

Modelling the qualities of a medical doctor in the South African healthcare context

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ABSTRACT

To address the numerous healthcare challenges facing South Africa, it is imperative that the skill set of medical doctors practising in the public sector evolve. This research identifies the qualities required for a medical doctor to be a good clinician, holistic practitioner, medical manager, and medical leader. Qualities of medical doctors were identified from a comprehensive literature review and used in the development of a fuzzy cognitive map (FCM). The FCM was refined through a pilot study and then presented to an expert sample of public sector medical doctors in a two-round Delphi study. The research propositions were refined as follows:

- (i) Critical thinking, above-average intelligence, individual motivation, the absence of poor work environment, and the absence of poor stress management are required for a medical doctor to be a good clinician.
- (ii) Critical thinking, strong interpersonal skills, individual motivation, the absence of poor work environment, and the absence of poor stress management are required for a medical doctor to be a holistic practitioner.
- (iii) Critical thinking, individual motivation, strong interpersonal skills, the absence of poor work environment, and the absence of poor stress management are required for a medical doctor to be a medical manager.
- (iv) Critical thinking, individual motivation, strong interpersonal skills, and the absence of poor stress management are required for a medical doctor to be a medical leader.

The findings of this study will be of value to individual medical doctors by providing insight and identifying areas for personal improvement; healthcare institutions to develop their staff to become better clinicians, holistic practitioners, medical managers and medical leaders; and Medical schools and colleges to focus their curriculum and teaching on producing multi-talented and multi-skilled medical doctors. Furthermore, continued professional development of practicing doctors along these paradigms can ensure higher quality medical practice, management and leadership in public-sector healthcare.

DECLARATION

I, Jayshina Punwasi, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.



Jayshina Punwasi

Signed at Johannesburg, South Africa

On the 28th day of February 2016

DEDICATION

To my daughters, Tara and Harini.

You have made the greatest sacrifice for this MBA. May you grow up to be smart,
beautiful and strong women.

To my husband, Dr. Shawren Singh.

Your support, patience and love during this journey has made it a success.

To my parents, Behareelall and Shakila Punwasi.

Thank you for giving me the foundation and tools to build a successful life.

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OTHER ACADEMIC OUTPUTS RESULTING FROM THIS RESEARCH

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CHAPTER 1. INTRODUCTION

1.1 Purpose of the study

The purpose of this research is to model the qualities that influence a medical doctor being a good clinician, a holistic medical practitioner, a medical manager and a medical leader in the South African public healthcare context.

1.2 Context of the study

Medicine as a science and an art has been traced to ancient Egypt, Greece and India (Gupta, 2015). Hippocrates (460 BC - 355 BC), an ancient Greek physician is widely accepted as the 'Father of Medicine' and the Hippocratic oath and its variants have for centuries served as a compass to medical doctors. It has grounded them in the responsibility of the profession in terms of ethics, values and conduct. Although Hippocrates laid the foundation for medical practice and is credited with separating medicine from philosophy, modern medicine is evolving and advancing to become a source of learning in itself (Gupta, 2015). As such, moving away from the pure science of medicine, the humanities have become increasingly involved in the study, teaching and practice of medicine (Benatar, 2015).

Over generations, the importance of medical doctors and their role in society has changed. Such changes are particularly pertinent to South Africa with its exponential population growth, extreme socioeconomic disparity, aging health infrastructure, shortage of medical personnel and complex burden of disease (Coovadia, Jewkes, Barron, Sanders, & McIntyre, 2009; Wesso, 2014). The requirements and demands placed on South African doctors across primary, secondary, tertiary and quaternary levels of practice have resulted in cases of exceptional individual performance despite many challenges. Therefore, South African health professionals are highly recognised and actively sought out in the international market place (Wesso, 2014).

From being a repository of knowledge and care, medical doctors are becoming facilitators of health and advisors rather than dictators about what would be best for the patient. This change is also attributed to a greater emphasis being placed on

patients' rights and responsibilities (Wesso, 2014) and the ability and opportunity patients have to easily access information from books and the internet. In addition, the way in which medicine is taught has evolved to better equip doctors with the skills required to practice in the 21st century (Frenk, Chen, Bhutta, Cohen, Crisp, Evans, Fineberg, Garcia, Ke, Kelly, Kistnasamy, Meleis, Naylor, Pablos-Mendez, Srinath Reddy, Scrimshaw, Sepulveda, Serwadda, & Zurayk, 2010).

There have been noteworthy changes in the type of individual who becomes a medical doctor and the reasons one may have for pursuing medicine as a career (Kuriakose, Revankar, Shetty, & Rao, 2015). Further changes in the style and content of medical curriculums and the teaching approach also impacts on the preparedness of the junior doctor to tackle the challenges of healthcare practice (Frambach, Manuel, Fumo, Van Der Vleuten, & Driessen, 2015). Over the past few decades, due to individuals from different generations and different ethnic and cultural backgrounds working together in the healthcare industry, some of these qualities have evolved, while some have been ignored.

The increasing expectations on healthcare personnel and the escalating demands to service the growing South African population add another dimension to what is required of a medical doctor (Mayosi & Benatar, 2014). South Africa being a country of extremes, has a unique disease profile and requires context-specific changes in its healthcare system in order to address its quadruple burden of disease (Wesso, 2014). Doctors need to rise to this challenge of providing quality care despite many individual and contextual problems they may encounter. The specific qualities required and how these qualities relate to each other have not been researched in the South African healthcare context. In order to address the disconnect of actual public sector practice and teaching at undergraduate and clinical practice level, it is necessary to examine the qualities required for medical practice in South Africa in contemporary times.

1.3 Problem statement

1.3.1 Main problem

The research problem is to model the qualities that impact on a South African medical practitioner being a good clinician, a holistic practitioner, a medical manager and a medical leader.

1.3.2 Sub-problems

The first sub-problem is to identify the qualities and the relationships between these qualities that influence a medical doctor becoming a good clinician.

The second-sub problem is to identify the qualities and the relationships between these qualities that influence a medical doctor becoming a holistic practitioner.

The third sub-problem is to identify the qualities and the relationships between these qualities that influence a medical doctor becoming a medical manager.

The fourth sub-problem is to identify the qualities and the relationships between these qualities that influence a medical doctor becoming a medical leader.

Search terms: qualities of a medical doctor, good clinician, holistic medical practitioner, medical leader, medical manager, South African healthcare.

1.4 Significance of the study

The findings of this study will be of value to:

- Individual medical doctors by providing insight and identifying areas for personal improvement;
- Healthcare institutions to develop their staff to become better clinicians, holistic practitioners, medical managers and medical leaders;
- Medical schools and colleges to focus their curriculum and teaching on producing multi-talented and multi-skilled medical doctors better equipped to practice medicine and provide exceptional patient care.

1.5 Delimitations of the study

- This study was conducted in Johannesburg, Gauteng, South Africa.
- It focused on medical doctors currently working in public sector healthcare across primary, secondary, tertiary and quaternary levels of care.
- The expert sample consisted of fifteen medical practitioners and/or managers with a minimum of 3 years of experience of medical practice post-graduation from a medical school or college.
- Junior doctors, allied health professionals, nurses and patients were not considered, as their opinions were deemed beyond the scope of this study.
- The actual reasons why an individual has become a doctor were not explored as such reasons are diverse and deemed beyond the scope of this study.

1.6 Definition of terms

Doctor: The word '*doctor*' originates from the Latin word '*docere*' meaning '*to teach*'. For the purposes of this research 'doctor' will designate a medical doctor and not an individual who has obtained a research doctorate.

Medical doctor: An individual who has the academic qualification required to practice medicine and the appropriate registration with the medical council in the country of practice. The primary role of this healthcare professional is to treat patients who are ill or sustained an injury. Their primary duties include evaluating patients, performing or ordering diagnostic tests, diagnosing ailments and prescribing treatment.

Clinician: A medical doctor that works directly with patients to take a history and examine patients, diagnose conditions, treat illnesses, and discharge patients.

Holistic practitioner: A medical doctor who treats a patient in his/her entirety considering the effect of body, mind, spirit and emotions on a patient's health and well-being. A holistic practitioner also considers the effects of socioeconomic factors of a disease entity.

Medical manager: A medical doctor in a managerial position supervising other health professionals.

Medical leader: A medical doctor who manages and leads other healthcare professionals to provide better patient care and medical services through horizontal and vertical collaboration; an advocate for change and improvement.

Primary care: Consists of community-based clinics and basic hospitals that service the general population for commonly occurring ailments.

Secondary care: Hospitals that provide a higher level of knowledge and service through specialised departments including Internal Medicine, General Surgery, Obstetrics and Gynaecology, etc.

Tertiary care: Large hospitals that offer a greater level of specialised services such as Rheumatology, Cardiothoracic Surgery, Neurosurgery, etc.

Quaternary care: An extension of tertiary care that is highly specialised and highly unusual such as Oncology, Genetic Medicine, etc.

Burden of disease: The impact that a disease entity has in terms of financial cost, mortality and morbidity, thereby affecting human and social capital.

1.7 Assumptions

- It was assumed that the participants were providing information based on their individual and observed experiences.
- It was assumed that the participants were openly and honestly sharing their experiences and knowledge.
- It was assumed that all primary participants would avail themselves for secondary evaluation of the refined cognitive map.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

Medicine as a profession requires lifelong study and learning in order for the practitioner to be updated with and informed about the advancements and changes impacting healthcare. Medical doctors tend to focus on only the disease and diagnosis, and are often not able or sometimes not willing to get involved with the patient in his/her entirety as a human being. In order to meet the requirements of the profession and the healthcare demands of the South African population a new paradigm is required (Coovadia et al., 2009; Frenk et al., 2010; Mayosi, Lawn, Niekerk, Bradshaw, Karim, & Coovadia, 2012). Medical schools are reengineering their curriculums, the profession is changing its approach and individual practitioners are re-evaluating their reasons for being. As such, the factors that positively and negatively influence a medical professional being a good doctor in all aspects of the profession need to be identified. It is imperative that the relationships between these factors be explored to ensure that South African doctors are being adequately moulded and developed in the appropriate areas to be the best doctors they can be.

To better understand the current environment in which medical doctors function, the following topics will be reviewed in order to address the research problem of modelling the qualities that impact on a South African medical practitioner being a good clinician, a holistic practitioner, a medical manager and a medical leader:

- Healthcare of the 20th century
- The call for reforms
- The qualities of a medical practitioner
- The renaissance of professionalism
- Healthcare in South Africa
- From problems to opportunity
- Understanding the South African medical doctor
- A paradigm shift

2.2 Healthcare of the 20th century

Although medical practice is an ancient art and profession, the 20th century has been the most disruptive and innovative in the history of healthcare. Advancements across the fields of biology, physiology, pharmacology and technology led to the doubling of lifespan in the 20th century (Frenk et al., 2010; Murphy, 2015). The medical knowledge base grew exponentially and doctors developed a better understanding of how the body worked and the impact of disease. More importantly, medical doctors were able to provide effective and curative treatment with the development of antibiotics in the 1920s (Jones, Podolsky, & Greene, 2012).

An epidemiological transition took place and acute epidemics continued to be replaced by non-communicable disease (Jones, 2015). While some of the deadliest diseases such as smallpox were eliminated, new diseases such as HIV and AIDS emerged. Disease profiles changed as people started to live longer and live differently. The emergence of the diseases of aging, particularly heart disease and cancer, and the identification of lifestyle diseases such as stress, diabetes and hypercholesterolemia posed new challenges in an exponentially growing and rapidly urbanising global population (Frenk et al., 2010).

Social causes of disease started to play a significant role in healthcare as people migrated and areas became urbanised. This resulted in the spread of many illnesses associated with migrant labour, as well as the emergence of trauma caused by violence and road traffic accidents (Coovadia et al., 2009). Social disparity and gender inequality became evident in the increase of crime related trauma and gender-based violence. Link & Phelan (1995) identified social factors and social support as fundamental causes of disease because they affect not only illness causation and disease outcomes, but impact an individual's access to healthcare services.

These developments and challenges of the 20th century have resulted in a focus change from curative medicine to preventative medicine, from treating the disease entity to treating the individual, from looking at causative organisms to addressing contextual factors that cause disease. Doctors are now required to look beyond the Petri dish and provide holistic treatment that addresses all aspects of the patient.

2.3 The call for reforms

As healthcare requirements of individuals and population constantly change, the demands placed on medical doctors and healthcare systems increase. In order to meet the requirements of specific times, there have been global calls for reforms in the teaching and practice of the medical sciences (Frenk et al., 2010; Murphy, 2015).

The first generation of reforms for health professionals was brought on by the publication of the Flexner report in 1910, the Welch-Rose report in 1915 and the Goldmark report in 1923. These reports were based on the development of medical science and transformed healthcare education to imbed a scientific foundation (Frenk et al., 2010). The result was medicine began to be taught as a scientific curriculum with the university being the primary source of learning.

The second generation of reforms started after World War II when national governments started engaging in health affairs. The second half of the 20th century saw the development of problem-based learning in small groups as opposed to a didactic lecture based form of teaching (Savery, 2006). Problem-based learning enables students to develop domain knowledge and thinking strategies. Through the process of facilitated problem solving, students work in collaborative groups to develop flexible knowledge, effective problem-solving skills, self-directed learning skills and intrinsic motivation (Hmelo-Silver, 2004). In this second generation of reforms, sources of teaching expanded to tertiary hospitals and academic health centres, thereby integrating training medical doctors, research and patient care (Frenk et al., 2010).

The third generation of reforms, which we are currently in, is aimed at addressing the gaps and opportunities created by a globalising, interconnected world (Frenk et al., 2010). The focus is on developing core competencies that combine evidence-based practice with patient-centred care. Interdisciplinary teams provide integrated healthcare and formal medical education creates a foundation for lifelong learning. Teaching is expanded along all levels of healthcare and holistic care of the patient is emphasised (Murphy, 2015).

Frenk et al. (2010) have summarised these three generations of reforms in Figure 1:

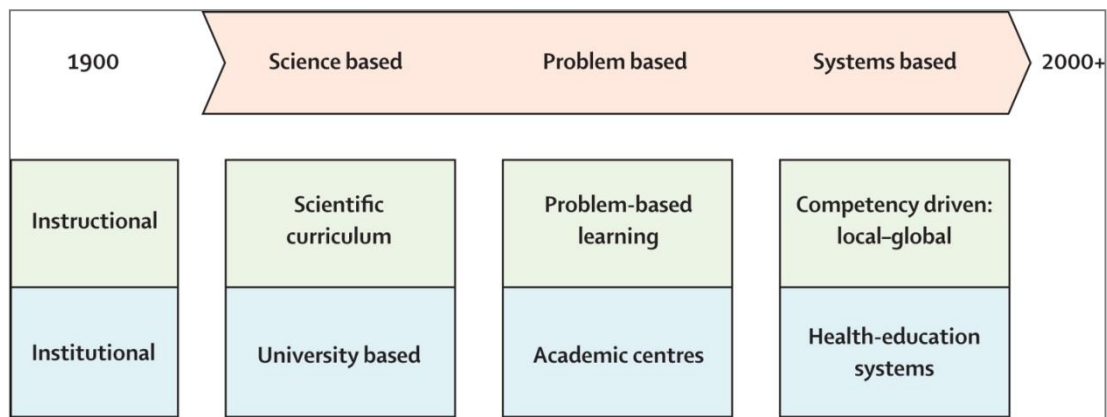


Figure 1: Three generations of reforms (Frenk et al., 2010)

As medical curricula have evolved, the role that medical schools and colleges play in the development of a medical doctor is critical. Undergraduate medical education must build on or develop the competencies with which a medical student enters medical school, and then equip the medical doctor with a continuous desire and ability to learn, as medicine is a profession of life-long learning (Evans, 2016). Medical graduates must cultivate the dexterity to adapt to the changing demands of patients and the evolution of healthcare systems.

As healthcare shifts from a foundation of technical competence to holistic medical practice, global healthcare is shifting from silo-operating systems to complex networks (Frenk et al., 2010; Murphy, 2015). As such, healthcare is rapidly undergoing reforms and will soon undergo a fourth generation that will not only address the health needs of individuals and populations from all angles, but will produce doctors that are motivated to provide the best patient care possible by leading change.

2.4 The qualities of a medical practitioner

With each generation of reforms, the qualities of the medical practitioner have also changed in order to meet professional standards and system demands. On the centennial of the Flexner Report, an independent global commission was convened in 2010 to address transformation of health systems and health professionals for the 21st century (Frenk et al., 2010). The commission identified several challenges in healthcare that affect medical doctors and their ability to address the health needs of the people they serve. These included scarcity and institutional design of medical

schools, financing of medical education, global workforce shortages, and the real-time, talent and financial costs of collaboration. The greatest challenge Frenk et al. (2010) identified when developing health professionals for the new century was the ability to adapt competency-based goals for local effectiveness. Local health education and systems were too often driven by the desire to fit into models from other contexts that might not be relevant to the local context (Murphy, 2015). As such, one must determine the competencies that are required of medical doctors in the local context as well as the factors that deter them from fulfilling these roles.

