FACILITATING RESILIENCE TO SUPPORT AND PREPARE FIRST-YEAR DIAGNOSTIC RADIOGRAPHY STUDENTS FOR THE CLINICAL ENVIRONMENT

by

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DECLARATION

I, **Heidi Thomas, student number 198116659**, declare that the contents of this thesis represent my own unaided work and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

_____ **February 2024**

ABSTRACT

The radiography profession is considered challenging, characterised by radiographers working under immense pressure. Radiographers must make complex decisions involving imaging techniques often involving very ill or severely injured patients and they must effectively manage high workloads and rapid patient turnaround times. Managing these challenges requires a high degree of resilience. In the study context, radiography students commence learning in the clinical environment from their first year of study, thus they form an integral part of the workforce before they qualify as radiographers.

The literature demonstrates that when radiography students transition from the academic to the clinical environment many feel completely overwhelmed and experience uncertainty, anxiety and stress. Despite this, students are expected to function effectively in the demanding radiography environment. In the South African context, there is a growing emphasis on the integration of resilience as a graduate attribute, acknowledging the inevitability of challenges and the complexity of problem-solving. Therefore, it would be important that students are not merely adopting coping mechanisms but are also introduced to skills that foster resilience, enabling them to manage the stressors of the clinical environment. Therefore, the purpose of the study was to explore the concept of resilience as experienced by radiography students in the clinical environment and to develop a teaching model to assist radiography educators in fostering resilience as a strategy to support and prepare students for the clinical environment.

This research adopted a qualitative, explorative, descriptive, contextual, and theory-generative approach. Theory generation, necessitating four steps, was used to develop the model in this study. Step 1, concept analysis, required the completion of focus group interviews with first-year diagnostic radiography students to explore how they interpret the meaning of resilience coupled with the exploration of the influences of resilience as it relates to the clinical environment.

Four overarching themes were developed: students' understanding of resilience, students' readiness for workplace learning, interpersonal interactions as they relate to the clinical environment, and factors affecting the transition to the clinical environment. Results showed that first-year radiography students associated resilience as a positive concept for learning. They experienced considerate negative emotions associated with

their initial clinical placement which impacted their confidence negatively. In addition, students felt ill-prepared for the various interactions of the clinical environment. Most of the findings relating to interactions with qualified radiographers and lecturers highlighted the need for building supportive relationships with students. In Step 1 of model development, inductive reasoning was used to identify the central concepts: facilitation, self-efficacy, and social connections. Subsequently, the identified concepts were defined and classified using dictionaries and literature sources.

In Step 2 relationships between the concepts were explored, and in Step 3 a model wherein resilience is emphasised to better prepare first-year diagnostic radiography students for the clinical environment was developed. Lastly, in Step 4, a detailed description of the operationalisation of the model to facilitate resilience among radiography students was provided. Specifically, the guidelines offer practical actions guiding radiography educators to facilitate resilience amongst radiography students, ultimately improving students' ability to navigate challenges in the clinical environment. Practical actions include reflection, active listening and embracing learned optimism.

DISSEMINATION AND OUTPUTS

Herewith a list of presentations and publications resulting from the research to date:

Thomas, H. 2023. Interpersonal interactions in the clinical environment and Radiography students' Resilience. *SORSA. Oral Presentation, Cape Town: Century City*. 18 – 19 August 2023.

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May your compassionate and inquisitive nature evolve, guiding you to embrace humanity and pursue a journey of lifelong learning and discovery.

The LORD is my shepherd, I shall not want.

Die Here is my herder, ek kom niks kort nie.

Ps. 23:1

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ACRONYMS AND ABBREVIATIONS

BSc	Bachelor of Science
B.Tech	Bachelor of Technology
COVID-19	Corona Virus Disease 2019
CPUT	Cape Peninsula University of Technology
CHE	Council on Higher Education
CT	Computed Tomography
CUT	Central University of Technology
DOH	Department of Health
DR	Diagnostic radiography
FGI	Focus group interview
FYE	First Year Experience
HEI	Higher Education Institution
HPCSA	Health Professions Council of South Africa
HPE	Health Professions Education
HPM	Health Promotions Model
LMS	Learning Management System
MITS	Medical Imaging and Therapeutic Sciences
MRI	Magnetic Resonance Imaging
NDip	National Diploma
POPIA	Protection of Personal Information Act
REC	Research Ethics Committee
SA	South Africa
SAQA	South African Qualifications Authority (SAQA),
UK	United Kingdom
WIL	Work-Integrated Learning
WPL	Workplace Learning

CHAPTER 1:

RATIONALE AND OVERVIEW OF THE STUDY

1.1 INTRODUCTION

Diagnostic radiography (DR), a branch of medical imaging makes use of radiation sources to demonstrate, diagnose and treat internal structures of the human body (Makanjee & Engel-Hills, 2018:202; Kissane et al., 2020:2). Various imaging modalities exist within DR, including general radiography; mammography; fluoroscopy; interventional procedures, computed tomography (CT) and magnetic resonance imaging (MRI). DR is usually one of the first-line examinations to be performed to diagnose injury and disease (HPCSA, 2020).

The radiography profession is dynamic, and technology develops at a rapid pace to meet health needs (Legg & Cohen, 2020:535). In 2019, Chipere and Nkosi reported a significant increase in the workload of radiographers. Despite the increase in workload, a shortage of radiographers in the country has still been noted. This has resulted in radiographers working under immense pressure (Britton et al., 2017:28; Hazell et al., 2020:238).

A diagnostic radiographer's daily routine requires them to deal with patients of varying degrees of urgency. The spectrum of urgency includes but is not limited to walk-in patients, comatose patients, patients presenting with severe trauma, terminally ill patients and deceased patients. Particularly in the Western Cape, there has been an increase in trauma-related cases, including gunshot injuries, stab wounds and open wound injuries caused by motor vehicle accidents and violence (Zaidi et al., 2019:14). Based on the patient's condition and urgency for treatment, the patient's immediate management relies heavily on the medical imaging team. Radiographers are therefore required to respond quickly to the patients' needs and adapt their radiographic technique to ensure that the patients progress through the imaging department as fast as possible (Verrier & Harvey, 2010:117). This environment causes some stress and anxiety for radiographers who have to be competent to perform their duty swiftly but at the same time be emotionally strong to handle the trauma they are faced with. One can thus argue that radiographers must be resilient to cope with the daily challenges and the realities of the clinical environment.

Resilience is a concept that is increasingly being used in health professions education as it relates to the welfare of those who experience stress, anxiety and burnout (Dunn et al., 2008:44; Hyde, 2015:245; Meyer & Shatto, 2017:279; Yilmaz, 2017:10). It was first studied in the early 1970s in high-risk children and adolescents who thrived despite being exposed to trauma (Masten & Tellegen, 2012:345). Key researchers such as Perry (2002:33) define resilience as the capacity to face stressors without significant negative disruptions in functioning. Masten (2001:228) expands the definition of resilience by suggesting that it is a dynamic process wherein individuals display positive outcomes despite threats to an adaptation of development. Ungar (2005:15), extends a distinctive perspective on resilience, asserting that resilience is more than just a set of characteristics and includes a focus on environmental factors. Furthermore, Rutter (2012:337) theorises that the environment acts as a catalyst for resilience. The focus on the environment indicates that resilience is partially contextual (Van Breda, 2018:9). From these varied explanations, it can be deduced that resilience as a concept is complex and difficult to define. It also shows that there are varied understandings of resilience and that there is no commonly accepted definition for resilience within health professions education (HPE) (Sanderson & Brewer, 2017:65). Mansfield et al. (2012:68) attribute the multifaceted understanding of resilience to the many complexities and diverse circumstances inherent in various professions. This demonstrates that resilience is influenced by a combination of personal, social and environmental factors.

There is a growing emphasis on the integration of resilience as a graduate attribute (Burke & Scurry, 2019:1; CPUT, 2020). The Cape Peninsula University of Technology (CPUT) has outlined its Vision 2030 which stresses the importance of producing resilient graduates. These graduates should recognise that challenges are inevitable; that problems are not always easy to solve and that they can engage confidently with such complexities. The literature outlines the underpinning components for graduate resilience and makes specific reference to facing difficult and complex situations, recovering from setbacks, preventing burnout, persisting with courage in endeavours, social integration, goal resetting and adaptability (Shimi & Manwaring, 2017:60; Burke & Scurry, 2019:29; CPUT, 2020). This demonstrates the importance of preparing graduates for the multifaceted challenges of professions and enabling them to navigate the challenges with resilience. To facilitate this, the curriculum should expose students to activities and support that enhance the development of resilience.

According to the 2019 government review, approximately 40% of all first-year students in SA do not complete their degrees (Marwala & Mpedi, 2022). Evidence shows that first-year students struggle with the academic and social integration of higher education (Bitzer, 2009:225; Evans & Morrison, 2011:206). Therefore, research has been conducted to identify factors contributing to an easier integration from school to university in SA. Aspects ranked high to ensure an easy transition included interaction with other students, knowing what skills are required to be successful at university, familiarity with support services, clear expectations from lecturers, and presentation of subject content (Combrink & Oosthuizen, 2020:39). Meehan and Howell (2018:894) add that the well-being and satisfaction of university students is influenced by support from academic staff and increased social engagement with peers. With this in mind, intentional focus is placed on students' first-year experiences (FYE) at SA universities, aimed at improving student retention and success. Furthermore, efforts are made to ensure a good foundation for student academic and social integration (Meehan & Howell, 2018: 894; Combrink & Oosthuizen, 2022:41). While there is a focus on transitioning from school to university, little is known about the support that can be offered to students to ensure an improved transition from the academic/university sphere to the workplace.

The literature demonstrates that when radiography students transition from the classroom to the clinical environment many feel completely overwhelmed and experience uncertainty, anxiety and stress (Hyde, 2015:246; De Witt, 2017:43; Legg & Cohen, 2020:535). Radiography students reported coping styles applied to manage work stress as a social distraction and avoidance strategies (Legg & Cohen, 2020:533). Both coping styles and resilience are described to promote students' well-being as both deal with managing stressors. Literature suggests that coping is a feature or trait that makes people resilient (Moore & Buchwald, 2017:8). However, Macia et al. (2021:10) assert that resilience is mostly associated with positive effects while coping can be adaptive or maladaptive. In the context of the demanding radiography environment, it would be important that students are not merely adopting coping mechanisms but are, introduced to skills that foster resilience. This is significant because relying solely on coping strategies may lead to maladaptive behaviours, for example avoiding certain clinical challenges instead of seeking support for effective problem-solving.

The Resiliency Theory has been studied across disciplines and describes a framework for building resilience (Ledesma, 2014:1). In this framework resilience is viewed as a process that allows one to adapt to adversity and to develop positive outcomes as a result of this process (Van Breda, 2018:2). Early researchers initially reported resilience as a fixed or static innate trait, implying that resilience is a behaviour that cannot be learned. However, more recent researchers explain resilience as a concept that can be developed through the use of various behavioural and cognitive strategies.

Reyes et al. (2015:2622) confirmed that resilience is a dynamic, contextual process when their research demonstrated that nursing students found the grounded theory of "pushing through" critical to withstand challenges relating to their well-being and academic lives. Luthar et al. (2000:546) stress resilience as a "dynamic" construct of positive adaptation during challenging situations. This implies that while one may lack resilience in one aspect of their life or development, they may be resilient in another aspect. For example, in radiography education students' resilience may be affected negatively by a difficult patient encounter, however, when the student experiences support and guidance from a radiographer or peer they may be able to cope better with the situation, experiencing a positive outcome, thereby strengthening their resilience. Moreover, the dynamic idea of resilience also supports that resilience is not a static trait. Tugade and Frederickson (2007:312) assert that through providing strategies that elicit positive emotional experiences resilience can be built. It is thus evident that resilience is a behaviour that can, to an extent, be developed through the introduction of appropriate strategies and the cultivation of emotion regulation strategies.

Amongst these strategies are the introduction of protective factors such as peer activities, reflective practice, directed learning, problem-based learning, experiential learning and behavioural interventions (Moore, 2020; Walsh et al., 2020:7). Furthermore, the development of resilience as an attitude and behavioural response is being promoted to counter negative outcomes. A study by Yeager and Dweck (2012:312) showed that psychological interventions can enable a change in a student's mindset and are effective in creating a resilient attitude. Therefore, if radiography students' attention can be drawn to focusing for example on positive coping mechanisms such as humour, self-motivation, and concentrating on one's goals rather than focusing on the negative, the psychological intervention may have a buffering effect against a negative outcome.

Seligman's (2006:44-49) theory of 3Ps (personalisation, pervasiveness and permanence) describes an individual's ability to adopt learned optimism, which is considered a core dimension of resilience. Through learned optimism, individuals are empowered to confront adversity by challenging negative thoughts and replacing them with positive thoughts in each of the 3Ps. In the instance of "personalisation", an optimistic individual will tend to focus on the situation whereas a pessimistic person will internalise things and take them personally. With "pervasiveness", an optimistic person will consider adversity as one aspect of their lives, understanding that a negative situation will not influence all aspects of their lives. Lastly, "permanence" refers to the passing nature of adversity. An optimistic person thus believes that a positive outcome is possible whereas a pessimistic person will perceive adversity as a permanent state. Thus, an individual essentially explains setbacks to themself through an optimistic perspective instead of a pessimistic one and rises above their failure and adversity through a positive mindset.

Sarkar and Fletcher (2014:57) caution against the common misconception that resilient people are always optimistic and free from negative emotions. They rather assert that resilient people actively seek to deal with adverse experiences protecting them from negative consequences. This approach is particularly useful for radiography students given the inevitability of making mistakes during the learning process. By actively adopting a positive outlook and seeking support, students can develop resilience and strength in the face of adversity.

Martin and Marsh (2006:267) advocate their 5Cs framework for cultivating academic resilience. The 5Cs framework suggests that the 5 components—confidence; capacity to plan; control; composure and commitment—are important requirements for dealing with academic challenges. Additionally, Zhang (2022:2), asserts that when students are academically motivated, they are inclined to engage in deliberate efforts to achieve their goals and overcome demotivating factors. This links strongly to the self-determination theory that asserts that individuals must have intrinsic/autonomous motivation and be actively directed towards growth to master challenges. When there is intrinsic motivation, coupled with support and feedback, students are more likely to perform and learn better (Deci et al., 2017:20). This motivation can bring about transformation in radiography students, leading to active involvement in activities, and the enhancement of self-esteem, facilitating resilience (Martin & Marsh, 2006:267).

In medical education, resilience has been promoted as vital to alleviate burnout. This promotion has resulted in improved patient care and a decrease in medical errors (Parks-Savage et al., 2018:37). Furthermore, there is evidence that resilience helps health professionals develop a strong sense of professional identity and allows for effective collaboration with others (Wald et al., 2015:753). Nurses have reported that resilience helped them overcome workplace challenges, improve interpersonal relationships, and maintain healthy and secure psychological functions (Yilmaz, 2017:12; Cleary et al, 2018:253). Furthermore, nurses identified resilience as critical to ensure a positive transition to clinical practice and to decrease nurse turnover (Thomas & Revell, 2016:462; Meyer & Shatto, 2018:276).

Within radiography education, there is a gap in the literature concerning the description of resilience strategies and what resilience means. Moreover, a recent study examining the experiences of radiographers working during the COVID-19 pandemic indicated that there is a need for the initiation of resilience strategies for radiographers (Lewis & Mulla, 2021:349). Available literature in radiography education demonstrated that radiography students are unprepared for the challenging interactions of the clinical environment and suggested introducing resilience strategies to better equip them (Hyde, 2015:245). However, a study done in the United Kingdom (UK) highlighted that radiography students demonstrated varied understanding of the concept of resilience. Furthermore, the author emphasises the need to highlight resilience as a beneficial concept for learning in radiography (De Witt, 2017).

Based on the existing literature, highlighting the stressful circumstances of the radiography profession (Britton et al., 2017:28; Hazell et al., 2020:238; Legg & Cohen, 2020:535) it becomes critical that the radiography curriculum prepares students for difficult interactions through the learning activities offered before commencing training in the clinical environment. Van Breda (2018:8) emphasises the necessity of fostering positive relationships between the individual and their environment for the cultivation of resilience. Consequently, it is imperative that stressors are not just identified but that radiography students are equipped with skills that will enable positive interactions and student success (Cohen & Legg, 2019:456). Furthermore, it is important to note that for students to be resilient, environmental and external protective factors need to be in place to respond to the unique clinical context (McIntosh & Shaw 2017:4; Chamunyonga et al., 2020:514). As a result, radiography curricula play a vital role in

ensuring that students are supported to be resilient in both the academic and clinical environment.

1.2 CONTEXT AND RATIONALE

In SA, to practice DR, one must be registered with the Health Professions Council of South Africa (HPCSA) and have attained a formalised qualification in DR at a Higher Education Institution (HEI) (HPCSA, 2020; South African Qualifications Authority (SAQA), 2021). The four-year professional degree in radiography was first introduced in SA in the year 2014. The training of radiographers was formerly a three-year National Diploma (NDip) with an option to upgrade the NDip to a Bachelor of Technology (B.Tech) in Radiography. The Cape Peninsula University of Technology (CPUT) and Central University of Technology (CUT) were the first universities in SA to shift from the three-year National Diploma in Radiography to a four-year Bachelor's degree (Friedrich-Nel & Isaacs, 2018:5). The rationale behind this change and upgrade of the qualification was aimed at the professional upliftment of radiographers in SA and to be comparable with international standards (Friedrich-Nel & Isaacs, 2018:5).

Upon successful completion of the four-year degree, graduates are required to complete 1-year compulsory community service at a Government Hospital within the borders of SA. This requirement is prescribed by the National Government to ensure that graduates commence employment across all nine provinces of SA and to improve access to quality healthcare for citizens in previously under-served areas and provinces in SA. Upon completion of the community service year, radiographers apply for independent practitioner status with the HPCSA, a prerequisite for professional practice Department of Health [DOH], 2006).

In 1994 when the apartheid regime in SA came to an end, access to healthcare services and educational opportunities were extended to previously disadvantaged populations. Subsequently, an increased number of students from diverse backgrounds gained admittance to universities (Makoni et al., 2022:3). More specifically, in the 1950s, training in radiography was only offered to white English-speaking South African students from Durban, Port Elizabeth, Cape Town and Johannesburg. Radiography training for Afrikaans-speaking white students was later offered in Karl Bremer Hospital in the Western Cape in 1960. The end of the apartheid era in SA marked a pivotal time wherein all hospitals became accessible to patients

irrespective of their racial background. This change allowed black students into previously whites-only hospitals (van de Venter & Engel-Hills, 2022:16).

With SA having eleven official languages and having recently added a twelfth (Fraser, 2023), it is often a challenge for students to adapt swiftly to the education system where the language of instruction may not be their first language. The most spoken languages in the Western Cape province are English, IsiXhosa and Afrikaans. Despite the prevalent medium of instruction being English at most universities and at the study site, it may not be the student's home language, nor may they be fluent in the official provincial languages (Makoni et al., 2022: i). While students are expected to communicate with peers, patients, and other healthcare professionals, the use of language may pose a barrier to communication.

The radiography profession is considered challenging, characterised by radiographers working under immense pressure, having to make complex decisions involving imaging techniques for severely injured patients, and having to effectively manage high workload and fast patient turnarounds (Verrier & Harvey, 2010:117; Hyde, 2015:244, Legg & Cohen, 2020:535). Despite these challenges, radiographers are entrusted with placing patients at the centre of care (Ehrlich & Coakes, 2016:63). As a practising radiographer, I can relate to this as I recall encounters with patients bearing severe trauma in the general X-ray department, crowded waiting rooms, and having to balance my emotions, all while ensuring that each patient receives the best care possible. Often the patients who enter the clinical department are in severe discomfort and pain or are too sick to offer cooperation. In other instances, patients experience fear, caused by the unfamiliarity of the imaging process and environment. Moreover, patients may experience anxiety and fear of negative results. All these factors require a unique approach to patient interactions.

Radiographers have reported that workload, time pressures, short interactions with patients and the demand for new technology are all causes of significant stress in the clinical environment (Legg & Cohen, 2020:535). Due to the short interactions, time pressures and fast patient turnover radiographers have limited time to establish a good rapport with patients. In addition, they have little time to recover from potentially stressful encounters before moving on to a new patient. This context differs significantly from nursing and other health science professions that exist in an environment of continuity of care. Nurses have more opportunities to establish good relationships with patients compared to the DR profession, which is arguably driven by

technology, patient output and time pressures (Legg & Cohen, 2020:535) yet considered a caring profession (Ehrlich & Coakes, 2016:63).

Training of radiography students within the SA context involves participation in an academic programme as well as compulsory work-integrated learning (WIL) (HPCSA, 2020). While the academic programme exposes students to theoretical content, workplace learning (WPL) immerses students in practical, real-world work environments and experiences (Council on Higher Education [CHE], 2011:4). Thus, WIL forms an integral part of radiography education. Furthermore, this curriculum structure, endeavours to enhance the workplace readiness of students and to facilitate seamless transition from student phase to qualified radiographer.

In the study context, radiography students commence learning in the workplace from their first year of study. After five months of classroom-based learning, they are introduced to the clinical environment on a rotational basis, alternating between two-day clinical and three-day academic rotations. Thus, DR students form part of the workforce before they qualify as radiographers. This is very different from other courses where students form part of the workforce during their final year of study or upon completion of their studies. Although radiography students are placed in the clinical environment, they maintain interaction with academic staff during clinical site visits and assessments. Moreover, academics remain accessible to students through email correspondence.

In March 2020 the outbreak of the Corona Virus Disease 2019 (COVID-19) pandemic, led to the suspension of face-to-face academic classes prompting a transition to online learning platforms. Consequently, the usual in-person learning activities, including face-to-face lectures, group discussions, role play and simulated scenarios often requiring radiographic equipment, could not be conducted. Social activities and interaction aimed at ensuring an easier integration of first-year students into higher education could not be facilitated (Meehan & Howell, 2018:894; Combrink & Oosthuizen, 2022:41). Universities were then tasked with finding alternative methods to ensure continuity in academic programs. In June 2021, during the third wave of the pandemic, students were allowed a return to face-to-face classes and WPL under strict conditions. At CPUT, first-year DR students continued online learning due to classroom space, which hindered adequate social distancing. As a result, face-to-face lectures were replaced with online platforms such as Microsoft Teams, Blackboard, and Zoom.

In July 2021, study participants commenced placement in the clinical environment for the first time. Generally, rotation of first-year students in the clinical environment includes but is not limited to the general X-ray department/room, orthopaedic department/room, the chest room, and trauma/emergency department. Hayre et al. (2016:246) report that nearly 90% of examinations in the clinical environment are general DR procedures. While these departments expose students to routine imaging examinations the departments/rooms are also known for their fast pace and high patient throughput. In addition, patient interactions can be very complex since patients can range from walking to post-operative and in other instances comatose and near-death patients. More specifically, within the South African context, the prevalence of a quadruple burden of disease (encompassing communicable diseases; violence and injury; maternal and child mortality and non-communicable disease) means that a lot of patients entering a hospital are likely to undergo medical imaging (World Health Organisation [WHO], 2018). In particular, the emergency department is considered as stressful since the potential of encountering a near-death patient due to severe trauma in an imaging department in SA is not uncommon. Indeed, radiography students in Australia agree that working in the emergency department and having to operate large imaging equipment affect their coping (Chamunyonga, 2020:514; Girn et al., 2022:496).

Students pursuing DR are often assumed to have insight into the profession however this assumption does not align with research findings. Research shows that radiography students are often uncertain and lack understanding of the nature of the profession. In addition, students did not expect patients to be severely ill (Hyde, 2015:244; Bwanga & Lidster, 2019:374).

1.3 STATEMENT OF RESEARCH PROBLEM

Over the years there has been a focus on the holistic development of students in healthcare professions to prioritise their well-being (Naidoo et al., 2018:167; Reyes et al., 2018:38). Specifically, the concept of resilience has gained interest as it relates to the welfare of radiography students (Hyde, 2015:246). Generally, the day-to-day activities within a DR department happen at a rapid pace and the expectation of being technically skilled and working with the ill can be quite daunting (Hyde, 2015:246). This reality can pose a challenge to students.

While students start their radiography training eager and optimistic, the reality of the clinical environment leads to significant stress, anxiety and even dropout if they are not adequately prepared for the profession (Probst et al., 2014:391; Bwanga & Lidster, 2019:370; Chipere & Nkosi, 2019:5). I noted that first-year students appear very timid and lack confidence when they are in the clinical environment. The concern is, therefore, that first-year DR students entering the clinical environment are not adequately prepared to deal with the pressures. Equipping students with resilience skills will better prepare them for clinical challenges. These skills can be utilised throughout the student's radiography career and can eventually be used to foster a supportive learning environment when they become qualified radiographers. Therefore, resilience methods that are unique to the radiography context should be considered to support radiography students.

Due to the contextual nature of resilience, stressors and challenges within the radiography context first need to be identified, followed by the introduction of appropriate resilience strategies. However, upon evaluating the content of first-year radiography modules, particularly those pertaining to interactions in the clinical environment, the researcher observed limited evidence that supports a student's capacity to build resilience and to deal with the daily stressors before they commence their first placement in the clinical environment. Topics covered in the modules include integrated health professions, professionalism, principles of human rights, ethics, law, and social principles of health and communication (CPUT, 2021).

The emphasis on resilience as a critical graduate attribute (Shimi & Manwaring, 2017:60; Burke & Scurry, 2019:29, CPUT, 2020) highlights the need to actively promote and cultivate resilience. Furthermore, the current workforce reflecting a steady increase in workload, radiographers experiencing anxiety; emotional exhaustion and radiographers wanting to leave the profession shows a need for support structures to be in place (Pereira et al., 2021:118; Alakhras et al., 2022:283; Knapp et al., 2022:1015; Abdullah et al., 2023:247). Given that student radiographers are exposed to the same workplace environment, they are at risk of experiencing similar effects.

It is against this background that the researcher deemed it necessary to explore radiography students' understanding of resilience and explore the stressors and enablers of resilience as it relates to the clinical environment. These findings will subsequently lead to the development of a model to facilitate the teaching of resilience to first-year radiography students. Furthermore, there is an existing gap regarding

detailed instruction on how to teach and embed resilience in radiography students before they enter the clinical environment (Probst et al., 2014:390).

1.4 RESEARCH QUESTIONS

The main question for this research was:

- How can resilience be developed in first-year DR students?

The sub-questions were:

- What are the clinical stressors experienced by first-year DR students?
- What does resilience mean to first-year DR students?
- What are the enablers of resilience in first-year DR students?

1.5 AIMS AND OBJECTIVES OF THE RESEARCH

1.5.1 Aim

This research study aimed to gain an understanding of the concept of resilience, as experienced by radiography students, in relation to the clinical environment. Based on this understanding, a teaching model was developed to assist radiography educators with the facilitation of resilience as a strategy to support and prepare radiography students for the clinical environment.

1.5.2 Objectives:

- To explore and describe the concept of resilience amongst first-year DR students.
- To explore and describe the stressors and enablers first-year radiography students experience in the clinical environment.
- To develop a model wherein resilience is facilitated to better support and prepare first-year students for the clinical environment.
- To develop guidelines for the operationalisation of the model to facilitate resilience.

1.6 PARADIGMATIC ASSUMPTIONS

Guba and Lincoln (1994:107) define a paradigm as a basic set of beliefs or worldviews that guide a researcher's actions. Building on this definition, Kivunja and Kuyini (2017:26) assert that the worldview denotes the perspective, thinking, or set of beliefs that inform the interpretation of or meaning of research data. Moreover, this worldview

provides philosophical grounding and provides a lens through which the researcher examines the world and acts. Paradigms can thus be summarised as human constructions indicating where the researcher is coming from when they assign meaning to the data under investigation.

Saunders et al. (2019:130) assert that researchers are bound to make assumptions, regardless of whether it is being done consciously or unconsciously. This includes assumptions about human knowledge (epistemology), assumptions about the realities they encounter in research (ontological assumptions) and the extent their values influence the research process (axiological assumptions) (Saunders et al., 2019:133). Therefore, an understanding of the paradigmatic perspectives is important for the reader as it explains the thought processes of the researcher and affords credibility to the research process.

1.6.1 The researcher's position statement

Upon commencing the doctoral journey, careful consideration of the researcher's positionality was undertaken, resulting in thoughtful reflection on her identity as a diagnostic radiographer, educator, and researcher. This aligns with Kivunja and Kuyini's (2017:27) view, which asserts that the researchers' positionality statements help to place themselves in the research context and to look beyond their own beliefs so they can discover what is new, given what is already known. Thus, based on her experience and insider knowledge as an educator, researcher and diagnostic radiographer the researcher acknowledged the impossibility of completely separating from these roles. Consequently, from the outset of the research, the researcher was cognizant of her influence and potential bias and was committed to accurately interpreting the research phenomena (Fusch et al., 2018:19).

