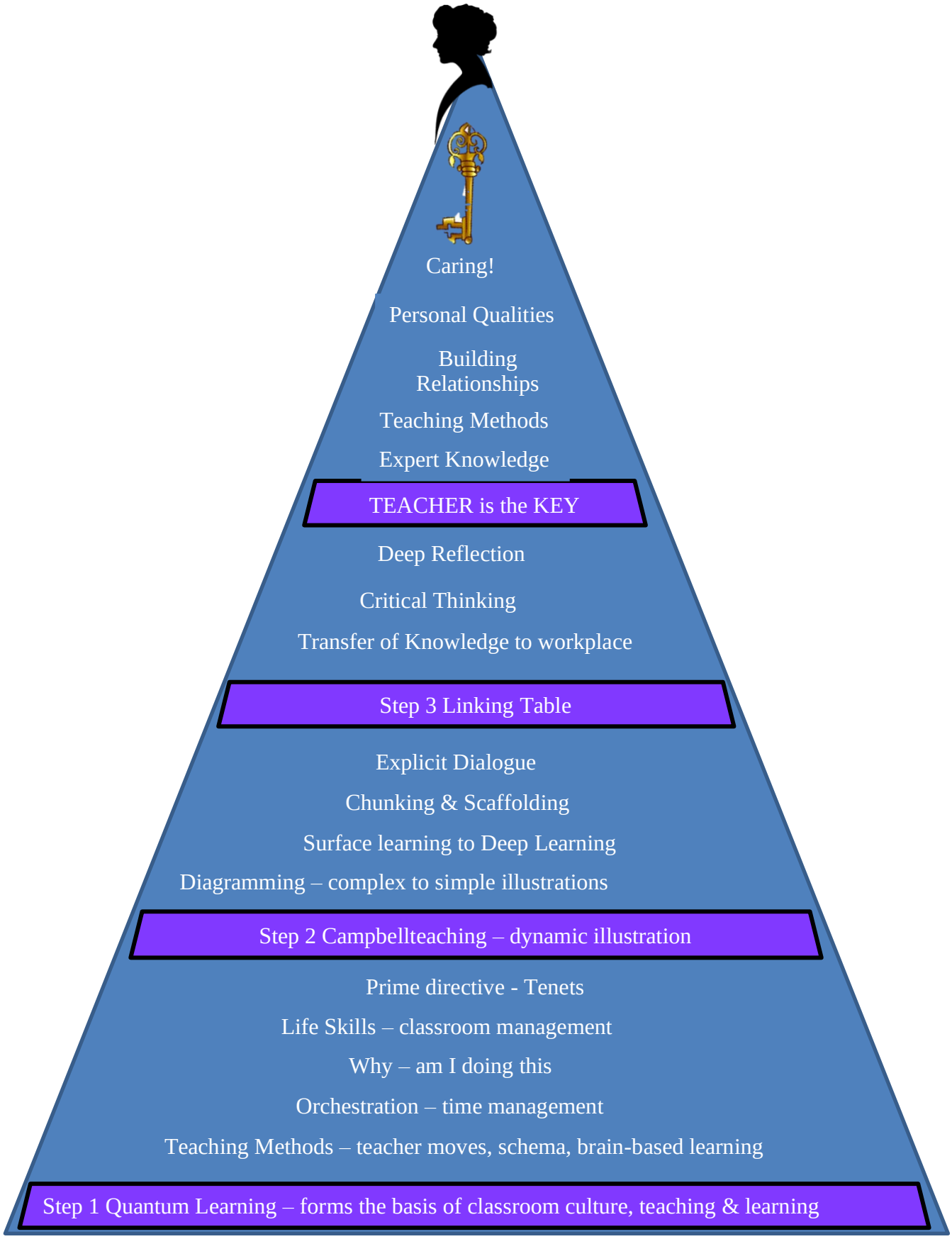
Appendix K

Mind map of influencing factors that affect student learning



Appendix L

An Enhanced Learning Model



Appendix M

Attributes and Skills of an Excellent Reacher