2.4.1 Factors positively influencing medical doctors

The function that medical schools and colleges serve in the learning and development of a medical doctor is key to establishing a learning culture, an ethical foundation and a well-rounded healthcare professional (Frambach et al., 2015). While some medical schools still use a didactic teaching approach, problem-based case study approach has been recommended to mould medical students into thinkers and lifelong learners (Hmelo-Silver, 2004; Frenk et al., 2010). Frambach et al. (2015) have compared problem-based learning to traditional methods in Sub-Saharan Africa and concluded that problem-based learning broadens medical education to facilitate self-directed learning, confidence in practice, and consideration of the patient as a whole. Furthermore, small group dissection of a case promotes peer learning, reflection and the development of professionalism (Branch, 2015).

Choosing a medical school is a complex process and attending a well-recognised medical school is paramount to the development of many qualities that will hold a medical doctor in good stead over his/her career (Zhang, Xierali, Castillo-Page, Nivet, & Conrad, 2015). Competition to get into well-recognised medical schools is fierce and admission criteria are aimed at attracting top performing individuals. The academic quality and teaching of clinical skills are usually of a high standard to produce a proficient clinician (Zhang et al., 2015). The financial cost of medical education must also be considered, as the study of medicine is one of the most expensive undergraduate qualifications an individual can undertake. While government makes a significant investment in producing a medical doctor, many graduates often have

significant financial debt when they start practicing (Shanafelt, Sloan, & Habermann, 2003).

One of the objectives of medical schools is to develop the critical thinking abilities required for medical practice (Hurwitz, 2013). For many generations, critical thinking has been taught in medical schools under different labels, and it had only recently become known as an entity under its own name (Pardíñaz-Solís, 2015). Critical thinking, problem-solving and collaboration are skills that are taught throughout an individual's educational journey. These skills, however, are imperative to the practice of medicine. Therefore, a foundation in these skills needs to be present and built upon during the teaching years. Critical thinking is further fine-tuned when the individual doctor puts his knowledge into practice, which is part of the lifelong learning that occurs in medical practice (El Bingawi, 2014).

Medicine is still considered an elitist profession (Curtis, 2014) and medical doctors are required to possess above-average intelligence ($IQ > 110$) in order to understand medical curricula and take responsibility for human life. Possessing an above-average intelligence, will aid the prospective medical student to gain admission into a reputed medical school. Academic excellence has a substantial weighting in the admission process globally as past achievement is considered a predictive measure of academic progress in medical school and beyond (Powis, 2014). An above-average intelligence will enable a doctor in training to understand the complexities of the human body and all that can go wrong with it. Doctors develop the ability to absorb large volumes of information and quickly learn diverse and complex procedures. Lifelong learning is required to stay updated with changes and advancements in medical knowledge (Frenk et al., 2010). An above-average intelligence will further enable a medical doctor to teach his/her colleagues and improve the overall quality of healthcare (Blanchard, 2015).

The individual motivation of a prospective medical student additionally aids in gaining admission to a well-recognised school (Powis, 2014). Individual motivation will influence the academic learning process and the development of clinical skills. Continuously challenging oneself to perform requires ambition, stamina and perseverance from medical students. As such, individual motivation is key to

graduating medical school and successfully completing junior doctor training (Hurwitz, 2016).

In medical practice, individual motivation influences a medical doctor's ability and willingness to learn and to teach (Blanchard, 2015). It enables the development of emotional intelligence and a depth of reflection essential for good medical practice and individual well-being (Cherry, Fletcher, O'Sullivan, & Dornan, 2014). Consideration of a patient in his/her entirety is dependent on what the individual doctor considers important. Individual motivation determines how far a doctor will progress in their medical career, how they manage their patients and how they interact with patients and colleagues. Hillis & Grigg (2015) have also identified individual motivation as key to a medical doctor taking on a leadership role as will and determination are required to put principles into practice and affect change.

Emotional intelligence in medicine describes how a medical doctor perceives and responds to his/her own emotions as well as the emotions of colleagues and patients (McKinley, Petrusa, Dijk, Mullen, Smink, Scott-Vernaglia, Kent, Black-Schaffer, & Phitayakorn, 2015). It influences how doctors deal with the demands of their job. Emotional intelligence influences a medical doctor's ability to deal with stress, conflict in the workplace and the emotional and mental fatigue of disease and death (Cherry et al., 2014).

Several internal and external factors determine the level of emotional intelligence that an individual doctor may possess. These factors range from individual motivation and cognitive abilities internally, to support structures and social conditioning externally (Anath, & Jones, 2013). Emotional intelligence is further deepened through the process of feedback and reflection (Blanchard, 2015). This enables the medical doctor to better understand him/herself and develop an ethical foundation. Practicing medicine with a sound ethical platform will enable a doctor to make reasonable decisions in their practice of medicine (Benatar, 2015). Emotional intelligence is also linked to the spiritual dimension of healthcare. Doctors must respect patient's values and beliefs as well as address the spiritual issues impacting patient management (Harbinson, & Bell, 2015).

The importance of interpersonal skills is well documented in medical practice (Blanchard, 2015; Frambach et al., 2015; Hillis & Grigg, 2015; Malan, Cooke, & Mash, 2015), and strongly associated with effective healthcare management and leadership (Pihlainen, Kivinen, & Lammintakanen, 2016). The development of 'soft skills' such as empathic listening, an appropriate bedside manner, patience and respect are essential in providing quality care (Benatar, 2015). Good interpersonal and communication skills are also key to working in teams and providing multidisciplinary patient care (Frambach et al., 2015). It aids a medical doctor in seeking advice from his/her colleagues, and enables learning and teaching through reflection and knowledge sharing (Blanchard, 2015).

2.4.2 Factors negatively influencing medical doctors

The biggest negative contributor to providing effective healthcare is a poor work environment. Long working hours, under-resourced facilities and a lack of professional support causes a medical doctor to make mistakes due to physical exhaustion and mental fatigue (Shanafelt et al., 2003). Overwhelming patient loads cause doctors to address only the most obvious of illnesses and disregard other causes of disease. Time constraints restrict doctors from improving their skills and knowledge and negatively impact reflection and physician well-being. A poor work environment is a de-motivator to teaching and learning, and it eventually takes a toll on the doctor. Poor work environment has been identified as a cause of emotional distress and a leading cause of burnout amongst doctors (Amofo, Hanbali, Patel, & Singh, 2015).

Stress has become endemic in the practice of medicine (Fernandes, 2015). The inability to cope with stress results in doctors becoming depersonalised from their patients, engaging in substance abuse, and having dysfunctional relationships (Ogundipe, Olagunju, Lasebikan, & Coker, 2014). Poor stress management by medical doctors lead to physical and mental illnesses that affect their ability to properly care for their patients (Shanafelt et al., 2003). In several cases, the inability of a medical doctor to adequately cope with work-related stress leads to decreased patient satisfaction and an increased incidence of medical errors (Regehr, Glancy, Pitts, & LeBlanc, 2014). Furthermore, poor stress management leads to absenteeism from work and decreased job satisfaction.

Medical practice is about addressing the needs of the diseased and the dying. Doctors must be willing to engage with, touch and thoroughly examine a patient irrespective of the condition in which the patient presents (Malan et al., 2015). As such, being visibly squeamish at the sight of blood, pus, vomit or faeces affects the care that the medical practitioner offers the patient. The medical doctor will have to overcome his/her personal opinion of the patient and gather the relevant information to make a diagnosis. It goes against good clinical practice to avoid doing an investigation because the doctor feels uncomfortable purely because he/she is squeamish. One has to be very careful as to how to approach patients as any perceptions of the doctor being squeamish will negatively affect the doctor-patient relationship (Underhill, Morrow, Colleran, Holcomb, Calabrese, Operario, Galarraga, & Mayer, 2015). Patients feel discriminated against and this leads to mistrust and eventually inefficient healthcare.

Death is a part of medicine and preparing a patient to die has become a sub-speciality of medical practice in the form of palliative care. However, while some medical doctors may become de-sensitised by regular encounters with the dying and the dead, they may also feel a sense of bereavement for the patients they lose (Redinbaugh, Sullivan, Block, Gadmer, Lakoma, Mitchell, Seltzer, Wolford, & Arnold, 2003). Furthermore, doctors are often not given the time to grieve or to reflect on what may be traumatic experiences. This can result in compassion fatigue and contribute to burnout (Gallagher, 2013). Long-term emotional and spiritual intelligence is affected, especially when physicians refuse to talk about their experiences. In the long-term, this may have a cascading effect and negatively impact on the quality of medical care offered.

2.5 The renaissance of professionalism

Medicine being one of the ancient professions has roots going back centuries. It has always been associated with the knowledgeable and respected class of society with an unspoken form of professionalism. These doctrines were fundamental to the content of the Hippocratic Oath and many other medical pledges that doctors take and are required to adhere to (Gupta, 2015).

Birden, Glass, Wilson, Harrison, Usherwood, and Nass (2014) conducted a systematic review of medical professionalism and concluded that due to constant changes in the context and practice of medicine, no definition had become definitive. Yet an understanding of professionalism is key to the socialisation and identity formation of a medical doctor which begins at the start of their medical career (Cruess, Cruess, Boudreau, Snell, & Steinert, 2015; Hillis & Grigg, 2015).

A generally used understanding presented by Emanuel (2015) regarding professionalism is that medical professionalism is "the moral ideal that promotes the well-being of the patient". Can something as fundamental as the development of one's professional identity be merely "a moral ideal"? And if not, what are the fundamental characteristics of medical professionalism.

Birden et al. (2014) describe that there exists multiple conceptual overlaps between professionalism, humanism, personal growth and professional development. Benatar (2015) states that in order to provide optimal patient care in the current reforms of the medical system, the individual doctor must be grounded by a strong ethical foundation. Interpersonal skills such as empathic listening and speaking at a level the patient understands further produce a higher quality of patient care (Benatar, 2015; Frambach et al., 2015).

Over the past twenty years, the medical fraternity has placed increased emphasis on professionalism (Hillis & Grigg, 2015). This is largely attributed to a widespread decline in professionalism as medical doctors pursue financial gain instead of social justice (Emanuel, 2015). As such, there have been noticeable movements of medical doctors from public to private sector healthcare, decreasing the human resource pool and placing pressure on public health systems (Coovadia et al., 2009).

The decline in professionalism is amplified by long working hours and overwhelming patient loads that dominate the public health sphere particularly in emerging economies like South Africa (Coovadia et al., 2009; Mayosi, & Benatar, 2014). Doctors become mentally and emotionally exhausted which affects personal well-being and eventually patient care (Wallace, Lemaire, & Ghali, 2009; Scheepers, Boerebach, Arah, Heineman, & Lombarts, 2015). Inadequate stress management leads to burnout, depression, substance abuse and dysfunctional relationships in medical

doctors. It is important that doctors acknowledge that they can also fall prey to disease and, therefore, need to find ways to address the stressors caused by the work they do (Wallace et al., 2009). Failing to do so will create a cycle that eventually results in the doctor and the patient suffering.

Other threats to professionalism include minimal emphasis on ethics and values at medical schools and a lack of mentoring in an individual's medical career (Birden et al., 2014). Furthermore, significant advancements in technology, globalisation, a profusion of rules and regulations introduced by government, and decreased human contact in practice, subsequently lead to diminished bedside manner and poor patient care (Benatar, 2015).

Debate still exists in medical practice as to whether professionalism should be a set of attributes of a medical doctor or an overarching ethos grounding medical practice (Birden et al., 2014). Irrespective of an individual's opinion, a medical doctor is moulded from the first day of medical school. An emphasis on professionalism at undergraduate level leads to the development of emotional intelligence, and an emphasis in practice leads to exemplary patient care (Cruess et al., 2015).

The importance of peer learning is emphasised as the best way to develop professionalism as individual doctors learn from and teach each other (Blanchard, 2015; Branch, 2015). Peer learning furthermore develops the skills of reflection and self-evaluation. Reflection is a critical skill in the repertoire of a medical doctor. It stems from the personal motivation and emotional intelligence of the medical doctor and has far-reaching implications in terms of patient care, personal well-being, mentoring, and developing the qualities needed for effective leadership and management (Blanchard, 2015).

The global crises in healthcare calls for a new form of professionalism to address emerging health challenges (Frenk et al., 2010). As healthcare progresses to a fourth generation of reform, the emphasis is on developing managerial and leadership qualities in addition to clinical acumen and holistic care. By changing the perceptions and redefining the current ethical foundations of medical doctors, an age-old profession will develop the resilience to adapt to ongoing change.

2.6 Healthcare in South Africa

Healthcare in South Africa faces a particular challenge because of the health systems and disease profiles that are a result of our political past, a job landscape dominated by mining, agriculture, low-skilled labour and a fragmented educational system. South Africa is unique in that it has a quadruple burden of disease with four concurrent epidemics in the form of (i) poverty-related illnesses, (ii) non-communicable or lifestyle diseases, (iii) HIV/AIDS and related conditions, and (iv) conditions related to violence and trauma (Coovadia et al., 2009; Redelinghuys, 2012; Pillay-van Wyk, Msemburi, Laubscher, Dorrington, Groenewald, Matzopoulos, Prinsloo, Nojilana, Nannan, Gwebushe, Vos, Somdyala, Sithole, Neethling, Nicol, Joubert, Rossouw, & Bradshaw, 2013).

While South Africa may not have been significantly active during the first generation of global health reform, in the second generation academic medicine thrived within the system. Investment at a tertiary level by the government prior to 1994 led to innovative research into the fields of malnutrition and infectious disease, as well as groundbreaking procedures such as the first heart transplant (Benatar, 1997). However, social and economic disparities previously and currently have led to South African healthcare being divided into public and private sector institutions and systems (Coovadia et al., 2009). Recent reform has focused predominantly on the public sector and requires a paradigm shift from the conventional biomedical model to a primary healthcare approach (Benatar, 1997). The government's proposed strategy is the introduction of a National Health Insurance (NHI) to generate financing in order to achieve universal coverage (Ataguba, & Akazili, 2010).

One of the major challenges to providing efficient and effective patient care is the shortage of appropriately trained health professionals. The human resource shortage is exacerbated by an exodus of medical practitioners who immigrate for various personal and professional reasons (George, Quinlan, Reardon, & Aguilera, 2012; Blacklock, Ward, Heneghan, & Thompson, 2014;). To address the demand and stem the migration of health professionals, the South African government has introduced a range of interventions.

Deliberate government interventions include increasing the duration of mandatory service during internship and community service, and through affirmative action and quota policies increasing the number of black African enrolees into South African medical schools (Gauld, 2012; Mayosi et al., 2012). Another government intervention to meet the public sector demand and encourage primary level care in rural and urban areas has been the introduction of Cuban-trained doctors into the system. In the mid-1990s, the South African government aimed to create a local version of the highly admired Cuban orientation to primary health care. The program would train medical doctors in Cuba and add one thousand graduates annually to the South African healthcare system (Mayosi, & Benatar, 2014). Participants were mostly black from rural or previously disadvantaged backgrounds. Problems have arisen with these graduates who are on a five-year programme in a country with a different disease profile, different language and distinct medical curriculum. South African medical schools are required to train these graduates for a sixth year to orientate them to local context and practice. Cuban-trained doctors account for half of South Africa's workforce and the practicality and associated costs of this approach have been questioned (Mayosi, & Benatar, 2014).

Another challenge facing South African healthcare is medical tourism. South Africa has become a "surgeon and safari" destination with patients coming from all over Africa to access health services particularly because of poor health services in SADC countries (Crush & Chikanda, 2015). Medical tourists add to the country's burden of disease numerically and financially. Differences in language and culture require greater interpersonal skills in order to provide effective care. Large inflows and high demand have prompted government to create inter-country arrangements in an attempt to recover the cost of treating foreigners, but the effect of such programmes remains to be seen (Mayosi & Benatar, 2014; Crush & Chikanda, 2015).

2.7 From problems to opportunity

Healthcare is a focal issue as seen in its inclusion in the United Nations Millennium Development Goals (MDG) (Scheffler, Mahoney, Fulton, Poz, & Preker, 2009) and its prominence in South African's National Development Plan (NDP). The MDG has put emphasis on healthcare with three out of its eight goals aimed at reducing infant and

child mortality, improving health and combating disease. The NDP has identified the social determinants of health, human capacity in the form of well-trained managers, doctors and other health workers, and health infrastructure as three key focus areas (National Planning Commission, 2013).

In 2009, The Lancet published a series titled *Health in South Africa* (Chopra, Lawn, Sanders, Barron, Karim, Bradshaw, & Jewkes, 2009; Coovadia et al., 2009; Kleinert, & Horton, 2009), and has since seen many changes in South African healthcare. In a follow-up article, Mayosi et al. (2012) identified four key changes and four key challenges to improving healthcare delivery in South Africa.

Table 1: Changes and Challenges of Health in South Africa (adapted from Mayosi et al. (2012))

No.	Changes	Challenges
1.	Leadership being a key driver	Social determinants and racial disparities
2.	Health system responses to the colliding epidemics	Integration and coordination
3.	Universal coverage with national health insurance	Surveillance and information
4.	Funding and regulation of health research	Scaling up innovative interventions

In 2009, Dr. Aaron Motsoaledi was appointed as the South African minister of health and began to implement changes at policy level. However, the bureaucracy at management level has been slow to change (Coovadia et al., 2009; Mayosi et al., 2012; Mayosi, & Benatar, 2014). This creates the opportunity for medical doctors to

emerge as managers and health leaders to tackle evident disparities in the social and racial elements of healthcare. From a professionalism point of view, healthcare managers and leaders will ensure the integrity of the practice of medicine. This will enable medical doctors to play a more active role in moulding the system to provide efficient service and effective patient care, as opposed to continuing to work in a dysfunctional system (Mayosi et al., 2012).