1.6.1.1 Position as a diagnostic radiographer

Upon completion of her high school education, the researcher enrolled for a qualification in DR at a Technikon in SA. Following the completion of a three-year course, she graduated with a National Diploma in Diagnostic Radiography resulting in the commencement of her first job position as a qualified radiographer at a private practice in Cape Town. This transition resulted in a mix of emotions, which included a sense of accomplishment and excitement but at the same time feeling anxious. The sense of accomplishment was rooted in finally pursuing her dream career as a

diagnostic radiographer. However, uncertainty crept in due to not knowing what to expect from an unknown environment. With support and guidance from colleagues and mentors, the transition was easier than expected.

Over the years the researcher was exposed to the various imaging modalities within the DR department leading to an increase in professional responsibilities over time. Being one who thrives on challenges and learning new things she eagerly took on more challenging roles. The roles revolved around being involved in team decisions, problem-solving and ensuring patient-centred care, often requiring looking beyond her own needs and instead towards the needs of the team. Existing in an environment characterised by resource constraints, heavy workload, and staff shortages was often difficult to stay positive. However, being committed to leading with integrity, focusing on her passion for the profession and support from superiors, friends, and family motivated her to persevere.

While the reality of working in a DR department can be experienced as stressful, the researcher firmly believes that when appropriate support and guidance are provided one can thrive. It is, therefore, vital that when students are placed in diagnostic clinical environments, mechanisms to support student learning and their general well-being are prioritised.

1.6.1.2 Position as an educator

The researcher transitioned from clinical practice to academia approximately ten years ago. While she was previously not in a formal educational role, the clinical role always required her to teach and supervise students and radiographers in the clinical environment. This was due to her love and natural attraction to teaching.

As a full-time, educator, mainly involved in first-year education, she became aware of the many aspects of learning and teaching and started to view students holistically rather than just as recipients of education. Her love and passion to engage with students allowed her to have a deeper understanding of what drives, motivates and discourages them. This started a yearning to avail herself as a mentor, listener, and support to students.

The yearning to educate was furthered by the social constructivist paradigm which shaped her educational beliefs. This educational paradigm also guided the research study. According to social constructivism, people create meaning through language, experience, and interaction (Akpan et al., 2020:50). Therefore, students are actively

involved in creating new knowledge through social engagement. Moreover, students make sense of ideas and information by interacting with others for example their peers, educators, and radiographers.

Furthermore, from an educator's perspective, the researcher strongly believes in creating a relaxed atmosphere where discussion between educators and students and student-to-student can happen. These discussions are critical for stimulating the affective domain of learning, where students can share their emotions, motivations, apprehensions, and appreciations, especially in a setting where the profession is considered to be driven by technology often lacking a humanistic aspect. Through providing safe spaces, students are encouraged to raise their views and engage in discussion without feeling judged.

1.6.1.3 Position as a researcher

The researcher always admired fellow researchers and often wondered what drives them to bring about change and to add to the body of knowledge. As an emerging researcher, she believes in the utmost importance of asking questions, being open to critical questions, and taking deliberate actions to respond and find answers to these critical questions.

The research theme “resilience” can be traced to the observations and conversations she had with first-year DR students relating to their confidence and the challenges they encountered associated with the clinical environment. Reflecting on these observations and the discussions with students, prompted a desire to understand how students can be supported to cope in the clinical environment and to understand what resilience meant to them. Having knowledge and understanding of the operations of a DR clinical environment and the challenges students generally face, required her to continually bracket her pre-conceived ideas and thoughts when listening to students’ views and opinions during these discussions. Specifically, she had to reserve her views of resilience and the teaching thereof.

1.6.2 Metatheoretical assumption

Metatheoretical assumptions are philosophical perspectives making claims about the reality of research and practice (Allana & Clark, 2018:1). The assumptions of the Health Promotions Model (HPM) have been selected and applied to underpin the research to radiography students’ resilience as it relates to the clinical environment. The HPM defines health as a positive dynamic state wherein individuals make healthy choices

rather than simply focusing on the absence of disease and is used universally to inform research, education, and practice (Aqtam & Darawwad, 2018:486). Specifically, the HPM depicts the multi-dimensional nature of an individual's interactions with their environment as they pursue health or meaning (Pender et al., 2011:2).

Furthermore, the HPM lends itself to the study of resilience in the sense that personal, psychological and socio-cultural factors predict health behaviours (Scoloveno, 2018:179). Therefore, the HPM was deemed relevant as it suggests that each person is partially shaped by their environment but also seeks to create an environment in which inherent and acquired human potential can be expressed (Pender et al., 2011:2). The following elements of the HPM, namely the person, environment, health profession, and self-initiated reconfiguration are deemed important to the researcher as factors critical for positive functioning in the clinical environment.

1.6.2.1 Person

The HPM suggest that the "person" is autonomous and partly shaped by the environment. For this study, the person refers to a DR student who forms part of the multidisciplinary team and is influenced by the conditions of the clinical environment. While they are autonomous individuals, they thrive in an environment where guidance and support are offered.

1.6.2.2 Environment

According to Pender et al. (2011:3), "environment" refers to the social, cultural and physical context in which the course of life unfolds. The authors assert that the environment should be manipulated to create a positive context of cues enabling health-enhancing behaviours. In this study setting, the environment relates to factors internal and external to the person.

- The internal environment refers to cognitive and mental factors that affect students. These factors are internal to a student and influence their functioning.
- The external environment relates to the clinical environment (physical), and the interactions (social) students encounter with radiographers, patients, and peers. These factors are external to the student and affect their operation.

I believe that students' resilience is greatly impacted by internal and external environments. Therefore, a focus on transforming the environment is vital, resulting in a positive transformation of the student over time.

1.6.2.3 Health profession

DR is a health profession which requires radiographers to take X-ray images of patients referred by an authorised practitioner. The literature demonstrates that the radiography profession is faced with various challenges resulting in radiographers functioning under stressful conditions. In SA, there is a shortage of skilled radiographers resulting in radiographers working under immense pressure. Radiographers are required to function optimally amidst the shortage of radiographers, the steady increase in workload and fast patient turnaround. These factors are amongst the most common sighted factors known to affect radiographers' coping leading them to often feel anxious, stressed, and overwhelmed. When students' radiographers commence clinical training, they are exposed to the same environment as qualified radiographers. The concern is therefore that without interventions, over time the profession will exert the same adverse effect on students as noted by radiographers.

1.6.2.4 Self-initiated reconfiguration

Pender et al. (2011:4) refer to "self-initiated reconfiguration" as interactive patterns essential to changing behaviour. In this study, the researcher considers resilience as a critical self-initiated reconfiguration. Resilience has proven to help students seek solutions to challenges encountered in the clinical environment and move forward positively. It also aids in having a positive mindset when things are tough. While students may not be resilient at the outset of their careers, resilience can be developed when appropriate support methods are initiated. The need for prioritising resilience as a positive concept for learning is therefore encouraged.

1.6.3 Methodological assumptions

Khatri (2020:1437) explains that methodological assumptions articulate the logic and flow of systematic enquiry. It is further concerned with how the researcher went about obtaining data, knowledge and understanding, enabling the researcher to answer the research question and contribute to knowledge (Khatri, 2020:1437).

Based on the lack of research on the facilitation of resilience in DR students for the clinical environment, a theory-generative approach was deemed necessary for this research. I opted for a qualitative methodology as it was considered a suitable methodological approach to understanding the study participants experiences within their natural context in which the phenomenon is experienced (Polit & Beck, 2018:9). Based on this understanding and the subsequent development of a theory, it is

assumed that a positive contribution to radiography education in the form of a resilience teaching model will be made. Detailed methodological assumptions about this research are explained in Chapter 2.

1.7 DEFINITIONS OF KEY CONCEPTS

1.7.1 Adversity

Adversity is defined as undesirable or harmful conditions detrimental to human and animal life, that can potentially have unwanted consequences for public and individual health and well-being (Palazzi et al., 2016:810).

1.7.2 Anxiety

Anxiety is a mood state associated with preparation for possible upcoming negative events (Craske et al., 2009:1068).

1.7.3 Challenge/s

A challenge is something new and difficult which requires great effort and determination (Collins Dictionary, 2023a).

1.7.4 Clinical education

Clinical education/training is referred to as healthcare education conducted in healthcare facilities, outpatient clinics, emergency centres, hospitals or private offices, under the supervision of a qualified practitioner or teaching staff (Cantatore et al., 2016:3).

1.7.5 Clinical environment

Papp et al. (2003:263) explain the clinical environment as encompassing all those aspects that surround the student, which include the equipment, the staff, the patients, the nurse mentor, and the nurse teacher. Within the radiography profession, the clinical environment relates to exposure to the reality of the profession whereby students are exposed to functional X-ray equipment, real patients and working with and interacting with qualified radiographers, peers, educators and the multidisciplinary health team.

1.7.6 Coping

The changes noted in one’s behaviour and cognitions during times of stress (Beutler et al., 2003:1151).

1.7.7 Diagnostic radiography

DR is a branch of medical imaging which makes use of radiation sources to demonstrate, diagnose and treat internal structures of the human body (Makanjee & Engel-Hills, 2018:205; Kissane et al., 2020:2).

1.7.8 Diagnostic radiography student

A DR student refers to a person who is registered on the BSc DR programme at the research site. In this research study, “diagnostic radiography student” and “radiography student” are used interchangeably. However, both refer to the DR student.

1.7.9 Facilitation

Facilitation is described as the process of making challenges easier for others while creating an environment of mutual respect and trust (Bates, 2016:67). In this study, the facilitation of resilience occurs when the educator guides and supports students to develop resilience by following the guided model process.

1.7.10 Model

A model is a symbolic representation of an empiric experience in the form of words, pictorial or graphic diagrams, mathematical notations or physical material (Chinn et al., 2022:156). Polit and Beck (2018:409) describe a model as a visual or symbolic representation of a theory or conceptual framework which can assist in expressing abstract ideas in a concise and convenient way. In this study, a model is developed which represents a theory in the form of words and a pictorial diagram.

1.7.11 Resilience

There are many operational definitions for resilience. In the study context resilience is referred to as “the ability of an individual to adjust to adversity, maintain equilibrium, retain some sense of control over their environment, and continue to move on in a positive manner” (Jackson et al., 2007:3).

1.7.12 Stressors

Stressors are defined as “conditions of threat, challenge, demands or structural constraints that affect operation” (Scheid & Brown, 2010:173).

1.7.13 Psychosocial

Psychosocial refers to the influence of social factors on an individual's mind or behaviour and the interrelation of behavioural and social factors (Oxford English Dictionary, 2023a).

1.8 RESEARCH DESIGN AND METHOD

1.8.1 Research design

This research adopted a qualitative, explorative, descriptive, contextual and theory-generative approach (Chinn et al., 2022:137-158). A qualitative research approach was deemed appropriate since the researcher wanted to gain a deep, holistic understanding of the stressors that radiography students experience in the clinical environment and subsequently interpret this information. The qualitative approach is grounded in the constructivist philosophical paradigm (Bloomberg & Volpe, 2012:19). There is a lack of information on clinical stressors and enablers of the clinical environment and the concept of resilience among first-year DR students entering the clinical environment for the first time, thus the constructivist philosophical paradigm allowed the researcher to explore and describe this phenomenon (De Vos et al., 2011). An inductive approach was adopted to generate theory. The inductive approach allowed the researcher to observe and identify patterns, categories and themes (Suter, 2012:351). The generated themes were interpreted, followed by the development of a theory to explain the phenomena at hand. Theory development for practice was the goal of the theory generative approach.

1.8.2 Research method

A model to facilitate resilience as a strategy to support first-year DR students in the clinical environment was developed following the process of theory development (Chinn et al., 2022:137-158). This process is frequently used within the health science context, specifically for the generation of a practice theory (Downing et al., 2017:158). Practice theory was considered appropriate for this study since it allowed for the development of a theory that relates to the practice and scope of radiography. Theory development necessitated the completion of 1) concept analysis, 2) relationship statements, 3) model development and 4) guidelines to operationalise the model.

How the four steps of model development align with the study objectives is described in Table 1.1

Table 1.1: Model development steps corresponding to the study objectives

Model development step	Objective/s
Step 1 Concept analysis & Step 2 Relationship statements	Explore and describe the concept of resilience amongst first-year DR students. Explore and describe the stressors and enablers of the clinical environment as experienced by first-year radiography students (Chapter 3)
Step 3 Model development and the description thereof	A teaching model wherein resilience is emphasised to better prepare first-year DR students for the clinical environment is developed (Chapter 5)
Step 4 Operationalisation of the Model	Guidelines for the operationalisation of the model to teach resilience are developed (Chapter 6)

1.8.2.1 Step 1: Concept analysis

According to Chinn et al. (2022:150), concept analysis requires the completion of two phases. The two phases are described as phase 1 (identifying central concepts) and phase 2 (defining and classifying concepts). Identifying central concepts required the researcher to isolate concepts which were pertinent to how the participants experienced resilience in the clinical environment. This meant that the researcher had to engage extensively with the data to identify the central concepts (Chinn et al., 2022:150). Once the central concept was identified, phase 2 commenced which necessitated defining and classifying the concepts.

Step 1, Phase 1: Identifying central concepts

A purposive sampling strategy was employed for this research. This was to ensure that the sample was relevant to the research question (Holloway & Galvin, 2016:346). Consequently, all study participants were first-year DR students studying towards a Bachelor of Science (BSc) in Radiography at the research site.

Qualitative data was collected through focus group interviews (FGIs). FGIs were conducted after the 2021 cohort of first-year DR students completed the final clinical placement of their first year.

Data analysis occurred concurrently with data collection. FGIs were audio recorded and transcribed. Analysis of the data was guided by Braun and Clarke's (2006:87) six

steps of thematic analysis. Central concepts were subsequently identified using inductive reasoning. The identified concepts formed the basis of the theory (Chin et al., 2022:162). In theory generation, scientific knowledge is used purposely to explain, support and extend the theory generated (Downing et al., 2017:159).

Step 1, Phase 2: Definition and classification of concepts

Phase 2 entailed defining and classifying the central concept (Chinn et al., 2022:150) The central concept was defined using dictionaries and literature sources. Classification of the central concept was done using Dickoff et al's. (1968:415) classification list, which includes the following six questions:

- Who is the agent?
- Who is the recipient?
- What is the context?
- What is the procedure?
- What are the dynamics?
- What is the outcome?

1.8.2.2 Step 2: Relationship statements

In this step, a description of how the identified and defined concepts interrelate with each other was formulated (Chinn et al., 2022:153).

1.8.2.3 Step 3: Model development and the description thereof

The model was structured and contextualised by forming links between and among the selected and defined concepts. The description of the model was done using the six components recommended by Chinn et al. (2022:160-166). These components are purpose, concepts, definitions, relationships, structure and assumptions. The model was evaluated following Chinn et al.'s (2022:170-176) evaluation criteria of clarity, simplicity, generality and accessibility. A panel of experts including the researcher's supervisors evaluated this model.

1.8.2.4 Step 4: Operationalisation of the model

In this step, a detailed description of the operationalisation of the model to facilitate resilience among radiography students is provided.

1.9 TRUSTWORTHINESS

Trustworthiness for the research was ensured by applying Guba's four principles of trustworthiness (Shenton, 2004:64). By applying the four principles listed as (1)

credibility, (2) transferability, (3) dependability, and (4) confirmability rigour for the qualitative research was maintained throughout the study. These principles are explained in detail in Chapter 2.

1.10 ETHICAL CONSIDERATIONS

Before the commencement of data collection, permission to conduct the study in the Department of Medical Imaging and Therapeutic Sciences (MITS) at the research site and ethical clearance were obtained. At all times during the research process consideration was given to honouring ethical standards (see 2.2) and compliance with the legal requirements of the Protection of Personal Information Act (POPIA) concerning confidentiality and protection of privacy.

1.11 STRUCTURE OF THE THESIS AND OUTLINE OF THE CHAPTERS

Table 1.2: Thesis structure

CHAPTER 1: Rationale and overview of the study	The purpose of this chapter is to provide a roadmap for the completed research thesis. Moreover, the context in which the study was undertaken, the research problem and the research paradigm which guided the research method and design are described. The study aimed to develop a theory related to radiography students' resilience.
CHAPTER 2: Research design and method	Chapter 2 gives a description of and justification of the research methods adopted to answer the research question: “How can resilience be developed in first-year DR students?” is presented.
CHAPTER 3: Findings and discussion	A deliberate omission of a literature review chapter was undertaken, contributing to a theory that is grounded in the findings of the study. However, Chapter 3, extensively utilises existing literature to support and contextualise the study findings. Furthermore, this chapter provides a critical

	explanation of the findings, along with a discussion following FGIs with first-year DR students.
CHAPTER 4: Development of a conceptual framework for the model to facilitate resilience	In this chapter a detailed description of the development of a conceptual framework for the model to facilitate resilience in first-year DR students is presented.
CHAPTER 5: The model for the facilitation of resilience	In this chapter, a description of the model to facilitate resilience in DR students is provided.
CHAPTER 6: Guidelines to operationalise the model	This chapter describes the operationalisation of the graphic model introduced for the facilitation of resilience in first-year DR students.
CHAPTER 7: Conclusion, challenges, recommendations, and original contribution	In this chapter, the challenges, recommendations for future research, contribution and conclusion of the original study are presented.

1.12 CONCLUSION

Chapter 1 presented an overview of the study encompassing a description of the context and rationale. This was followed by an explanation of the statement of the problem, the research question and the description of the aims and objectives of the study. The research paradigm that guided the research method and design was also presented. In Chapter 2, the research methods and design employed in this research study are presented.

CHAPTER 2:

RESEARCH DESIGN AND METHOD

2.1 INTRODUCTION

The context in which this study was undertaken, the research problem and the paradigm which guided the research method and design were described in Chapter 1. In Chapter 2, a description and justification of the research design and methods adopted to answer the research question: “How can resilience be developed in first-year DR students?” is provided. The chapter starts with the presentation of the ethical considerations of this study and then proceeds to describe the research design and method, based on the four steps of model development, namely concept analysis, relationship statements, description of model development and guidelines to operationalise the model (Chinn et al., 2022:139-180). This is followed by a description of the trustworthiness applied to ensure trustworthy and rigorous research.

2.2 ETHICAL CONSIDERATIONS

This research study was conducted according to the ethical principles of autonomy, beneficence, and non-maleficence. Before the commencement of data collection, site permission (Appendix A) and ethical approval (Appendix B) were obtained. At all times during the research process consideration was given to honouring ethical standards and compliance with the legal requirements of the Protection of Personal Information Act (POPIA) concerning confidentiality and protection of privacy. Aligned with the research data protection policy of CPUT, research data are stored securely and managed through the institutional data management repository (CPUT, n.d.).

2.2.1 Permission and ethics approval

Permission to conduct this research was obtained from the Head of the Department of Medical Imaging and Therapeutic Sciences (MITS) (Appendix C). Ethics clearance was obtained from the Research Ethics Committee (REC) of the Faculty of Health and Wellness Sciences, Cape Peninsula University of Technology (CPUT).

2.2.2 Informed consent and voluntary participation

DePoy and Gitlin (2019:29) assert that participants of research studies must be informed of the purpose of the study, the agreement in terms of confidentiality as well as voluntary participation. An independent recruiter posted an invitation containing the

study information (Appendix D) on the learning management system (LMS). All first-year DR students registered for the clinical subject were automatically notified by email. A detailed explanation of the nature and relevance of the study was provided. Participation in the research study was voluntary and informed consent (Appendix E) was obtained from participants prior to the FGIs. Participants were allowed to select to participate through a face-to-face or online interview.

To ensure autonomy, the researcher, who is also a lecturer to the study participants, was not involved in recruiting participants. Since a student/ lecturer relationship exist, students are considered a vulnerable population due to their position and the power and knowledge differential that exist between them and the lecturers. An independent person who is not involved in teaching first-year DR students was therefore approached to facilitate recruitment to reduce the possibility of coercion. This included posting an announcement containing the study information (LMS). Additionally, the independent recruiter with research knowledge, engaged the students during a face-to-face session. Participants were assured that declining to participate in the study would not result in negative consequences for them. FGIs were facilitated by the researcher after the final assessments for the academic year had taken place to eliminate the feeling of compulsion to partake in discussions and coerced to respond in a particular way out of fear that their results may be affected.

In keeping with qualitative research, the researcher is considered a co-creator of data together with the interviewees since the researcher understands the context of the participants and asks appropriate questions which someone who is not familiar with the phenomenon may not be able to do (Sorsa et al., 2015:9; McGrath et al., 2019:1004). The researcher took a subjective and active role in the data generation and analysis as prescribed by McGrath et al. (2019:1004). Throughout the interviews, the researcher was mindful of bracketing her feelings and preconceived ideas; instead, she focused on using her knowledge and experience of the phenomenon to elicit detailed responses. (Walker et al., 2005:7; McGrath et al., 2019:1004). During all the interviews the researcher emphasised her role as researcher and not as lecturer. Moreover, the researcher assured participants that the interviews were not for assessment purposes and would not count toward academic progress. Participants were further assured that expressing their opinions would not subject them to any prejudgment or penalties. The researcher also made sure to inform the participants of their right to withdraw from the study without facing any consequences, even after

giving their initial consent. It was clarified that any data obtained up until withdrawal would still be included in the study, as participants had contributed to the research under anonymity.

2.2.3 Anonymity and confidentiality

Confidentiality about FG discussions was addressed within the informed consent process and during the FG interviews (DePoy & Gitlin, 2019:29). Before the commencement of interviews, participants were reminded of the confidential nature of the discussions and were explicitly instructed not to disclose any information shared during the interviews beyond the confines of the interview room. To reinforce the commitment, participants were requested to sign a confidentiality agreement form (Appendix F). To safeguard participants' confidentiality, all names disclosed during the FGIs were omitted. Additionally, participants were reassured that their personal information would not be linked to the data, and any identifying details revealed during transcription would be removed. Each participant was assigned a unique code to ensure their anonymity.

The transcriber of the FGIs was required to sign a confidentiality agreement (Appendix G) before being granted access to the audio recordings. All data collected and analysed were securely stored on a computer protected by a password. Access to this computer was restricted solely to the researcher. Research supervisors were granted access on an as-needed basis. To minimise the risk of data breaches, no individuals were permitted access to the audio recorder until the audio recordings had been transcribed and securely transferred to a password-protected computer, after which the recordings were removed from the recording device and stored systematically. Furthermore, in line with CPUT's research data management requirements, all data sets are stored in the institutional data repository, where anonymised data is securely stored and accessible by permission. Additionally, in relation to POPIA, no personal information was required nor collected from study participants (CPUT, n.d.).

2.2.4 Benefits and risk

The research study presented minimal anticipated risks to the participants. Nevertheless, given that the interviews focused on the stressors encountered by students in the clinical setting, precautions were taken to address the potential emotional stress that could arise. An agreement between the researcher and the student counselling department at the study site was established, ensuring that

appropriate resources from the counselling department were accessible to participants. Given that face-to-face interviews were conducted during the COVID-19 pandemic, a risk of viral transmission existed. Consequently, safety measures like social distancing, compulsory wearing of face masks and hand sanitising were implemented in accordance with COVID-19 safety guidelines.

While the immediate benefits of the research findings may not directly impact the participants, it is important to note that future students in the same course stand to gain from the outcomes of this study. Consequently, the outcomes of this study will be shared with both the participants and the Department of MITS.

2.2.5 Integrity and trust

The integrity of the data was upheld by engaging in extensive discussions with the research supervisors, who thoroughly examined the accuracy of data interpretation. The researcher demonstrated awareness of potential biases during the data collection process and adopted an impartial stance when documenting the thoughts and emotions expressed by the participants. This required the researcher to maintain a neutral demeanour, refrain from expressing her personal opinions, and listen to participants without judgment. Furthermore, efforts were made to establish a relationship of trust with the participants, emphasising the role of a researcher rather than a lecturer. Participants were reassured that the FGI provided a secure and non-judgmental space for open dialogue, where their opinions would not be prejudged. Additionally, all research-related inquiries posed by the participants were addressed truthfully.

2.3 RESEARCH DESIGN

Research design is explained as the overall structure of research in response to a particular research question (Polit & Beck, 2018:741). To answer the study question, this research adopted a qualitative, explorative, descriptive, contextual, and theory-generative approach. Each of these research design terms is described.

2.3.1 Qualitative

A qualitative research approach was deemed appropriate to answer the research question. This approach was selected since qualitative research provides detailed information regarding research participants' experiences, behaviour, perspectives and feelings about a particular phenomenon through observation, of written or spoken word

(Taylor et al., 2015:16; Holloway & Galvin, 2016:3). Moreover, the qualitative research approach, as an interpretive method of social reality, is beneficial in environments of change (Holloway & Galvin, 2016:3). Lincoln and Guba (1994:107) describe qualitative research as naturalistic since it examines participants in their natural environment. Therefore, the participants were given the opportunity to express and provide accounts of their own experiences of resilience. The researcher considered the qualitative approach particularly suitable since qualitative research is not driven by pre-determined hypotheses and thoughts, but by experiences and perspectives as they occur naturally and holistically within a context (Johnson & Christensen, 2020:34). Thus, the nature of qualitative research was deemed fitting for the exploration of the concept of resilience as experienced by radiography students and derived meaning from the findings. Subsequently, a theory in the form of a model for the facilitation of resilience in DR would be developed.

2.3.2 Explorative/exploratory

Exploratory research aims to provide insight and a better understanding of a problem (McGregor, 2018:208; Polit & Beck, 2018:12). The need for an exploratory design in the study setting arose from a prevailing lack of understanding of the influence of what resilience means to first-year DR students as it relates to the clinical environment. The flexibility, open-ended and interactive nature of explorative research, resulted in a good fit for this research (Holloway & Galvin, 2016:93). Furthermore, this method was particularly useful as it allowed the researcher to explore the problem in-depth especially since no literature on what resilience means to DR students could be found. Davies (2011:2) confirms that exploratory research is mainly concerned with discovery and building or developing a theory or model. FGIs were incorporated for the exploration of the influences of resilience and what it means to DR students in this study.

2.3.3 Descriptive

Descriptive design is useful for building an understanding of participants' reality where little is known (McGregor, 2018:209). Descriptive research elicits information on "how", "why", "where" and "when", resulting in a dense description of the phenomenon. This information proposes a picture of the phenomenon as it transpires in the context and aids in describing variables to answer the research question. It also provides a summary in everyday, factual language that enables understanding of a selected phenomenon (Sandelowski, 2000:336; Brink et al. 2012:112, Colorafi & Evans,

2016:16). A descriptive design was therefore considered appropriate to provide an accurate and systematic description of the phenomena at hand. The description of experiences and perceptions was used to enhance the researcher's authentic understanding of the participants' reality.

2.3.4 Contextual

A contextual research design is used when a thorough examination of a natural setting is required. Corbin and Strauss (2015:155) describe context as a set of conditions that bring about problems or circumstances to which individuals respond through action, interaction, or emotion. Holloway and Galvin (2016:316) add that contextual design must enable readers to understand the processes and interactions in which the research took place. This guided the researcher and warranted the exploration and description of the phenomena in the natural context. A contextual design offered insight into the participants' experiences which directly relate to the DR clinical environment.

2.3.5 Theory generative design

In the study context, a theory generative design that is qualitative, explorative, descriptive and contextual was followed. Chinn and Kramer (2011:257) define a theory as "an expression of knowledge within empiric patterns, the creative and rigorous structuring of ideas that project a tentative, purposeful and systematic view of phenomena". These authors uphold that the theory that is generated must have a purpose and be grounded in the reality of the participants of the study. This is supported by the literature that asserts that theory must be based on empirical evidence and generated with a goal in mind (Dickoff et al,1968:430; Chinn & Kramer, 2018:189; Braun & Clarke, 2019:331; Walker & Avant, 2019:4). Silverman (2001:4) opines that the purpose of theory generation is to put an unknown phenomenon into perspective by producing information that serves as a frame of reference for the phenomena. Since little is known about the phenomenon of resilience in the selected context, the researcher observed the phenomenon with an open mind to generate a theory and develop and describe a resilience model to prepare and support radiography students for the clinical environment.

2.4 REASONING STRATEGIES

DePoy and Gitlin (2020:5) emphasise that when conducting research, it is important to indicate the thinking and action processes behind the research design. These processes are known as reasoning strategies. In general, reasoning refers to drawing

conclusions from salient, meaningful pieces of information (Khemlani, 2018:385). The reasoning strategies followed in this research are inductive, deductive and abductive reasoning (Bryant & Charmaz, 2019:126).

2.4.1 Inductive reasoning

Inductive reasoning is a method described as a process of developing generalisation following specific observations. Inductive reasoning, therefore, moves from specific to more general observations and requires the researcher to seek general rules or patterns from specific observations (Polit & Beck, 2018:11). Inductive reasoning adopts an approach where the researcher does not hold any presumptions or pre-existing ideas, instead aiming to construct understanding by incorporating the perspectives of the participants (DePoy & Gitlin, 2020:5). In the present study, inductive reasoning was applied to find patterns in the data and to develop comprehensive themes. This involved relying on personal reflections, observing participants during data collection, and interpreting the gathered data to arrive at a general conclusion (Polit & Beck, 2018:11). Additionally, a further objective of the research was to develop a model, through a process of inductive reasoning and the analysis of the research themes the researcher developed generalisations and established the central concept (Johnson & Christensen, 2020:14).