South Africa's four colliding epidemics have generated specific changes in policies and programmes resulting in South Africa having the world's largest antiretroviral treatment programme (Mayosi, & Benatar, 2014). South Africa leads the development of tuberculosis treatment regimes, but the increasing spread of drug-resistant tuberculosis continues to take up a large part of the national tuberculosis budget (Sinanovic, Ramma, Vassall, Azevedo, Wilkinson, Ndjeka, McCarthy, Churchyard, & Cox, 2015). Reductions in infant and child mortality have been largely attributed to the Prevention of Mother to Child [PMTCT] transmission HIV programme (Mayosi et al., 2012). Non-communicable diseases have increased, but policies have been put in place to address lifestyle risks. Addressing injury and violence requires commitment and support from many departments within government to reduce injury and disability caused by gender-based violence and crime (Coovadia et al., 2009). Significant challenges still remain to address South Africa's burden of disease, but the opportunity for an individual doctor to make a positive difference exists in every consultation.

National health insurance is government's response to The Lancet's 2009 call for action with regards to universal coverage (Chopra et al., 2009; Ataguba, & Akazili, 2010). The plan aims to transform the unequal and skewed healthcare system and has been piloted in selected districts. The main focus is at the primary healthcare level to provide easily accessible, affordable and appropriate service. However, staff shortages, long waiting times and treatment interruptions due to insufficient medication, highlight the need for much more operational and implementation research and skills (Mayosi et al., 2012).

The period between 1994 and 2009 saw a decline in clinical research and prompted the National Health Research Committee to convene in 2011 and produce a set of priorities to improve the quality of health research in South Africa (Mayosi et al., 2012). These included increased funding in the health budget; prioritising training of

researchers and supporting infrastructure; improving the regulatory framework and turnaround times of translating research into policy and programmes; and monitoring the effects of health research on the burden of disease in South Africa (Pillay, 2008; Mayosi et al., 2012). These reforms act as enablers for medical doctors to embark on research particularly because of the opportunity afforded by South Africa's disease profile.

2.8 Understanding the South African medical doctor

South Africa's doctors come from many different contexts. At a graduate level, they are from eight South African medical schools (each with a different admissions criteria and different curriculum) or from the Cuban-based training programme (Mayosi, & Benatar, 2014). From a practice perspective, they can come from anywhere in the world with a repertoire of knowledge, skills and experience that may be very different to the South African healthcare context.

Changing the entrance criteria at South African medical schools and the introduction of Cuban-trained medical doctors have resulted in a change of medical practice from an academic and cultural perspective (Mayosi, & Benatar, 2014). The academic and interpersonal diversity now present in South African healthcare requires greater levels of learning from the individual and greater levels of teaching from experienced doctors. Senior doctors need to mentor junior doctors and South African doctors need to create context for their Cuban counterparts who are accustomed to different disease profiles and different medical practices (Bateman, 2015). As such, the roles of strong interpersonal skills, individual motivation, and the willingness to learn and teach will greatly influence the type of doctor an individual is, the level of professionalism one has, and an individual's potential to be a medical manager or leader.

The primary healthcare approach towards which the South African government wants to steer healthcare requires a transformation of the system and the medical doctor in that system. As a medical doctor shifts from a secondary and tertiary level of practice to a primary level of practice, his/her role can change considerably. In a survey of primary healthcare doctors, Malan, Cooke and Mash (2015) identified the following roles that primary care doctors are required to fulfil:

- competent clinician,
- capacity builder,
- critical thinker,
- change agent,
- collaborator,
- community advocate.

These roles can also be adopted by secondary level doctors but are very different to the specialist clinical roles of tertiary and quaternary care. From these descriptions, we can infer that the current public sector doctor must be adaptable to cater to the increased variability that patients introduce into the health system, particularly at primary care level. In addition to incorporating the humanities into medical practice (Benatar, 2015), medical doctors will require some form of leadership and management training to provide effective patient care (Emanuel, 2015).

Due to various health challenges in South Africa, particularly under-resourced, poor work environments, many doctors are migrating to western countries (Mayosi, & Benatar, 2014). South African trained doctors are actively recruited because of their skillset and their experience in treating multiple disease profiles. This practice has been condemned by the World Health Organisation and resulted in policy initiatives to reduce migration (Blacklock et al., 2014). The emigration of domestically trained doctors is estimated to annually cost South Africa and eight other Sub-Saharan countries more than \$2 billion in investment (Mayosi, & Benatar, 2014).

Blacklock et al. (2014) have identified the following 6 reasons why medical doctors are leaving South Africa:

- Unfulfilled material expectations of self, family and society
- Emotional and mental strain due to interpersonal discord and insecurity in the workplace
- The fear of threats to individual and family, in and out of the workplace
- The absence of adequate professional support and development
- The desire for professional prestige and respect
- The conviction that their hope and goals can be achieved overseas.

From this, we can conclude the important role that a poor work environment and stress-related factors play in the lives of South African doctors to the point where they feel they have no other alternative but to leave the country.

The incidence of a South African doctor contracting tuberculosis from a patient not on treatment, or HIV through a needle-stick injury when he/she is exhausted from long working hours in an under-resourced or under-equipped facility has not been adequately researched. The effects of stress are well documented in the literature, and result in reduced well-being, emotional exhaustion and depersonalisation. The effects of stress-related disorders caused by practicing in the South African healthcare system needs to be further examined. More specifically, the effect that these conditions have on the role that the medical doctor plays has to be explored.

2.9 A paradigm shift

The 21st century doctor must incorporate learning at three different levels. Frenk et al. (2010) describe these three successive levels as informative, formative and transformative. Informative learning, involving the acquisition of skills and knowledge, will lead to technical competence and an individual being a good medical clinician. Formative learning, directed towards socialising practitioners around values, aims at producing professionals. This can be expanded to produce competent managers of both patients and health systems. Transformative learning develops leadership attributes in order to produce change agents.

There are four main roles that are required of practising medical doctors in South Africa: a good clinician, a holistic practitioner, a medical manager and/or a medical leader. Good clinician refers to a doctor whose main function is superior patient care. They base their practice on clinical experience, scientific knowledge and the appropriate use of medical technology (Boudoulas, 2005). The holistic practitioner takes into consideration the patient as a whole including the physical, psychological, social and spiritual aspects. The holistic practitioner explores all potential factors that may be causing the patient's disease with the aim of treating the symptoms of illness as well as the underlying cause (Ventegodt, 2004; Fulder 2005). Medical managers are responsible for patients, other health professionals and specific areas of the

hospital. They are placed in executive roles and their mandate is to effectively run the hospital or parts thereof (Stefl, 2008; Pihlainen et al., 2016). Medical leaders are the change agents in the healthcare system. While the competencies of a medical leader may be similar to a medical manager, a medical leader can exist at all levels of the healthcare hierarchy whereas the medical manager is typically in an executive function (Warren, 2010). Healthcare leaders are strongly mission-driven and aim to improve healthcare delivery in the institution (Hopkins, 2015).

Globally there exists a crises in leadership and this is particularly relevant of the healthcare sector. Pihlainen et al. (2016) conducted a review of the available literature on medical management and leadership competence and were only able to locate thirteen articles specific to the subject. While they were able to identify some of the core competencies of a medical manager and leader, there is no literature that describes qualities specific to the South African healthcare context. This emphasises the need to look deeper into the evolution of the South African medical doctor and what would be considered his/her core competencies to practice medicine in contemporary times.

2.10 Conclusion of Literature Review

With constant change and reform in the South African healthcare system, as well as growing demands by patients and by government, it is essential to identify the qualities that influence a medical doctor and understand the relationships between these qualities. Furthermore, it is imperative to recognise how these associations can determine if the South African medical doctor will be a good clinician, a holistic practitioner, a medical manager and a medical leader.

2.10.1 Research Proposition 1:

Critical thinking, above-average intelligence, the absence of poor work environment, the absence of poor stress management and the absence of being squeamish, are required for a medical doctor to be a good clinician.

The following literature support this proposition:

Table 2: Literature supporting the qualities of a good clinician

Critical thinking	Hmelo-Silver (2004), Hurwitz (2013), El Bingawi (2014)
Above-average intelligence	Frenk et al. (2010), Curtis (2014), Powis (2014), Blanchard (2015)
Poor work environment	Shanafelt et al. (2003), Amofo et al. (2015)
Poor stress management	Shanafelt et al. (2003), Ogundipe et al. (2014), Regehr et al. (2014)
Being squeamish	Malan et al. (2015), Underhill et al. (2015).
Good clinician	Boudoulas (2005), Braude (2015)

2.10.2 Research Proposition 2:

Critical thinking, strong interpersonal skills, individual motivation, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a holistic practitioner.

The following literature support this proposition:

Table 3: Literature supporting the qualities of a holistic practitioner

Critical thinking	Hmelo-Silver (2004), Hurwitz (2013), El Bingawi (2014)
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Strong interpersonal skill	Blanchard (2015), Frambach et al. (2015), Hillis & Grigg (2015), Malan et al. (2015)
Individual motivation	Hmelo-Silver (2004), Powis, (2014), Blanchard (2015), Hillis & Grigg (2015)
Poor work environment	Shanafelt et al. (2003), Amofo et al. (2015)
Poor stress management	Shanafelt et al. (2003), Ogundipe et al. (2014), Regehr et al. (2014)
Holistic practitioner	Ventegodt (2004), Fulder (2005)

2.10.3 Research Proposition 3:

Critical thinking, strong interpersonal skills, individual motivation and the absence of poor stress management are required for a medical doctor to be a medical manager.

The following literature support this proposition:

Table 4: Literature supporting the qualities of a medical manager

Critical thinking	Hmelo-Silver (2004), Hurwitz (2013), El Bingawi (2014)
Strong interpersonal skill	Frambach et al. (2015), Hillis, & Grigg, (2015), Malan, Cooke, & Mash, (2015)

Individual motivation	Hmelo-Silver (2004), Powis, (2014), Blanchard (2015), Hillis & Grigg (2015)
Poor stress management	Shanafelt et al. (2003), Ogundipe et al. (2014), Regehr et al. (2014)
Medical manager	Stefl (2008), Pihlainen et al. (2016)

2.10.4 Research Proposition 4:

Critical thinking, strong interpersonal skills, above-average intelligence, individual motivation and the absence of poor stress management are required for a medical doctor to be a medical leader.

The following literature support this proposition:

Table 5: Literature supporting the qualities of a medical leader

Critical thinking	Hmelo-Silver (2004), Hurwitz (2013), El Bingawi (2014)
Strong interpersonal skill	Blanchard (2015), Frambach et al. (2015), Hillis & Grigg (2015), Malan et al. (2015)
Above-average intelligence	Frenk et al. (2010), Curtis (2014), Powis (2014), Blanchard (2015)
Individual motivation	Hmelo-Silver (2004), Powis (2014), Blanchard (2015), Hillis & Grigg (2015)

Poor stress management	Shanafelt et al. (2003), Ogundipe et al. (2014), Regehr et al. (2014)
Medical leader	Warren (2010), Hopkins (2015)

CHAPTER 3. RESEARCH METHODOLOGY

This chapter outlines the research approach that was followed to determine the credibility of the research propositions:

- Critical thinking, above-average intelligence, the absence of poor work environment, the absence of poor stress management and the absence of being squeamish, are required for a medical doctor to be a good clinician.
- Critical thinking, strong interpersonal skills, individual motivation, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a holistic practitioner.
- Critical thinking, strong interpersonal skills, individual motivation and the absence of poor stress management are required for a medical doctor to be a medical manager.
- Critical thinking, strong interpersonal skills, above-average intelligence, individual motivation and the absence of poor stress management are required for a medical doctor to be a medical leader.

The data required to determine the credibility of these research propositions is primarily qualitative in nature. A literature review was conducted to identify the qualities that influence a medical doctor in the role he/she takes in the medical profession. The literature informed the development of the research propositions along the four roles described in this research.

From the literature, the researcher has identified 4 qualities that positively affect the medical doctor namely good medical school, above-average intelligence, strong interpersonal skills and individual motivation. The researcher has also identified 4 qualities that negatively influence a medical doctor namely poor work environment, poor stress management, being squeamish and the fear of death.

A further 19 qualities were identified that explore the relationships between the primary 8 qualities. These qualities were academic quality, clinical teaching, examination skills, procedural skills, proficient clinical skills, theoretical knowledge, emotional IQ, reflection, spiritual IQ, ethics, good communication skills, willingness to teach,

willingness to learn, team player, good communication skills, considering the patient's external environment, good bedside manner, good patient care, and professionalism.

Between the primary 8 and secondary 19 qualities, 114 associations were made; 82 associations were positive and 32 were negative. Secondary associations combined to form 15 associations that produced a good clinician, a holistic practitioner, a medical manager or a medical leader.

To develop a more credible model, a two-round Delphi study was conducted with expert South African medical practitioners to build consensus in the FCM model.

3.1 Research methodology / paradigm

The research process for this study is summarised in Figure 2

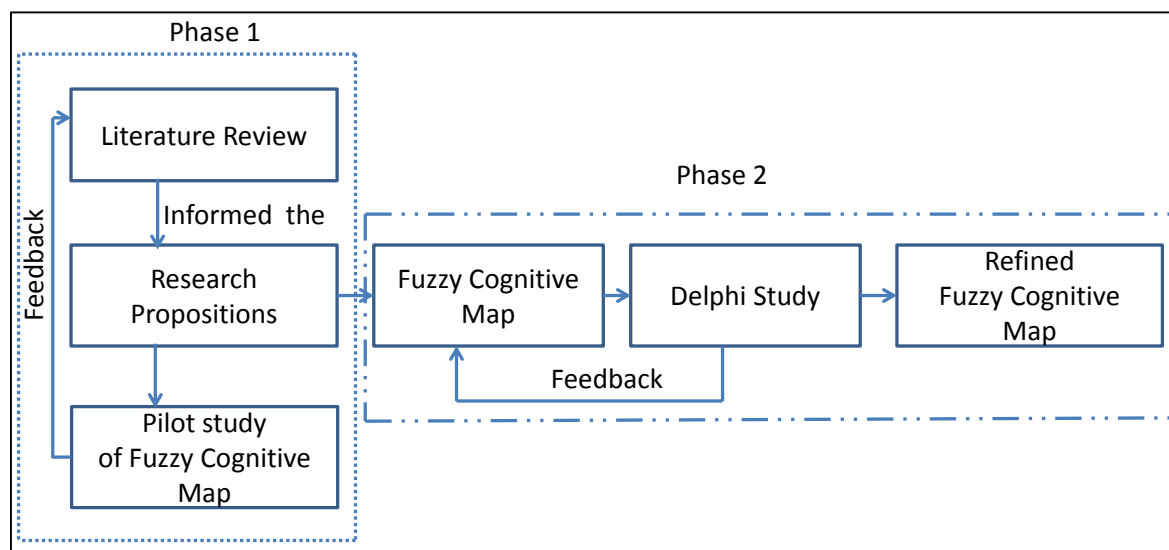


Figure 2: Research Process

In phase 1 of this research process, a systematic literature review was conducted. The systematic literature review was used to identify the key qualities that influence a medical doctor, to identify the relationships between those qualities and the influence of those relationships on a medical doctor becoming a good clinician, a holistic practitioner, a medical manager and a medical leader. The literature review informed the initial research propositions. The identified qualities and relationships were used to develop an initial Fuzzy Cognitive Map (FCM) (Appendix 6) using Mental Modeler

software (Gray, 2013). Fuzzy cognitive mapping was used because it allows the researcher to model the causal relationships between the identified characteristics and the development of a good clinician, a holistic practitioner, a medical manager and a medical leader.

Özesmi and Özesmi (2004) argue that fuzzy cognitive mapping is especially suitable when the researcher is interested in understanding:

- human behaviour and how human actions can affect their environment,
- situations where there is a gap in the scientific literature but there is rich set of local knowledge amongst people in that environment,
- scenarios that are complex, involve several stakeholders, and have no easy solutions or right answers, and
- cases where public opinion is required.

Fuzzy cognitive mapping was used in this research because there appears to be gaps in the scientific literature and the research propositions require understanding complex human behaviours and their contextual effect. The research problem in this study is complex, affects several stakeholders and does not have a definitive right or wrong answer.

The initial research propositions and version 1 of the FCM were tested in a pilot study by expert participants to determine the appropriateness of the research instrument in terms of complexity and understanding. The pilot study further focused the literature review, in turn re-informing the research propositions and refining the FCM. This created a more robust model (Version 2, Appendix 7) that was streamlined and less complicated for participants in the next phase of the research process to understand.

Phase 2 of this research process was to conduct a Delphi study with medical practitioners to refine the FCM. A Delphi study is a structured technique that utilises a group of experts and uses an instrument for soliciting opinions and encouraging participants towards a position of consensus (Linstone, & Turoff, 2002; Powell, 2002). For this research, the FCM was individually presented to the group of experts in order for the FCM to be further refined. This process was repeated a second time using the refined FCM to build consensus. Figure 3 outlines this two-phase Delphi study.

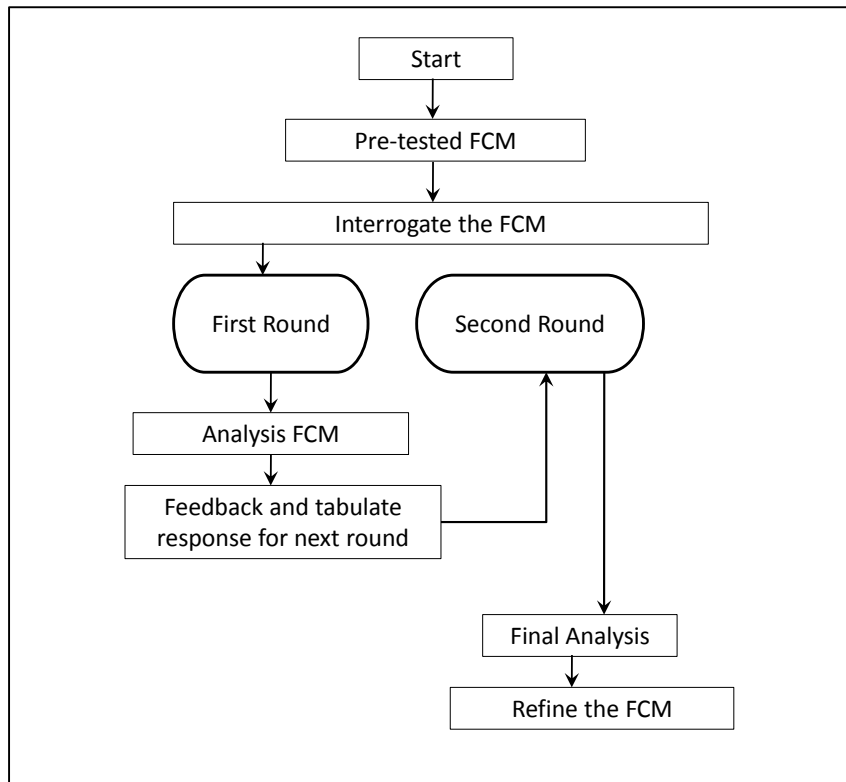


Figure 3: Flow Diagram Showing 2 Round Delphi Study

The value of using a Delphi study method lies in obtaining a view of the relative importance of the issues presented to subject matter experts.

3.2 Research Design

This research is qualitative in nature and drew on the literature to identify concepts that are important for medical practice in South Africa. The concepts from the literature review were used to develop the FCMs in Phase 1 and this was a qualitative process. The advantages and disadvantages of using fuzzy cognitive mapping are outlined in Table 6.

Table 6: Advantages and disadvantages of FCM (Özesmi & Özesmi, 2004)

No.	Advantage	This Research	Disadvantage	This Research
1.	The ability to allow feedback processes	A feedback loop is important to develop a credible FCM	The interviewees' knowledge, ignorance, misconceptions and biases are all encoded in the maps	This is minimised by the Delphi study and using an expert sample
2.	The ability to deal with many concepts which may not be well-defined	Concepts were described when conducting the Delphi study	Although what-if's can be modelled in FCMs, why's cannot be determined	This did not affect this research
3.	The ability to model relationships between variables that are not known with certainty, but can be described in degrees such as a little or a lot	The relationship between the qualities and magnitude thereof was important for this research	They do not provide real-value parameter estimates or inferential statistical tests	This did not affect this research

4.	The ability to model systems where scientific information is limited but expert and/or local knowledge is available	Expert opinion and local knowledge was available for this research	Lack of a concept of time	This research was not modelling transient behaviour
5.	Ease and speed with which cognitive maps may be obtained	The researcher is under a time constraint	They cannot deal with co-occurrence of multiple causes such as expressed by “and” conditions	This was minimised by the Delphi study and an expert sample
6.	Ease and speed with which many different knowledge sources can be combined	The researcher was under a time constraint	“if, then” statements cannot be coded.	This did not affect this research
7.	Ease and speed of modelling the system and the effect of different policy options	This research can be used to inform policies regarding the development of a medical doctor		

Based on Table 6, fuzzy cognitive mapping was deemed to be the most appropriate approach for this research.

Using the FCM refined in the pilot study of phase 1 (version 2, Appendix 7), the researcher conducted a Delphi Study. The Delphi method has a long history of being used in medical and management research (Keeney, Hasson, & McKenna, 2001; Päivärinta, Pekkola, & Moe, 2011). There are various approaches to conducting a Delphi study. Some researchers would commence by distributing an open-ended questionnaire to a group of experts (Remenyi, & Sutherland, 1993). However, for this study, the researcher conducted a literature review (Hsu, & Sandford, 2007; Watson, 2008) and a pilot study which served as the foundations to develop the FCM. The advantages and disadvantages of using the Delphi technique are outlined in Table 77.

Table 7: Advantages and disadvantages of using the Delphi technique (Keeney et al., 2001; Stitt-Gohdes, & Crews, 2005)

No.	Advantage	This Research	Disadvantage	This Research
1.	Expert Participants	To improve the FCM, expert views were required	The process is time consuming to coordinate and manage.	This did affect my research, but expert opinion was required for a credible FCM
2.	Is inexpensive for participants	The researcher had a limited budget and time constraints	It can be difficult to maintain active participation by participants	This affected my research because medical doctors are busy

3.	The anonymity between participants is preserved. This can avoid self-censorship, and give participants the flexibility to modify their views as they learn from others	Anonymity allowed participants to be more candid in their assessment thereby improving the FCM	The decision-making process is less transparent, and can be more easily influenced by the coordinator.	The researcher tried to minimise this effect by not sharing her opinion.
4.	Provides a structured way for a group of people to make decisions	Reduced time and resources required		
5.	Helps keep attention directly on the issue	The researcher had limited time and required focus		

Based on Table 7, the Delphi technique was deemed the most appropriate approach to refine the FCM. The feedback loop in a two-round Delphi Study allowed for the FCM to be further refined in order to develop final research propositions that were credible and relevant to the research problem.

3.3 Population and sample

3.3.1 Population

The sample population was selected from medical doctors who were working at that time in public sector healthcare across primary, secondary, tertiary and quaternary levels of care. These participants were considered subject matter experts based on their knowledge and experience in public sector healthcare.

3.3.2 Sample and sampling method

An expert sampling technique was used for the Delphi study, where the participants were chosen in a non-random manner based on their expertise of the issues being studied (Bhattacharjee, 2012). Taylor-Powell (2002) stated that the number of participants in a Delphi study depends not only on the purpose of the study, but the diversity of the targeted population. Ten to fifteen participants may be an adequate number for a Delphi study that is focused and where the participants do not vary a great deal (Stitt-Gohdes, & Crews, 2005). In this research, fifteen participants were used. Table 8 outlines the list of participants with regards to years and levels of experience, gender and participation in this study:

Table 8: List of participants

Respondent No.	Years of Experience	Level/s of Experience	Gender	Participated in Round 1	Participated in Round 2
1.	~ 17	Primary, Secondary, Tertiary, Quaternary	M	✓	✓
2.	~ 12	Primary, Secondary, Tertiary	M	✓	✓
3.	~ 20	Secondary	F	✓	✓
4.	~ 9	Primary, Secondary	F	✓	✓

5.	~ 35	Primary, Secondary, Tertiary	F	✓	✓
6.	~ 7	Secondary	F	✓	✓
7.	~ 25	Primary, Secondary, Tertiary, Quaternary	M	✓	✓
8.	~ 6	Secondary	M	✓	✓
9.	~ 10	Primary, Secondary	M	✓	✓
10.	~ 5	Secondary	M	✓	✓
11.	~ 8	Secondary, Tertiary	F	✓	✓
12.	~ 4	Secondary	F	✓	✓
13.	~ 4	Primary, Secondary	F	✓	✓
14.	~ 4	Secondary	F	✓	-
15.	~ 5	Secondary, Tertiary	F	✓	-

3.4 The research instrument

Participants were provided with a covering letter and an informed consent document (Appendix 1), and a participant's information sheet (Appendix 2). Once the participant agreed and provided signed informed consent, interviews would commence.

During the interview, the researcher presented the participant with an explanation of the terms used as the nodes of the FCM (Appendix 4). This ensured mutual understanding of the terms between researcher and participants.

For this research, the instrument consisted of the following three parts:

- The participant received a hard copy of the FCM on which he/she could remove any of the nodes and agree or disagree with the associations. Appendix 6 shows the initial FCM used in the pilot study and Appendix 7 shows the FCM used for data collection in its entirety. The FCM was printed on paper in sections that showed each node and its associations. To ensure that participants were not confused by the complexity of the FCM, each set of relationships could be

individually assessed by using this approach thereby ensuring understanding and interpretation.

- The participant also received a blank copy of the nodes in order to draw new associations. Each participant was asked six questions in order to solicit their opinion on the relationships that influence the four outcomes (Appendix 3).
- In order to measure the magnitude of the associations, the researcher had a grid of the relationships between the nodes and quantified the magnitude as -3, -2, -1, +1, +2 or +3 when described by the participant.

3.5 Procedure for data collection

To gather expert opinion from a broader sample of medical practitioners, a Delphi study was conducted with participants who evaluated the FCM. The Delphi study was conducted on a face-to-face basis, as the FCM required explanation and the researcher had to document the magnitude of associations. Each participant was asked to comment on the FCM, and extensive notes were taken during this process. Expert opinions were collated to produce a refined FCM. Participants were requested to participate in the second round with the refined FCM to build credibility before the model could be analysed further in order to refine the research propositions.

3.6 Data analysis and interpretation

Once consensus had been reached in the two rounds of the Delphi study, the FCM was revised accordingly. Based on the relationships identified between nodes, the magnitude of those relationships were analysed to determine which qualities were required in the South African healthcare context to produce a good clinician, a holistic practitioner, a medical manager and a medical leader.

All versions of the FCMs were designed in Mental Modeler software (Gray, 2013) which enabled the construction of a qualitative conceptual model, allowed iterative model development of the FCM, and facilitated the development of scenarios. Once relationships were identified in the conceptual mapping interface of the software, the matrix interface allowed the structural properties of the FCM to be evaluated in pairwise relationships (also known as “edge” relationships).

Each edge relationship was weighted and the qualitative weights between components were then translated into quantitative values between -1 and 1 and plotted in the matrix interface. The Mental Modeler matrix was then exported into an Excel model in order to conduct semi-quantitative analysis as described by Stacey (2016). A semi-quantitative approach enabled the analyses to be understood in relative terms as outputs were interpreted as ordinal level data. Semi-quantitative analysis has also been widely and explicitly applied to the medical sciences (Stacey, 2016).

The following assumptions of conventional iterative analysis were applied to the construction of this model (Stacey, 2016):

- All systems are either stable or marginally stable, never unstable
- All FCM nodes limit equally
- Input nodes are moderated.

The final FCM was captured in the adjacency matrix of the model (Appendix 10). The system reached a stable steady state and convergence was established. Scenarios were then run through the model to determine the accuracy of the research propositions.

3.7 Limitations of the study

- The sample was limited to 15 public sector medical practitioners
- Only key concepts from the systematic review were identified and modelled
- The sample did not include junior medical doctors as to what their expectations were of the profession.
- Medical academics were not consulted when developing this model, only practitioners were consulted.

3.8 Validity and reliability

3.8.1 External validity

Bryman (2012) describes external validity as a concern whether the results of a study can be generalised beyond the context in which it was conducted. An expert sampling technique was used in this research, as the purpose of this technique was to develop a better understanding of the issues being researched and to develop a credible FCM. The credibility (Lincoln, & Guba, 1985) of the FCM was reinforced by selecting a diverse group of experts for the Delphi study. However because they were expressing their opinion based on their experience of South African healthcare, the results of this study cannot be generalised outside the borders of South Africa even though healthcare in other parts of the world may have doctors who experience similar challenges or have similar opinions.

3.8.2 Internal validity

Bryman (2012) describes internal validity as a concern regarding the causal relationship between two or more variables and the soundness of that relationship. Internal validity in this study was established as the causal links identified originated from the literature. Internal validity was further enhanced through the Delphi approach.

3.8.3 Reliability

Bryman (2012) refers to reliability as the degree to which the measure of a concept yields the same results. The causal links identified in this study are based on the available literature and the experience of the participants. The challenges facing South African public healthcare are being experienced by medical doctors throughout the country, some possibly more than others. Having an expert sample with significant experience in public sector healthcare ensured the reliability of this study.

CHAPTER 4. PRESENTATION OF RESULTS

4.1 Introduction

A total of thirty-one interviews were conducted during this research: three in a pilot study, fifteen in round 1 of the Delphi study and thirteen in round 2 of the Delphi study. Individuals were presented with the relevant FCM for each round and asked the same six questions. The results of each respective round were then collated to develop an enhanced FCM, which was presented to participants for their ratification to establish a level of consensus. The results for each round of data collection are presented below.

4.2 The Pilot Study

The draft FCM (version 1, Appendix 6) that was formulated from the literature review was complex as it consisted of 31 concepts, 129 connections and a Mental Modeler complexity score of 2.0. As a research instrument, it was complex for participants to understand and weigh the relationships between the different nodes. A pilot study was conducted with three participants that resulted in a more focused FCM (version 2, Appendix 7) that was used for data collection.

In version 2, the number of concepts were reduced to 20 with 61 connections and a Mental Modeler complexity score of 1.5. The initial FCM (version 1) consisted of 8 transmitter nodes which were reduced to 7 in Version 2. The changes were the removal of “fear of death” and changing the node “good medical school” to “critical thinking”.

There was consensus among the pilot study recipients that although the “fear of death” was important, due to the regular exposure that medical doctors had to death, they appeared to have varying degrees of fear ranging from denial to complete acceptance. This fear related more to their own death than to the death of a patient. As such, it was difficult to provide a generalised weighting on this variable and the relationships that it had in the FCM.

Although a good medical school can contribute to an individual becoming a better doctor, the pilot study recipients argued that there are still good¹ doctors that are produced from what is considered mediocre medical schools and some bad² doctors that had graduated from highly acclaimed institutions. The fundamental skill that medical school teaches the young doctor is “critical thinking” and this was therefore considered more appropriate as a transmitter node.

Eleven receiver node concepts were removed as these were considered less important and were included to some degree in the nodes that remained. “Good communication skills”, “reflection”, “good patient care”, “academic quality”, “clinical teaching”, “examination skills”, “spiritual IQ”, “teacher of medical practice”, “procedural skills” and “consideration of the patient’s external environment” were removed. No new variables were added. The driver components of “good clinician”, “holistic practitioner”, “medical manager” and “medical leader” were unchanged.

After the pilot study, the research propositions were redefined as follows:

- Critical thinking, above-average intelligence, the absence of poor work environment, the absence of poor stress management and the absence of being squeamish, are required for a medical doctor to be a good clinician.
- Critical thinking, strong interpersonal skills, individual motivation, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a holistic practitioner.
- Critical thinking, strong interpersonal skills, individual motivation and the absence of poor stress management are required for a medical doctor to be a medical manager.
- Critical thinking, strong interpersonal skills, above-average intelligence, individual motivation and the absence of poor stress management are required for a medical doctor to be a medical leader.

¹ This is a relative term and is beyond the scope of this research.

² This is a relative term and is beyond the scope of this research.

4.3 Round 1 of the Delphi Study

Version 2 of the FCM was supported by the fifteen participants who participated in the first round of the Delphi study. All twenty nodes remained, but the relationships between nodes changed as participants weighted all the current relationships and identified new relationships in the FCM.

Nine new relationships were established, and no relationships were removed. New relationships all had a value of 1 and were established between:

- Critical thinking  willingness to teach
- Critical thinking  proficient clinical skills
- Critical thinking  theoretical knowledge.
- Above-average intelligence  willingness to learn
- Strong interpersonal skills  willingness to teach
- Individual motivation  emotional IQ
- Poor stress management  ethics
- Willingness to learn  willingness to teach
- Willingness to learn  team player

Participants were asked to weigh relationships from -3 (affects most negatively) to +3 (affects most positively). The heat map below is indicative of the cumulated average weights provided by the fifteen participants. The key for the heat map is as follows:

+3	Strong positive influence
+2	Moderate positive influence
+1	Mild positive influence
-1	Mild negative influence
-2	Moderate negative influence
-3	Strong negative influence
0	Weak association
-	No association

Table 9: Heat map of Round 1 results

	Willingness to learn	Willingness to teach	Emotional IQ	Team Player	Proficient clin. skills	Theoretical know.	Ethics	Good bedside manner	Professionalism	Good Clinician	Holistic Practitioner	Medical Manager	Medical Leader
Critical Thinking	3	1	2	0	1	1	0	0	0	0	0	0	0
Above Avg. Intelligence	1	2	-	-	2	3	-	-	-	-	-	-	-
Strong Interpersonal Skills	0	1	2	2	0	-	2	3	0	-	-	0	-
Individual Motivation	3	2	1	2	0	0	2	3	2	-	-	-	-
Poor work environment	-2	-2	-2	-2	-2	-1	-0	-2	-2	-	-	-	-
Poor stress mx	-2	-2	-2	-2	-2	-2	-1	-2	-2	-	-	-	-
Squeamish	-2	-	-	0	-2	-	-	-2	0	-	-	-	-
Willingness to learn	-	1	0	1	3	3	0	-	0	0	0	0	0
Willingness to teach	0	-	0	2	0	2	-	-	0	-	-	0	0
Emotional IQ	-	0	-	0	-	0	3	3	3	-	0	-	0
Team Player	0	0	0	-	-	-	2	0	3	0	0	0	3
Proficient clinical Skills	-	-	-	-	-	-	-	-	-	3	3	0	0
Theoretical knowledge	-	3	-	-	-	-	-	-	0	3	3	0	2
Ethics	-	-	3	0	-	-	-	2	3	0	3	2	3
Good bedside manner	0	-	0	0	0	-	0	-	-	0	3	0	2
Professionalism	-	-	0	0	-	-	0	0	-	0	3	3	3

Of the positive relationships, twenty-five were regarded as strongly influential (score of 3), seventeen relationships were regarded as moderately influential (score of 2) and eight were regarded as mildly influential (score of 1). Of the twenty negative relationships, none were regarded as highly influential. Eighteen relationships were regarded as moderately influential and had a value of -2, while two relationships were regarded as mildly influential and had a value of -1.