2.4.2 Deductive reasoning

Polit and Beck (2018:11,275) explain deductive reasoning as the process of developing a prediction from general principles. This form of reasoning entails moving from a general principle to understanding a specific situation. Following data analysis, a central concept was derived which formed the basis for model development. Notably a model is abstract in nature and deductive reasoning is used to move from abstract concepts within the model to guidelines for model operationalisation. Hence, in light of this understanding, the utilisation of deductive reasoning was imperative to devise guidelines for the operationalisation of the model.

2.4.3 Abductive reasoning/retroductive reasoning

Abductive reasoning is explained as the iterative process in naturalistic inquiry. This form of reasoning lends itself to developing a new theory or data where there is a lack of literature (DePoy & Gitlin, 2020:6). The application of abductive reasoning is thus deemed "theory generative" since it entails analysing data to uncover distinctive patterns and concepts (DePoy & Gitlin, 2020:6). Given the absence of an established

framework for facilitating resilience in the specific context under investigation, abductive reasoning was deemed necessary to generate a theory from the identified concepts within this study and to fill the existing theory gap in the literature.

2.5 THEORY GENERATIVE METHOD

This section gives a detailed account of the research methods that were followed for the research study. Research methods describe the techniques used to organise and structure the study in a systematic way, from the start to the end, to satisfy the research question, aims and objectives of the research (Polit & Beck 2018). Theory generation advocated by Chinn et al. (2022:139-180) was the method used to develop a model in this study. A demonstration of the four steps of model development is presented in Figure 2.1.

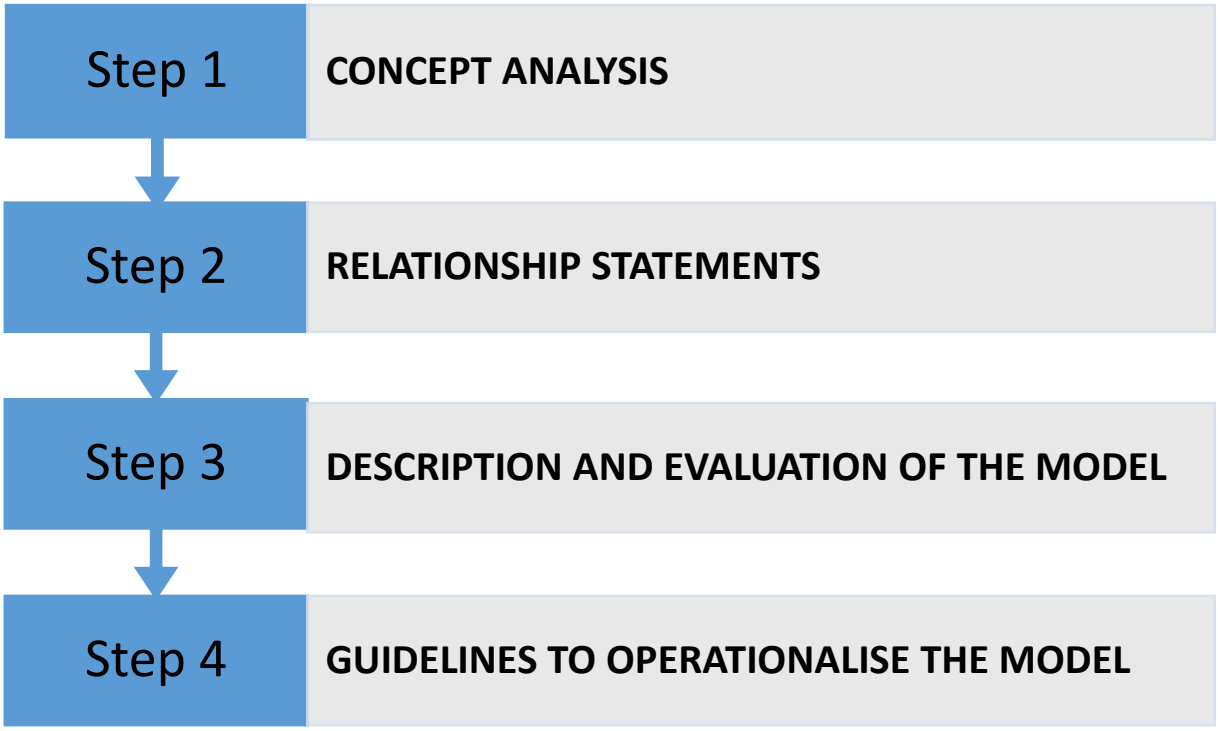

Figure 2.1: Four steps of model development

2.5.1 Step 1: Concept analysis

Concept analysis is a process of investigating the fundamentals, construction and meaning of a concept (Walker & Avant, 2005:77). Concepts form the basic building blocks of theory generation and are required to be solid and strong to defend the structure of the theory. Walker and Avant (2019:167) explain solid and strong concepts

as those that are named and defined, with their uses made clear so that readers are aware of what is described, explained or predicted. Chinn et al. (2022:150) describe concept analysis as the first step in the process of theory generation. Concept analysis steps outlined by Walker and Avant (2019:167) were followed. Table 2.1 outlines the recommended concept analysis steps outlined by Walker and Avant (2019:168).

Table 2.1: Concept analysis steps

WALKER AND AVANT STEPS (Walker and Avant, 2019)
1. Select a concept. 2. Determine the aims and purpose of the analysis. 3. Identify the uses of the concept that you can discover. 4. Determine the defining attributes. 5. Identify a model case. 6. Identify an additional case. 7. Define antecedents and consequences. 8. Define empirical references.

2.5.1.1 Select a concept

Step 1 of Walker and Avant's concept analysis necessitated the identification of the central concept. The central concept was identified following the exploration of the influences of resilience coupled with the exploration of how DR students interpret the meaning of resilience as it relates to the clinical environment. This was achieved by gathering empirical data using FGIs conducted with first-year DR students. The process is explained below.

- ❖ Study population

Study populations refer to groups of individuals who are accessible to the researcher and possess the necessary knowledge and experience related to the subject of study (Holloway & Galvin, 2016:143). In the context of this research study, the study population comprised first-year DR students who were enrolled in the Bachelor of Science (BSc) in Diagnostic Radiography programme during the 2021 academic year at a University of Technology located in the Western Cape, SA. Approximately 65

students enrol annually in the BSc Diagnostic Radiography programme. At the time of conducting the study in 2021, a total of 64 students were actively registered. During the first six months of enrolment, the first-year radiography students primarily underwent classroom-based learning at the university. For the remainder of the academic year (July to November), they participated in a rotation comprising two days of clinical practice and three days of classroom-based learning. All participants in the study were required to fulfil the compulsory clinical placement component at one of the assigned accredited DR facilities. During these clinical placements, students were actively involved with patients and the workflow under the supervision of qualified diagnostic radiographers.

- ❖ Sampling and recruitment

The study employed a purposive sampling method to select participants, thereby facilitating the intentional and systematic selection of individuals who could provide comprehensive and pertinent insights into the study's focal area (Brink et al., 2012:35; Holloway & Galvin, 2016:143). Specifically, the target population comprised first-year students enrolled in the BSc radiography programme, who had been exposed to the clinical environment during their first year of study. This group was deemed to possess information-rich characteristics, enabling them to offer the most accurate and detailed descriptions of the primary factors influencing resilience within the clinical setting during their early experiences in studying radiography.

Recruitment of the study participants commenced after ethical clearance was obtained. As a lecturer affiliated with the BSc Radiography program, primarily engaged in teaching at the first level, my direct involvement in the participant recruitment process for this research investigation was abstained. Brink et al. (2012:35) describe students as vulnerable and having diminished autonomy when there is a power imbalance. To ensure a neutral and unbiased approach to recruitment, a lecturer not associated with first-year or second-year instruction in the BSc diagnostic radiography programme was entrusted with the facilitation of the recruitment process.

The dissemination of study information and invitation to participate (Appendix D) in the research study were carried out through an announcement on the LMS, a platform all first-year DR students could access simultaneously. The utilisation of the LMS aimed to ensure equitable access to study information and establish that the invitations were not directed at specific individuals, thus allowing students the autonomy to either

accept or decline participation. Invitations included a comprehensive study information leaflet, alongside the researcher's contact details, facilitating direct communication for any inquiries or clarification pertaining to the research. Upon receiving expressions of interest from students, arrangements were made to complete the informed consent process. This process ensured that participants were fully informed about the study's purpose, procedures, potential risks, benefits, and their rights as research subjects. Those who provided informed consent were then invited to participate in FGIs.

- ❖ Data collection

Data collection was conducted using FGIs. FGIs are a common method for collecting qualitative data. The researcher believed that the perspectives and experiences shared in a FG would contribute more to understanding the phenomenon being studied than individual experiences (Paradis et al., 2016:263). Data collection began after the students completed their final assessments, coinciding with the final clinical placement for their first academic year. This timing was chosen to ensure participants would be less stressed as their assessments would have been finalised. Additionally, selecting this period meant that the quality of participants' reflections would be enhanced, as interviews would still be within the same academic year or soon after. Consequently, data collection was conducted between 11 November, 2021 and 20 January, 2022.

When selecting participants for interviews, it is important to balance rich experiential descriptions while also representing a diverse range of experiences (Patton, 2002:273). Rather than including a large number of participants in each FG, the researcher aimed for an in-depth understanding of participants' views. Krueger and Cassey (2014:68) propose that the ideal size of focus groups ranges between five to eight participants. However, a small focus group size of four to six participants is advisable where the ease and comfort of participants are concerned. Considering COVID-19 regulations, encompassing restrictions on large group gatherings, the researcher exercised prudence by limiting focus group sizes to four to five participants.

To mitigate the potential risk of coercion, participants were advised that no financial compensation would be offered. After obtaining informed consent and ensuring that at least four students were available to participate, the first FG was arranged. Participants were given the option to participate in face-to-face FGIs or via an online platform like Zoom. Most participants chose face-to-face interviews, but one FG was conducted via Zoom due to logistical restrictions and participant preference. For face-to-face

interviews, a venue separate from the participants' usual academic setting was chosen to create a relaxed atmosphere. The researcher ensured that the selected rooms, based at the clinical facilities were conveniently positioned for students to access, yet not associated with the usual academic and clinical activities. The researcher clarified her role as a researcher rather than an educator to encourage participants to view her as an impartial investigator. All COVID-19 protocols were followed during face-to-face interviews, including social distancing, mask-wearing, and hand sanitisation.

FGIs were conducted using a semi-structured open-ended interview guide (Appendix H). Before utilising the semi-structured interview guide, the questions in the guide were reviewed by the researcher's supervisors to ensure clarity and neutrality. The semi-structured format allowed for flexibility and the inclusion of additional questions that emerged during the interviews. Probing and follow-up questions were used to encourage in-depth responses and clarify any ambiguous answers.

Focus group interviews ranged from 49 to 71 minutes. The researcher was able to gather both interview information and observational information, noting participants' behaviours and reactions to others' comments. Bracketing, or setting aside pre-assumptions, was employed to maintain objectivity throughout the study (LeVasseur, 2003:408). Strategies such as keeping a reflective journal and debriefing sessions with the research supervisors were used to support bracketing (Polit & Beck, 2018:187).

At the end of each FG, participants were asked for final comments before the recording was stopped. The audio recordings were then transcribed by a professional transcriber (Appendix I: Sample transcript). Data saturation, indicating that no new information was emerging (Schneider et al., 2017:377), was achieved after the fifth FG. Recruitment was subsequently ceased.

- ❖ Data analysis

Data analysis occurred concurrently with data collection. Analysis of the data was guided by Braun and Clarke's (2006:87-93) six steps of thematic analysis. The six steps involved: (1) familiarising yourself with the data; (2) generating codes; (3) searching for themes; (4) reviewing the themes; (5) defining and naming the themes and (6) producing the report. The researcher aimed to gain a deep and clear understanding of the data, immersing herself in the data.

- Step 1: Familiarising yourself with the data.

In Step 1, the researcher familiarised herself with the transcripts by reading them several times and cross-referencing the findings with field and reflective notes. This approach allowed for a fair understanding of the content leading to the identification of codes and themes in an inductive and interpretive manner.

- Step 2: Generating codes

Moving on to Step 2, the coding process was performed manually. Yin (2011:308) explains codes as the assignment of words or short phrases to capture the meaning of a larger portion of textual or visual data. The researcher systematically worked through the data to identify interesting aspects of the data (Braun & Clarke, 2006:88). Braun and Clarke (2006:89) propose a range of approaches for coding which include written notes on the text, posted notes identifying patterns in the data and coloured pens/highlighters indicating possible patterns. The researcher coded the content of the entire data set by writing notes and highlighting interesting aspects of the data. An interpretive reflexive coding process was followed meaning codes were identified openly without the use of a coding framework (Braun & Clarke, 2021:334). The result was a coding document that recorded all the identified codes.

- Step 3: Searching for themes.

In Step 3, after coding and collating all the transcripts, a long list of codes was obtained. Braun and Clarke (2021:340) describe codes as a unit, capturing observations. The researcher then sorted these codes into potential themes and created a thematic map to observe relationships between them. In reflexive thematic analysis (RTA) Braun and Clarke (2019:593) relabelled this step to “generating initial themes” to reflect the researcher's active participation in creating the themes. This required the researcher to construct themes from the data.

- Step 4: Reviewing the themes.

During Step 4, the themes were reviewed to ensure they adequately captured the data's essence, and to assess the need for the possible collapse of the themes (Braun & Clarke, 2006:91). Themes are patterns of shared meaning united by a shared idea (Brand & Clarke, 2021:341). Themes were further refined through discussions with research supervisors.

- Step 5: Defining and naming the themes.

In Step 5, the themes were defined and named. While this step was adhered to, themes were further refined. By defining and naming the themes the essence of what each theme captured was identified as well as the aspects of the data that each theme covered.

- Step 6: Producing the report.

Lastly, in Step 6, the analysis was finalised through a process of inductive reasoning and a report was written. A dense literature control is available for each theme to contextualise the findings within the existing literature.

The development of the central concept began following the thematic analysis process. Through a process of inductive reasoning, specific patterns in the analysis were observed. Walker and Avant (2019:170) describe these patterns as areas of paramount significance, representing critical needs within the study's context. Subsequently, the researcher formulated generalisations that could plausibly explain the observed finding. These generalisations evolved into the central concept.

2.5.1.2 Defining and classifying concepts

Walker and Avant (2019:171) explain the second step of concept analysis as determining the aim and purpose of the analysis. In the context of the study, the aim and purpose were to define and classify the identified central concepts.

In step 3, the identification of the uses of the concepts were achieved by utilising various dictionaries and literature sources. The role of diverse sources is critical to distinguish the different uses of the concepts within various contexts. Subsequently, in step 4, using the diverse sources, the defining attributes of each concept were isolated. Walker and Avant (2019:173) explain attributes as characteristics that are most frequently associated with the concept. All these attributes form a cluster of attributes allowing for the broadest insight into the concept. In step 5, an exemplary/model case was constructed demonstrating all the critical defining attributes of the central concepts (Walker& Avant 2019:174; Chinn et al., 2022:144). Furthermore, in step 6, a contrasting case, illustrating the opposite of the exemplary case was constructed. Both an exemplary and a contrary case are presented in Chapter 4. Walker and Avant

(2019:175) expound upon step 7 as the examination of situations occurring before the concept exist and outcomes resulting from the concept. Lastly, step 8, serves as a measure for gauging the efficacy of the concept.

To conclude the concept analysis process, the classification of the central concept was done using the Dickoff et al. (1968:415) classification list which includes six questions. The six questions that were asked are:

1. Who is the agent?
2. Who is the recipient?
3. What is the context?
4. What is the procedure?
5. What are the dynamics?
6. What is the outcome?

In the study context, the “agent” refers to the person who acts as a facilitator (lecturer) of an activity. The “recipient” is a radiography student who is the receiver of the activity. The “context” refers to the radiography context in which the activity is being performed. The “procedure” relates to the processes to ensure that the outcome is met. The “dynamics” refer to the internal and external motivation and sources which enable both the recipient and agent to meet the outcome of the activity. Lastly the “outcome” refers to the results that are achieved collaboratively by the agent and the recipient. These aspects all play a critical role in the development of the model.

2.5.2 Step 2: Relationship statements

Chinn et al. (2022:153) assert that relationship statements require specific attention to the substance, direction, strength and quality of the interactions between concepts. Relationship statements range from simple to complex and from two to multiple statements. These statements begin to take form as the concepts are identified and emerge in step 1 of the model development. The relationship statements structurally connect the concepts of a theory (Chinn et al., 2022:153). Further explanation of the relationship statements is provided in Chapter 4.

2.5.3 Step 3: Model development and the description thereof

A theory is defined as a creative and rigorous structuring of ideas that projects a tentative purposeful and systematic view of phenomena (Chinn et al., 2022:160). When a theory is developed, a description of and critical reflection as to what the theory means should be made explicit. In this study, a model was created and contextualised

by forming links between and among the selected and defined concepts to demonstrate the relevance of the theory to practice. The description of the theory was done by posing six questions recommended by Chinn et al. (2022:160-168) that include purpose, concepts, definitions, relationships, structure and assumptions. A description of the six questions follows. In Table 2.2, an overview of the questions is presented highlighting the scope of each question.

Table 2.2: Theory description

QUESTION	SCOPE
What is the purpose of this theory?	The purpose of the theory is to specify the context and circumstances to which the theory can be applied.
What are the concepts of this theory?	The concepts are isolating words or groups of words representing objects, properties or events within a theory.
What is the definition of this theory?	The definition of the theory delineates the precise meaning of the concepts.
What are the relationships in this theory?	Here the linkages between concepts are warranted.
What is the structure of this theory?	The structure of the theory clarifies the relationships between concepts, which are expressed through relationship statements in the model.
What are the assumptions in this theory?	In this context, assumptions refer to those general beliefs or accepted truths that are fundamental to theoretic reasoning that should be described.

- What is the purpose of this theory?

The purpose of the theory specifies the context and situations in which the theory is useful. By asking why the theory was formulated, information regarding the purpose of the theory is elicited (Chinn et al., 2022:160). The theory is thus relevant to the DR context. Radiography contexts are known to be stressful due to their fast patient turnarounds, rapid technological changes and high workload. These factors are known to affect diagnostic radiographers' well-being. The purpose of this theory was therefore to develop resilience in DR students as it relates to the clinical environment.

- What are the concepts of this theory?

Concepts of theories are identified by isolating words or groups of words representing objects, properties or events within a theory (Chinn et al., 2022:162). In the study context, this was achieved by listing key ideas and tentatively identifying how they interrelate. Once relationships were considered key concepts of the theory became evident and concepts which formed part of the supporting narrative were identified (Chinn et al., 2022:162). The key concepts formed the basis of the theory.

- What is the definition of this theory?

The definition of the theory explains the explicit meanings of the concepts. Chinn et al. (2022:163) assert that definitions are crucial to clarify the nature of the abstraction constructed by the researcher in a way that the reader can understand. Without these definitions, it may be challenging to determine the theoretic structure which may well lead to assumptions and compromised definitions. The definition of the identified theory is presented in Chapter 4.

- What are the relationships in this theory?

Chinn et al. (2022:164) explain relationships as linkages among and between concepts. When concepts are identified, ideas about relationships between and among them begin to form. The way in which relationships emerge can take various forms and may be linked to the theory by assumptions which explain how concepts fit within the matrix. Consequently, the relationship statements were purposefully formed to describe the association between concepts.

- What is the structure of this theory?

The structure of the theory indicates the overall conceptual relationships within the theory. Various structures exist; however, theories should contain a discernible

structure in which all concepts coherently fit (Chinn et al., 2022:165). Thus, the relationships between concepts in this research study were clarified so that the structure could be determined. The structure of the theory is composed of the relationship statements of the model.

- What are the assumptions in this theory?

Chinn et al. (2022:168) describe assumptions as those general beliefs or accepted truths that are fundamental to theoretic reasoning. These assumptions can be made explicit or take the form of factual assertions (assumptions that are knowable) or reflect value positions (asserting what is good, right or ought to be). Stating the researchers' assumptions of truths is important so that the theory that contains them is understood within its context. The assumptions of this theory were based on the Health Promotions Model (HPM) which demonstrates that each person is partially shaped by their environment but also seeks to create an environment in which inherent and acquired human potential can be expressed (Pender et al., 2011:2).

To ascertain the adequacy and applicability of the theory for practice, critical questions were addressed. Through the process of critical reflection, comprehension of how well the theory relates to practice, education, and its contribution to research is demonstrated. The findings were presented to the research supervisors and a panel of evaluators from radiography and nursing professions who are knowledgeable about model development and theory generation. The theory was evaluated by critically reflecting on Chinn et al.'s (2022:170-176) evaluation criteria of clarity, simplicity, generality, accessibility and importance. A summary of the key evaluation points is presented in Table 2.3.

Table 2.3: Evaluation criteria of the model

CRITERIA	APPLICATION
How clear is this theory?	• Definitions of key concepts are provided. • The meaning of concepts is used consistently
How simple is the theory?	• Simplicity was achieved by limiting the number of concepts and the corresponding relationships. • A simple theory was selected to operationalise the model
How general is the theory?	• The theory was developed with a primary focus on radiography students. It is however envisaged that the theory be applied across other social contexts.
How accessible is this theory?	• Suggestions for the use of the theory in practice are provided. • Definitions for key concepts are provided. • Concepts are validated by providing theoretical relationships
How important is this theory?	• The theory holds significant importance as it is intended to instigate change in radiography education.

- How clear is this theory?

Clarity describes how well the theory can be understood and how consistently the ideas are conceptualised (Chinn et al., 2022:171). Clarity of the concepts was achieved by explicitly defining the key concepts of the theory. The meaning of the concepts was kept consistent throughout the theory description.

- How simple is the theory?

Simplicity refers to the number of interrelationships between concepts. Chinn et al. (2022:174) explain multiple relationships between and among numerous concepts as

having greater theoretic complexity. Simplicity and complexity are, however, dependent on the context in which it is developed. In the study context, a simple theory was considered relevant as a guide for practice.

- How general is the theory?

The generality of a theory relates to its breadth of scope and purpose. Defining the scope of the concepts and the purpose within the theory provides clues regarding the generality (Chinn et al., 2022:174). A general theory can be applied in a wide range of situations.

- How accessible is this theory?

The accessibility of a theory addresses the extent to which the concepts are identified and made practical. Practical indicators are experiences that can be used in practice to assess whether the purposes of the theory can be attained as the theory suggests (Chinn et al., 2022:175). The accessibility of the concepts in the theory was validated by providing theoretic relationships and suggesting the use of the theory in practice.

- How important is this theory?

An important theory is forward-looking; is useable in practice, education, and research and is valuable for creating a desired outcome (Chinn et al., 2022:176). The current theory holds practical and clinical significance aimed at creating change in radiography education.

2.5.4 Step 4: Guidelines to operationalise the model.

In this step, a detailed description of the operationalisation of the model is provided. Guidelines, outlining the actions for achieving the aim of the model are presented in Chapter 5.

2.6 STRATEGIES EMPLOYED TO ENSURE TRUSTWORTHINESS

To ensure adherence to a reliable and methodologically robust research process, careful consideration was given to pivotal facets. The notion of trustworthiness of qualitative research is an important concept to describe the rigour of qualitative research studies. Guba and Lincoln's model describes the criteria for trustworthiness through four elements, namely credibility, transferability, dependability and confirmability (Guba & Lincoln, 1994:114). The measures for trustworthiness followed

in this study are presented below. Table 2.4 presents a summary of the measures followed.

2.6.1 Credibility

Credibility alludes to the fact that the study measured what it intended to. The researcher had prior experience in collecting qualitative data and was thus familiar with the qualitative research process. An awareness of the qualitative research process enabled the researcher to truthfully reflect on and report the research findings. Ensuring credibility involved using established research methods and maintaining an accurate research journal that documented all the steps in the research process and aligned with the researcher's reflections and field notes. Field notes (Appendix J: Sample field notes) represent written accounts of the researchers' observations, including descriptions of the setting and participants' behaviour (Carter et al., 2014:545). Holloway and Galvin (2016:311) explain that reflective information goes parallel with data collection and analysis which aims to maintain the principle of triangulation. Triangulation mitigates bias and augments the attainment of data saturation. To realise this principle, the utilisation of diverse data sources concerning a particular phenomenon is imperative (Fusch et al., 2018:19; Johnson & Christensen, 2020:284). These sources included transcriptions and the researcher's field and reflective notes (Carter et al., 2014:545). The incorporation of diverse sources played a critical role in ensuring that the researchers' initial impressions and emerging patterns in the data were accurately recorded (Shenton, 2004:64; Bloomberg & Volpe, 2012:16). Additionally, the researcher maintained communication and debriefing sessions with her supervisors. These collaborative sessions aided in framing developing ideas, and probing helped the researchers recognise potential biases (Shenton, 2004:67). Another critical technique to establish credibility involved member checking. Member checking eliminates potential misunderstandings and affirms that the views and explanations of participants are correctly interpreted and recorded (Bloomberg & Volpe, 2012:16; Holloway & Galvin, 2016:311). This was done by presenting the themes and categories to the whole first-year diagnostic group. Afterwards, a debriefing session was held with the study participants where the findings were validated as being inclusive, representative, and impartial (Appendix K), further solidifying the credibility of the research (Holloway & Galvin, 2016:311).

2.6.2 Transferability

Transferability refers to the extent to which the research results may be applicable to other situations (Shenton, 2004:69). Bloomberg and Volpe (2012:17) assert that sufficient information regarding the research design and context as well as a dense description of the situation under investigation should be available to ensure transferability to similar settings or populations. To demonstrate the extent to which the results are transferable to other contexts, the researcher has explained the study context, the methods used to collect data, and the sampling method. An account of the demographics of the study participants (Chapter 3), the number and length of data collection sessions, and a detailed description of the data and results are provided (Shenton, 2004:70).

2.6.3 Dependability

Shenton (2004:71) explains dependability as the reliability and consistency of the findings and how much the study yields the same results should it be repeated in the same context. To ensure dependability all FG recordings, transcriptions, thematic maps, and field notes are kept. In addition, detailed records of all the research steps are available.

2.6.4 Confirmability

Confirmability refers to the objectivity of the researcher during the research process signifying that data represents the information that participants provided during the FGs and that it is not manipulated by the researcher (Shenton, 2004:72). The researcher is cognizant of reflexivity associated with the collection of data in qualitative research. An awareness of reflexivity enabled the researcher to understand the potential influence of her own beliefs and pre-conceptions on the study (Walker et al., 2005:7). Consequently, to prevent bias, debriefing sessions with the research supervisors were done on a regular basis. Member checking was done by returning the transcriptions to participants to confirm that a shared meaning of the interpreted data was obtained (Bloomberg & Volpe, 2012:16). Detailed notes of all decisions and analyses, as they progressed, were kept. Confirmability was further strengthened through the triangulation of data collection, utilising FGIs, field notes, and reflective notes from the researcher (Shenton, 2004:72; Carter et al., 2014:545). Finally, to support the developed themes, the researcher presents verbatim quotations.

Table 2.4: Measures used for trustworthiness

CRITERION	STRATEGY	CRITERIA
Truth value	Credibility	• Prolonged engagement • Knowledge of the research setting • Journal reflecting research process • Reflexivity • Triangulation of data • Supervisor debriefing sessions • Member checking
Applicability	Transferability	• Purposive sampling • Description of the participant demographics • Dense description of research methodology • Detailed description of the findings
Consistency	Dependability	• FG recordings are safely stored. • Transcriptions • Thematic maps • Field notes • Research steps
Neutrality	Confirmability	• Reflexivity • Researcher knowledge • Debriefing sessions • Member checking • Audit trail • Triangulation • Verbatim quotations

2.7 CONCLUSION

In this chapter, a detailed description of the research design and methods conducted for this research study were outlined. Strategies implemented to ensure the trustworthiness and rigour of the research were also presented. This permits the transferability of the findings into similar contexts. The following chapter, Chapter 3,

provides a critical explanation of the findings and discussion following the FGIs with first-year DR students.

CHAPTER 3:

FINDINGS AND DISCUSSION

3.1 INTRODUCTION

This chapter outlines the findings and discussions following FGIs with first-year DR students. Relevant literature is presented to locate the findings in the existing body of knowledge, to verify or negate them as well as to show the novel insights from this study when no literature exists. The research questions: *"How can resilience be developed in first-year DR students?"; "What are the clinical stressors experienced by first-year DR students?"; "What does resilience mean to first-year DR students?" and "What are the enablers of resilience in first-year DR students?"* guided the FGIs. Responses were analysed using a thematic analysis approach. Following the analysis of the five FGs, four themes and various subthemes (Table 3.1) were developed. Themes were reviewed by the research supervisors and member checking was conducted to add rigour to the process.

3.2 DEMOGRAPHICS OF THE PARTICIPANTS

The demographics of the participants and FG information are presented in Table 3.2. All first-year DR students enrolled at a University of Technology in the Western Cape were invited to partake in this research study. Participating in this research study, required participants to willingly provide consent and then engage in an FGI. Subsequently, a total of 21 participants voluntarily agreed and partook in the FGIs. The participant group comprised 7 males and 15 females.

Scheduling of the FGs was approved based on the mutual availability of participants and the interviewer. Times were coordinated to not coincide with academic activities. A total of five FGs were conducted. Four FGs took place in a private venue away from the classrooms and clinical environment. As per the request of the participants, one FG was conducted via the online communication platform, Zoom. The duration of focus groups ranged between 49 to 71 minutes. Data collection persisted until saturation was reached.

Table 3.1: Themes and subthemes

THEMES	SUBTHEMES
3.3 Students' understanding of resilience.	3.3.1 The fundamentals of resilience 3.3.2 External protective factors 3.3.3 Internal protective factors
3.4 Students' readiness for workplace learning.	3.4.1 Initial feelings 3.4.2 Online learning 3.4.3 Theory practice gap
3.5 Interpersonal interactions as they relate to the clinical environment.	3.5.1 Student-patient relations 3.5.2 Student-qualified radiographer relations 3.5.3 Student-lecturer relations 3.5.4 Student-student relations
3.6 Factors affecting the transition to the clinical environment	3.6.1 A lack of sufficient learning opportunities 3.6.2 Managing expectations 3.6.3 Communication 3.6.4 Need for physical and mental strength

Table 3.2: Participant and focus group information

FOCUS GROUP (FG)	PARTICIPANT (P) MALE (M) & FEMALE (F)	FG DURATION
1	2 M & 2 F	63 minutes
2	2 M & 2 F	60 minutes
3	0 M & 4 F	65 minutes
4	1 M & 3 F	49 minutes
5	2 M & 3 F	71 minutes

3.3 THEME 1: STUDENTS' UNDERSTANDING OF RESILIENCE

The data analysis provided valuable insight into what resilience means to DR students. Participants' interpretation of the concept included a focus on their understanding of resilience and protective factors. Varied explanations were provided reflecting their understanding of resilience. Furthermore, participants demonstrated an inclination to link protective factors with resilience. Three subthemes were generated when participants explained resilience, namely: (1) the fundamentals of resilience; (2) external protective factors and (3) internal protective factors. The sub-themes are discussed with supporting verbatim quotes from the participant data. Abbreviations are used to indicate the FGIs and the direct quotations from participants (P), for example, FG1P1 means focus group 1, participant 1. Verbatim participant quotations are presented in italics and placed in double inverted commas. A literature control follows the presentation of the findings.

3.3.1 The fundamentals of resilience

Participants gave various explanations of how they understand resilience. A dominant message from these explanations was that resilience was the ability to push through despite experiencing difficult circumstances. Resilience was also viewed as the ability to overcome and recover from challenging situations. Notably, participants expressed confidence as a core requirement of resilience and function as a radiographer.

> *"Resilience to me is basically like, pushing through, like, okay, identifying your problem, or at least seeing that there is a problem, and then focusing on that problem." (FG1P2)*

> *"Thinking of resilience makes me think of after we started clinical. It was a lot, it was also overwhelming then, but I should only take or we should only take one lesson at a time. Like usually when I studied I said one page at a time. That's resilience that pushing through even though when it's hard or when it's not as good." (FG1P4)*

> *"Its that capacity or ability to recover so quickly after any problem or any difficulty" (FG1P3)*

> *"With resilience, it's just like overcoming, that hardship. I think just speaking about it helps" (FG3P1)*

"There's this guy, he's in third year or something. He's so confident. It's as though he's a radiographer already. Like a professional radiographer. Resilient students are confident." (FG3P3)

The literature presents various definitions to explain resilience. The notion of recovering from setbacks and bouncing back from difficult situations was described by radiography students in the United Kingdom (De Witt, 2017:43). Nursing students described pushing through to define their understanding and enactment of resilience (Reyes et al., 2015:2622). Seminal researchers such as Ungar (2005:15) and Rutter (2012:336) explained resilience as a process of overcoming adversity and rising above their challenges. In support of this, Hart et al. (2016:3) define resilience as overcoming adversity while at the same time challenging and transforming aspects of the adversity.

Participants of this study presented similar explanations when they explained their understanding of resilience. Pushing through, recovering, and confidence was frequently used to explain their understanding. They considered pushing through, particularly when things were hard in the clinical environment. In this instance they had to remind themselves why they chose radiography as a career and as a result, they pushed through when they felt like giving up. Similarly, Robertson and Cooper (2013:175) identified resilience as a quality that comes into play when recovery is needed.

From the varied explanations following the exploration of radiography students' understanding of resilience, it is evident that there is no one explanation of what resilience means. This is confirmed by literature which emphasises that there is no consensus on the meaning and description of resilience (Mansfield et al., 2012:258; Sanderson 2017:70). However, it is evident from these explanations that resilience is a characteristic that is a necessity for overcoming challenging circumstances and having the capability to recover from hardships when required. The fact that participants of the present study used descriptions of resilience such as recovering, overcoming and confidence in abilities is evident that they associate the concept with positive characteristics. This highlights the need to emphasise resilience as a positive concept for learning (De Witt, 2017:43).

3.3.2 External protective factors

External protective factors appeared to be key when participants considered what resilience means to them. External protective factors relate to factors which are

external to the participants but are critical influencers of resilience development. Radiography peers, friends, family, and radiographer support were identified. Getting emotional support, sharing experiences and being able to talk to these people in a supportive environment were regarded as critical.

> *"I forgot her name but she's in her fourth year. Every time when I had a problem or had a bad experience, I just tell them and they would comfort me. Usually, they share their experiences and tell you that it's early, I'm still going to make mistakes and stuff." (FG4P2)*

> *"I think what helps me the most is that I talk a lot to people, especially my friends. My friends like all of them are all doing health-related courses even though they are not doing radiography, so like we talk a lot and I hear the challenges as well that they are facing in their workplaces and stuff." (FG5P4)*

> *"I would say the way I dealt with that, like I went home and I went to my mom and I was just like, "Okay, this happened." And like some of the stuff I was excited about and then some of the stuff I wasn't and I was just like okay, "So I've seen this and I'm not going to do this again." (FG3, P1)*

> *"I had someone to talk to whether it was family or another radiographer I felt comfortable enough to talk to but mental health I suppose is a big thing and not everyone has someone to talk to." FG5P1*

> *"I was lucky enough to meet good people (radiographers) who opened up and who welcomed me and they made me not feel like I'm not around my family in a way so they are there for me. I can say that because it's not only about like schoolwork but we only talk about our personal stuff and that made me adapt to the environment quickly." (FG5P3)*

Participants identified social relationships in and outside of the radiography context as external protective factors contributing to resilience. This links to Oliver's (2017:1) view, which states that the responsibility for developing resilience should not reside with the individual alone. Moreover, Ungar (2012:xxiv), asserts that resilience is more than an individual set of characteristics and includes a focus on environmental factors. Rutter (2012:336) asserts that environmental factors are dynamic conditions which balance the risk that one is exposed to. Therefore, the identification and awareness of

appropriate external protective factors within radiography education are critical as they support or undermine resilience (Howe et al., 2012:350).

Participants of this study identified family, friends, peers and supportive radiographers as protective factors. This is consistent with literature that demonstrates family support, interpersonal interactions with educators, and community support as external protective factors contributing to high resilience (Dias & Cadime, 2017:29; Litt et al., 2020:2). These external protective factors acted as a buffer against stressors and potential negative outcomes. This is an important observation as it emphasises that resilience is not a static process as initially believed (Masten, 2001:230). Hence, one can adapt when appropriate support structures are provided.

3.3.3 Internal protective factors

This category focuses on aspects internal to participants that acted as internal protective factors fostering resilience. Participants consciously chose to be optimistic by concentrating on the good days rather than mistakes. Moreover, they focused on their goals and considered a coping response such as laughing when dealing with stressors. Assertions such as *"I can do this", "whatever happens at work stays at work"; "I need to be somewhere"; "don't give up" are observed from quotations and allude to a positive mindset.*

> *"So how I recover is I look at my good days, but I can do this and I even see that qualified radiographers make some mistakes as well." (FG1P2)*
>
> *"The best thing is to tell yourself that I'm here at work now so I rather focus and then whatever, after work whatever happens at work stays at work." (FG2P3)*
>
> *"For me where I gain my confidence is I think at the end, at the four years, I want to get there. So whatever comes my way I just push through and go through all the challenges they give me." (FG2P1)*
>
> *"Sometimes instead of being upset I would just laugh and say, "Oh ma'am sorry it's a mistake, and I will just tell them, "Ma'am I will do it right next time." (FG2P2)*
>
> *"Anything that might have happened that I've done wrong whether it's calling out the wrong patient or assuming the wrong gender or anything like that, I just told myself don't give up, just learn from your mistakes." (FG5P1)*

Rutter (2012:336) refers to internal protective factors as psychological interventions and adjustments to balance the risks that individuals are exposed to. Through psychological interventions, students adapt positively to situations by using internal resources such as autonomy, self-knowledge, self-awereness and self-help (Horvath et al., 2011:25; Saraff et al., 2020:332). In the current study, participants were cognizant of internal protective factors, which resulted in them focusing on their goals and not giving up. As a result, the interventions enabled a change in students' mindsets and were effective in creating a resilient attitude. This emphasises the need to draw students' attention to positive coping skills for clinical learning such as self-motivation, humour, and concentrating on the result rather than focusing on the negative (Delany et al., 2015:1309). Based on the experiences shared by the participants, they can be considered as having a resilient attitude.

Another dimension of psychological interventions is learned optimism (Seligman, 2006:113). Seligman (2006) advocates optimism to cultivate positive perspectives. The fact that participants of this study chose not to think about difficulties after work alludes to their ability to separate work from personal life. In this instance, participants made a conscious decision not to let one setback influence all aspects of their lives, hence they chose to focus on something else after work rather than on work-related matters. The ability to separate work life from personal life denotes "pervasiveness", which is a core element of learned optimism. Seligman (2006:113) furthermore emphasises that through optimism, instead of being pessimistic, through a person's positive explanatory style they shape the meaning and outcome of an experience.

The notion of laughter as a coping mechanism to counter negative experiences and create a more relaxed learning environment was observed in this study. Liu et al. (2017:1) report humour as a common way to alleviate stress within health professions education. However, Penson et al. (2005:653) assert that humour can be considered inappropriate and disrespectful, therefore, students should be advised to use humour with caution when diffusing the situation. Based on the caution by Penson et al. (2005:653), it can be deduced that there is a need for debriefing sessions with radiography students to consider when humour is considered fitting. Indeed, Chauvet and Hofmeyer (2007:91) suggest that educators can play a role by providing guidelines on what is considered appropriate fun/laughter within the learning environment. In light of these considerations and the various methods that exist to develop and support

resilience, it would be advantageous to incorporate resilience in the curriculum to enable students to develop a resilient attitude to mitigate challenges.

3.4 STUDENTS' READINESS FOR WORKPLACE LEARNING

This theme focused on the participants' preparedness to commence their clinical placements in the diagnostic clinical environment. Feeling prepared to commence clinical placement in DR is vital as it significantly influences participants' approaches to situations and their successful integration into the clinical environment. Various factors were highlighted impacting the participants' resilience as it relates to their clinical readiness. The factors included a focus on (1) initial feelings, (2) online learning, and (3) the theory-practice gap.

3.4.1 Students' initial feelings

Participants remembered their initial feelings upon entering the clinical environment providing detailed accounts of their experiences. Contrasting descriptions of positive and negative emotions and feelings were observed. Noteworthy negative emotions/feelings influencing students' resilience encompassed feelings of uncertainty, fear, being overwhelmed and nervousness. Despite the negative impression, feelings of excitement were also reported. The narratives below depict the range of initial feelings participants experienced.

> *"How can I say, the feeling of being overwhelmed. It's a hospital. I've heard of people in clinical that haven't even stayed a night in the hospital, nonetheless, actually seen blood from other people or like that. So, it's also that kind of overwhelming." (FG1P4)*

> *"I would say the first day we were scared, our group was scared. We were just shoved into a corner because everything was busy and we were just sitting-- We're standing there watching everything and everything is going so fast, and we were lost." (FG3P1)*

> *"Going to the hospital environment for the first time. I knew how to position a patient, but you know, there was no experience to it. So I was nervous and like oh my word." (FG1P2)*

> *"I was a bit nervous with patients because it was my first time working with a patient so I would want to be as careful as possible, at the same time to*

avoid making mistakes, but then which was not easy to avoid mistakes because you'll do them now and then." (FG2P2)

Though the initial feelings were described as rather negative, participants also articulated positive emotions. Some participants conveyed a sense of excitement as they anticipated the first clinical placement, expressing eagerness to engage with the clinical team.

"My first day, I was excited to be at the hospital, to experience what radiography is all about, and to know more about it" (FG2P3)

"Okay, so when we started, it was very scary, not knowing what was going to happen, and how it's going to be but more excited for the future and what lies ahead. And now I can see why I was excited because it is amazing. And I feel a lot more comfortable with everything that has happened and how the year went so far." (FG1P1)

"Okay, on my first day when I got to work, everything was fine, staff was welcoming. On the first day, we didn't do much. We were doing more of an orientation in the hospital. They were showing us places, and cafeterias. This is this ward. This is this, maybe, ICU, things like that. Even practice on each other that day and then the staff like gave us tips." (FG5P4)

Bwanga and Lidster (2019:370) assert that the clinical environment is usually challenging for students commencing it for the first time. This assertion was substantiated by reports of radiography students feeling nervous and scared when they first experienced the clinical environment. Correspondingly, radiography students at a university in the United Kingdom reported feeling completely overwhelmed and uncertain when they commenced clinical practice (Hyde, 2015:146). This initial experience proved to be no different for nursing students who explained fear of the unknown and fear of making mistakes upon entering the clinical environment (Joolaee et al., 2015:15; Byron, 2018:4). The participants of the current study provided similar explanations when reflecting on their readiness to commence clinical placement. These observations are important to note as feeling unprepared and uncertain may pose a threat to students' resilience. Byron (2018:4) supports this perspective, by highlighting that uncertainty can cause anxiety. Moreover, feeling distressed, anxious, scared and afraid of failing has proven to affect functionality and resilience in general (Lyu et al., 2022:01).

Despite the negative orientation concerning students' initial encounters with the clinical environment, instances of positive first clinical experiences among nursing and radiography students have been documented (Hyde, 2015:246; Levett-Jones et al., 2015:307; Cowen et al., 2018:18). Nursing students, for instance, reported experiencing excitement to commence clinical, coupled with an eagerness to engage with patients; enthusiasm for learning and expanding their knowledge base (Levett-Jones et al., 2015:307; Cowen et al., 2018: 18). Like nursing student's, radiography students in the United Kingdom reported a keen interest to embark on placement in the clinical environment (Hyde, 2015:246). These positive emotions align with the sentiments of radiography students in the current study, who also conveyed eagerness to commence clinical placement and apply their acquired knowledge. It is noteworthy that an optimistic outlook is not just associated with higher levels of resilience, but also promotes stronger adaptation to the clinical learning environment (Cleary et al., 2018:117).

3.4.2 Effect of online learning

Participants' responses indicated that the predominant online learning environment during the COVID-19 pandemic had implications on their preparedness to commence clinical placement. Despite the utilisation of diverse teaching approaches and activities aimed at preparing students for the clinical environment, participant responses revealed a desire for increased face-to-face interaction with both peers and lecturers before their exposure to the clinical environment. Responses indicated a need for more social and face-to-face interaction as a lack thereof affected students' resilience. One participant expressed that the lack of social interaction affected their confidence. The lack of confidence and social and face-to-face interaction can be depicted in the quotations below.

> *"Cos when you see a face you just like, it feels like you are in an actual class, not just watching a video. And that helps a lot. More than people think…. it feels like interaction with us when we can see your face." (FG1P1)*

> *"Because I think it's easier to talk about everything face to face and it's much better because you get to experience very well with face-to-face interaction. We actually interact with you more, because if we see you*

online, I don't think we would have interacted the same way we are interacting now." (FG3P1)

"I think one of the reasons why some of us are not confident is because we're not used to talking to new people introducing myself to people. So, I think maybe if we would have had, like, if there was no COVID and we would have had everyone on Open Day, would have gotten to know each other because you're nervous, you don't know anyone." (FG2P1)

"So you all scared, you don't know who's going to start the examination. But if you got the opportunity to know each other, I feel like we just going to have a conversation and actually help each other with patients. But I think that's how it (lack of social interaction) affected us because we didn't know each other and then we were both nervous... So, you just have to start a conversation with someone you don't know and then hope that person doesn't snap or be rude to you." (FG2P2)

While the online learning environment during the pandemic was linked to negative learning experiences, there were instances where participants reported benefits arising from this mode of learning. For example, the consolidation of all lectures on the online platform facilitated the opportunity for participants to replay and review lectures regularly, at their convenience. The ability to listen to recorded lectures repeatedly was noted to contribute to a deeper understanding of the content.

"Personally, I like online classes. Online classes help me to catch up anytime that I will want to go to, even more and more and more and more. If I didn't understand something, I will go more again to understand. So at least on the online classes we still have everything and any time we can come on that and understand more and more and more." (FG1P3)

Research shows that the online learning environment during the COVID-19 pandemic presented significant challenges to the offering of radiography training globally (Kemp & Grieve, 2014:1; Alhasan & Al-Horani, 2021:69; Ogolodom et al., 2023:128). While online learning continued during the pandemic, research by Curry et al. (2020:52) and Ogolodom et al. (2023:130) emphasised a lack of open communication and feelings of isolation experienced by students. This observation aligns with a study focusing on nursing students' perceptions of online learning during COVID-19 which identified a lack of interaction and communication with peers as a major obstacle to student

learning (Ogolodom et al., 2023:130). Furthermore, this coincides with the opinions of the participants of the current study who reported that their ability to communicate and interact with others in the clinical environment was affected by the pre-dominant online learning environment.

As radiography students transition from the classroom to the clinical environment, the ability to interact, especially with peers in a similar situation, becomes crucial. Classroom interactions play an important role in preparing students to engage with one another, as well as with patients and healthcare professionals, once they are placed in the clinical environment. Agashe et al. (2021:3) posit that humans possess a fundamental need for social connection and interpersonal relations. Additionally, Fuller-Iglesias et al. (2008:181), in their study on resilience in old age, emphasise the importance of social connections as a significant protective factor that facilitates resilience. Based on this perspective, the absence of communication and social interaction can be considered as factors significantly contributing to low resilience.

While the majority of participants in the current study expressed concerns about the lack of social interaction, some reported finding benefits to online learning, particularly in the accessibility of recorded lectures at any time. This accessibility resulted in a better understanding of theoretical content for these participants. Research investigating the perceptions of both nursing and radiography students regarding online learning identified catching up on missed lectures, improved learning material quality, and the comfort of learning as major advantages (Ongolodom et al., 2022:3). This aligns with the feedback from radiography students in the United Arab Emirates who considered online learning beneficial to their progress (Alhasan & Al-Horani, 2021:76). Ungar (2006:55) emphasises access to resources as a general enabler of resilience. Therefore, when theoretical content is readily accessible, radiography students may feel more confident in their knowledge as they enter the clinical environment impacting their resilience.

3.4.3 Theory practice gap

Participants' responses suggested the existence of a substantial gap between theoretical knowledge and practical application. Participants expressed concerns regarding a disparity between their classroom and textbook learning and the realities observed in clinical practice. An example of the absence of immobilisation devices was highlighted when participants explained the disparity. Furthermore, participants believed that the examples demonstrated in the textbooks seemed less challenging

than the actual patients encountered in clinical practice. Handling patients who suffer from real pain was more complicated. These differences led to students feeling ill-prepared affecting their resilience. Examples of the theory-practice gap are evident in the extracts below.

> *“So, for me, I wasn’t confident, I only knew theory, I didn’t know how to apply it practically. But now I’m confident enough to do patients independently.” (FG2P3)*

> *“Weren’t you guys taught how to put the markers? No, you must put the markers this way. And the chest also. Weren’t you guys taught how?” This our first day here we don't know what exactly we're supposed to do. We just know the book. Not, the physical thing, yes, it was hectic.” (FG3P2)*

> *“I have to adapt and just use different ways on how to do things, especially with like immobilization devices. They don't have everything that we've taught with the routine stuff, so we just have to find something that looks similar and then just put it there or something. So, they don't, everything that we're taught routinely probably about I'd say 60% of that stuff we actually use, where the others they don't use it, they don't have it or something like that.” (FG3P1)*

> *“Some things are not exactly the same way they were taught as the way we are taught here, so sometimes that actually confuses you because you are still new to all of this you don’t know what’s right or what’s wrong.” (FG4P1)*

A participant highlighted that the examples presented in textbooks and classrooms do not mirror reality. They expressed that the radiographic positioning of actual patients with real pathology proved to be more challenging.

> *“And also, what's in the book is just like a patient that doesn't have fractures or anything. So it's much easier in the book than actually doing it because when you're doing a patient that maybe has fractures or has a pain and you have to actually think of the patient before moving the hand maybe yeah, if like maybe in the next to the patella.” (FG3P3)*

Participants from this study encountered difficulties with integrating theoretical knowledge with practical application. They perceived a discrepancy in the theory learned in the classroom and the practical experiences in the clinical environment. This

observation aligns with a review of the literature on radiography students' perceptions of clinical that indicates that they often face a disparity between classroom learning and the realities of clinical practice (Bwanga & Lidster, 2019:374; Kumsa et al., 2022:637). Similar findings were noted among nursing students who reported that the theory and practice are not always aligned and often staff do not provide adequate explanations as to why this happens (Jonsén et al., 2013:299).

Kahlke et al. (2020:228) explain that healthcare settings are complex and emphasise that health professionals may not consistently align their actions with their knowledge and beliefs and often have to adapt practices according to the needs of patients. Consequently, a disconnect between knowledge and action arises. However, Bwanga and Lidster (2019:372) emphasise the significance of these differences, potentially leading to confusion, stress and anxiety among students.

It is for this reason that Jonsén et al. (2013:299) recommend that explanations and reflections happen in an attempt to clear confusion about these variations. Being mindful of the realism of the radiography context is important and requires effective communication with students The Oxford English Dictionary (2019) describes communication as "The transmission or exchange of information, knowledge, or ideas, by means of speech, writing, mechanical or electronic media". Harris and Bostain (2021:81) stress the importance of mindfulness and further state that it significantly contributes to resilience. In addition, Wald et al. (2015:755) propose both individual and collaborative reflections, particularly focusing on workplace challenges holding the potential to mitigate fears and contribute to resilience. Consequently, a focus on mindfulness and reflection is instrumental towards facilitating improved resilience in students.

3.5 INTERPERSONAL INTERACTIONS AS THEY RELATE TO THE CLINICAL ENVIRONMENT

The theme of "interpersonal interactions" focused on the various interactions participants encountered while in the clinical environment. These interactions triggered various reactions in participants, which resulted in an enabling learning environment and, at times hindered learning. Participants' responses indicated that the diverse interactions with patients, peers, radiographers, and lecturers significantly influenced their coping in the clinical environment.

3.5.1 Student-patient relations

Participants' responses showed that they weren't fully prepared for the various interactions they encountered with patients. Some participants expressed a sense of surprise at the severity of patients' conditions. Other participants reported their disbelief when they were exposed to patients who used offensive language and were rude to them. These difficult interactions, unexpected by the participants affected their resilience. Despite some participants feeling despondent by the patient's behaviour, they demonstrated some consideration for the patient's circumstances as they could relate to them. Consequently, participants demonstrated sympathy and empathy for their patients and voiced their love for working and engaging with patients. Some stories about patient interactions are presented below.

> *"I recall there was a patient who was actually swearing at everyone. I think my past experiences has, it's what has built me as a person to accept people. Because people react differently to situations. I think, from my side, I assume that okay, it's pain, making the patient to act the way (swear) because I myself was once in pain. I would be so mean to everyone like, you don't know what I'm feeling and you're busy working around and whatever. I understood it. I understood him very well. It was just pain because I don't think he would have swore at people who wants to help him." (FG2P2)*

> *"They get mad at us when you ask them the LMP, "Why are you asking my personal stuff? Why? What are you gonna do with that information?" I'm like, "Ma'am, I just have to ask you because these stuff harm the babies and stuff so I can take an X-ray if you're pregnant." And they argue with you when you are taking let's say the hand, they say, "But my elbow is paining. Why are you taking my hand?" They'll start asking-- I'm like, "Oh my goodness." (FG3P2)*

> *"Oh, my goodness, this patient is so hurt but at the same time I still have to get the job done. What am I going to do?" And then you just stand there and then you call someone to finally help you but at the same time you just know that-- So I'm still going to meet more patients, patients who are more injured. I didn't think I'd deal with patients so injured." (FG3P4)*

“So in terms of us, if I may like compare to clinicals, it’s how we adapted in the clinical environment since we didn’t know anything about hospital or about radiography. So to some of us it wasn’t easy as you had to have – you had to adapt to see sick people every day. And to be able to handle them with care and to be patient and to have sympathy and empathy to them.” (FG5P3)

Some positive stories of patient encounters were also shared. Engaging with patients seemed to have motivated participants to wake up every morning. Patients served as a reminder of why they chose radiography as a profession. Other participants demonstrated a high level of ease working with patients. They took their time to introduce themselves and found it easy to communicate with patients. This is depicted in the quotes below.

“Every time I wake up in the morning, and I come to the hospital, I always tell myself that I did not come here for any radiographer, I just came here to help the patients and take the x rays and as good as possible for the doctors to be able to diagnose their patients and to know what's really going on whatever examination that I'm doing. Working at a hospital is something that I'm actually really happy doing like helping patients.” (FG2P2)

“I’m not really scared of patients. Because when I came here, I thought I was scared of patients, but I was surprisingly not really scared because some people can be scared of patients who are in critical conditions patients that have just been operated. I think it’s because since I prepared myself that I’m going to work in a hospital so I might get to see these things on a daily basis.” (FG4P1)

“It's always easy to communicate with my patients, I always introduce myself. And then sometimes ask them questions like, do you know why you here? And they know and then some of them they like, no, they are clueless of what's really going on. And I always take my time to explain to them, why they’re there. They always respond nicely. Every time when they say thank you after everything, I feel a lot better.” (FG2P1)

Participants did not anticipate patients who entered the radiography department to be extremely ill. They were surprised by this. This observation aligns with existing

literature on the experiences of radiography students, which indicates a similar lack of anticipation regarding working with very ill patients. Students reported feeling shocked and unprepared for such scenarios (Hyde, 2015:244; Bwanga & Lidster, 2019:374). Similarly, nursing students working with critically ill patients admitted feeling sad when they treated critically ill patients. They often experienced a sense of helplessness in providing adequate support to these patients (Charalambous & Kaite, 2013:5).

Charalambous and Kaite (2013:2) caution that difficult patient encounters can traumatise and de-motivate students, therefore, adequate preparation and support should be available. They advocate sessions where students can raise their sad emotions and difficult patient encounters. Consequently, curricula should incorporate regular debriefing sessions to normalise such discussions and provide opportunities for human interaction that may provide information which can offer valuable insights into managing similar situations in the future (Fisher et al., 2019:1; Jeyandrabalan et al., 2022:504). Talking about emotions can help students reframe negative emotions in a positive way (Cleary et al., 2018:114). Correspondingly, Joolaee et al. (2015:15) associate positive feelings with normal functioning. One can thus deduce that when students experience negative feelings this would pose a barrier to normal functioning which has a direct effect on the students' resilience.

Strudwick and Harvey-Lloyd (2012:26) claim that despite radiography students having difficulty with patient interactions, they are generally happy to return to the clinical environment. This assertion was echoed by the responses of the participants of this study who reported that encounters with patients like communicating and making sure a patient gets a diagnosis motivated them to return to clinical. The fact that participants demonstrated an understanding of the patient's conditions and demonstrated sympathy, empathy and patience while treating patients suggests that they are resilient to some extent. Taylor et al. (2020:2) describe empathy and compassion as components pertinent to the development of resilience. Moreover, it supports the argument that radiography students usually enter the profession because they are caring and empathic by nature (Loke et al., 2015:421; Williams et al., 2015:60; Naidoo et al., 2020:2).

3.5.2 Student-qualified radiographer relations

While in the clinical environment, participants worked under the supervision of qualified radiographers. Participants' responses suggested that feedback, perceptions and attitudes of radiographers influenced their resilience. Working with supportive

radiographers seemed to have impacted participants' performances in a positive way. The assistance, patience and tolerance demonstrated by radiographers contributed to an increase in participants' resilience. Participants expressed appreciation for radiographers who communicated reassuring messages. Affirmations such as "you can do this" and good job have boosted participants' confidence.