Furthermore, sixty new relationships were proposed, but the average weighting was less than 0.5 and therefore too low to identify a definite relationship. These weak associations are reflected in the heat map above in grey.

The collated opinions of the fifteen participants were averaged to develop an enhanced FCM (Version 3, Appendix 8) that was used for the second round of data collection.

4.4 Round 2 of the Delphi Study

Version 3 of the FCM was presented to thirteen participants, all of whom had participated in Round 1 of the Delphi study. Two participants could not contribute as one individual was on prolonged leave and the other had transferred to another hospital. No changes were made to the nodes, however, the relationships between the nodes changed considerably. A summary of the results of Round 2 is presented in the heat map below. The key for the heat map is as follows:

+3	Strong positive influence
+2	Moderate positive influence
+1	Mild positive influence
-1	Mild negative influence
-2	Moderate negative influence
-3	Strong negative influence
0	Weak association
-	No association

Table 10: Heat map of Round 2 results

	Willingness to learn	Willingness to teach	Emotional IQ	Team Player	Proficient clinical skills	Theoretical know.	Ethics	Good bedside manner	Professionalism	Good Clinician	Holistic Practitioner	Medical Manager	Medical Leader
Critical Thinking	3	1	2	0	1	2	0	0	1	1	1	1	1
Above Avg. Intelligence	1	2	0	0	2	3	0	0	0	0	0	0	0
Strong Inter Personal Skills	1	1	2	2	0	-	2	3	0	0	0	1	0
Individual motivation	3	2	1	2	1	1	2	3	2	0	0	0	0
Poor work environment	-2	-2	-2	-2	-2	-1	-0	-2	-2	-	0	0	0
Poor stress mx	-2	-2	-2	-2	-2	-2	-1	-2	-2	0	0	0	0
Squeamish	-2	-	-	-0	-2	-	0	-2	-0	-	-	-	-
Willingness to learn	-	2	0	1	3	3	0	0	1	1	1	1	1
Willingness to teach	1	-	1	2	0	2	0	0	1	0	0	0	1
Emotional IQ	0	0	-	0	0	0	3	3	3	0	0	0	0
Team Player	0	1	0	-	0	-	2	0	3	1	1	1	3
Proficient clinical skills	-	-	-	-	-	-	-	-	-	3	3	0	0
Theoretical knowledge	0	3	-	-	-	-	-	-	0	3	3	0	2
Ethics	0	0	3	0	0	0	-	2	3	1	3	2	3
Good bedside manner	0	0	0	0	0	-	0	-	0	1	3	0	2
Professionalism	0	0	1	1	0	0	1	1	-	1	3	3	3

The following twenty-nine new relationships were identified and each was weighted to have a mildly positive influence (value of 1):

- Critical thinking → professionalism
- Critical thinking → good clinician
- Critical thinking → holistic practitioner
- Critical thinking → medical manager
- Critical thinking → medical leader
- Strong interpersonal skills → willingness to learn
- Strong interpersonal skills → medical manager
- Individual motivation → proficient clinical skills
- Individual motivation → theoretical knowledge
- Willingness to learn → professionalism
- Willingness to learn → good clinician
- Willingness to learn → holistic practitioner
- Willingness to learn → medical manager
- Willingness to learn → medical leader
- Willingness to teach → willingness to learn
- Willingness to teach → emotion IQ
- Willingness to teach → professionalism
- Willingness to teach → medical leader
- Team player → willingness to teach
- Team player → good clinician
- Team player → holistic practitioner
- Team player → medical manager
- Ethics → good clinician
- Good bedside manner → good clinician
- Professionalism → emotional IQ
- Professionalism → team player
- Professionalism → ethics
- Professionalism → good bedside manner
- Professionalism → good clinician

Of the positively influential relationships, two relationships changed from mildly influential to moderately influential:

- Critical thinking  theoretical knowledge
- Willingness to learn  willingness to teach

No relationships changed from moderately to highly influential. No new negatively influential relationships were identified and the weights allocated to the negative relationships did not change from Round 1 to Round 2 of the Delphi study.

However in Round 2, seventy-six relationships were suggested with an average weighting of less than 0.5 which was too low to determine definite influence. These weak associations are presented in grey in the heat map above.

A final version of the FCM was then constructed and analysed using a semi-quantitative approach as described by Stacey (2016) in order to answer the research propositions. In order to develop the semi-quantitative values on which the analysis matrix could be built, qualitative scores of 1, 2, and 3 were translated into FCM values of 0.15, 0.3 and 0.6 respectively. Negative values were encoded as the inverse of the positive relationships.

Values were then put into the mathematical model and various scenarios were run in order to determine which qualities resulted in a medical doctor becoming a good clinician, a holistic practitioner, a medical manager and a medical leader.

4.5 Summary of the results

Through a two-round Delphi approach, participants were able to better understand the FCM presented to them and thereby provide a more comprehensive opinion. The results of the survey as presented in version 4 of the FCM supported the draft FCM and have put forward suggestions to enhance it. The results of version 4 of the FCM were analysed in Excel using a semi-quantitative approach in order to answer the research propositions.

CHAPTER 5. DISCUSSION OF THE RESULTS

5.1 Introduction

Using a semi-quantitative approach as described by Stacey (2016), the final version of the FCM was analysed to determine the cogency of the research propositions. This chapter examines each of the four propositions as defined by the outputs of the final FCM (Appendix 9) and how each proposition is supported by the available literature.

The findings from this study suggest that the qualities required of a medical doctor in South Africa to be a good clinician, a holistic practitioner, a medical manager and a medical leader closely relates to the qualities required in global medical practice. The difference lies in the strength of the relationships between the qualities as it demonstrates the influence of some qualities over others in determining each of the outcomes.

5.2 Requirements for a medical doctor to be a good clinician

Initial proposition: Critical thinking, above-average intelligence, the absence of poor work environment, the absence of poor stress management and the absence of being squeamish, are required for a medical doctor to be a good clinician.

Refined proposition: Critical thinking, above-average intelligence, individual motivation, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a good clinician.

Similarities between initial and refined propositions: Critical thinking, above-average intelligent, absence of poor work environment and poor stress management

Difference between initial and refined propositions: individual motivation added, being squeamish removed

A medical doctor is regarded as a good clinician if he/she has a high level of competence in diagnosing and treating the physical condition of a patient (Boudoulas, 2005). In order to be a good clinician, the medical doctor must possess theoretical knowledge and be proficient in clinical skills. This will enable him/her to develop

differential diagnoses, perform the relevant investigations, refine his/her diagnoses and treat the patient appropriately.

This research has identified that a medical doctor must have critical thinking, above-average intelligence and individual motivation in order to be a good clinician. Hurwitz (2013) described the qualities that a good doctor possesses in the broad categories of methodical (including critical thinking), cognitive capacity (including intelligence), and role certainty (including motivation to be a doctor). These qualities very closely link to the qualities that have been attributed to a good clinician.

Critical thinking will allow a medical doctor to be able to judge what to learn, how to learn, and how to apply the knowledge and skills obtained (Evans, 2016). This is particularly important considering the size and depth of the medical knowledge base and the exponential growth in medical research and publishing. Frenk et al. (2010) have described transformative learning approaches as the most appropriate to develop critical thinking in medical doctors of the 21st century.

Pardíñaz-Solís (2015) has also highlighted the need for a paradigm shift towards transformative learning approaches as these methods of teaching and learning support a high level of critical thinking. Problem-based learning has been identified as key to students developing effective problem-solving skills, particularly in sub-Saharan Africa, but a shortage of good clinical teachers compromises its effectiveness (Frambach et al., 2015). Medical schools in South Africa began to adopt a problem-based approach since the early 2000s in order to facilitate independent learning and critical thinking. Critical thinking can also be fostered in medical research and clinical thinking, areas which have received significant attention at South African medical schools (Mayosi et al., 2012).

Another benefit of problem-based learning is the development of intrinsic motivation (Hmelo-Silver, 2004). The motivation that one has to be a medical doctor is considered as one of the most important qualities by Hurwitz (2013). While providing a high level of clinical service to a patient may be a fundamental element of medical practice, one must be motivated to provide that service. Individual motivation is required to not only become a medical doctor, but also to remain one and to continuously endeavour to become a better practitioner.

The findings from this research suggest that individual motivation is also key to being a good clinician. Individual motivation is required to gain admission to a well-recognised medical school (Powis, 2014), and it will ensure successful completion of undergraduate study (Hurwitz, 2013). Furthermore, individual motivation determines the type of doctor one becomes, and the level of care he/she provides to patients. This research identified individual motivation as a determinant to the willingness one has to learn and to teach, to collaborate in order to be a team player, and to develop ethics and professionalism. These findings are congruent with the literature (Blanchard, 2015) and these associations must be encouraged throughout undergraduate and postgraduate medical curricula.

Evans (2016) emphasises that education is at the centre of practice and practice is the centre of each clinician. Therefore, the willingness to learn is essential to the individual becoming a good clinician. However, one must also have the cognitive facilities in order to be willing to learn and excel at the demanding course that undergraduate medical studies is. In this study, highly influential relationships were identified between critical thinking and the willingness to learn, and individual motivation and the willingness to learn. The willingness to learn in turn leads to the development of proficient clinical skills and theoretical knowledge, the qualities essential to becoming a good clinician.

In order to acquire and understand medical knowledge and develop proficient clinical skills, this research has identified above-average intelligence as being another key quality to becoming a good clinician. Although past academic achievement is a measure of academic progress in medical school (Powis, 2014), there has been emergence in the literature that academic performance is not sufficient for the selection of medical doctors (Hurwitz, 2013) because as a stand-alone variable, it will not produce a good clinician. Above-average intelligence will allow for theoretical knowledge acquisition but when combined with the individual motivation to be a good clinician, and the critical thinking abilities to use the theoretical knowledge appropriately in the clinical setting, the individual medical doctor is better equipped to deliver a high quality of patient care.

This study has also identified two qualities that negatively affect the medical doctor from being a good clinician. Poor work environment was identified as a leading cause

of burnout among doctors (Amoafo et al., 2015). The effects of a poor work environment include decreased morale, mental and physical fatigue, an increased propensity to make mistakes and insufficient time for learning and reflection. All of these factors can prevent the good clinician from providing the best level of patient care possible. Medical doctors in sub-Saharan Africa are challenged daily as they try to meet global ideals in healthcare, but are faced with the stark reality of diminishing resources in the local context in which they practice (Frambach et al., 2015).

In the South African healthcare system, high patient loads, shortage of resources and human resource challenges also prevent medical doctors from going deeper into a patient's disease profile (Coovadia et al., 2009). This is exacerbated by patients receiving care from different doctors at different facilities. Hence, the focus is on curing the physical with the hope that the physiological and social will be addressed by another entity, be it a nurse, social worker or priest.

One of the other issues that a medical practitioner must deal with is the personal burden, sacrifice, and self-mastery that clinical medical practice demands (Braude, 2015). As such, a medical doctor must have appropriate coping strategies and stress management approaches (Shanafelt et al., 2003). In this study, poor stress management was found to moderately affect the willingness to learn, the willingness to teach, emotional IQ, team player, proficient clinical skills, theoretical, good bedside manner and professionalism negatively. These relationships have then further impact on the medical doctor in whichever role he/she practices.

Ogundipe et al. (2014) described the growing concern surrounding the mental health of medical practitioners and the interplay poor stress management has with their professional responsibilities. The two main factors associated with burnout amongst doctors were perceived heavy workload and emotional distress, but support from management was found to improve care provided by the otherwise competent clinician (Ogundipe et al., 2014). Fernandes (2015) further explains how initiatives to combat poor stress management among doctors leads to higher retention and improved productivity, both of which are challenges faced by the South African public health sector.

In this study, participants rated the relationship between being squeamish and the willingness to learn, being squeamish and proficient clinical skill, and being squeamish and good bedside manner as moderately influential. While all these relationships have been identified (Underhill et al., 2015), the overall impact of being squeamish on being a good clinician in the presence of the other supporting qualities was not influential enough to be a defining quality of a good clinician. Many doctors that have reported being squeamish improve over time, and in instances where it persists, individuals tend to become involved in activities that do not require direct patient contact such as radiology, pathology and haematology.

Producing good clinicians is key to providing an adequate level of healthcare to the millions that are treated in the public sector in South Africa. Coovadia et al. (2009) highlighted incompetence and limited capacity at all levels of the South African public healthcare system and attributes it to past conditioning from our historical legacy and the education system from which students emerge with limited numeracy, literacy and problem-solving skills. Upon entering medical school, critical thinking and individual motivation must also be evaluated and developed further to ensure that graduates are at the very least competent clinicians. The lacklustre rewards and in some cases, the inability to cope with being a doctor in South Africa, particularly due to the demanding environment in which public sector doctors practice, are forcing individuals to pursue a career in the private sector or abroad (Rust, 2010). This highlights the need for local interventions in order to create and retain more good clinicians.

5.3 Requirements for a medical doctor to be a holistic practitioner

Initial proposition: Critical thinking, strong interpersonal skills, individual motivation, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a holistic practitioner.

Refined proposition: Critical thinking, strong interpersonal skills, individual motivation, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a holistic practitioner.

Similarities between initial and refined propositions: Individual motivation, critical thinking, strong interpersonal skills and absence of poor work environment and poor stress management

Difference between initial and refined propositions: none.

Holism refers to a view that is often easily forgotten in medical practice. Holistic healthcare encompasses patterns of signs and symptoms, patterns of function, patterns of physiology, the psychological picture of the patient, life habits, social aspects, constitutional tendencies and history, environmental influencers and even the spiritual life of the patient (Fulder, 2005).

In order to look deeply into all aspects of the patient, this research has identified that the holistic practitioner must possess critical thinking, individual motivation and strong interpersonal skills. Critical thinking in the holistic practitioner will enable the medical doctor to develop a deep understanding of the individual patient and the context in which the disease occurs and medical care provided (Pardíñaz-Solís, 2015). Critical thinking will enable the holistic practitioner to make the appropriate diagnosis and provide treatment accordingly. Most importantly, critical thinking leads to the willingness to learn, which in turn highly influences proficient clinical skills and theoretical knowledge.

Holistic medical practice is an aspiration that a medical doctor must work towards. Therefore possessing the individual motivation to be a holistic practitioner will enable a medical doctor to take the time and make the effort to inquire about all aspects of the patient (Ventegodt, 2004). This requires developing the doctor-patient relationship to a level of trust where the patient can be honest and open with the attending doctor without feeling judged.

While the good clinician for many reasons may not treat the physiological and social causes of disease, it is engrained in the holistic practitioner to enquire about other aspects of the patient's life that may cause or exacerbate his/her disease. Apart from mere enquiry into the psychosocial aspects of the disease, the medical doctor must have the emotional intelligence and the professional maturity to deal with these aspects of the patient (Hillis, & Grigg, 2015). This reinforces the highly influential relationships identified in this research between ethics and holistic practitioner, good

bedside manner and holistic practitioner, and professionalism and holistic practitioner. These three nodes are highly influenced by emotional IQ, which in turn is moderately influenced by critical thinking and interpersonal skills.

Problem-based learning has been flagged as the teaching approach that will enable the medical doctor to become a well-rounded professional who treats the biological, psychological and social causes of a patient's condition (Frenk et al., 2010). Looking specifically at the African context, Frambach et al. (2015) have also demonstrated that problem-based learning will establish a learning culture, an ethical foundation, and a well-rounded professional. The problem-based teaching method is most successful as it ensures that students in their undergraduate years and medical doctors during their practicing years have the capacity to work in teams and the capacity for individual learning (Hurwitz, 2013).

Hurwitz (2013) has shown that good verbal communication and interpersonal skills are another desired quality of future doctors. Malan et al. (2015) have identified the future roles and competencies required of South African doctors, all of which require strong interpersonal skills. Medical doctors must be confident in their interactions with patients and fellow healthcare professionals. This will facilitate actively participating in patient management and allow enquiry and learning from colleagues.

This research also suggests that the holistic practitioner should not work in a poor work environment or have poor stress management. Poor work environment does not provide the medical doctor with the time and operational facilities to enquire into all aspects of the patient's disease context (Scheffler et al., 2009; Amofo et al., 2015). Poor stress management does not allow the medical doctor the psychological and physical faculties to enquire deeply into the patient's life (Ogundipe et al., 2014). One might argue that there are many holistic practitioners who operate in a poor work environment or who do not adequately cope with work-related stress. While in the short term, it is possible to be a holistic practitioner under these circumstances, long-term practice under such conditions leads to burnout, health problems, personal difficulties and may eventually result in malpractice or leaving the profession (Ogundipe et al., 2014).