> *"I can do this, I did it, I already did it and I nailed it." So it's just like radiographers telling you that you did a good job and just like ensuring you that you shouldn't be stressed and just know that you can do this, so, ja." (FG1P1)*

> *"But it was the one day that I also had to do a patient with a lot of X-rays and I was not scared but stressed that I was gonna mess it up I called somebody just to come and check and they told me that everything was perfect. So it's just like them telling you that you did a good job and just like ensuring you that you shouldn't be stressed and just know that you can do this." (FG1P1)*

> *"And there was this one radiographer she kept motivating and motivating. Motivating me, there came a, patient with a lot of X-rays. Chest X-ray, humerus, 2 femurs, a knee, just a lot and even a chest and a very long shopping list, and I did it." (FG1P4)*

> *"There are staff who are actually really good in teaching, they give their time, they explain things thoroughly and they just help us even with the reports that we ask them they just do them willingly because they see we are trying by all means." (FG4P1)*

> *"I asked a qualified radiographer to help me, to assist me and I think she saw that I wasn't okay because after the patient was rude, after we were done with the patient she told me that sometimes you will meet people like this, people who will just take away your peace. But don't allow it; just carry on with your work and carry on smiling at the patient because this patient is in pain. I think talking to qualified radiographers, because they've been there for such a long time, it helps just to get your peace back and all that." (FG5P3)*

Participants also expressed instances of negative radiographer behaviour. At times, they perceived radiographer behaviour to be harsh, and evidence of poor patient care and communication was observed.

> *"I wanted to say my first examination, the senior radiographer was a bit harsh and then— I think she's the main reason for me to actually do better because first time when I did my first examination the radiographer was like, "The first patient is yours." (FG2P2)*

> *"Ma'am (radiographer) was a bit rough with the patients and they didn't show like an example of how proper patient care should be… When I think now is the only time I've encountered someone when they talk to a patient like down on them, which was very scary to think. And then when they teach us that in patient care management, and then it's not applied in the hospital. What's the word? Yeah, it's inappropriate for them to do something like that. They don't show examples." (FG3P1)*

> *"The way we are expected to communicate with patients is the same way we would like radiographers to communicate with us. Because at this level we don't know anything so we are going to panic. In the same way a patient would panic if he or she is not told what to do but there are just big machines and all that. So it's like we are patients to the radiographers because we don't know anything, we just see everything going around but we are not told what to do." (FG4P1)*

Challen et al. (2017:27) highlight that students identify radiographers as role models while they are in clinical placement. This implies that students look up to radiographers and would potentially follow their example. Participants of this study observed how radiographers demonstrated patience, guidance and assistance to them. While students were at the receiving end of the positive behaviour, their confidence was boosted. In their "5 Cs framework" of resilience, Martin and Marsh (2008:50) highlight confidence as a determining factor of resilience.

A search of the literature by Bwanga and Lidster (2019:371) revealed that students appreciate radiographers who make time for them and who help them with the transition to the clinical environment. Linked to the same review, students reported that when they observed radiographers demonstrate care and good communication with patients, it assisted them in developing professional behaviours. Moreover, a study by

Jeyandrabalan et al. (2022:502) found that radiography students considered radiography staff to be mentors and a source of emotional support. These aspects have contributed positively to students' mental well-being. There is a positive association between mental well-being, motivation, confidence and resilience (Martin & Marsh, 2008:55, Liu et al., 2022:3). All these factors were gauged from the participants' responses as they relate to student-radiographer interactions. By implication, radiographer interactions greatly impact students' resilience.

Like participants of the current study, radiography and nursing students reported observing undesirable behaviour from qualified radiographers and nurses (Charalambous & Kaite, 2013:6; Cunningham et al., 2015:269; Bwanga & Lidster, 2019:373). The review of the literature by Bwanga and Lidster (2019: 373) revealed that radiography students are negatively impacted when radiographers show poor communication skills towards students and patients. The authors attribute the poor communication skills to the increasing workload and limited trained clinical supervisors. Radiographers themselves have reported the increased workload as a cause for the limited support provided to students (Doughty & Hodgson, 2009:30). The workload increase in radiography is a reality, and while radiographers work under pressure, they have to be mindful that their behaviour has an impact on student's resilience. It is therefore recommended that radiographers develop effective coping strategies to deal with work stress as over time negative behaviour can affect radiography students' mental and emotional well-being. Ineffective coping strategies and undesirable behaviour stand to have a negative impact on the profession overall.

3.5.3 Student-lecturer relations

Participants expressed their appreciation for face-to-face interaction with their lecturers while they were on the clinical rotation. They specifically referred to the mid-year progress interviews where participants interacted one-on-one with their lecturers. From the interactions, it was evident that lecturer relations were considered critical, especially since some participants were separated from their families and loved ones while studying. Participants highlighted the need for lecturers to check in with them more frequently and suggested that regular visits would create a platform where misunderstandings can be resolved and where students' self-esteem can be boosted.

> *"Number 1 is maybe checking up more on the students like I've explained to ma'am about my misunderstanding…. but if lectures would check up*

more on students, I feel like it would make a difference as well. As we are scattered. So just check up on those that are scattered." (FG1P2)

"We want to interact with you more. Because what I know is if you're a student that is like you're a slow learner or you take time to process information. If you see that your lecturer is supporting, you that actually boosts your self-esteem because you believe that you can do it and all that." (FG4P1)

"Others haven't seen their families in three, almost ten months, ten, nine months, haven't seen our families. Just check up because I know of a lot of students that are actually struggling to focus sometimes because nobody's asking them how, how you are doing. If you're not doing well go to this person, you can talk to this person and that person." (FG1P4)

"The interviews with lecturers were actually very nice pouring out how you feel about the academic year and everything. It was motivating. Because I think it's easier to talk about everything face to face and it's much better because you get to experience you very well with face-to-face interaction." (FG4P1)

Results from the study revealed insight into how participants perceived support from their lecturers. Quotations revealed that most participants felt less supported by their lecturers while they were on clinical placement. Despite this, few elements were identified as strengthening their coping. Existing research in the nursing domain shows that nursing students experienced a sense of support when their lecturers interacted with them in a nurturing and caring way (Daniels & Jooste, 2018:3). Similarly, a study investigating radiography students' perceptions of clinical stressors reported comparable findings, with students highlighting face-to-face interaction with their lecturers as a form of emotional support (Jeyandrabalan et al., 2022:503).

Mason (2006:440) reports lecturer availability and regular feedback to students as an enabler of learning. The author states that the absence of these factors can lead to stress and burnout as students continually question themselves. Findings by Jeyandrabalan et al. (2022:503) correspond with this suggesting that debriefings with lecturers to counter the effect of emotional distress should be weekly rather than after a 12-week block. In a similar manner, medical interns reported better stress management from regular well-being check-ins with their supervisors (Fischer et al.,

2019:5). Dobrovská and Andres (2016:42) assert that educators should have an inherent awareness and be able to react to students' needs. This heightened awareness is likely to be fostered through direct interaction between the educator and the student.

Based on these findings, it becomes evident that radiography students would benefit from regular one-on-one check-ins and interactions with lecturers as these interactions will boost their resilience. Chamunyonga et al. (2020:515) caution that not all students may be comfortable speaking about emotional challenges and may disguise their true emotions. For this reason, student counselling services within university settings should be promoted and details about these services made available to students. This approach ensures that students have multiple options for seeking guidance and support in an environment they find comfortable.

3.5.4 Student-student relations

Responses indicate that participants relied immensely on support and interaction from peers while working in the clinical environment. These interactions transpired among peers at the first-year level and between first-year students and senior radiography students. Peer support became apparent as an important factor contributing to participants' resilience. Having a peer to talk to helped to see things that were not obvious. Peers offered advice to each other and solved problems together. Peers also offered emotional support to each other and developed fun and comfortable relationships.

> *"And then I would speak about it to my peers, and I would speak to them and be like, "Okay, now I did it like this." But they said it's like this. So then you I think just speaking about it also helps and sometimes to see things you don't want to see. And then you also speak about it. It helps a little bit." (FG3P1)*

> *"Students should ask questions, and not keep everything in. Like, as he said, they spoke amongst one another, and maybe it made you feel better, I don't know. But talking to someone could also solve the problem." (FG1P1)*

> *"I think maybe the other thing that helped me – that is still helping me here in (location omitted), another thing, I think it's my colleagues. Those are*

the people that I talk to most, especially my year group colleagues because like they are new to this environment" (FG5P4)

Responses indicate a specific reliance on support from senior peers. Once participants identified a supportive senior student, they would attach themselves to them. The support and assistance from senior students motivated participants to attend clinical placement, gave them a sense of connection and encouraged them to become future mentors.

"But just when you feel that okay this fourth year is nice to me that morning when you come back then you're like okay, "I'm going to stick with you and then whatever extra you do I will help you and then you will show me." I think that's the only way I got through the second week, knowing that the fourth years will help us." (FG3P1)

"And also, some fourth-year students who helped us whenever we needed help, pushed me to come back they were always there to help." (FG3P3)

"I also know that guy, and I was about to tell. I think he's like a perfect example of a person who's resilient because he is very confident in himself in whatever he does and in as much he is confident in himself, he is always willing to support the first-year students." (FG4P1)

"Like I know if I go into radiography next year, I will help my first years even though I probably know just as little as they do. I will still help them do the chest, I will still help them do the small things because that small thing can make a difference to them and they can learn from their mistakes, they can learn from my mistakes, they can learn from everyone else's." (FG3P1)

Peer support is increasingly recognised as a way for students to support each other and build resilience (Del Prato et al., 2011:112, Mansfield et al., 2016:80). Gray et al. (2019:7) encourage peer-assisted learning in the nursing environment as supervision from supervisors can often cause some anxiety for students. Students of this current study reported peers to function as major support to them. Seeing how resilient and confident students are encouraged them to push through. Elshami et al. (2020:112) reported comparable results when radiography students described better self-confidence and improved communication skills and they experienced learning in an enjoyable environment through peer-assisted learning.

The benefit of peer support was not just limited to radiography and nursing students, as medical students reported improved clinical skills following peer assistance (Blank et al., 2013:6). While improved clinical skills were reported, findings of the current study indicate that through peer interaction students solved problems and engaged in reflection. The literature affirms this, as a study by Ekstedt et al. (2019:9) found that students who continuously work with a peer are more capable of reflecting, problem-solving and collaborating with others.

A study by Hyde (2013: not published) reported that although radiography students in the United Kingdom felt they received good peer support, they would benefit from protected time with their peers and mentors in the clinical environment. The rapid-paced radiography environment with its fast patient turnover can be quite daunting to radiography students. Having dedicated time where common stressors can be shared amongst peers who have an authentic understanding of the environment will be beneficial. Indeed, the literature asserts that students who are supported by a peer or mentor are more likely to be resilient (Mansfield et al., 2016:80; Sanderson & Brewer, 2017:69).

3.6 FACTORS AFFECTING THE TRANSITION TO THE CLINICAL ENVIRONMENT

This theme centres on the participants' experiences while adjusting to the clinical environment. Adjusting to the clinical environment appears to have posed some challenges for the students as they grappled with many factors that hindered their development. Amongst these factors, a lack of sufficient learning opportunities, managing expectations; communication; and the need for physical strength were identified. These factors affected their resilience to adjust to the workplace.

3.6.1 A lack of sufficient learning opportunities

A lack of learning opportunities was highlighted as a barrier to clinical learning. Participants of the study believed the clinical environment does not provide enough learning opportunities for all students, and some examinations were rare to find. In addition to this, participants believed that they were placed at a disadvantage due to them being first-year students who lacked experience. Senior students were considered more capable of dealing with patients, thus they were more frequently exposed to learning opportunities. The sentiment that there were insufficient learning opportunities and that senior students were perceived as more capable could cause

worry, a sense of helplessness, and self-doubt among first-year students. Worrying and feeling helpless will negatively impact students' resilience.

> *"You find that especially when it comes to spines it's rare to find a patient who needs c spines…. Let's say maybe I'm at the orthopaedic department or somewhere and we have two patients who need c spine X-rays. So obviously, senior students will need to do those spines for their logbooks too, and we as first-year students end up not having those X-rays." (FG2P2)*

> *"Sometimes they don't need someone who's going to do it for the first time. Sometimes in general maybe there's a spine, they just say, 'Fourth-year students. At least you know, right? I'm sure a lot of you know.' Maybe there's something else, 'Oh a third-year student here.' And then for the first year a chest. So when it comes to that it's also a challenge." (FG2P3)*

> *"I wish we could get to know all the categories, even the COVID patients because now we are getting a little experience. I can say ma'am it does prepare you for the future so even maybe there could be a minimum number of patients we do for a certain condition because it does prepare you." (FG4P2)*

It is through hands-on practice that radiography students develop confidence, clinical radiography skills and competencies for the world of work (Bwanga & Lidster, 2019:374; Kumsa et al., 2022: 634). However, participants of this study reported a lack of hands-on practice and learning opportunities. The scarcity of imaging requests and the high ratio of students placed in the clinical environment were cited as reasons. This does not seem to be an isolated situation as a systematic review depicting radiography students' experiences of the clinical environment also described a lack of learning opportunities for similar reasons (Shiner, 2018:263; Bwanga & Lidster, 2019:374). This shortage has resulted in students feeling anxious and worried.

Since the COVID-19 pandemic affected healthcare systems globally, one could argue that the lack of learning opportunities is a result of the pandemic. Particularly, many patients opted to avoid hospitals due to fear of infections and to alleviate the burden on healthcare workers (Elshami et al., 2022:50). Consequently, the aftermath of the pandemic may have impacted students' professional development and overall resilience.

Issenberg and Scalese (2008:31) believe that due to better health management, patients require less medical care and hospital stays which has resulted in a general reduction of patient availability. However, in the absence of adequate learning opportunities, students' competence and confidence may be compromised. This will eventually affect students in a negative way as they will question their knowledge and competence. Resilience is known to be adversely affected by a lack of confidence in one's abilities (Martin & Marsh. 2008:55).

While students perceive their confidence is affected by a lack of hands-on experience, Bloom's Taxonomy identifies observation as a form of clinical learning. In Bloom's taxonomy, observation is observed at the 2nd level of the educational categorisation and is identified under the taxonomy as "understand" (Krathwohl, 2002:214). Although students may not directly be involved in hands-on experience, through observation, they'll be able to explain, describe and recognise the positioning technique. This understanding will assist in demonstrating hands-on experience at a later stage. Hence, hands-on experience should not be considered the only form of clinical learning.

3.6.2 Managing expectations

Participants reported experiencing idealistic expectations from staff. These expectations were assumed very early on during the participants' clinical rotation. Some participants were expected to competently manage the imaging equipment and perform imaging examinations to which they were not yet exposed. A specific incident was reported where a student experienced low tolerance from staff when lead markers were placed incorrectly. These expectations made students panic. While some participants reported unrealistic expectations, some reported getting support from radiographers to meet these expectations. Some participants were of the view that the idealistic expectations encouraged them to do better.

> *"Like I remember the head of the Radiography department, she said to one of the radiographers, "No, the students are supposed to know what is happening." So I was like, but I don't know what is happening. So like, during the examinations they just like expected me to be okay, to do this, and I was still like I don't know how the machines work." (FG1P2)*

> *"You would assume that they would at least let you like do a few chests or just a few easy X-rays. No, they threw me in the deep end and I just had*

to swim. I really had to swim but that was my weird first experience. After I'd done my first patient I obviously, like told myself I'm okay, calm down. Calm down. Take it slow. You only started today." (FG5P2)

"Like they just expected me to know what I'm doing and all of that. Once I froze up and then they just took over and they didn't ask like, "Do you know what's happening?" So it's just nice if they don't just take over but explain." (FG4P4)

Some participants reported getting assistance from radiographers. They found explanations and demonstrations helpful in meeting radiographers' expectations.

"So like this year, I think even the extremities some of them gave us extremities without us doing them at school. So they will just show us how to do it and then from there explain. I think it depends on the radiographer… most of them actually help us a lot…and will just correct you and everything will be normal. So now I'm just confident I can do patients on my own." (FG2P2)

"I don't want to lie it's (clinical) overwhelming and it's scary at the same time…. but they do give you room to make mistakes and they also give you time to adapt in the environment and also learn how to do your patient and also learn your own ways on how to deal with patients." (FG5P3)

Participants from this study were challenged by the high expectations of radiographers. A recent study exploring radiography students' perceptions of the clinical environment reported that radiography students felt distressed when they were expected to know and position a theatre machine on the first day. They felt extreme pressure when they were expected to be capable of performing procedures in which they lacked experience (Girn et al., 2022:496). This is similar to reports from the current study participants who reported being left alone to operate X-ray equipment without having a demonstration of how the equipment operates. Surprisingly newly qualified radiographers also reported experiencing pressure from radiography staff when they commenced their new positions. They felt overwhelmed by the expectation that they should perform at a certain level (Harvey-Lloyd et al., 2019:65). Unrealistic expectations compromise the student-supervisor relationship. It also places a burden on students and puts them in distress, having the potential to affect their resilience (Girn et al., 2022:496).

Jeyandrabalam et al. (2022:499) stress that confidence in clinical skills and the ability to manage clinical situations grows gradually over time; therefore, staff should not place unrealistic expectations on students. This necessitates radiography staff to demonstrate and explain the appropriate techniques especially when students do not feel comfortable or capable. Meeting expectations collaboratively boosted students' confidence, as was observed in this study. Strudwick and Harvey-Lloyd (2012:27) assert that workplace culture and expectations from staff affect the way students integrate into the clinical environment. Having realistic expectations will create a positive workplace environment where students feel less pressured and burdensome.

3.6.3 Communication

Communication between radiography staff and students was emphasised as an important component when adjusting to the clinical environment. Participants shared stories of poor communication. The communication was highlighted in two dimensions. The dimensions focused on (1) the manner information was communicated and (2) the use of conversational language. Some participants felt excluded and did not fully understand when communication happened in a language unfamiliar to them. The use of communication affected participants' resilience as it triggered feelings of low self-esteem, panic, feelings of disrespect, and at times hyperventilation.

> *"That was the worst day when we had just arrived. I think it was just the beginning of clinical so we didn't know a lot of things… Aren't you supposed to be cleaning? The way she just snapped at us, it was in front of everyone, we felt disrespected. I felt she should have maybe said it in a polite way, 'Do you guys know where the linen room is?'. You're supposed to do this and this and this and that. It's the way she spoke and also just in front of everyone. It was just embarrassing. I believe that was my worst day." (FG4P4)*

> *"I feel like when you talk to me in whatever way I panic and then I make a lot of mistakes. So, I feel like, "Talk to me properly, make me understand what's going on." And then that's when I'm gonna be also productive." (FG4P3)*

> *"So, one qualified radiographer came inside, and we didn't position correctly, so she was speaking Afrikaans and then they excluded me*

because I don't understand Afrikaans. I just kept quiet and looked at what they do." (FG2P4)

"When they are explaining X-rays, if you're standing with a person who speaks Afrikaans they will explain in Afrikaans, and I don't understand….so you just stand there. It's just a lot to take in." (FG3P4)

While language was considered a barrier to learning, one participant explained that they were supported by staff and peers to learn. In addition, the language classes which are part of the curriculum seem to have assisted with communication.

"Then another thing I think the language barrier plays a big role. But I'm learning bit by bit because now sometimes if they talk to me, using Afrikaans I can hear such words, it's just that I can't contract maybe a sentence [indistinct]. Because like sometimes it happens that you are all alone in the department and there comes a patient who only speaks Afrikaans and doesn't understand English. I think taking classes online, Afrikaans and everything was helping me and also, with my fellow colleagues at work, are helping me in terms of this and also, with reception, sometimes it's hard to pronounce people's names." (FG5P4)

Ineffective communication was highlighted as a barrier to learning by participants of this study. Ehrlich and Coakes (2021:91) stress that communication and professional behaviours have a strong effect on motivation and efficiency. Furthermore, literature observed a relationship between communication and job satisfaction when nursing students and nurses reported a decrease in burnout and an improvement in motivational levels when nurses communicated in a pleasant manner (Vermeir et al., 2018:26; Goktas et al., 2022:556). This is critical information and emphasises the need to communicate in a manner that is clear and that expresses respect and patience.

Elshami et al. (2020:122) argue that language barriers can lead to ineffective communication causing dissatisfaction among healthcare professionals and patients. Moreover, radiography students in Europe felt excluded when radiographers communicated with each other in their native language excluding them from communication (Challen et al., 2017:25). It is thus no surprise that participants of this study reported feeling excluded from learning opportunities when radiographers communicated in a language they did not understand. When explanations are offered

in a language the student does not understand, there is a risk of mistakes being repeated due to the student's lack of understanding.

Additionally, students may feel mistreated and excluded by the lack of consideration for their language proficiency and feel less valued than their peers who are proficient in the language predominantly spoken. Linkov et al. (2022:2) assert that inclusiveness should be an important consideration when we teach as it is an important determinant of resilience. The Oxford English Dictionary (2023) defines inclusiveness as the practice or policy of providing equal access to opportunities and resources for people who might otherwise be excluded or marginalised. Therefore, all students should be given an equal opportunity to learn in an environment where mutual respect and patience are highly favoured.

3.6.4 Necessity for physical strength and stamina

Participants' responses indicated that to effectively adapt to the clinical environment, one requires physical strength and stamina. They alluded to the need for physical strength to lift, position, and transfer patients throughout the day. They described the clinical environment to be very tiring, especially considering having to wake up early and sleep deprivation. Having to stand for long periods affected their performance. All these factors impacted participants' resilience.

> *"So, you have to prepare yourself even though we know the patient transfer techniques, but we have to be strong, especially when lifting huge patients. Imagine doing the patient alone we have to lift and then the patient is unconscious." (FG3P4)*

> *"Having to deal with school (university), being tired and having to deal with positioning or not doing something right. You have to wake up at five, you have a class starting at eight or nine and clinical. Like the days you have to wake up at five to catch a taxi or bus or shuttle wherever. That's what I mean by tired, physically tired. And being there the whole day. Not sleeping." (FG1P4)*

> *"It feels like they don't understand what you are going through in the clinical. Clinicals are very draining. When you reach the residence, you are already tired. You just want to sleep but you don't get enough sleep." (FG4P1)*

“We actually train from school to wake up early. But like when you came straight out of school, and for almost two to three months, you've been laying at home, waking up at 10 or 11, having no problems and then suddenly, okay, you have to wake up at five, you have class or clinical starting at eight or nine.” (FG1P4)

Participants explained the need for stamina and physical strength to function in the clinical environment. They felt that a lack thereof had a direct effect on their academic and clinical performance. Okano et al. (2019:3), who studied the effect of poor sleep on university students, found that academic performance was negatively impacted by insufficient sleep. Moreover, a review of the literature affirms that factors such as lack of sleep and poor diet affected radiography students’ well-being (Chamunyonga et al., 2020:514). Chatburn et al. (2013:2) explain that a lack of sleep can affect resilience as people are less able to regulate their emotions and are prone to reduced energy levels.

In the current study, participants referred to heavy patients and the difficulty of lifting and transferring them. However, the researcher did not find explicit mentions of aspects which relate to patient transfer and heavy patients affecting radiography students coping. Del Prato et al. (2011:110) reported that a major contributor to stress in nursing students is the workload. Literature in radiography education concurs that workload contributes to students feeling stressed (Bwanga & Lidster, 2019:268, Chamunyonga et al., 2020:514). Although participants in this study did not mention workload as a potential factor affecting their resilience, the general increase in workload relates to busier departments and this could potentially have an impact on students’ stamina and physical capability. Chamuyonga et al. (2020:514) recommend regular physical activity, sufficient sleep, and diet to increase stamina and well-being. Educational institutions can play a pivotal role in fostering resilience by promoting wellness programs and encouraging routine wellness check-ins.

3.7 CONCLUSION

In Chapter 3, prolonged engagement with the data provided insight into the complexity of participant's experiences in the clinical environment as it relates to their resilience. Participants’ experiences of resilience were largely influenced by their ability to deal with negative and positive experiences. While some findings allude to participants being resilient to a certain extent, the overall findings indicate a lack of support

mechanisms fostering the development of resilience in first-year radiography students as it relates to the clinical environment. The knowledge gained through engaging with the data will guide curriculum development initiatives relating to resilience development.

Chapter 4 presents a detailed description of the development of a conceptual framework for the model to facilitate resilience in first-year DR students.

CHAPTER 4:

DEVELOPMENT OF A CONCEPTUAL FRAMEWORK FOR THE MODEL TO FACILITATE RESILIENCE

4.1 INTRODUCTION

The purpose of this chapter is to present a detailed description of the development of a conceptual framework for the model to facilitate resilience in first-year DR students. The themes and sub-themes discussed in Chapter 3 formed the basis for the development of the conceptual framework.

4.2 IDENTIFICATION OF THE CENTRAL CONCEPT

The identification of concepts was conducted in accordance with the phases of concept analysis (2.5.1). Concepts, which form the basic building blocks of a theory are defined as a mental image of a phenomenon, an idea or construct in the mind, about a thing or an action (Walker & Avant, 2019:168). Chinn et al. (2022:151) highlight the significance of concepts in revealing the focus and significance of a theory.

Identifying the central concept necessitated the researcher to engage extensively with the data presented in Chapter 3, subsequently isolating concepts pertinent to how participants experienced resilience in the clinical environment. Four themes, namely students' understanding of resilience, students' readiness for workplace learning, interpersonal interactions as they relate to the clinical environment, and factors affecting the transition to the clinical environment, were introduced in Chapter 3. Through inductive reasoning, involving reflection on the themes to discern an underlying and common meaning across the four themes, the central concepts were identified. These concepts denoted an area deemed critical within the study setting (Walker & Avant, 2019:170).

The identified concepts were further validated through the researcher's field and reflective notes, compiled during the data collection process. While reflecting on the central concepts, the researcher was cognizant of her position as a radiographer and educator who knows the study setting and the potential influence this background would have on the construction of knowledge. Thus, reflexivity remained integral to the entirety of the research process, involving constant introspection regarding personal biases and preconceptions (Palaganas et al., 2017:427). Subsequently, the concepts

identified from the data formed the basis for the theory (Chinn et al., 2022:137). The following sections summarise the empirical data.

Theme 1 centred on the students' understanding of resilience. The results revealed diverse interpretations of resilience among first-year DR students. Participants provided fundamental descriptions of resilience which included pushing through, confidence and recovering. These descriptions align with the literature, demonstrating that participants have a sound understanding of the concept of resilience.

Findings indicate that participants demonstrated a profound awareness of external protective factors and identified various factors in and outside of the radiography contexts influencing resilience. Family, friends, radiographers, and peers were identified as critical to supporting the development of resilience. In addition, participants alluded to internal protective factors like optimism, confidence, and a focused mindset critical for fostering a resilient attitude. Additionally, participants associated resilience as a positive concept for learning, which aligns well with the literature. What was further uncovered was a need to provide guidance on the use of resilience-building approaches. This acknowledgement arose from instances where coping methods, such as laughter, were observed to be employed inappropriately within the clinical environment.

Theme 2 revealed that participants experienced considerate negative emotions associated with their initial placement in the clinical workplace. Feelings of uncertainty, fear, being overwhelmed and nervous affected their resilience. This demonstrates the need for introducing methods to mitigate the initial feeling of fear and distress as negative emotions can lead to poor adaptation to the clinical environment. Participants identified key factors affecting their readiness to commence clinical in the workplace as the predominant online learning environment and the disparity between theory and practice. The inability to communicate and interact socially was strongly evident. The researcher's field notes reflected participants' diverse emotional responses, with some expressing excitement about commencing clinical activities, while others recalled feeling rather negative. This observation warrants attention to ensure a positive outlook for all students embarking on clinical placement.

The worry that was raised by participants about the disparity between what is learned and seen in the clinical department without any reasons and explanations provided by radiographers resonates with the researcher's own past experiences as a student. The

lack of clarification when deviations in technique were applied left the researcher confused. Therefore, it becomes imperative that radiographers and clinical educators are encouraged to provide comprehensive explanations where variations in techniques are required so that students approach the clinical environment with confidence.

The third theme revealed that the various interactions students encountered in the clinical environment led to a disabling and at times enabling environment. This affected students' resilience. Patient interactions seemed to be difficult at times however students demonstrated patient-centred care towards their patients. Aspects such as listening, informing and involving patients in their care were demonstrated. Peer support was greatly valued by participants as a means of improving their confidence and resilience. Seeing how self-assured their peers functioned encouraged them that with experience they too would develop competence. Most of the findings relating to interactions with radiographers and lecturers alluded to the need for building supportive relationships with students. While radiographers were helpful some behaviours affected students' confidence negatively. There is substantial evidence that students require greater engagement and face-to-face interactions with their lecturers while on clinical placement. It is evident that the curriculum falls short of describing methods to nurture resilience where interpersonal interactions are concerned.