The results from this study are reflective of the literature as the proposition that critical thinking, strong interpersonal skills, individual motivation, the absence of poor work environment, and the absence of poor stress management, are required for a medical doctor to be a holistic practitioner, has remained unchanged. The holistic practitioner is a medical doctor who sees the whole that is greater than the parts and, therefore, has a multidisciplinary and multidimensional view of the patient's condition (Fulder, 2005). The ability to have a wider and more inclusive view is particularly relevant to the South African healthcare context where disease is often caused by social circumstances, and social circumstances can further hinder treatment and recovery (Coovadia et al., 2009).

5.4 Requirements for a medical doctor to be a medical manager

Initial proposition: Critical thinking, strong interpersonal skills, individual motivation and the absence of poor stress management are required for a medical doctor to be a medical manager.

Refined proposition: Critical thinking, individual motivation, strong interpersonal skills, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a medical manager.

Similarities between initial and refined propositions: Individual motivation, critical thinking, strong interpersonal skills and absence of poor stress management

Difference between initial and refined propositions: absence of poor work environment added

Healthcare managers are those individuals who ensure that their institution operates effectively and efficiently. Their primary responsibility is to provide medical doctors and nurses with the tools required to deliver a high level of patient care. Healthcare managers may or may not be medical doctors as they oversee the business aspects of the institution. A medical manager, however, is a medical doctor operating in a managerial position, very often as the head of department, clinical supervisor or medical superintendent. Although not every doctor may have the opportunity to manage a medical department or hospital, every doctor manages an individual patient,

the attending team of allied healthcare professionals and the patient's family. Both these contexts are different for the medical doctor and while one might excel at the latter, many medical doctors tend to incur difficulties when asked to manage a ward, department or institution.

In this study, the positively influencing qualities required for a South African doctor to become a medical manager were critical thinking, individual motivation and strong interpersonal skills. Critical thinking is required for a medical manager to make well-informed decisions regarding the people and context that they have control over. Hurwitz (2013) has classified the methodical skills desired of future doctors as being critical thinking, thoroughness, organisational skills, the ability to work and think independently, and personal insight. All of these qualities stem from critical thinking and are required of medical doctors in managerial positions. Hmelo-Silver (2004) has recommended a problem-based approach for medical doctors to develop effective problem-solving skills, self-directed learning skills and intrinsic motivation. This is an interesting point as case study analysis is used in management schools to develop these skills in managers across all sectors.

Individual motivation, self-confidence, decisiveness and composure under pressure were grouped under role certainty by Hurwitz (2013). In order to be an effective medical manager, a medical doctor must have the motivation and desire to genuinely lead a team, unit, department or institution. If a medical doctor is motivated to be an effective manager, he/she will actively develop the complementary qualities of confident decision-making, and rational planning and action. Hillis and Grigg (2015) have also identified the strong influence of individual motivation on medical doctors assuming a management and leadership role, suggesting that doctors must go further to engage with and be part of health management in order to influence the healthcare environment.

Another quality identified in this study that determines whether a medical doctor will become a medical manager is interpersonal skills. The ability to engage with other health professionals is key in a medical manager ensuring those under his/her supervision deliver a high level of patient care. Interpersonal skills are essential to contemporary, team-based healthcare (Hillis & Grigg, 2015). Medical managers must become collaborators that use their credibility and authority to aid their team across

all levels of care (Malan et al., 2015). One of the objectives of a medical manager is to solve operational problems in healthcare practice and this can only be achieved by engaging all stakeholders appropriately. As such, interpersonal skills are key to being an effective medical manager.

Furthermore, for an individual in the position of a medical manager, how he/she deals with patients, doctors and allied health professionals strongly influences their credibility as a supervisor and manager. In this study, professionalism was found to be the strongest intermediary quality of the medical manager. Stefl (2008) have identified professionalism as one of the competency domains of medical managers. Medical managers must be able to align their organisational conduct with their personal conduct, while maintaining ethical and professional standards.

The global medical ecosystem is undergoing reform and in South Africa, it is particularly important that medical doctors aspire to the highest levels of professionalism (Benatar, 2015). This is even more pertinent to medical managers who are in positions of authority and influence as they serve as role models for other health professionals and their actions affect how other medical doctors deliver healthcare. Furthermore, Pillay (2008) has suggested that medical managers derive great benefit from informal learning approaches such as coaching and mentoring. Engaging in these programs requires a certain level of professionalism and demands an even higher level in order to be a successful manager.

This study has also identified poor work environment has an inhibitor of a medical manager. This is reflective of South African public sector healthcare as the decline in professionalism has been attributed to long working hours and high patient loads (Coovadia et al., 2009; Mayosi, & Benatar, 2014). A poor work environment contributes additional strain for the medical manager as he/she is required to achieve even more with less resources. Public sector hospitals and clinics in South Africa are known to be highly stressed environments due to understaffing, high patient loads, and management and leadership failures (Rust, 2010).

Medical managers must deal with challenges from subordinates and the environment in which they work, but more ominously with pressures from higher managerial structures. One example is hospital managers that feel disempowered and frustrated

by growing centralised control at provincial level in the South African public sector (Rust, 2010). They are unable to effectively manage their institutions due to bureaucracy and maladministration at the upper echelons of the system. Malan et al. (2015) have identified a substantial need for improvement with regards to clinical governance among South African doctors. Upskilling those in managerial positions will ensure more effective interventions when addressing issues arising from poor work environment.

Another example is the lack of effective management capacity in public sector organisations (Rust, 2010). This was evident in a study conducted by Pillay (2008) which identified a lack of management capacity in South African public sector healthcare institutions. There was a great need to further develop managers who rated themselves as 'reasonably competent but not good' across all managerial domains including planning, organising, leading, controlling and self-management (Pillay, 2008). This was of concern as public sector managers reported that they were more likely to have attended formal training in healthcare management.

Poor stress management was also identified as an inhibitor to a medical doctor becoming a medical manager. The medical doctor already experiences a considerable amount of stress in clinical practice, but these levels can increase exponentially once the medical doctor is placed in a managerial role. Poor stress management at this level of an institution can have far-reaching repercussions to the personal well-being of the doctor and the patients under his/her care (Regehr et al., 2014).

Mayosi and Benatar (2014) have identified that poor administrative and managerial capacities of the State will hamper the delivery of universal health coverage in South Africa, a goal that all key stakeholders in the healthcare system are tirelessly working towards. The lack of competent medical managers can be mitigated by teaching basic managerial skills to medical students and doctors as they progress through the system. This will ensure that doctors can exercise their management capabilities throughout their careers as opposed to only receiving training when placed in a managerial role. There are various universities that teach management studies in the medical curriculum or alongside it (Pihlainen et al., 2016), to ensure that graduates understand higher-level decision-making and policy implications. This may be an

option for South African medical schools if they aim to produce more competent medical managers for the 21st century.

5.5 Requirements for a medical doctor to be a medical leader

Initial proposition: Critical thinking, strong interpersonal skills, above-average intelligence, individual motivation and the absence of poor stress management are required for a medical doctor to be a medical leader.

Refined proposition: Critical thinking, individual motivation, strong interpersonal skills and the absence of poor stress management are required for a medical doctor to be a medical leader.

Similarities between initial and refined propositions: Individual motivation, critical thinking, strong interpersonal skills and absence of poor stress management

Difference between individual and refined propositions: above-average intelligence removed.

Management and leadership are terms that are often used interchangeably, but for the purposes of this study, they have been used separately and have been clearly defined. Medical management is based on the hierarchy that exists in the healthcare sector where a medical doctor is given a position and a clear set of objectives and deliverables. Medical leadership, however, is not subject to authority or position; it is the ability to become a change agent in the healthcare system thereby improving clinical practice and patient care. Good medical leadership is essential for the delivery of high-quality healthcare yet globally medical doctors have lacked leadership credence when compared to technical and academic ability (Warren, 2010).

In this study, the positively influencing qualities identified for a medical doctor to be a medical leader were critical thinking, strong interpersonal skills and individual motivation. Pihlainen et al. (2016) included critical thinking under the thinking and application competence required by medical leaders. Critical thinking leads to the development of a strategic mind-set and will enable medical leaders to cultivate the foresight required to lead themselves and/or an organisation of professionals. Critical thinking will enable doctors to take a macroscopic view of healthcare as they progress

in their career, and if they move up the healthcare hierarchy critical thinking will facilitate system-wide decision-making in terms of healthcare provision and resource allocation (Warren, 2010). Critical thinking will equip the medical doctor to better understand the political, economic, social and technological drivers for change and enable a medical doctor to make well-informed decisions.

In terms of individual motivation, Blanchard (2015) states that the motivation to be a medical leader must come from the medical doctor. Hillis and Grigg (2015) also suggest that medical doctors must have the will and determination to excel and become medical leaders. Regarding junior doctors, Warren (2010) pointed out that junior doctors specifically have become increasingly interested in developing leadership skills for themselves, as they are motivated by the opportunity to change and improve the environment in which they work thereby rendering a higher quality of healthcare.

While the desire to create change and improve service delivery may be individualistic, it must be enacted in an environment where team-based healthcare is the most the appropriate model of operation (Hillis & Grigg, 2015). Interpersonal skills have become more important as leaders today are more prone to consensus building and, therefore, will have to appropriately and effectively communicate with various stakeholders (Rust, 2010).

In this study, moderately influential relationships were identified between strong interpersonal skills and being a team player, and strongly influential relationships were identified between being a team player and being a medical leader. Other strongly influential relationships were identified between professionalism and medical leader, and ethics and medical leader. These links were supported by the comprehensive review of management and leadership competence in hospitals conducted by Pihlainen et al. (2016) under the categories of operational management and leadership competence, and general management and leadership competence.

Along with emotional intelligence, which had strongly influential relationships with ethics and professionalism, the qualities of interpersonal skills, team player, ethics and professionalism cover the 'softer' aspects of good leadership (Warren, 2010). Relationships between the willingness to learn, the willingness to teach and being a

medical leader suggest that medical doctors must also understand the principle of 'followership' as described by Warren (2010). Followership also links closely with being a team player as it will enable the individual doctor and the team to learn from each other and progressively work towards positive change.

In the development of the final FCM, above-average intelligence was removed as a defining quality of a medical leader. This highlights the consensus in the recent literature that academic performance and level of intelligence is insufficient in creating the type of doctor that will be required in the future (Hurwitz, 2013). Medical doctors must be able to identify a challenge and develop a feasible solution that will benefit all stakeholders involved in that specific problem. The process requires critical thinking skills to appropriately assess and develop solutions, interpersonal skills to engage with the various stakeholders and decision makers, and the individual motivation to want to improve the current situation. In this way, the medical doctor leads change and becomes a medical leader. While above-average intelligence would be of benefit to a medical leader in assessing and solving a specific issue, it is not essential. One respondent even stated that it may negatively influence the medical leader as the more intellectually gifted doctors tend to be more involved in academia instead of practice and they are not sufficiently involved to effect change.

Somewhat unexpectedly, poor work environment did not affect the outcome of one becoming a medical leader. While Shanafelt et al. (2003) and Amofo et al. (2015) suggest that poor work environment affected service delivery, the opinion of the participants in this study did not identify the relationship as being influential in creating a medical leader. Comments by some participants alluded to the fact that when the work environment is challenging, it provides the medical leader with more opportunities to identify problem areas and affect positive change.

Poor stress management however negatively influences the medical leader. As the medical doctor progresses in his/her medical career and is recognised by moving up the hierarchy, the emerging medical leader is faced with more responsibility and more authority. Often a medical leader will have to make compromises for the greater good, sometimes even sacrificing his/her personal values and beliefs (Ogundipe et al., 2014). This may lead to emotional strain and subsequent professional and personal challenges if the medical leader is unable to effectively manage his/her stress levels.

Ideally, a medical manager and/or leader must have an understanding of the profession and clinical practice in order to effectively lead or manage a medical department. These results suggest that clinical competence should still form the foundation on which business and leadership competence in healthcare can be established. As described by Pihlainen et al. (2016), clinical competence encompasses the knowledge and skills of professional and clinical issues and provides the professional credibility for the medical manager and leader.

As a medical doctor, one faces a lifetime of change (Evans, 2016), and must therefore be able to adapt to change or develop the ability to influence change. Individual doctors must become effective change agents and healthcare advocates in the diverse healthcare environments of South African medical practice by considering economic and cultural factors in addition to the individual biopsychosocial aspect of contemporary medicine. Coovadia et al. (2009) have explicitly stated that leadership will be a key driver to addressing the health needs of South Africa now and in the future. While there have been several failures in South Africa's public health system, greater emphasis has been placed on delivering effective healthcare through policy changes and the recently released white paper on National Health Insurance in South Africa. There has also been a call for increased innovation in service delivery by South African healthcare practitioners (Coovadia et al., 2009; Mayosi, & Benatar, 2014). This innovation can come from medical doctors at every level and must be encouraged to motivate and inspire emerging medical leaders. However, it is imperative that the innovation and changes that occur at higher levels of healthcare filter through to the lower levels of state run facilities in order for there to be tangible differences to patients.

5.6 Other insights

In this study, participants were asked if there were any qualities they considered important to add to the FCM in each round of the Delphi study. Some suggestions included the effect of individual support systems towards the development of a good clinician, holistic practitioner, medical manager and medical leader. These comments included support systems during undergraduate studies to cope with the demands of studying medicine, family support systems to cope with the demands of practicing

medicine and support systems within the hospital or healthcare institution to deal with operational challenges. These support systems determine how an individual doctor will deal with stress associated with medical practice. To investigate the effects that different support systems have in the different phases of a medical doctor's development is beyond the scope of this study.

Some participants also highlighted the growing role that technology plays in the delivery of patient care. Technological advancements are enabling doctors to treat more patients, but at the same time the inappropriate use of investigations can lead junior doctors to lose the ability to formulate differential diagnoses as they instead rely on the results of investigations to pin down the cause of illness. In contrast, the use of telemedicine has revolutionised healthcare delivery particularly in Africa, as it is a tool for both practice and learning as we progress into the 21st century (Evans, 2016).

Another insight provided by the participants in this study was the need for management and leadership training of medical students and junior doctors. Globally there has been call for competent medical managers and leaders to take healthcare into the 21st century (Coovadia et al., 2009; Frenk et al., 2010; Mayosi et al., 2012; Pihlainen et al., 2016). While some researchers advocate developing leadership qualities along with clinical skill, others suggest that medical managers and leaders must be specifically groomed in order to take up senior roles in a healthcare institution. Warren (2010) proposes that merely having the knowledge, skills and information of a medical leader is insufficient for future medical leaders. As healthcare evolves, medical managers and leaders will require non-technical skills such as setting strategic direction, service redesign and improvement, cross sector networking, and effective negotiation.

Both viewpoints, however, advocate that what we currently have is insufficient and policies must be put in place to ensure that healthcare systems and institutions are appropriately and competently led. Warren (2010) and Hurwitz (2013) also make the point that the earlier a medical doctor is introduced to this new way of thinking and practice, the more likely one is to develop these skills. Pihlainen et al. (2016) makes the point that clinical expertise can be strengthened by management and leadership competence. This therefore, makes a very strong case for management and

leadership education during undergraduate years and throughout clinical practice, particularly in a country like South Africa.

Other qualities suggested were patience, tolerance, and professional development through coaching and mentoring. Patience and tolerance can be included in the humanistic side of medical practice which is well documented (Benatar, 2015), and results in medical doctors having a stronger ethical foundation on which they practice medicine. Furthermore, it links to the development of professionalism towards patients and colleagues (Warren, 2010; Pihlainen et al., 2016). This is evident in the strong relationships that emotional IQ, team player and ethics had with professionalism and the strong influence that professionalism had in determining if one would become a holistic practitioner, medical manager or medical leader.

With regards to coaching and mentoring, it is well recognised in the development of leadership and management capabilities (Warren, 2010; Pihlainen et al., 2016). However, in the South African public health sector, various constraining factors such as doctor shortages, high patient loads and insufficient time, hinder the formation of a mentor or coaching relationship. This particular aspect needs to be further investigated, as coaching and mentoring will play an important role in developing the medical doctor of the 21st century.

5.7 Conclusion

The qualities required for a medical doctor to become a good clinician, a holistic practitioner, a medical manager and a medical leader that have identified in this study are well supported by the available academic literature. All four propositions have been refined and are summarised as follows:

- Critical thinking, above-average intelligence, individual motivation, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a good clinician.
- Critical thinking, strong interpersonal skills, individual motivation, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a holistic practitioner.

- Critical thinking, individual motivation, strong interpersonal skills, the absence of poor work environment and the absence of poor stress management are required for a medical doctor to be a medical manager.
- Critical thinking, individual motivation, strong interpersonal skills and the absence of poor stress management are required for a medical doctor to be a medical leader.

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

This chapter will provide high-level highlights of this research study and suggest recommendations that key stakeholders in the South African public healthcare environment and medical education can implement in order to create good clinicians, holistic practitioners, medical managers and medical leaders. Additionally, suggestions for further research will be made for individuals wishing to delve deeper into this topic and related fields of study.