The last theme focused on participants' experiences while adjusting to the clinical environment. Participants highlighted a lack of learning opportunities. This resulted in them questioning their knowledge and competence and this ultimately affected their resilience. The fact that participants were challenged by radiographer expectations calls for a need for radiographers and educators to have a shared understanding of curricular outcomes and competencies required at various year levels. Moreover, there needs to be an awareness that the ability to manage clinical situations grows over time. Students' stories about tiredness and lack of sleep suggest that participants need physical strength and stamina to cope in the clinical environment. HEIs are instrumental in building resilience and should introduce and encourage wellness programs where students can be educated on managing personal well-being and maintaining good health.

The themes above, together with the definition of resilience, were reviewed to conceptualise resilience in the study setting. Jackson et al. (2007:3) define resilience as the ability of an individual to adjust to adversity, maintain equilibrium, retain some sense of control over their environment, and continue to move on in a positive manner.

The aspect of “continuing to move in a positive manner” associated with resilience suggests a process of growth or development in a potentially nurturing environment. Notably, the literature explains that building and promoting resilience is more than just the individuals’ responsibility, rather, cultivating healthy individuals requires modification in workplace cultures and education (McAllister & McKinnon, 2009:371; Mansfield, 2020:288). Moreover, the literature in radiography education suggests that a supportive environment; the ability to adapt to changes and the belief in one’s ability are crucial to students’ resilience in the clinical environment (Williams & Decker, 2007:81; Terashita et al., 2016:2; Jeyandrabalan, 2022:500-501). These findings indicate that there is a need for a collaborative scheme involving radiographers, educators, HEIs, peers, family, friends, and personal resources to cultivate resilience in DR students. Thus, when developing the central concept, consideration for holistic approaches that affect the individual’s internal and external environment was prioritised. Through a process of reflection and reviewing the definition of resilience the concepts of self-efficacy and social connections surfaced strongly as central to the development of resilience in this setting.

Bandura (1977:195) explains self-efficacy as the belief that an individual has about their capability to complete a task successfully. Self-efficacy can be developed through four mechanisms of operation, namely: mastery experience, vicarious experience, verbal persuasion, and physiological state (Bandura, 1977:195). In all these instances, the individual’s beliefs play a critical role and affect how they view challenges in the clinical environment. Notably, Tschannen-Moran and Hoy (2007:946) assert that self-efficacy relates to an individual’s belief about their capability and does not necessarily reflect their actual capability. However, the research emphasises that it is not just enough for individuals to possess the requisite knowledge and skills to complete a task, they must also be confident that they can perform these behaviours under regular and challenging circumstances (Artino, 2012:77).

A display of self-efficacy is vital in the radiography profession, specifically when students transition from the classroom to the clinical environment and have reported a lack of confidence, fear of making mistakes, uncertainty and unpreparedness for diverse person interactions (Hyde, 2015:146; Bwanga & Lidster, 2019:370; Kumsa et al., 2022: 634). The understanding is therefore that when individuals believe they can achieve and master a challenging situation they are able to control how they deal with the challenge and direct their actions. When individuals have high self-efficacy, they

have the belief that they can succeed in learning. This carries through as confident students are likely to have a positive attitude. Students and qualified radiographers, both require these skills in a profession where changes continually happen over time and confidence in ability is compromised. Moreover, the literature explains self-efficacy as critical for the development of resilience (Martin & Marsh, 2008:55; Schwarzer & Warner, 2013: 141; Wang et al., 2022:1306).

Tschannen-Moran (2007:947) explains that self-efficacy is most receptive early in the learning process. Therefore, radiography educators play a critical role in the facilitation of self-efficacy in first-year radiography students. Methods to develop self-efficacy like positive feedback, problem-based learning, supportive resources and learning from a peer are promoted (Bartimote-Aufflick et al., 2016:1930; Terashita et al., 2016:1).

Like self-efficacy, social connections are vital for the development of resilience. For example, Fuller-Iglesias et al. (2008:181) describe social connections as a critical protective factor facilitating resilience in old age. A lack of social connections and social isolation are also reported as factors adversely affecting students' well-being (Agashe et al., 2021:3; Smith & Dhillon, 2021:339). This became apparent when radiography students reported that a lack of social connectedness resulted in them feeling distressed which compromised their resilience (Smith & Dhillon, 2021:339). In support of this, research in education and psychology shows that social ties with family, friends and those in the workplace are critical for the development of resilience (Fuller-Iglesias et al., 2008:181; Boss et al., 2015:545; Holt-Lunstad, 2018:1308). This association may be linked to the understanding that social connections give people a sense of belonging and allow people to regulate their emotions and maintain well-being with the help of others (Lee et al., 2001:310). It is thus no surprise that radiographers reported greater job satisfaction and lower levels of stress when they received help and social support from colleagues. The support included getting assistance with job requirements, reflecting together, and emotional support (Rutter & Lovegrove, 2008:142). The participants of this study shared stories of lack of communication, feeling isolated, and lack of social ties. Seppala et al. (2013: 425) explain that a feeling of being socially connected upholds self-esteem even in the absence of others. Thus, the cultivation of social connections to maintain a state of well-being within the radiography context where students often feel overwhelmed; isolated, nervous, and anxious, may encourage students to seek guidance and support (Hyde, 2015:146; Bwanga & Lidster, 2019:370; Currie et al., 2020:52; Ongolodom et al., 2023:3).

Connecting with others in the workplace is crucial for a more engaged team eliminating communicational misunderstandings (Bosworth, 2023). Particularly in radiography, communication plays a vital role in ensuring the safety and care of patients.

Based on this understanding the "**facilitation** of **self-efficacy** and **social connections"** became the central concept for the development of a model to facilitate the teaching of resilience in DR students.

4.3 CONCEPT DEFINITION AND CLASSIFICATION

The aim of the concept analysis is to identify the attributes and provide a precise definition of the concepts. The three concepts which were identified to form the basis of the theory are facilitation, self-efficacy, and social connections. Defining each concept is imperative as concepts can be interpreted in various ways (Walker & Avant, 2019:172). Thus, identifying the potential uses of concepts and determining the defining attributes was necessitated.

The three identified concepts are defined in the study context using dictionaries and available literature (Walker & Avant, 2019:172). The defining attributes that make concepts unique from other concepts and appear repeatedly in definitions are highlighted in bold. Critical defining attributes for the central concept were derived from the highlighted defining attributes. To demonstrate the critical defining attributes of the central concept, an exemplar and contrary case are demonstrated.

4.3.1 Concept definitions of facilitation

English dictionaries were used to define the concept of facilitation. Table 4.1 demonstrates the definitions that were discovered.

Table 4.1: Dictionary definition of facilitation

DEFINITION OF FACILITATION	SOURCE
The act of **helping** other people to deal with a **process** or reach an agreement or solution without getting directly involved in the process, discussion, etc. yourself	Cambridge Dictionary (2023c)
The act or **process** of facilitating	Collins Dictionary (2023b)
The act or **process** of facilitating	Dictionary.com (2023b)
The act or **process** of making something **easier** or helping it along:	Dictionary.com (2023a)
The act of facilitating: the state of being facilitated	Merriam Webster (2023)
To make it possible or **easier** for something to happen	Macmillan Dictionary (2023)
The **process** or fact of making something possible or **easier**	Oxford Learners Dictionary (2023b)
Facilitation is a 'means of facilitating or **helping** forward	Oxford Learners Dictionary (2023b)
To make it **easy** or **easier**	The American Heritage Dictionary of the English Language (2023)

4.3.2 Subject definitions of facilitation

Literature sources were searched to identify the definition of facilitation. Definitions are presented in Table 4.2.

Table 4.2: Subject definitions of facilitation

DEFINITION OF FACILITATION	SOURCE
Facilitation refers to the type of **support** practitioners need to change their attitudes, habits, skills, thinking and working ways.	Heynes et al. (2017:106)
The **process** of **identifying** and **providing** suitable **resources** which will help the learning process.	Scholtz (2005:14)
The **process** of making challenges easier for others while creating an environment of mutual respect and trust.	Bates (2016:67).
Making things **easier** for others by providing **support**	Cranley et al. (2017:1)
Facilitation refers to the **process** of **enabling** (making easier) the implementation of evidence into practice	Harvey et al. (2002:579)
A **helping** role to enable others to take the lead	Bens (2018:1)
To make something **easier'** or 'move freely'	Van Loon et al. (2017:19)

4.3.3 Concept definition of self-efficacy

A search of dictionary sources was conducted to explore the term "self-efficacy" The definitions that were discovered are presented in Table 4.3.

Table 4.3: Dictionary definitions of self-efficacy

DEFINITION OF SELF-EFFICACY	SOURCE
A **person's belief** that they can be **successful** when carrying out a particular task	Cambridge Dictionary (2023d)
A person's estimate or **personal judgment of** his or her **own ability** to **succeed** in reaching a **specific goal**, for example, quitting smoking or losing weight, or a more general goal, for example, continuing to remain at a prescribed weight level.	The Free Dictionary (2023b)
The belief that one is capable of accomplishing a behaviour or developing a competency.	Stedman's Medical Dictionary for the Health Professions and Nursing (2011)
People who are self-efficacious are people who **believe in themselves** and their own **personal** strengths. These people are more likely to **achieve** their **goals** through a f**ocused mindset** and **determination.**	Health Engine (2012)
A belief system that sees individuals as having the **capability** to **execute** a course or courses of action that is necessary to manage potential situations.	proctorfree.com (2023)

4.3.4 Subject definitions of self-efficacy

The definitions of self-efficacy were searched to find the subject meaning. Subject definitions are provided in Table 4.4.

Table 4.4: Subject definitions of self-efficacy

DEFINITION OF SELF-EFFICACY	SOURCE
A **stable sense to master** a **stressful** or challenging **situation**, relevant for all kinds of behavioural domains	Schwarzer and Jerusalem (1995:35)
Self-efficacy is the belief of being able to control and shape one's personal future and attain desired outcomes because of one's own actions and decisions	Bandura (1977)
Self-efficacy refers to an **individual's** evaluation of **personal capabilities**	Schwarzer and Warner (2013:143)
Self-efficacy refers to one's belief in their ability to successfully manage a variety of situations	Chen et al. (2001:71)
Self-efficacy is a **person's belief** in their **ability to** complete a task or **achieve a goal.**	Cherry (2023)
People's **judgement** of their **capabilities** to **organise and execute** courses of action required to attain designated types of performances	Lenz and Shortridge- Baggett (2002:10)
"**beliefs** in one's **capabilities** to **organize and execute** courses of action required to **manage** prospective **situations**"	Judge et al. (1998:170:2)

4.3.5 Concept definition of social connections

The concept “social connections” was interpreted by searching through several English dictionaries. Social connections are broadly referred to as social connectedness. Table 4.5 depicts the definitions.

Table 4.5: Dictionary definitions of social connections

DEFINITION OF SOCIAL CONNECTION	SOURCE
Social connection: the experience of f**eeling close** and **connected** to others. It involves feeling loved, cared for, and valued and forms the basis of interpersonal relationships.	The Free Dictionary (2023a)
Broadly defined, “social connectedness” (also referred to as “social connection”) is a state of **feeling close** (or “**connected**”) to another person or other **people**.	Perry and Braren (2023)
Social: relating to activities in which you meet and spend time with **other people** and that happen during the time when you are not working Connections: the people you know and who can help you	Cambridge Dictionary (2023a; 2023e)
Social: relating to **meeting people**, forming **relationships** with them, and spending time with them Connection: the way in which two facts, ideas, events etc are related to each other, and one is affected or caused by the other	Longman Dictionary (2023)
Connectedness: the state of being connected and having a **close relationship** with other things or **people**:	Cambridge Dictionary (2023b)
Connectedness: **a feeling** that you have a link with somebody/something or are **part of a group**	Oxford Learners’ Dictionary (2023a)

4.3.6 Subject definition of social connections

Literature sources were searched to identify definitions for the term “social connections”. The definitions are listed in Table 4.6.

Table 4.6: Subject definitions of social connections

DEFINITION OF SOCIAL CONNECTIONS	SOURCE
Social connection is an umbrella term that refers to the ways in which one can **connect** to **others** physically, behaviourally, cognitively, and emotionally	Holt-Lunstad (2018:1308)
Social connectedness is considered an attribute of the self that reflects cognitions of enduring **interpersonal closeness** with the **social** world in toto.	Lee et al. (2001:310)
Social connectedness: A person’s subjective sense of having **close** and **positively experienced relationships** with **others** in the **social** world.	Seppala et al. (2013:412)
Social connectedness: The subjective awareness of **interpersonal closeness** with the **social** world. The **social** world includes proximal and distal **relationships** with **family, friends, peers**, acquaintances, strangers, **community**, and society as a whole.	Lee and Robins (1998:338)
Social connectedness refers to the **experience** of **belonging** to a social relationship or network	Lee and Robbins (1995:233)

4.3.7 Critical defining attributes

Upon reflection of all the definitions and defining attributes (Table 4.7) of the concepts of “facilitation”, “self-efficacy” and “social connections” a list of critical defining attributes (Table 4.8) for the central concepts “facilitation of self-efficacy and social connections in DR students” was constructed.

Table 4.7: List of defining attributes for facilitation, self-efficacy and social connections.

DEFINING ATTRIBUTES		
FACILITATION	**SELF-EFFICACY**	**SOCIAL CONNECTIONS**
Helping	Persons’ belief	Experience of feeling close
Process	Successful	Connected to others
Easier	Personal judgement	Feeling loved
Easy	Own ability	Cared for
Support	Specific goal	Valued
Identifying	Capable of accomplishing	Interpersonal relationships
Providing	Developing competence	Connected
Enabling	Achieve	People
	Focused mindset	Help
	Determination	Meeting
	Execute	Close relationship
	Stable sense to master	Part of a group
	Manage situations	Members
	Being able	Share qualities
	Control and shape	Positively experienced
	Future	Family
	Desired outcomes	Friends
	Individuals’ evaluation	Peers
	Capabilities	Community
	Organise	Belonging
		Social

Table 4.8: Critical defining attributes for facilitation, self-efficacy and social connections

CONCEPT	CRITICAL DEFINING ATTRIBUTES
Facilitation	❖ Process
	❖ Helping
	❖ Support
Self-efficacy	❖ Developing a focused mindset
	❖ Persons' belief in their own ability
	❖ Capability to successfully organise and execute
Social connection	❖ Positive interpersonal relationships
	❖ Part of a group
	❖ Connecting with others

Following a review of dictionary and subject definitions and the defining attributes of the identified concepts "facilitation", "self-efficacy", and "social connections", a conceptual definition was constructed. The conceptual definition contained all the critical defining attributes. Thus, the definition of "Facilitation of self-efficacy and social connections in diagnostic radiography students" refers to:

Offering help and **support** to DR students to **develop** a **focused mindset so** that they have the **capabilities** to be **successful** at **organising** and **executing** a planned action**.** It is a **process** of **supporting** DR students to recognise their **value** within a **group** by **connecting** with **others** and developing **positive interpersonal relationships.**

4.4 CREATING CONCEPTUAL MEANING FOR THE CONCEPT OF "FACILITATION OF SELF-EFFICACY AND SOCIAL CONNECTIONS IN DIAGNOSTIC RADIOGRAPHY STUDENTS"

To differentiate the statement that defines the critical defining attributes and the central concept from other related ideas and statements an exemplar and contrary case relevant to the DR setting is presented.

An exemplar case is one where we present a situation where all the critical defining attributes of the concepts are evident. This is to ensure the correct instance of the concept, specifically, where meaning needs to be identified from a set of competing meanings. Chinn et al. (2022:144) assert that exemplar cases represent the concept to the best of the researcher's understanding. The exemplar case that is presented is thus created from the researcher's understanding of how resilience using self-efficacy and social connections are demonstrated within the DR clinical environment. Additionally, a contrary case is presented. A contrary case is a case that is not an instance of the concept and represents a narrative that is opposite of the exemplar case (Chinn et al., 2022:147). Yazdani et al. (2016:49) assert that the contrary case completes the justification for the defining attributes. Furthermore, the inclusion of the contrary case strengthens the findings, as multiple perspectives are being presented. The inclusion of both the exemplar and contrary cases is, therefore, imperative to clarify the concept.

4.4.1 An exemplar case

Ruby is in the final year of her radiography training. It has always been her desire to work in healthcare, she sees this profession as her calling. During the four years of training, she has learned how unpredictable and fast-growing the profession is. Her first year of studying were the greatest revelation. The severity of patients differed with each encounter and the pace at which radiographers worked was extremely fast. Recognising the need for courage, perseverance, and clinical and theoretical competence, Ruby committed herself to becoming an attentive and compassionate radiographer.

Supported and **helped** by her lecturers who played a pivotal role in nurturing her resilience, Ruby acquired essential skills early in her training. One crucial skill was establishing **connections** with fellow students who were embarking on the same educational journey. Engaging in pre-clinical discussions and sharing concerns proved

instrumental in alleviating her uncertainties and fears before commencing placement in the clinical environment. As she began her clinical placements, Ruby found comfort in knowing she could identify with her **peers**. A planned induction into the clinical setting helped her familiarise herself with other team **members,** including clinical radiographers and senior peers who offered valuable mentorship to her and her first-year **peers** during their training.

Now, as a fourth-year student nearing the end of her undergraduate studies, Ruby has a deep understanding of the challenges posed by **interpersonal interactions** in the clinical environment, especially when dealing with patients with diverse needs. She acknowledges her struggles and communicates her challenges to experienced radiographers, who are always willing to help. Together they approach problem scenarios under less stressful encounters and engage in critical discussions. This experience has given her the confidence to **manage** similar **situations** in the future.

Ruby takes the initiative to **connect** regularly with her lecturers and **peers** to discuss her difficulties. She **organises** her time by scheduling meetings to review her progress and develop action **plans** and consider realistic timelines to ensure she achieves her **goals**. Open discussions provide insights into navigating clinical challenges, including positioning techniques, patient care, and communication. Ruby practices radiographic positioning regularly, engages in reflection, and seeks feedback on how to effectively **execute** her plans. These actions help her develop **competence** and strengthen her **self-belief**.

Understanding the benefits of a positive outlook, Ruby interprets negative experiences as opportunities for learning. She extends this perspective to encourage her junior **peers**, making a point of involving them in discussions and decisions. She knows the impact of feeling important and **part of a group,** as it helped her cope when she first started. Experiencing a **sense of belonging** made her thrive when she first became **part** of the team. Ruby appreciates **connecting** with others and forming positive **interpersonal relationships.** These **relationships** make her feel safe to **share** experiences and clarify uncertainties.

Believing in her **abilities,** Ruby maintains a determined attitude, motivating herself to persistently build confidence as she develops **competence**. She prioritises a **focused mindset,** by tackling one task at a time, especially when things get tough. She understands that by **managing** herself mentally and emotionally and embracing

support from her team, she will provide the best care possible to her patients and remain motivated to persevere in the profession she loves.

4.4.2 A contrary case

Sage is a first-year radiography student, who relocated 200 km away from her hometown and parental home to commence her studies in radiography. Despite her eagerness to achieve independence and excitement to commence her studies, she is confronted with challenges in adapting.

She finds the transition between clinical and academic learning to be highly **stressful.** The fast-paced clinical environment often makes her feel like she is in the way. Radiographers are always busy, and the high number of patients rotating through the department resulted in her not receiving a **thorough induction** to the x-ray rooms.

Consequently, the initial confidence and enthusiasm she had for the profession faded, leaving her **discouraged** and **feeling incompetent.**

An encounter with an aggressive and uncooperative patient further intensified Sage's feelings of **uncertainty,** leading to an all-time **low in self-confidence and self-esteem.** She began to **doubt** her abilities and view herself as a failure.

Sage finds it difficult to engage in conversations and discussions resulting in her **feeling excluded** and contributing to her **sense of isolation** and **helplessness**. Unfortunately, Sage feels hopeless, left alone and unsupported.

Every entry into the imaging department is accompanied by feelings of **panic and anxiety.** Work has become a **source of dread** for Sage, and she feels **demotivated** by the **absence of guidance and support**. This has left her with no enthusiasm but persistent negative emotions. Increasingly, Sage yearned for a place and time when she believed in herself, experienced team support and felt motivated. This yearning has resulted in her wishing to find a new career.

4.5 CLASSIFICATION OF CONCEPTS

Classification of the central concept was done according to Dickhoff et al. (1968:415) 6 elements of theory development. The six-element classification list is explained below:

4.5.1 Who is the agent?

The agent in this model is the radiography educator. The radiography educator provides a conducive learning environment and facilitates the process of developing resilience in students.

4.5.2 Who is the recipient?

The recipient is a first-year DR student who experiences the DR clinical environment and who needs guidance to develop resilience.

4.5.3 What is the context?

The context is an HEI where the student completes the DR training. Training is undertaken in two key settings, namely the classroom (based at the university) and the diagnostic clinical environment.

4.5.4 What are the dynamics?

The “dynamics” refer to the internal and external motivation of both the agent and the recipient to meet the outcome. The participants of the study clearly articulated the need for resources to buffer against uncertainty, anxiety and feeling overwhelmed. They spoke about the determination to push through and the need for confidence and believing in their ability when things were tough. They identified that social relationships in and outside of the radiography context influenced their resilience. Support from their family, friends, peers and radiographers was frequently required as a means of coping during challenging times. A lack of meaningful interaction and feelings of isolation were further highlighted. The internal motivation of the educator is closely linked to her belief that demonstrating empathy and compassion towards patients and students is essential, as these actions aid in mitigating stress and anxiety. With appropriate support systems in place, anxiety-inducing emotions can be alleviated. Additionally, the curriculum falls short of prescribing methods to develop resilience in radiography students to buffer against stressors of the clinical environment.

4.5.5 What is the procedure?

The procedure reflects the processes that the radiography lecturer follows to develop resilience in students. The educator displays keen enthusiasm when introducing methods to cultivate resilience. The educator encourages students to actively participate in the learning process. The students are the recipients of structured

methods to enable focused mindsets, belief in abilities and successful organisation and execution of goals. The students are guided to make positive social connections and develop interpersonal relationships with patients, peers and radiographers. The educator facilitates and assesses the self-efficacy and social connections outcomes, aimed at enabling resilience in DR students.

4.5.6 What is the outcome?

The outcome of the model is a resilient DR student who is self-efficacious and demonstrates positive social connections.

4.6 DEVELOPMENT OF RELATIONSHIP STATEMENTS

The classified concepts in section 4.5 were written into relationship statements. These statements denote the linkages among concepts (Chinn et al., 2022:153).

- The goal of the educator is the cultivation of resilience in radiography students for the clinical environment through a structured process of offering support and guidance. This goal will be achieved through the systematic provision of assistance and support in the classroom. Consequently, the educator will create an environment that fosters the development of resilience among radiography students by facilitating self-efficacy and establishing social connections within the classroom. These methods for resilience are designed to equip students with coping mechanisms for navigating the challenges encountered in the clinical environment.
- The current curriculum does not noticeably address the instruction of resilience, thus lacking the inclusion of effective coping methods for radiography students to employ when faced with challenges in the clinical environment.
- The radiography educator plays a pivotal role in empowering the radiography students to enhance their self-efficacy and social connections by supporting, guiding, and introducing methods to improve confidence and self-belief and promote communication and interpersonal relations essential for developing resilience in radiography students.
- The radiography student actively embraces and applies the methods fostering a focused mindset, belief in their abilities and successful organisation and execution of planned actions. Furthermore, the students actively adopt and participate in the methods to establish positive social connections and interpersonal relationships.

- The embracement of self-efficacy and social connections enables the resilience needed to cope effectively with the demands of the clinical environment.

4.7 CONCEPTUAL MAP

A conceptual map was developed based on the classified concepts and relationship statements. This conceptual map is illustrated below in Figure 4.1

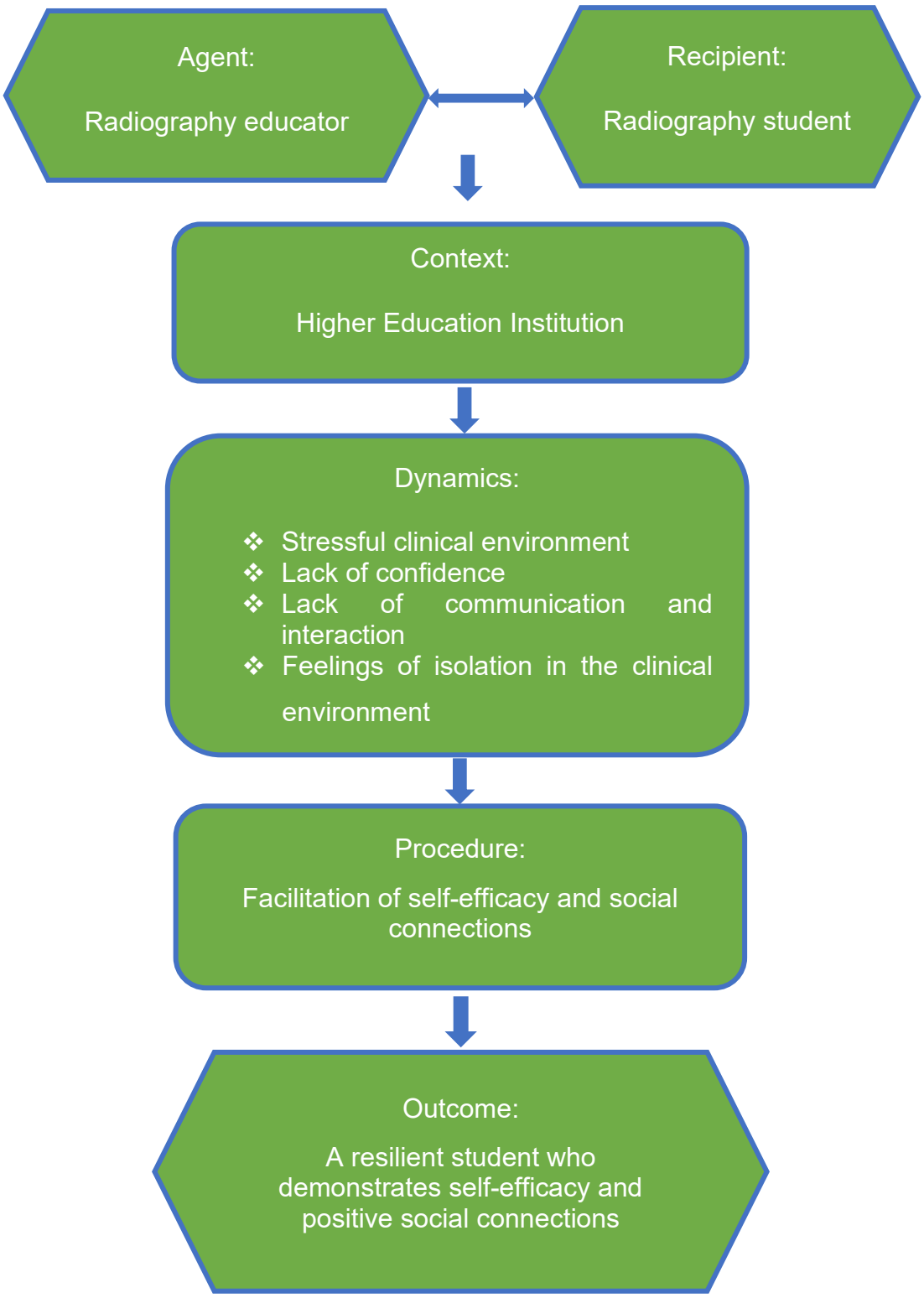

Figure 4.1: Conceptual map

4.8 CONCLUSION

In this chapter, the central concepts were identified. Dictionaries and literature sources were consulted to explain the defining attributes of the central concepts of the "facilitation" of "self-efficacy" and social "connections" in DR students. An exemplar and contrary case were presented to demonstrate the critical defining attributes of the central concept. Lastly, a conceptual framework for the model created for this study was presented. Chapter 5 describes the model for facilitating resilience in radiography students.

The researcher would like to close this chapter with the following motivational quotes by Mother Theresa and Mahatma Gandhi. These quotes aptly emphasise the importance of a sense of belonging, appreciation, and self-belief and are in keeping with the stories shared by the study participants.

"Being unwanted, unloved, uncared for, forgotten by everybody, I think that is a much greater hunger, a much greater poverty than the person who has nothing to eat."

Mother Teresa

"If I have the belief that I can do it, I shall surely acquire the capacity to do it even if I may not have it at the beginning."

Mahatma Gandhi

CHAPTER 5:

THE MODEL FOR THE FACILITATION OF RESILIENCE

5.1 INTRODUCTION

In Chapter 4 the identification, definition, and classification of the central concept that formed the basis for the development of the model were presented. The central concept of “facilitation of self-efficacy and social connections” in DR students and the relationship statements were identified.

In this chapter, a description of the model to facilitate resilience in DR students is presented. The discussion is structured according to the overview of the model, a detailed description of the model, and the model process. The chapter ends with a critical description and reflection on the evaluation of the model to facilitate resilience in radiography students.