6.2 Conclusions of the study

South African healthcare has made great strides over many decades to provide appropriate and adequate services to the citizens of the country. Currently on the verge of many redefining policies, the system's greatest resource, its medical doctors, must evolve and develop in order to address South Africa's quadruple burden of disease and meet the growing demands of the system and the patients they serve. As such, it was necessary to explore the qualities required for medical practice in South Africa in terms of the roles that doctors will take in the 21st century.

The first objective of this research was to identify the qualities required for a medical doctor practising in the South African healthcare context. This was achieved through a comprehensive literature review and the outcomes were refined by an expert sample of industry specialists through a two-round Delphi study. The relationships between the qualities identified led to the development of four research propositions that presented the qualities required for a medical doctor to be a good clinician, a holistic practitioner, a medical manager and a medical leader. These are all roles that doctors must fulfill in the healthcare system based on the rapid changes that are occurring globally and locally.

The second objective of this research was to create a Fuzzy Cognitive Map (FCM) based on the literature and then test that FCM with an expert sample. By conducting a pilot study and a two-round Delphi study, the FCM was revised through three

iterations and the research propositions refined accordingly. Thirty-one interviews were conducted during this research with an expert study sample of public sector medical doctors, individuals who were best positioned to determine which qualities and roles are required of current and future doctors.

While the South African healthcare context is unique when compared to the rest of the world, the core qualities and competencies required of medical doctors are very similar throughout the world. Critical thinking and individual motivation are required for all possible roles that a medical doctor can assume and poor stress management negatively affects the medical doctor in all the roles presented. Critical thinking and individual motivation were the strongest influencing variables. It not only influences why one becomes a doctor, but the type of doctor an individual becomes.

Above-average intelligence has been identified as an enabler to one becoming a good clinician, and in keeping with international thinking, its role as a defining quality of a medical doctor has changed as the humanistic qualities required for medical practice have become more recognised. This is evident in the more pronounced role that interpersonal skills play and the subsequent influence of emotional IQ, team player, ethics and good bedside manner.

It was interesting to note the strong influence that poor stress management had on the role one takes in medicine. Poor stress management had a greater impact than poor work environment. This highlights the influence of an individual doctor-related factor over the context-related factor of poor work environment and relates in some ways to individual motivation. The sphere of control lies with the individual who can deal with a poor work environment to a certain point, before it becomes a vicious cycle with poor stress management, as each tends to fuel the other. If not addressed, the poor work environment in which South African doctors practice will continue to negatively affect individual doctors personally and professionally.

One can argue with regards to which qualities required of a medical doctor are innate, which must be further developed, and which qualities can be taught at medical school and in clinical practice. The qualities described in the Hippocratic Oath are still in many ways core to *'who and what'* a medical doctor should be. With the changing role of the medical doctor to meet the demands and challenges of 21st century healthcare,

learning and upskilling of South African doctors must occur in the medical sciences and technical skills, but more importantly, soft skills and individually influencing variables must also be developed to ensure medical doctors are appropriately trained to deal with a career of change and learning.

6.3 Recommendations

As South African medical doctors enter and continue to practice in the healthcare system, they will be working in an environment that is constantly and rapidly changing. These changes will be evolutionary and in some cases, revolutionary of how and why medicine is practiced as it is. With the new generation of South African doctors coming from a generation of outcomes-based education, there exists certain challenges, but also a myriad of opportunities. Medical students and doctors in practice have to be able to continue learning even after leaving medical school or when the teaching and guidance of senior doctors is no longer accessible.

Based on the results of this research, medical schools and individuals responsible for training doctors in practice must assess the level of critical thinking skills that an individual doctor has. Directed measures must be put in place to further develop and enhance the critical thinking and problem-solving skillset, both in medical school and in clinical practice. Furthermore, the South African medical doctor must reflect on their motivation for becoming a doctor, and how this has changed as one progresses through their career. Each doctor must also identify a potential lack of or underdeveloped quality, and put in processes for improvement. The insight provided by reflection and the genuine desire to improve in the domains identified will allow doctors to become more resilient and agile in their profession. This research can influence an individual doctor at all levels of the healthcare system from the junior student and intern to senior leaders and managers by identifying qualities and competencies that require improvement.

For doctors currently practicing in the public sector, this research has identified focus areas that hospital management can address in order to develop their staff. Management can intervene in context-related factors such as poor work environment thereby mitigating the negative influence it has on the role a doctor plays. Measures

can also be put in place to address individual-related factors such as motivation, interpersonal skills and stress management. These would include a personal development program, seminars and workshops, and a coaching and mentoring program involving all levels of medical doctors. One example that affected all the roles identified in this research is the negative effect of poor stress management. The personal and professional effects of poor stress management cannot be underestimated and medical doctors must, therefore, receive special training throughout their career as stress causing variables change. Poor stress management can be appropriately addressed in all of the interventions mentioned above.

By understanding the qualities required in medical practice in South Africa, medical schools have the opportunity to modify their curriculum in order to develop these qualities from the beginning of one's medical career. Basic competencies in critical thinking and interpersonal skills must be identified and where lacking, must be developed in undergraduate training. Although academic qualification and individual motivation form part of the admission requirements to medical school, they should continue to receive attention throughout the training years. Stress management techniques and skills to address and modify poor work environment circumstances should be taught at medical school. In this way, the core qualities identified in this research can be developed to produce a good clinician and holistic practitioner.

However, to develop medical managers and leaders, management and leadership training must also begin during undergraduate years. This can be done through an elective short course in basic business administration while one is still a medical student. As one progresses in their career, management and leadership training must be encouraged and potentially funded for practising doctors who show promise as emerging managers and leaders. This will result in the creation of well equipped, high-quality managers and leaders who are required to address the challenges in the South African public healthcare sector.

6.4 Suggestions for further research

Greater value can be extracted from this research by presenting the FCM constructed to a wider group of medical practitioners. This will provide a deeper understanding of medical doctors and healthcare demands throughout the country.

Each of the individual qualities used in the FCM can be further researched. A possible example would be to evaluate the level of critical thinking skills present in a sample of medical doctors in order to identify gaps and areas of improvement. The same can be done with interpersonal skills, stress management skills, the willingness to learn, willingness to teach, emotional IQ, professionalism, etc.

This research focused primarily on the qualities of the medical doctor. Other areas to consider would be patient perspectives concerning their expectations of medical doctors and healthcare services, and undergraduate medical students' perspectives on the qualities they believe are required for medical practice. This will allow greater understanding of medical services across the medical supply chain.

Furthermore, in this research specific management training and skills acquisition was noted as a possible core competency. Further research into the current level of managerial skills and the effect of management training amongst medical managers in South Africa will help to inform decision makers on the evolution of possible future curriculum developments.

6.5 Concluding Remarks

This research study may be understood as a platform for ongoing research. The findings from this research offer opportunities for others to follow on and further improve on these understandings. In the words of Checkland (1999) writing about systems thinking and practice:

"Obviously the work is not finished, and can never be finished. There are no absolute positions to be reached in the attempt by men to understand the world in which they find themselves: new experience may in the future refute present conjectures. So the work itself must be regarded as an on-going

system of a particular kind: A learning system which will continue to develop ideas, to test them out in practice, and to learn from the experience gained."

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Appendix 1: Letter of Consent for the Interview

I, _____, agree voluntarily to take part in the research project being conducted by Jayshina Punwasi as part of the requirements for her MBA Degree at Wits Business School. I have read the Participant Information Sheet and I understand the contents thereof. Any questions which I have asked have been answered to my satisfaction.

I understand that the information which I will supply is confidential and that it will be anonymised and will only be used in the findings of the research.

I understand that I do not have to answer all the questions which may be put to me. The information. The information which I provide will be held securely until the research has been completed after which it will be destroyed.

The information which I provide will not be used for any other purpose.

I understand that I am entitled to ask for a de-briefing session or a copy of the research at the end of the project.

I have been informed that I may withdraw from this study at any time and that any information which I have supplied will be used for be used for this research and any records relating to my contribution will be destroyed.

Signed.....

Date.....

Appendix 2: Interview - Participants Information Sheet

	Issue	Response
1.	Name of Researcher Contract details	Jayshina Punwasi e-mail: Jayshina@gmail.com Tel: 082 701 8187
2.	Title of Research Project	Modelling the qualities of a medical doctor in the South African healthcare context
3.	Purpose of the Study	The purpose of this research is to understand the qualities of a medical doctor.
4.	Description of the Study	Academic research for a degree which requires primary data from individuals.
5.	Duration of the Study	7 months
6.	What will be your involvement and how long will it take	Contributors will be interviewed. The time required is estimated to be approximately 60 minutes.
7.	Why you have been asked to participate?	You have been asked to partake in this study due to your experience as a medical doctor.
8.	What will happen to the information which will be given for the study?	The information will be held in a confidential manner (secured cupboard) while the interviews transcripts are being processed. Following the successful completion of the research the interviews transcripts will be shredded.
9.	What will be done with the Results of the study?	The results of the interviews will be reported in the findings section of the research. This will be done in a completely anonymous manner.
10.	What are the possible disadvantages?	There are no costs to you associated with your involvement with this study. It is not envisaged that any negative consequences will accrue to you from your contributions in this research.

11.	In what way will the study be beneficial and to whom?	It is hoped that this study will provide a useful framework to understand the qualities of a medical doctor.
12.	Who has reviewed this study to ensure that it complies with all the requirements and ethical standards of the university?	The Ethics Committee of the University of the Witwatersrand has approved this research proposal and granted permission for the research to commence.
13.	Can permission be withdrawn having previously been granted?	Yes, all contributors shall retain the right to have their contributions to the research withdrawn at any time.
14.	Can you refuse to answer any question?	Yes. The contributor has the right to refuse to answer any question during the interview.

Appendix 3: Interview Schedule

- a) Name of department/sub-division: _____
- b) Name of respondent: _____
- c) Title: _____

Questions:

In the context of the diagram, would you please answer the following questions:

1. In your experience, are these qualities important for medical practice in South Africa?
2. Are there any qualities that you would remove?
3. Are there any other qualities that you would add?
4. Would you suggest any changes to the identified relationships? What would they be?
5. How strong are the associations between these qualities?
6. How does the relationship between these qualities impact an individual medical doctor becoming a good clinician, a holistic practitioner, a medical manager and a medical leader?

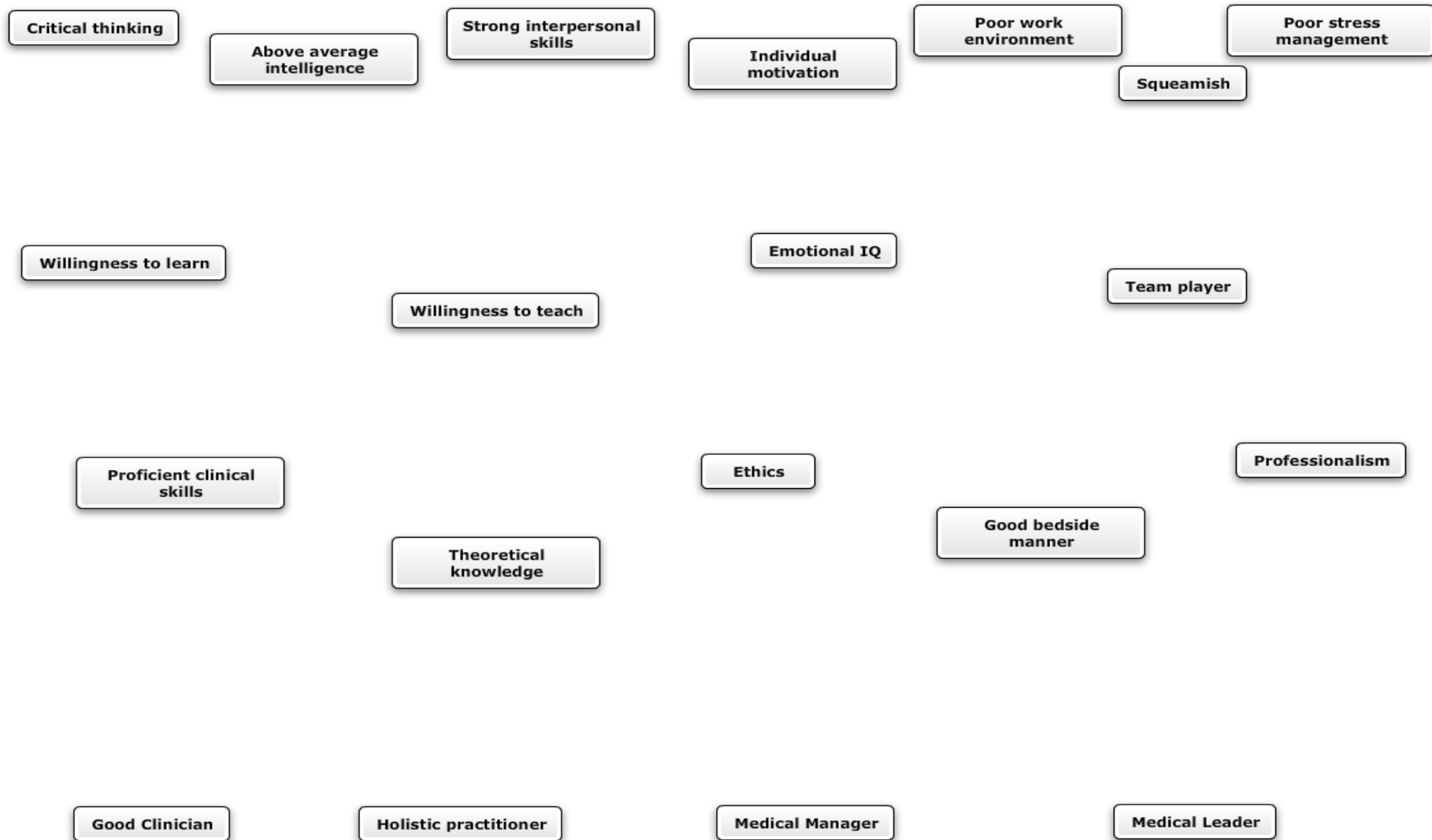
Appendix 4: Definition of terms

Term	Definition	Reference
Critical thinking	The ability to think clearly and rationally in order to make reasoned judgements informed by evidence.	Hurwitz (2013) El Bingawi (2014)
Above-average intelligence	An IQ greater than 110 is generally accepted as above average, or comfortably passing tests and examinations.	Curtis (2014) Powis (2014)
Strong interpersonal skills	The ability to communicate and interact well with other people. Sometimes referred to as soft skills.	Blanchard (2015) Hillis and Grigg (2015)
Individual motivation	The driving force that motivates the individual to set and achieve specific goals.	Powis (2014) Hillis and Grigg (2015)
Being squeamish	Feeling disgusted or sick by unpleasant things eg. Blood, vomitus, pus, etc.	Malan et al. (2015) Underhill et al. (2015).
Poor work environment	Workplace factors that negatively influence patient care eg. Long working hours, lack of resources, high patient loads, etc.	Shanafelt et al. (2003) Amofo et al. (2015)
Poor stress management	Inability to manage triggers and symptoms of stress that arise from medical practice. Can lead to poor patient care and self-destructive behaviours.	Ogundipe et al. (2014) Regehr et al. (2014)
Willingness to learn	The desire and ability to learn that allows you to improve and develop your skillset.	Blanchard (2015)