5.2 OVERVIEW OF THE MODEL

The model to facilitate resilience in DR students is presented in Figure 5.1. The model illustrates the radiography educator facilitating self-efficacy and social connections to assist the radiography student in developing resilience. The goal of the facilitative journey is to enable the radiography student to cultivate a focused mindset essential to successfully organise and execute a plan while fostering the capacity for self-belief. Furthermore, through the establishment of positive connections, the student will recognise their value within a group and develop positive interpersonal relationships.

The radiography educator acknowledges that students exhibit a lack of belief in their own ability, demonstrate a lack of focused mindset, and encounter difficulty in developing interpersonal connections. Thus, the educator implements structured methods in the classroom aimed at nurturing the development of these skills, thereby enabling the cultivation of resilience essential for navigating the demands of the clinical environment. In acknowledgement of their responsibility to acquire resilience, students embrace and adhere to the structured methods implemented by the educator.

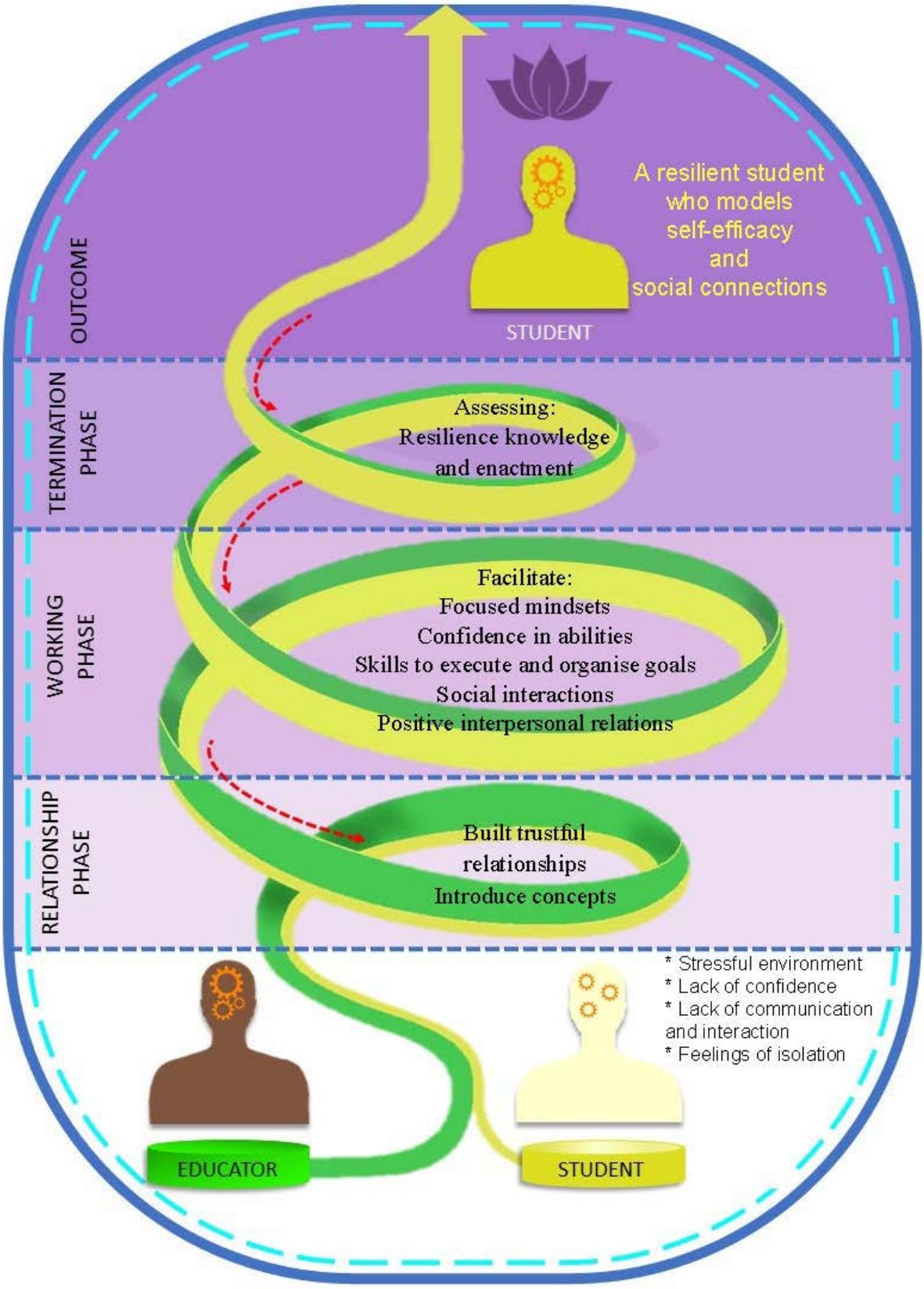

Figure 5.1: A model to facilitate resilience in radiography students.

5.3 DESCRIPTION OF THE MODEL

The model is described according to the guidelines outlined by Chinn et al. (2022:164).

- The purpose of the model
- The assumptions of the model
- The theoretical definitions of the model
- Nature of the relationships of the model
- The context of the model
- The structure of the model

5.3.1 The purpose of the model

The purpose of the model is to provide a framework for facilitating resilience among radiography students.

Despite ample evidence demonstrating that the radiography clinical environment is experienced to be stressful for those operating in it, few guidelines have been provided to mitigate negative effects on coping. While feeling overwhelmed when first experiencing the clinical environment, fast patient turnarounds and rapid technology advances are frequently cited as causes of stress for radiographers and students, other inherent conditions of the profession were highlighted as factors adding to students' coping in this study. Specifically, students highlighted their surprise at the severity of patient conditions and the disparity between theory and practice. Moreover, interactions between students and patients and students and radiographers were highlighted as challenging at times and negatively impacting their confidence. There were instances where students felt alone particularly when they were excluded from conversations and felt less supported when they had little interaction with lecturers and peers. These factors hugely impacted students' coping and emphasised the need for guiding principles as to how to navigate these clinical challenges.

Analysis of the data revealed that it is imperative for radiography students to cultivate self-efficacy and establish social connections to develop and enhance their resilience as it relates to the clinical environment. Consequently, students are required to embark on this educational journey with the guidance and support of the educator. The educator creates an environment conducive to learning with a particular emphasis on cultivating self-efficacy and social connections essential for developing resilience as it relates to the clinical environment.

5.3.2 The assumptions of the model

The assumptions of the model align with the meta-theoretical assumptions of the Health Promotions Model (HPM) (Pender et al., 2011:2-14).

The first assumption of the theory is that a “person” is autonomous and partially shaped by the environment. This indicates that a person has the capacity to govern and make decisions for themselves without being coerced. They seek an environment where their potential and acquired characteristics and experiences can be expressed. Thus, in the study context, the first assumption suggests that:

The radiography student (person) is introduced to methods to foster resilience. The student is autonomous and makes an informed decision to adopt and participate in these methods. The student's decisions are influenced by the internal and external environments, therefore the person and environment cannot be seen in isolation but as integral to the student's learning.

The second assumption of the HPM asserts that a person thrives in an “environment” where positive health-enhancing behaviours are prioritised. Therefore, for this model, the second assumption implies:

A transformation in both the internal environment, denoting cognitive and mental factors, and the external environment, encompassing the physical and social context must happen. By placing emphasis on the cultivation of self-efficacy within the internal environment and fostering social connections in the external environment, it is envisioned that a gradual and positive transformation towards the development of resilience will happen over time.

The third assumption of the theory emphasises the necessity of the “health profession” to maintain favourable conditions to promote healthy behaviours. Therefore, in this model, the third assumption postulates the following:

Recognising that students' coping is affected by the stressful and inherent complexities of the radiography profession, efforts tailored to the demands of the profession are made to alleviate stressors. Consequently, the educator adopts a crucial role in providing support and guidance to students thereby facilitating the implementation of the model (in the classroom) and addressing resilience to be implemented in the clinical environment.

The final assumption termed “self-initiated configuration” refers to the behaviours necessary to enable change in the students. The assumption posits the following:

Research demonstrates that resilient behaviours help students adapt to challenges and setbacks. It aids in a positive mindset particularly when things are challenging in the clinical environment. While students may not inherently possess resilience at the onset of their professional journey, this behaviour is fostered when students adopt a focused mindset, gain confidence in their ability to organise and execute planned actions and establish social connections and positive interpersonal interactions. Consequently, students must be actively involved in cultivating these behaviours, strengthening and building their resilience.

5.3.3 The theoretical definitions of the model

Establishing a theoretical definition for the model holds great importance as it communicates the meaning of the theory. The central concepts and the critical defining attributes presented in Chapter 4 delineate the concepts that are pertinent for facilitating resilience in the context of the research study. The central concept serves as the foundation for the model, identified as the facilitation of self-efficacy and social connections in DR students.

The definitions below describe the meaning of the concepts. The defining attributes are highlighted in bold font, accompanied by an appended line delineating the critical defining attributes.

- Facilitation

  In this model, facilitation refers to **offering help** and **support** to radiography students. It is a **process** where the educator **identifies** and **provides resources** to **help** students **develop** self-efficacy and establish social connections.

- Self-efficacy

  In this model, self-efficacy refers to the student’s **belief** that they are **capable** of **accomplishing** and **successfully organising** and **executing** a plan. It is about a **focused mindset** to **manage situations** to attain designated outcomes.

- Social connections

  For the purposes of the proposed model, social connections refer to the notion of **experiencing connections** with the **social world**. A student who embraces social connections will **develop positive relationships** and **feel connected** to and be a **valued group member**.

- Diagnostic radiography students

  In this model, a DR student is a person who is registered on the BSc Diagnostic Radiography programme. This student cannot **develop** or improve their resilience by themselves and needs **support** from the educator to cultivate this behaviour.

The theoretical definition pertinent to the model (presented in Chapter 4) is as follows.`

Offering help and **support** to DR students to **develop** a **focused mindset** that they have the **capabilities** to be **successful** at **organising** and **executing** a planned action. It is a **process** of **supporting** DR students to recognise their **value** within a **group** by **connecting** with **others** and developing **positive interpersonal relationships.**

5.3.4 The nature of the relationships within the model

Relationship statements convey how the concepts are connected (Chinn et al., 2022;164). The various relationships provide structure to the model.

- The goal of the educator is to offer help and support, create opportunities, and guide radiography students to foster resilience by introducing self-efficacy and nurturing social connections within the learning context.

- The radiography curriculum focuses on practical and theoretical outcomes to prepare students for the practical and technical/clinical nature of the profession. The current curriculum however exhibits shortcomings in its approach to providing a learning environment wherein coping skills are prioritised. Consequently, a change in delivery is imperative whereby the holistic well-being of the students is emphasised leading to the development of well-rounded students who are not only theoretically and practically competent but who can

employ coping skills necessary for good mental health in the clinical environment.

- Radiography students encounter challenges in demonstrating resilience. However, through a guided process, they will embrace self-efficacy and foster social connections. By instilling belief in their own ability, having a focused mindset and forming interpersonal connections, their' resilience will be enhanced.

- Through a facilitated process, the educator presents the radiography student with help, support and guidance to develop the skills needed to be resilient, specifically as it relates to navigating the stressful clinical environment, developing confidence, and establishing communication and interactions. The student embraces and implements the methods introduced to develop self-efficacy and establish social connections.

- The adoption of self-efficacy and social connections will enable students to hold optimistic beliefs about their ability to cope and connect with others, which will result in resilient students who can employ these methods when experiencing challenges with coping in the clinical environment.

5.3.5 The context of the model

The context refers to the setting/area where the model will be implemented. In this instance, the context is a radiography department/programme at an HEI. Within the context, the radiography curriculum lacks explicit instruction on resilience. Consequently, educators will facilitate structured methods in the classroom to better support and prepare radiography students for the challenges of the clinical environment.

5.3.6 The structure of the model

In this section, the visual illustration of the model presented in Figure 5.1 is discussed in detail. The following is included in the discussion of the resilience model: the context,

the meeting stage, the educator, the radiography student, the cogwheels, the facilitative process, resilience regress, and the outcome.

5.3.6.1 Context of the model (Border)

The context of the model for the facilitation of resilience in radiography students is an HEI in the Western Cape, SA, where the DR programme is offered.

The model's context is visually indicated by two borders (Figure 5.2). The outer border refers to the classroom setting, while the inner border refers to the clinical environment where students gain real-life working experience. Learning, interacting, communicating, growing and developing a focused mindset and building positive interpersonal relationships happen in both these settings. However, methods to facilitate resilience will be introduced in the classroom.

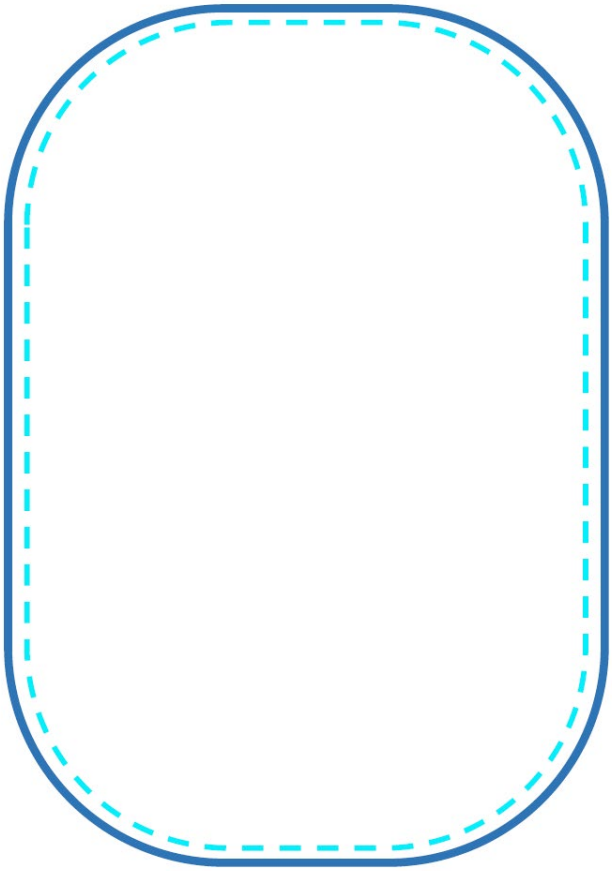

Figure 5.2: Context of the model

A geometric shape with rounded corners, as opposed to one with sharp, fixed and rigid angles, was chosen to indicate the borders of the context. Like a circle with no beginning or end, the selection of rounded angles for the context is indicative of the individual's continued and lifelong pursuit of knowledge and personal growth.

A solid dark blue line was chosen to represent the outer border. The colour blue is symbolic of calmness, responsibility and dependability (Kumar, 2017:4; He & Lv, 2022:767). By choosing the blue the researcher recognises that both the educator and student have a responsibility towards learning. It refers to the commitment to train, educate, and acquire knowledge. Blue also gives a sense of calmness referring to a non-threatening environment.

A dashed line is chosen to demarcate the borders of the clinical environment. Although the clinical environment is distinctly separate from the conventional classroom setting, it forms a compulsory part of the radiography curriculum. Thus, students systematically move between the classroom and the clinical learning environment to gain patient and authentic working experience. The dashed line, thus, indicates that there is a flow in the connection between the clinical setting and the classroom.

This colour is believed to possess properties conducive to enhancing both physical and emotional healing, given its capacity to mitigate stress and anxiety. While the clinical environment is characterised by inherent stressors the incorporation of the turquoise colour serves to indicate that with appropriate support in place, anxiety-inducing emotions can be alleviated. Turquoise also symbolises empathy and sympathy, qualities that hold particular relevance for the researcher, as they align with her belief that the demonstration of empathy and compassion can convey feelings of respect and understanding, signifying that one's views and feelings are taken into consideration. These behaviours are important when tending to patients and functioning within the healthcare team.

5.3.6.2 Meeting platform

Interaction between the educator and students is symbolically represented by the meeting platform, using two distinct colours: green and yellow (Figure 5.3). These colours come together and evolve into a spiral, symbolising the trajectory and engagement of both the educator and student throughout the educational process.

Figure 5.3: Meeting platform

The start of the educator's journey is denoted by the green platform, a deliberate choice due to the association of the colour with growth, moving forward, reassurance and success (Hanada, 2018:231). Within the study context, educators are dedicated to cultivating growth mindsets, providing reassurance to students, addressing their uncertainties and fears, and motivating them towards success. Additionally, the colour green is linked to well-being, a crucial concept in fostering resilience among students (Scott-Kemmis, 2018).

On the other hand, the student's journey is indicated by the yellow platform. Yellow denotes enthusiasm, optimism, and confidence (Hanada, 2018:233; He & Lv, 2022:768; Nguyen, 2023). According to the literature, students often commence their educational journey possessing these attributes (Hyde 2015:244; Naidoo et al., 2020:5). The overarching goal is to harness and further cultivate these attributes as students embark on their educational journey, subsequently, extending into their professional careers.

5.3.6.3 The educator

The figure on the bottom left of the model represents the educator (Figure 5.4).

Figure 5.4: The educator

The colour brown was selected for the educator. Brown is associated with exuding warmth, friendliness, support, comfort, wisdom, reliability and practicality (Kramer, 2022). The presence of a warm, friendly, and nurturing demeanour plays an indispensable role in the establishment of a secure learning environment and the cultivation of interpersonal bonds. The educator has expertise, comprehensive

knowledge, and a profound understanding of both theoretical and practical domains and actively engages in providing unwavering support to students.

Cogwheels are positioned in the head of the educator. The colour orange was chosen for the cogwheels as the colour is associated with two-way communication and mental and creative stimulation (Scott-Kemmis, 2018). Orange also symbolises the assimilation of new ideas and a positive attitude (Pro Expo Team, 2017).

The rationale behind the use of cogwheels as a metaphor is based on their symbolic representation of efficiency and productivity (Matlin et al., 2022:415). In a parallel manner, the placement of cogwheels in the educator's head symbolically embodies the cognitive processes linked to the educator's knowledge, understanding, and experience of the learning environment. The interconnection among the cogwheels signifies that the educator has not only acquired knowledge but, their experience in the radiography profession and the higher education context allows them to integrate this knowledge and understanding and apply it effectively. Consequently, the educator is well-equipped to guide and facilitate the learning process, drawing upon this comprehensive cognitive foundation.

5.3.6.4 The radiography student

The figure on the bottom right of the model represents the student (Figure 5.5).

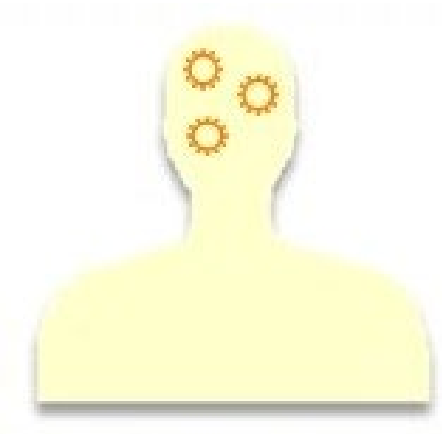

Figure 5.5: The radiography student

The colour cream was chosen for the figurine. The colour cream is on the same spectrum as the colour yellow which is commonly associated with optimism (Pro Expo Team, 2017). However, while radiography students may start their journey optimistic, many experience anxiety associated with fear of the unknown (Hyde, 2015:146; De

Witt, 2017:43). This anxiety and fear usually lead to self-esteem issues, resulting in a lack of confidence and a lack of self-belief. The colour cream was thus deliberately chosen to reflect the researchers' observations of the participants' emotions as they made the transition from the classroom to the clinical environment.

As with the educator, three cogwheels metaphorically represent the cognitive processes within the student's mind. However, in contrast to the educator, these cogwheels are not interlinked. The three cogwheels symbolises that the student possesses a foundational level of knowledge and some resilience potential, however, the absence of interconnection of the cogwheels suggests that the student has yet to acquire the ability to effectively integrate and apply their knowledge. Moreover, the student has not fully developed resilience, particularly in the context of the clinical environment. Growth, cognitive linkage, and the fostering of resilience are cultivated through active engagement in the learning process.

5.3.6.5 The facilitative process

The facilitative process indicates (Figure 5.6) how the facilitation of resilience happens. An upward spiral was selected for the facilitation process for its association with a process of growth, development and evolution (Doty, 2018). Garland et al. (2010:851) assert that upward spirals are associated with optimal functioning and enhanced social openness to exploratory activity.

The facilitative process is placed against a purple background. In the model, varying shades of purple are used, starting with a lighter shade and evolving into a deeper shade of purple. The transition from a lighter to a deeper shade of purple refers to a deeper understanding and growth as the students gradually move through the various phases. Moreover, the colour purple for the background was purposeful, drawing on the association of attributes such as strength, resilience and transformation (Pro Expo Team, 2017).

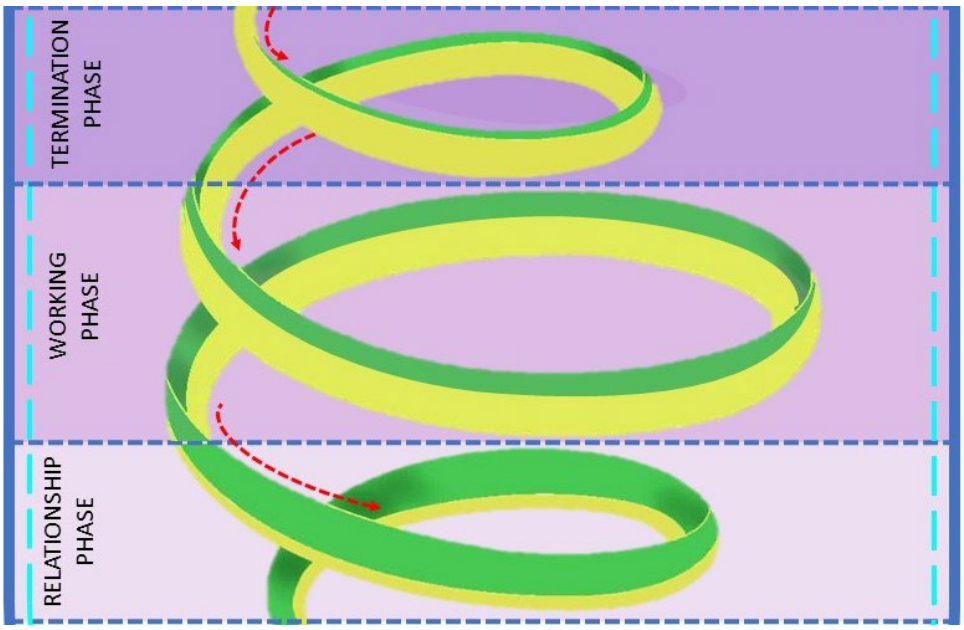

Figure 5.6: The facilitative process

The spiral consists of three loops with varying sizes reflecting the degree of effort invested in each stage of the facilitative process. The loop at the bottom, associated with the relationship phase, is medium-sized compared to the other two loops of the spiral. This indicates that a fair amount of activity will take place, with the educator taking the lead in guiding the educational process, while the student adopts a comparatively less active role. Consequently, the colour green, denoting the educator's role, occupies a greater expanse and is more noticeable than the yellow segment of the loop in this phase.

The loop in the centre (working phase) is the biggest compared to the two adjacent loops. This difference in size corresponds to the educational activities taking place in this phase. Within this phase, the student assumes a greater involvement in the teaching and learning processes compared to the relationship phase. This heightened engagement is represented by the thicker segment of yellow colouration within the loop, in contrast to the relationship phase. The educator assumes a less dominant role during the working phase compared to the relationship phase, hence, the green segment of the spiral is thinner as the educator's level of involvement decreases.

The loop at the top of the spiral is the smallest (termination phase). This phase requires the least amount of activity, thus the loop of the spiral is the smallest when compared to the relationship and working phase. An assessment will be conducted to evaluate the students' resilience. Notably, the yellow line reaches its greatest thickness since

the start of the facilitative process, signifying that the student has accepted the highest level of responsibility since the start of the journey. In contrast, the educator's line appears considerably thinner, indicating the student's proximity to achieving independence.

5.3.6.6 Resilience regress

A resilience regress is depicted by red dotted lines (Figure 5.7). The direction of these red dots is downwards and runs parallel to the ascending spiral. The colour red for the regressed line signifies a state of alert and/or concern (Kumar, 2017:11; Kramer, 2022).

Figure 5.7: Resilience regress

Regress events can happen at any time during the facilitative process, and even after the student has achieved the intended outcome. However, due to the student's exposure to the resilience process or part thereof, it is believed that such regressions will be short-lived as students will have the capacity to navigate their way back to a state of resilience when faced with challenges.

The educator's goal is to facilitate learning within a stable state, as denoted by the solid green spiral line. The presence of the red dotted line suggests a slower rate of regression. This slow deceleration is attributed to the student's ability to recall or redirect their actions, a capability nurtured through the resilience process.

5.3.6.7 The outcome of the model

Figure 5.8 represents the outcome of the model, a student who displays resilience. At the start of the journey, the student was demonstrated in cream (a pale yellow), however, in the outcome an intense and bright yellow was chosen to represent the student. The literature explains that bright colours signify freshness and enlightenment and are frequently associated with positivity (Kumar, 2017:4, Nguyen, 2023).

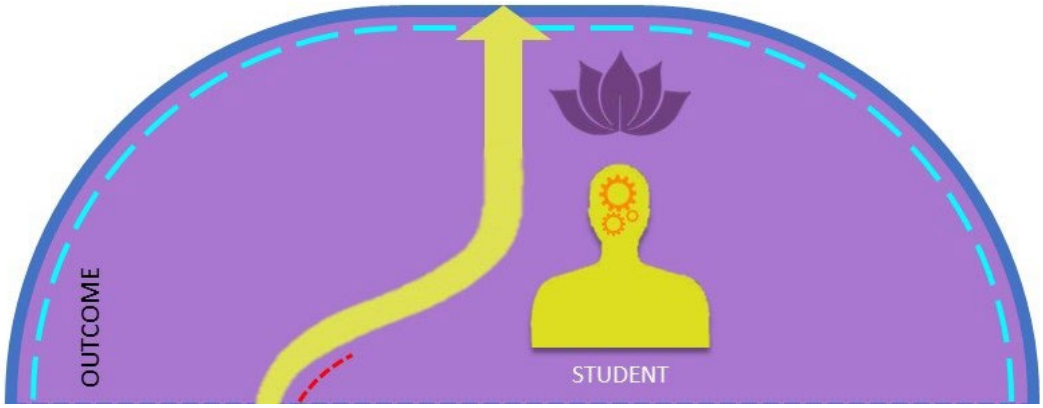

Figure 5.8: The outcome of the model

Moreover, the bright yellow symbolises a sense of optimism, enthusiasm, confidence, self-esteem, emotional strength, joy, communication and intellect (Nguyen, 2023). This suggests that the student exhibits an enthusiastic approach towards the clinical learning environment and their subsequent professional role. It is further underpinned by the student's confidence in their ability to organise and execute tasks and utilise tools to function amid regular and challenging circumstances. Additionally, students demonstrate the capability to focus their effort on their goals, make meaningful connections and move forward with self-belief. These traits are all in alignment with the outcome of the resilience model.

Located at the outcome of the model is a lotus flower. This decision was influenced by the lotus flower's well-established symbolism of resilience and strength (Robinson, 2023). Just like a lotus flower emerges from muddy waters unstained, we aim to foster the belief among students that in the face of challenges, they possess the capacity to rebound and advance with strength and resilience.

Within the framework of the resilience model, the spiral indicating the trajectory of resilience extends beyond the confines of the HEI context. This observable phenomenon suggests that the resilience capabilities cultivated within the HEI environment extend beyond its boundaries and seamlessly integrate into the student's professional career and lifelong learning.

5.4 THE MODEL PROCESS

The process of facilitating resilience progresses through three distinct phases of the facilitation process, namely the relationship phase, the working phase, and the termination phase. These successive phases are commonly used where the facilitation of learning is required and are useful where participation is required and for developing skills (Toerien et al., 2020:2-3).

Figure 5.7 indicates the facilitation process from start to finish. The process is active and starts at the relationship phase and ends at the termination phase. It is noteworthy that these phases are dynamic, allowing for transitions and movements both within and between them.

5.4.1 Relationship phase

The relationship phase of the model involves the establishment of a mutual relationship between the educator and the student, which serves as the basis for the collaborative model development process. Toerien et al. (2020:3) describe the relationship phase as fundamental for the successful implementation of the model and critical for participants to move to the working and termination phases. Thus, as a starting point, it is imperative that the relationship be clarified, which is designed for the benefit of the students and to foster resilience in them. To achieve this, the educator adopts the responsibility of creating a relationship of trust, wherein the aims, roles, and shared responsibilities of the educator and student are clearly delineated. Moreover, the educator encourages the students to freely express their opinions without fear of judgment. This approach is integral to building trust between the educator and the student. As the relationship develops over time, it results in a reduction in the student's apprehension, thus enabling them to participate and feel at ease in sharing their thoughts, ideas, and concerns openly.