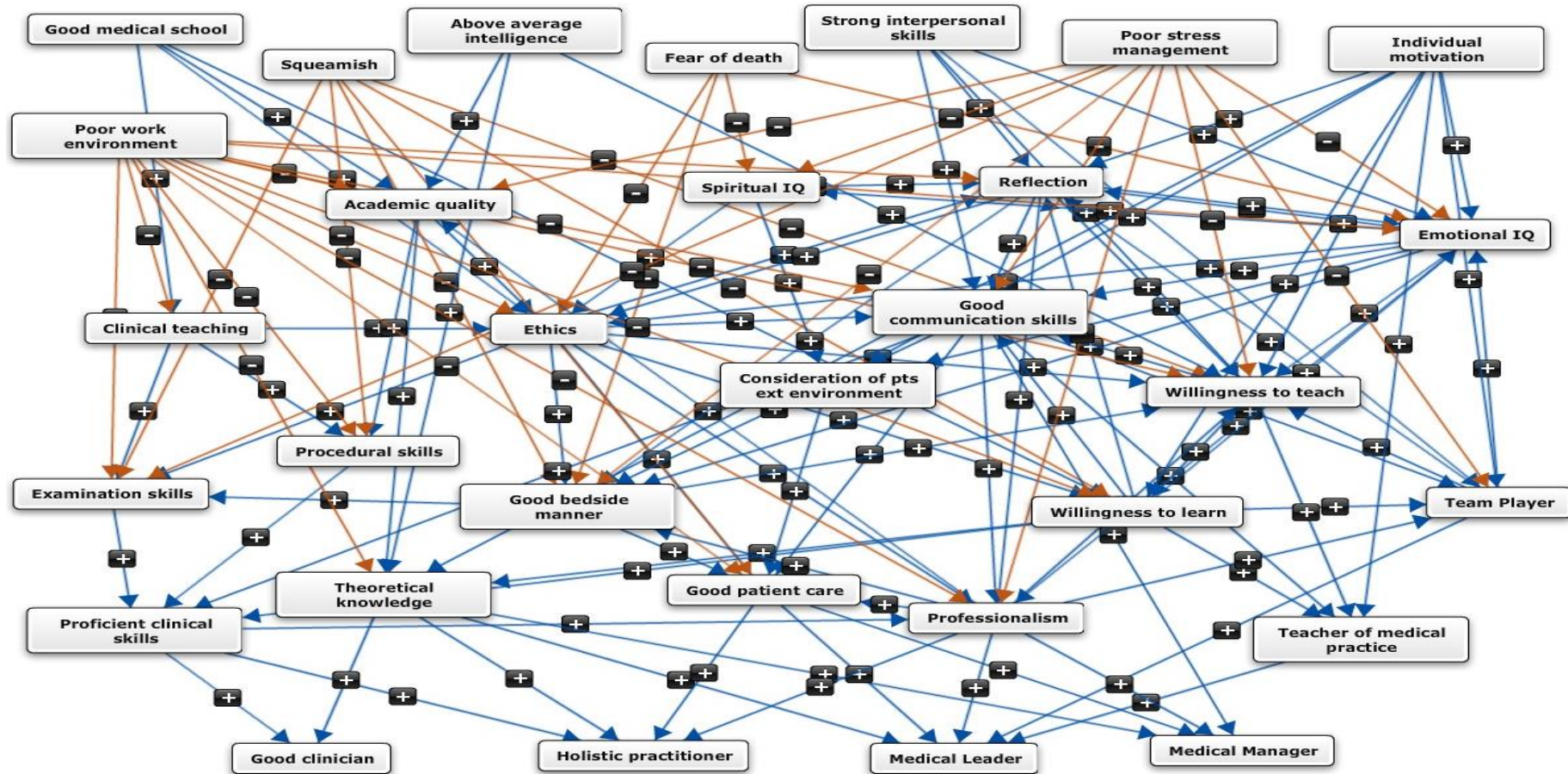
Willingness to teach	The desire and ability to share knowledge and skills with other individuals.	Blanchard (2015)
Emotional IQ	The cognitive ability to recognise, understand and manage your own emotions.	Cherry et al. (2014) McKinley et al. (2015)
Team player	The ability to work well as a member of the multi-disciplinary healthcare team. Requires cooperation to achieve what is best for the patient.	Blanchard (2015) Hillis and Grigg (2015)
Proficient clinical skills	The acquisition and development of the skills necessary to interview, examine and perform investigations on a patient.	Boudoulas (2005) Braude (2015)
Theoretical knowledge	The body of medical knowledge that an individual doctor would have. Relates to medical condition and disease profiles.	Boudoulas (2005) Hurwitz (2013)
Ethics	The values and judgements an individual doctor has that influences how he/she handles moral dilemmas in medical practice and patient care.	Benatar (2015) Gupta (2015)
Good bedside manner	The way a medical doctor treats the patient and engages in the doctor-patient relationship.	Hurwitz (2013) Hillis & Grigg (2015)
Professionalism	The set of values, behaviours and belief system that medical doctors commit to eg. integrity, compassion, altruism, excellence, etc.	Birden et al. (2014) Emanuel (2015)
Good Clinician	A medical doctor with a high level of competence in diagnosing and treating the physical condition of a patient.	Boudoulas (2005) Braude (2015)

Holistic Practitioner	A medical doctor who treats the biopsychosocial aspects of the patient and the disease.	Ventegodt (2004) Fulder (2005)
Medical Manager	A medical doctor in a managerial position supervising other health professionals.	Stefl (2008) Pihlainen et al. (2016)
Medical Leader	A medical doctor who manages and leads other healthcare professionals to provide better patient care and medical services through horizontal and vertical collaboration.	Warren (2010), Hopkins (2015)

Appendix 5: Blank FCM for Data Collection



Appendix 6: FCM Version 1



The diagram illustrates a complex network of relationships between various factors influencing the development of a medical professional. The nodes are arranged in a hierarchical manner, with personal and environmental factors at the top, intermediate skills and attitudes in the middle, and professional roles at the bottom. Arrows indicate the direction and nature (positive or negative) of the influence.

Top Level (Inputs/Context):

- Critical Thinking
- Above average intelligence
- Strong interpersonal skills
- Individual motivation
- Poor work environment
- Poor stress management
- Squeamish

Second Level (Intermediate Skills/Attitudes):

- Willingness to learn
- Willingness to teach
- Emotional IQ
- Ethics
- Good bedside manner
- Professionalism
- Team Player

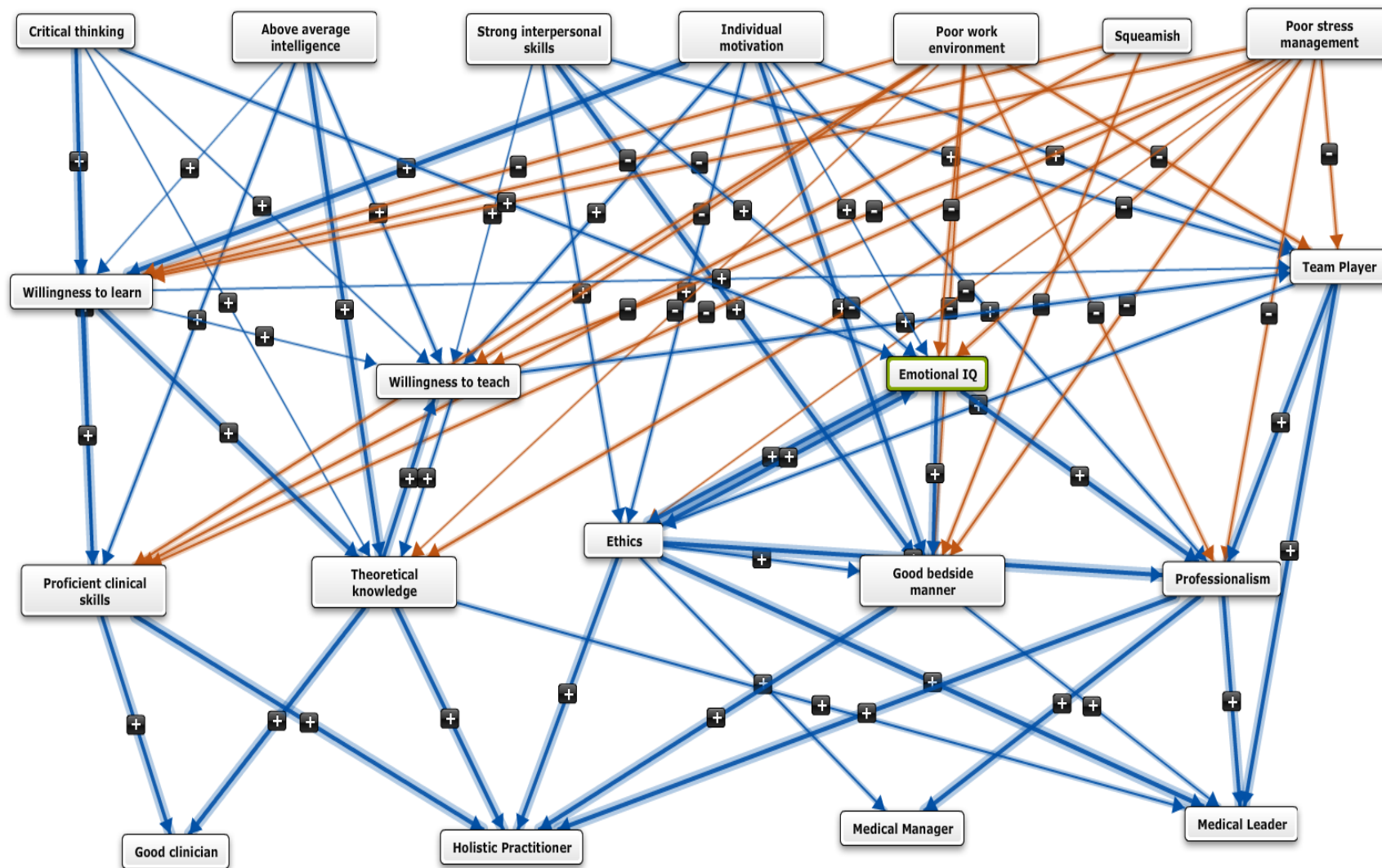
Bottom Level (Professional Roles):

- Good Clinician
- Holistic Practitioner
- Medical Manager
- Medical Leader

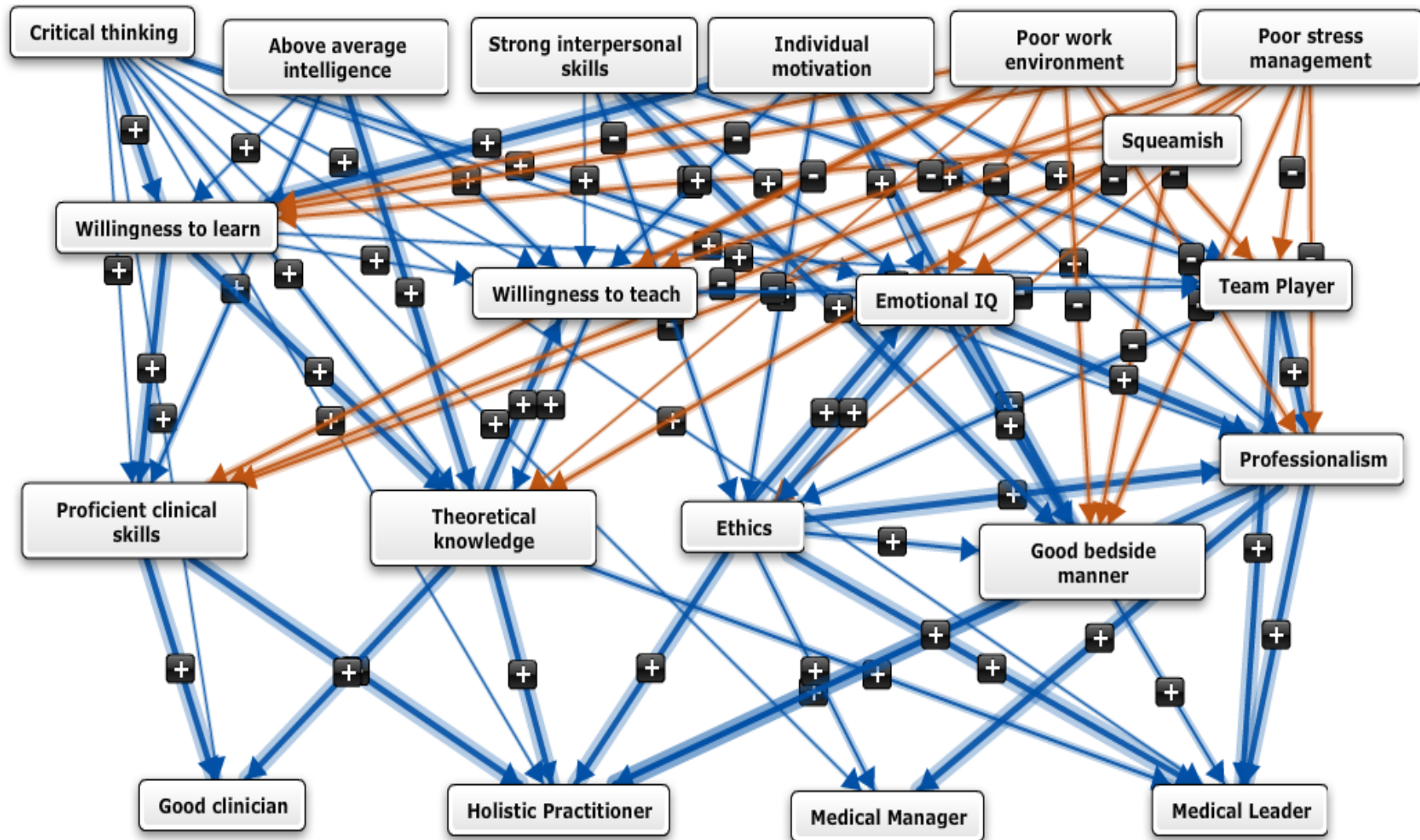
Key Relationships:

- Positive Influences (+):**
 - Critical Thinking → Willingness to learn
 - Above average intelligence → Willingness to learn, Willingness to teach, Theoretical knowledge
 - Strong interpersonal skills → Willingness to teach, Theoretical knowledge, Ethics, Good bedside manner, Professionalism
 - Individual motivation → Willingness to learn, Willingness to teach, Emotional IQ, Ethics, Good bedside manner, Professionalism
 - Willingness to learn → Proficient clinical skills
 - Willingness to teach → Theoretical knowledge
 - Emotional IQ → Ethics, Good bedside manner, Professionalism
 - Ethics → Good bedside manner, Professionalism
 - Good bedside manner → Professionalism
 - Professionalism → Good Clinician, Holistic Practitioner, Medical Manager, Medical Leader
 - Team Player → Professionalism
 - Proficient clinical skills → Good Clinician
 - Theoretical knowledge → Holistic Practitioner
- Negative Influences (-):**
 - Poor work environment → Willingness to learn, Willingness to teach, Emotional IQ, Team Player, Professionalism
 - Poor stress management → Willingness to learn, Willingness to teach, Emotional IQ, Team Player, Professionalism
 - Squeamish → Willingness to learn, Willingness to teach, Emotional IQ, Team Player, Professionalism
 - Individual motivation → Willingness to learn, Willingness to teach, Emotional IQ, Team Player, Professionalism
 - Team Player → Professionalism

Appendix 8: FCM Version 3



Appendix 9: FCM Version 4 (Final FCM)



Appendix 10: Adjacency Matrix of the FCM

	A	B	C	D	E	F	G	H	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	CX				
1	Adjacency Matrix	Critical thinking Squeamish Strong interpersonal skills Above average intelligence Individual motivation Poor work environment Poor stress management Proficient clinical skills Good clinician Holistic Practitioner Theoretical knowledge Medical Leader Willingness to teach Good bedside manner Team Player Professionalism Ethics Medical Manager Willingness to learn Emotional IQ																								
2	Critical thinking	Transmitter nodes								0.15	0.15	0.15	0.30	0.15	0.15			0.15		0.15	0.60	0.30				
3	Squeamish									-0.30						-0.30					-0.30					
4	Strong interpersonal skills														0.15	0.60	0.30		0.30	0.15	0.15	0.30				
5	Above average intelligence												0.30								0.15					
6	Individual motivation												0.15			0.30	0.60	0.30	0.30	0.30		0.60	0.15			
7	Poor work environment												-0.30			-0.30	-0.30	-0.30	-0.30			-0.30	-0.30			
8	Poor stress management												-0.30			-0.30	-0.30	-0.30	-0.30	-0.15		-0.30	-0.30			
22	Proficient clinical skills									Normal and Receiver Nodes									0.60	0.60						
23	Good clinician																									
24	Holistic Practitioner																									
25	Theoretical knowledge					0.30	0.60																			
26	Medical Leader																									
27	Willingness to teach					0.30	0.15												0.30	0.15			0.15	0.15		
28	Good bedside manner					0.30																				
29	Team Player					0.15	0.15		0.60									0.15			0.30	0.30	0.15			
30	Professionalism					0.15	0.60		0.60										0.15	0.15		0.15	0.60		0.15	
31	Ethics					0.15	0.60		0.60										0.30		0.60		0.30		0.60	
32	Medical Manager																									
33	Willingness to learn																				0.15	0.15		0.15		
34	Emotional IQ																				0.60		0.30	0.60		
102																										
103	Steady State:	1	0	1	1	1	0	0	1.88	8.05	19.3	3.6	16.7	4.23	8.95	3.53	8.92	7.23	8.67	2.13	7.06					
104																										

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AX	AY		
1	Adjacency Matrix																																						
105	Eigenvalue - Number									1	2	3	4	5	6	7	8	9	10	11	12	13																	
106	Eigenvalue - Real									0.3	0.3	0	0	0.6	0.8	0	0	0	0	0	0	0	0																
107	Eigenvalue - Imaginary									1.5	-2	0	0	0	0	0	0	0	0	0	0	0	0																
108	Determinant multiplier									2.4		0		-0.6	-0.8	-0	0	0	0	0	0	0	0																
109	1									2.4	0			-0.6	-0.8	-0	0	0	0	0	0	0	0																
110	Chart range minimum									2.4	0			-0.5	-0.8	-0	0	0	0	0	0	0	0																
111	1.4									2.4	0			-0.5	-0.8	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1																
112	Chart range maximum									2.4	0			-0.5	-0.7	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1																
113	1.5									2.4	0			-0.5	-0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1																
114										2.4	0			-0.5	-0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1																
115										2.4	0			-0.4	-0.7	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2																
116										2.4	0			-0.4	-0.6	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2																
117										2.4	0			-0.4	-0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																
118										2.4	0.1			-0.4	-0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																
119										2.3	0.1			-0.3	-0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																
120										2.3	0.1			-0.3	-0.6	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3																
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141																																							
142											2.5	0.6		0.2	-0.1	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8																
143											2.6	0.6		0.2	-0	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8																
144											2.6	0.7		0.2	-0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8																
145											2.6	0.7		0.2	0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8																
146											2.6	0.7		0.3	0	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9																
147											2.6	0.8		0.3	0.1	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9																
148											2.7	0.8		0.3	0.1	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9																

Chart 1: Eigenvalue - Real vs Index

Index	Eigenvalue - Real
1	0.3
2	-2
3	0
4	0
5	0.6
6	0.8
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0

Chart 2: Eigenvalue - Imaginary vs Index

Index	Eigenvalue - Imaginary
1	1.5
2	-2
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0