The radiography student commences the radiography journey, often lacking a comprehensive understanding of the intricacies inherent to the radiography profession. The interview responses indicated that students felt unprepared for the interactions of the clinical environment and the need for self-efficacy and social connections were derived from the data. While these concepts bear direct relevance to the construct of resilience, it is not conventionally integrated or formally introduced within the radiography curriculum. Consequently, there exists a need to establish a foundational understanding of these concepts. In support of this, Toerien et al. (2020:3) assert within

their psycho-educational model that a foundational understanding of the issues at hand must be established during the initial relationship-building phase. This assertion aligns with the necessity of incorporating the concepts of self-efficacy, social connection, and resilience during the early stages of the facilitation of the learning process. By doing so, students can be better equipped to develop a firm foundational understanding of these concepts and, correspondingly, recognise their significance in the cultivation of resilience. Comprehensive guidelines on the implementation of the relationship phase, as well as the subsequent working and termination phases, are presented in Chapter 6.

5.4.2 Working phase

During the working phase, a systematic exploration and application, of resilience strategies take place. The working phase involves the identification and introduction of coping mechanisms and support systems, enabling the students to develop self-efficacy and foster social connections. The educator plays a crucial role in introducing and equipping students with established methods and theoretical concepts designed to facilitate a focused mindset, confidence in abilities, skills to organise and execute goals and establish social interactions and positive interpersonal relations. The student enthusiastically adopts these approaches, leading to a change in their behaviour, thereby fostering the cultivation of resilience.

Upon thorough analysis of the FGI data and subsequent refinement of the central concept, it is evident that students lack confidence in their abilities, experience feelings of isolation, and struggle with effective communication and interpersonal interaction during clinical placement. Consequently, the working phase concentrates on cultivating these skills to instil resilience among students.

The first step in this phase is to prioritise the cultivation of a focused mindset in students. According to Anderson (2021), efficiency and effectiveness in problem-solving necessitate the cultivation of a focused mindset. A focused mindset facilitates the identification of potential challenges and enables prompt responses to them. By adopting a focused mindset, individuals consciously focus their attention, thereby diminishing the likelihood of ineffectiveness (Anderson, 2021; Waddington, 2023:1). Hence, the elimination of distractions is critical for achieving desired outcomes. The literature describes various strategies for nurturing a focused mindset, including active participation in the formulation of structured study plans, adherence to timelines, and

the deliberate eradication of potential distractions (Bartimote-Aufflick et al., 2016:1930).

Another aspect of the educator's role is cultivating students' confidence and equipping them with skills to organise and execute goals. Fostering confidence in abilities and enhancing logical thinking processes requires continuous practice and refinement of skills. Moreover, the identification of gaps in knowledge and skills should be prioritised. This can be achieved by involving and engaging students in continuous feedback and motivation. The act of motivating and giving feedback should be facilitated by both educators and peers. Engaging in motivation and providing feedback to their peers contributes significantly to the augmentation of their own self-confidence and critical thinking skills (Gray et al., 2019:7; Elshami et al., 2020:112).

Also linked to the working phase, the educator is required to prioritise the facilitation of social interactions and positive relationships. The establishment of social interactions can be enhanced through collaborative activities, wherein students are directed to initiate conversations and are assigned explicit questions and tasks to promote participation in conversational exchanges. These discussions are anticipated to elicit responses that, in turn, promote the process of meaning-making by encouraging individuals to critically assess their comprehension, ideas, and perspectives. Additionally, active interaction and bonding with peers, radiographers, educators, and family members is actively encouraged, with a particular emphasis on allocating dedicated time for purposeful meaningful interactions.

5.4.3 Termination phase

In the termination phase, the educator concludes the instructional relationship upon the fulfilment of mutually agreed-upon outcomes established during the relationship phase between the educator and the student. The educator would have addressed all the uncertainties and challenges encountered during the working phase, ensuring readiness for this phase. The termination phase is characterised by the student demonstrating comprehensive knowledge of resilience-enhancing methods and the observable enactment of resilient behaviour in a variety of situations. The educator assesses these outcomes through structured assessment methods.

The facilitation is considered successful when the student effectively and observably demonstrates self-efficacy and the ability to establish positive social connections, leading to a resilient outcome.

The educator concludes the process by saying goodbye to the student. As the relationship draws to a close in the termination phase, the student may encounter feelings of anxiety. Consequently, it is imperative for the educator to engage in open discussions with the student about these emotional responses to provide necessary support and reassurance, resulting in a constructive conclusion to the educational journey.

5.5 EVALUATION OF THE MODEL

Step 3 of the Chinn et al. (2022:170) model development process requires that the proposed model be evaluated for the adequacy and applicability of the theory for practice. Subsequently, this process required critical questions to be addressed. A panel of experts in model development were therefore invited to participate in the evaluation process. The evaluation was conducted via Microsoft Teams online platform to facilitate remote access. The panel consisted of 10 evaluators and comprised experts from the fields of nursing and radiography. Seven evaluators completed the evaluation forms as outlined in Table 5.1.

Table 5.1: Evaluator demographics

Evaluator (E)	Years of experience in model development	Profession
E1	3 – 5 Years	Radiography (Prof)
E2	5 – 7 Years	Nursing (Prof)
E3	5 – 7 Years	Radiography (Dr)
E4	1 – 3 Years	Radiography (Dr)
E5	More than 7 years	Nursing (Prof)
E6	3 – 5 Years	Radiography (Dr)
E7	1 – 3 Years	Nursing (Dr)

The evaluation was done according to Chinn et al.'s (2022:170-176) five critical points: clarity, simplicity, generality, accessibility and importance. Responses were obtained from 7 evaluators (E). The responses were critically reflected on and recommendations were taken into consideration for finalisation of the model. Direct quotations from evaluators are presented.

5.5.1 How clear is this model?

Clarity describes how well the theory was understood and how consistently the ideas were conceptualised. To enhance the clarity and understanding of the model the researcher defined the central concept as it relates to the study context and applied the concept consistently to the model.

Evaluators concurred that the model exhibited a high level of clarity:

> *"The model is clear" E1*
>
> *"The model on its own is relatively clear." E4*
>
> *"The model is very clear. It could improve with labels of the people in the diagram and well as the stating the outcome of the model" E5*
>
> *"The model was clear and easy to follow" E6*

Suggestions made to enhance the overall clarity of the model included:

> *"The solid line between the phases - does this mean there is no fluidity between the phases - even though the spiral shows fluidity." E1*
>
> *"Labels on the ovals and figures. Consider the white background and the significance." E3*
>
> *"It could improve with labels of the people in the diagram" E5*

In response to the suggestions, changes made to improve clarity included changing the background of the model from white to various shades of purple, with purple chosen for its connotation of resilience. Furthermore, adjustments in the form of dashed lines were applied to the previously solid phase lines signifying fluidity between phases, and clear labelling of figures within the model was undertaken.

5.5.2 How simple is this model?

Simplicity refers to the number of interrelationships between and among concepts. In this model, the number of concepts and the relationships between them were kept to a minimum to aid understanding. Collectively, this was guided by the central concept. A design that is both simple and meaningful was implemented, yet fulfilling the purpose of the model.

All evaluators concurred that the model exhibits simplicity:

“Model quite easy to follow” E2

“The model is simple to follow, specifically by means of the clear narrative” E4

“The model was simple and easy to follow” E6.

“The model is simple to interpret based on the presentation of relational concepts. It is laid out from the commencement of a simple learner and lecturer resilience building relationship highlighting how the process unfolds and concludes.” E7

One evaluator suggested that whole figurines instead of just heads be used to represent the educator and the student:

“The researcher could improve on not using heads to refer to people involved but use a whole figured person” E5

Following the configuration of the model, the researcher included figurines depicting the upper part of the body. This decision was motivated by the intention to mitigate the possibility of interpreting the educator and students solely as cognitive beings a concern that might arise if only the head were visible.

5.5.3 How general is this model?

The generality of a theory describes the breadth of scope and purpose of the theory. While the theory was developed for the radiography profession, responses strongly suggest that the model is generalisable. Evaluators overwhelmingly expressed that the theory can be effectively applied and utilised in diverse contexts. This aligns with the perspective put forth by Chinn et al. (2022:174), emphasising that a general theory holds the capacity for application across a range of situations.

All evaluators unanimously concurred that the model adhered to the generality principle, specifically, emphasising the use of it in a variety of contexts and across the curriculum:

“The model is general and can be applied to various concepts” E1

“Very general the model can be taken and used in different contexts” E2

"The model does appear general and although first years were indicated in the study it could be used for all undergraduate students at different phases of their teaching and learning." E3

"The model is applicable to teaching and learning environments where the WIL involved" E5

"It fits the generality principle as it seems to apply across fields beyond Radiography, where both components of theory and practice are required. The classroom learning and teaching milieu suits many situations where formal knowledge transfer occurs, and this model could be the best fit for such environments." E7

5.5.4 How accessible is this model?

The accessibility of a theory was addressed by identifying the concepts and making the theory practical. The researcher ensured the accessibility of the concepts of the theory by providing theoretic relationships and suggesting the use of the theory in practice.

Evaluators found the model to be accessible and underscored the necessity for the results to be disseminated:

"It is accessible as consumers will easily follow what needs to be done to help students gain resilience" E2

"It is accessible" E3

"The accessibility of the model will depend on when and how and how soon the researcher communicates this with the targeted audience through e.g., publication to raise awareness." E4

"The model was accessible" E6

"It is still in its formation phase and not accessible to users." E7

5.5.5 How important is this model?

An important theory is characterised by its forward-looking nature, applicability to practice, education, and research, and is one that is valuable for achieving desired outcomes (Chinn et al., 2022:176). The present theory holds significant practical and

clinical relevance, specifically directed at instigating transformative change within radiography education.

The responses from the evaluators overwhelmingly underscored the model's importance, emphasising its crucial role as a much-needed intervention for health professions:

> *“The model is important to facilitating resilience even among healthcare workers.” E1*
>
> *“Very important as students come across different challenges that cause stress in the clinical setting and definitely have to be resilient to deal with these.” E2*
>
> *“The model is important in the context of radiography and particularly after being front line workers during a pandemic resilience is extremely relevant. Students often struggle with the hierarchial structure in clinical practice and this could help them cope. The model could be used for other health professions.” E3*
>
> *“In my view, the model is important and significant. Its implementation will benefit and empower students, educators as well as colleagues in the clinical space” E4*
>
> *“It is quite necessary to the students considering the stress levels brought on by clinical practice. one-on-one engagements with the lecturer could assist the student to pull through the process of character and resilience building for future encounters.” E7*

In summary, based on the evaluators' feedback, the major revisions to the model included:

- *Clarifying that, within the context of the resilience model, the "agent" and the "recipient" refer to a radiography educator and student, respectively.*
- *Modifying the figurines representing the radiography educator and student from mere heads to half-body representations.*
- *Changing the background of the model from white to various shades of purple, with purple chosen for its association with resilience.*

5.6 CONCLUSION

Chapter 5 described the model to facilitate resilience in DR students. An overview and a visual demonstration of the model were presented and discussed. The process of the model was also presented. Chapter 6 discusses the guidelines to operationalise the model.

CHAPTER 6:

GUIDELINES TO OPERATIONALISE THE MODEL

6.1 INTRODUCTION

In Chapter 5 a description of the model and the process of the model to facilitate resilience was presented. This was followed by a reflection on the evaluation of the model to facilitate resilience in radiography students. Chapter 6 shifts the focus to the guidelines for implementing the resilience model. The guidelines include a description of educational principles and practical steps required in the relationship phase, working phase and termination phase to achieve resilience, the outcome of the model. The structured guidelines aim to provide a practical approach for educators to nurture and enhance resilience among radiography students.

6.2 GUIDELINES

The guidelines for the model to facilitate resilience are recommended for the radiography context but can be implemented in other curricula where students are required to complete WIL. It is envisioned that the implementation of the model will be situated in subjects or modules where the emphasis is on outcomes such as professionalism, communication, and health behaviours of the patient and society. The model's applicability also extends to the subjects where the focus is on applying theoretical and practical concepts to the clinical environment.

The set guidelines (Figure 6.1) are formulated to assist radiography educators in fostering resilience among radiography students. Moreover, the guidelines offer methods for educators to nurture resilience development. While the guidelines have been developed to suit the needs of first-year radiography students, they can be adapted to allow for their integration of resilience across multiple levels of study, extending to the fourth-year level and into the professional domain.

It is recommended that the process for implementing the guidelines be guided by the social constructivist and transformative learning theories. Respectively, these theories emphasise the notion that knowledge is actively constructed through collaborative and social interactions and that viewpoints and assumptions are altered following a process of critical reflections on a transformative experiences (Fleming 2018:123; Akpan et al., 2020:50). Consequently, individuals play an active role in the creation of new

knowledge through their engagement in social interactions. Furthermore, students derive meaning from concepts and information through human interactions as they collectively participate in the learning process (Akpan et al., 2020:50).

The guidelines for implementing the model to facilitate resilience among students are described according to the distinct phases of the model, namely, the relationship, working and termination phases. By following the guidelines and prescribed actions for each phase, resilience can systematically be cultivated. However, the phases are fluid, meaning movements within and among the phases are likely to occur. Consequently, when a decline in resilience is experienced actions can be redirected to the appropriate phase and the corresponding guideline.

This is illustrated in Figure 6.1 below - Framework: Resilience guidelines

FRAMEWORK: RESILIENCE GUIDELINES

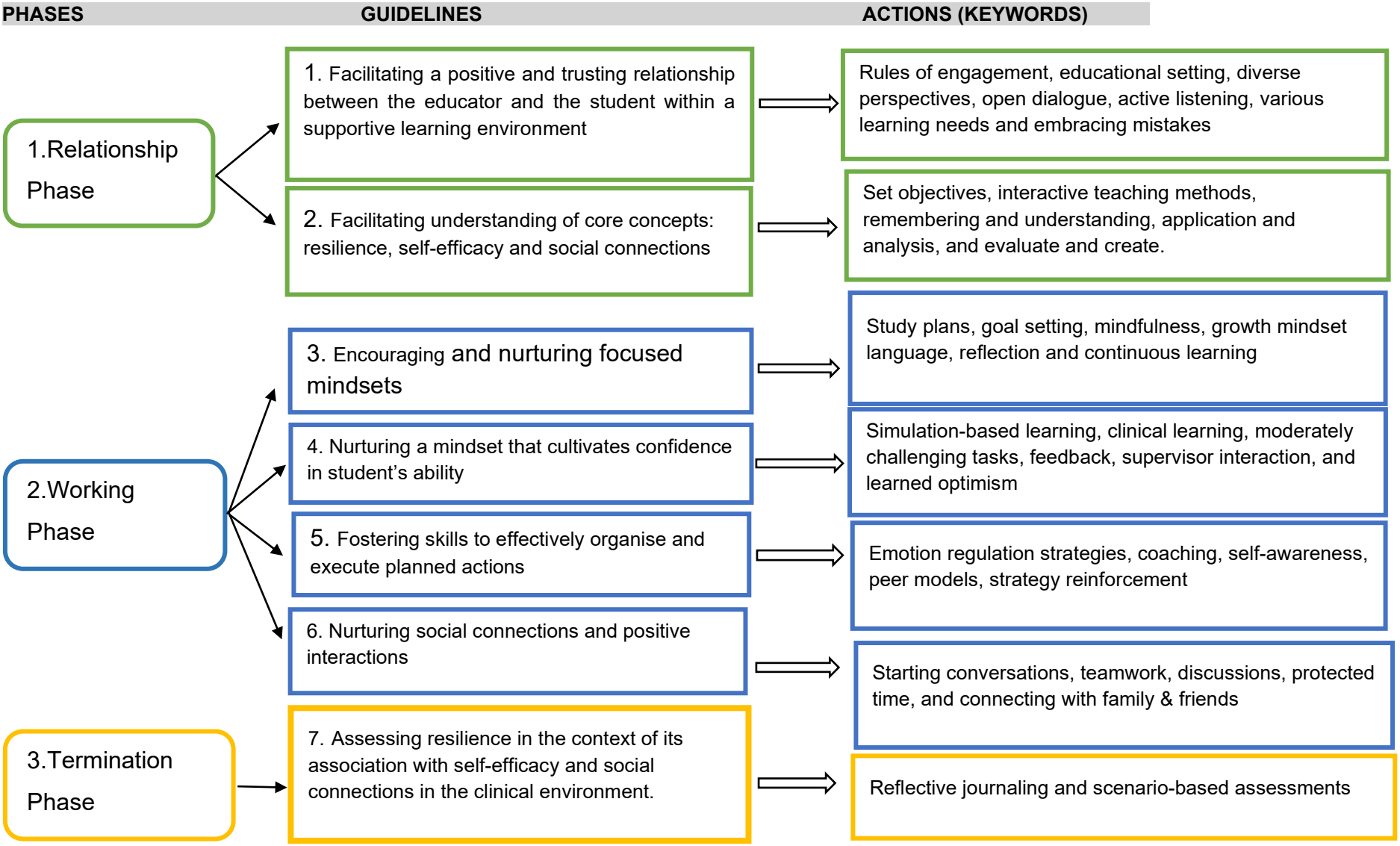

Figure 6.1: Framework: Resilience guidelines

6.2.1 Relationship phase

The model starts with the radiography educator and the radiography student coming together to commence the educational journey towards developing resilience in students as it relates to the clinical environment. Employing a dynamic interactive approach, the educator assumes the role of providing essential support and guidance to students, who in turn actively engage with and internalise this support and guidance to meet the objectives set for this phase. The guidelines of the relationship phase entail the facilitation of a positive and trusting relationship between the educator and the student within a supportive learning environment and nurturing a foundational understanding of key concepts of self-efficacy and social connections critical for the development of resilience. The guidelines are explained and the actions to achieve these guidelines are detailed.

6.2.1.1 Guideline 1: Facilitating a positive and trusting relationship between the educator and the student within a supportive learning environment

The literature describes the cultivation of positive relationships with students as a key element in the facilitation of effective learning (Holley & Steiner, 2005:49; Platz, 2021:688; van Dyk et al., 2022:9). This positive rapport plays a significant role in fostering trust, mutual respect, and ultimately, a safe learning environment. As the relationship between the student and educator progresses and deepens, educators gain valuable insights into the unique characteristics and needs of their students. This understanding enables educators to offer tailored and meaningful support, encouragement, and motivation to students, thereby enhancing the overall learning process.

The literature explains that a trusting and respectful relationship provides a foundation for cooperation, collaboration, confidence development, commitment and managing conflict over time (Platz, 2021:689; Snijders et al., 2022:426). Furthermore, trusting relationships encourage open communication and active listening between students and educators. By learning how to communicate emotions and feelings, students are equipped to discuss and resolve issues that are impacting their interactions with their peers, educators, qualified radiographers and patients. The theme of “interpersonal interactions as they relate to the clinical environment” highlighted that participants encountered challenges in relationship building and communication. Therefore, teaching and learning should be designed to prioritise trusting and respectful interactions when considering learning and relationships. By equipping students with

the skills to build trusting relationships within the classroom, we better prepare them for such interactions in the clinical environment.

The aim of a supportive learning environment is to create a sense of safety and openness where students can openly and honestly express their viewpoints. It is a place where students feel at ease seeking guidance, and exploring knowledge, and where a welcoming and caring atmosphere is given preference (Holley & Steiner, 2005:49; Platz, 2021:688; Van Dyk et al., 2022:9). When these conditions are met, students are more likely to experience an increased sense of self-efficacy, feel encouraged to participate and engage in learning, and consequently fostering a greater belief in their ability to succeed (Margolis & McCabe, 2006:218).

The implementation of the following actions is advised to fulfil Guideline 1.

Table 6.1: Actions to fulfil Guideline 1

i. Rules of engagement	All relationships are built on mutual respect for one another, and this principle should also apply to the classroom. This can be instilled in the class through the establishment of clear ground rules created by both the educator and students that prioritise group norms and promote respectful communication (Chauvet & Hofmeyer, 2006:290). Rules could encompass treating others with respect at all times, displaying kindness, active listening when others are speaking, preparedness for class, active participation in class activities, and cooperating with peers. These rules, which apply to both the educator and students, should be introduced early on in the relationship-building process.
ii. Clarity of the educational setting	Educators should strive to establish a well-structured learning environment. Communicating a structured learning environment requires setting high and clear expectations, setting realistic goals, holding students accountable, and living by the same rules which are set for students (Meador, 2019). Such environments are transparent and translate to

		a safe learning environment where students can focus on learning and experience personal and academic growth.
iii.	Demonstrate a genuine interest in students	Displaying a genuine interest in students' learning and well-being is essential for cultivating a positive and thriving relationship within the educational setting. Best (2020) suggests that when educators remember things about their students and share things about themselves, it cultivates a positive and thriving relationship. Asking students about their interests, learning about their challenges and getting to know each other through icebreakers and group activities will create a sense of care and concern for their academic and personal growth. An icebreaker in the form of two truths and one lie game is a fun way to get to know each other. With this game, each person calls out three statements about themselves, two being true while one statement is a lie. For example, when a student presents their statements, the student sitting to their right side will guess the true and false statements. The student who guessed will also be the next person to present their statements. This game can be introduced at the beginning of the year during the initial class interaction whereby the educator can record notes helping them to remember information about their students.
iv.	Incorporate diverse perspectives	Introduce activities that emphasise the importance of differing perspectives in the classroom. Through small group discussions, students can share their heritage and cultural beliefs with each other. By incorporating such activities, the educator promotes an environment that is inclusive, broadens students' knowledge and supports the integration of multiple perspectives (Lee, 2017:14). This is critical considering the diverse nature of interactions that students encounter both in the classroom and clinical environment.

v.	Encourage open dialogue	Encourage open dialogue where students can freely express their views, ideas and opinions without fear of judgment. Moreover, Barimani et al. (2022:7) assert that open dialogue develops communication skills, and participation, and facilitates social connections. Basic principles like acknowledging comments, participating in decision-making, positive feedback and engaging in general conversations rather than one-way communication are advised (Barimani et al., 2022:3).
vi.	Promote active listening and respectful communication	Where necessary, when students engage in discussion, they should be encouraged to listen carefully without interrupting and be reminded about the established ground rules for respectful communication. Specifically, where listening is required, or information should be gathered the 80/20 rule of communication can be applied which refers to 80% listening and 20% speaking. Waiting until the person is finished before speaking and making eye contact will also enable one to listen in a more meaningful way (Steber, 2019).
vii.	Cater for various learning needs	Displaying a sincere interest in enabling student success is crucial. This can be achieved by providing guidance and support tailored to student's learning needs. Combining various learning styles as prescribed by the VARK learning model into one lesson significantly influences academic outcomes. The VARK model, an acronym introduced by Flemming denoting visual, aural, reading and kinesthetic (K) learning suggests that visual (V) learners learn by looking at images, graphs, flowcharts and videos while auditory (A) learners pay attention to spoken words and prefer to listen for example a podcast. The learners who prefer reading (R) make sense of words like lecture notes and textbooks while the (K) learners prefer hands-on and practical experience (Prithishkumar & Michael, 2014:184). By incorporating

	multiple learning approaches, students are more likely to excel as we effectively cater for students' various learning preferences.
viii. Embrace mistakes	Eckstein et al. (2023:1) promote the idea of educators embracing mistakes with openness and honesty, considering them as an inevitable aspect of acquiring new knowledge. When educators openly acknowledge mistakes, it fosters an environment of safety, particularly in the clinical environment where students often express fear of making mistakes. Moreover, by embracing mistakes growth and learning are encouraged and the stigma of struggling in academia is minimised (Eckstein et al., 2023:1). The English Learning Institute (2023) suggests that educators create a positive space by refraining from a harsh judgement following mistakes, rather praising students when they answer correctly and highlighting their progress after making mistakes.

6.2.1.2 Guideline 2: Facilitating understanding of core concepts: resilience, self-efficacy, and social connections

The researcher acknowledges the complex nature of resilience and the significance of self-efficacy and social connections in its development for an individual. Recognising this, the facilitation of these concepts was considered critical, by the researcher, to ensure that students gain a comprehensive understanding of resilience. Linked to this, research asserts that a foundational understanding of the issues at hand must be established early in the learning process (Toerien et al., 2020:3). Consequently, establishing an understanding of resilience, self-efficacy, and social connections is prioritised in the working (first) phase.

Bloom's taxonomy, comprising various cognitive domains in hierarchical order, describes learning through six elements—remember, understand, apply, analyse, evaluate and create— and is used to introduce concepts and their applicability. By applying the taxonomy, the educator presents a scaffolded approach where students

develop an understanding of concepts of resilience, self-efficacy and social connections systematically by moving from a basic understanding to more complex cognitive domains (Krathwohl, 2002:214). As per Bloom's taxonomy, to develop competence in an area of enquiry, students must have a deep, factual foundational understanding, thereby understanding facts and ideas as they relate to the context and organise knowledge that facilitates the retrieval and application thereof. Thus, developing a foundational understanding of these concepts is important before students can engage in critical thinking and ultimately build towards the enactment and application of resilient behaviours.

The implementation of the following actions is advised to fulfil Guideline 2.

Table 6.2: Actions to fulfil Guideline 2

i. Set objectives	During teaching, the educator should pre-determine the intent of content by clearly stating and defining the scope, as well as the learning objectives and outcomes as a result of instruction (Krathwohl, 2002:212). These statements are important to guide students on the knowledge, skills, and attitudes they are required to demonstrate and possess concerning resilience, self-efficacy and social connections during each section of the learning process. Thus, a systematic approach to learning by dividing Bloom's taxonomy into sections is advocated to structure teaching and learning of the concepts. The systematic approach includes setting objectives for (1) pre-class classroom and (2) classroom activities (Kurt, 2018).
ii. Incorporate interactive learning methods	Research demonstrates that incorporating interactive and fun learning activities is essential for enhancing student participation, improving memory retention, and keeping students engaged in the learning process (Forbes, 2021:57). Moreover, an interactive approach helps students let their guard down, destress and bond socially. In addition, it is a move away from the traditional teaching approach

		which tends to be rigid and passive (Forbes, 2021:57). The flipped classroom presents a student-centred interactive learning approach (Yin, 2020:76) and can be used to facilitate understanding of concepts. By using the flipped classroom method, students gain factual knowledge of resilience, self-efficacy, and social connections through the pre-recorded lecture at their own pace outside the classroom setting. Subsequently, during classroom contact, students actively engage in discussion, collaborative activities, problem-solving, and applying the knowledge of the concepts. Through these interactions, not only are misconceptions corrected, but a deeper understanding of the concepts is facilitated (Talbert, 2019). It is important to note that the flipped classroom method requires extensive preparation and experience from educators to ensure that students come prepared for class. In addition, to effectively facilitate flipped classrooms educators have to be able to maximise classroom interaction and provide instant support to students (Long et al., 2017:197). Long et al. 2017: 197) suggest peer support amongst educators and institutional support to conduct the flipped class method effectively.
iii.	Focus on remembering and understanding	In terms of Bloom's taxonomy, the flipped classroom inverts the classroom so that classroom activities traditionally taught in the class are learned at home through structured activities and the more complex activities are reserved for the social environment (during class time) (Talbert, 2019). Pre-class content focuses on “remembering” and “understanding” concepts. The educator can present a pre-recorded lecture focusing on terminology, educational theories and models, and principles and generalisations (Armstrong, 2010) of concepts of resilience, self-efficacy and social connections. Students are required to engage with the lecture content independently and in their own time, before attending a face-to-face class. To enhance

		engagement with the pre-recorded lecture, it is advised that the educator embed structured questions and activities critical for the classroom activity. This can be in the form of open-ended questions and reflections. Additionally, the educator can include a short practice quiz, allowing students to assess their own comprehension of the concepts.
iv.	Emphasise application and analysis	Following the pre-class content, the students attend the classroom with an overview and understanding of the presented concepts. During the first few minutes, the educator should spend time addressing questions and comments related to the concepts as they arise following the pre-class content. In addition, the educator should pose questions related to the pre-class content to establish student's understanding of the concepts of resilience, self-efficacy and social connections. The focus of the classroom activities is directed at tasks aligned with "applying" and "analysing" Bloom's taxonomy. These activities enable students to have a deeper understanding of the concepts (Talbert, 2019). Thus, students can be divided into smaller groups where they present and discuss real-world examples of resilience, self-efficacy and social connections and how the understanding and enactment of the concepts can help overcome difficulty. An example could be where students consider the approaches they can employ during a difficult encounter with a peer, radiographer or patient. The share and exchange approach results in interactive discussions and enhanced comprehension of the key concepts. Talbert (2019) emphasises that tasks involving applying and analysing can be particularly challenging for students therefore, the flipped classroom is beneficial, as support and guidance are at the student's immediate disposal during the in-classroom activity.

v. Evaluate and create	In accordance with Bloom's taxonomy, the top two levels centre on the cognitive processes of "evaluating" and "creating." Educators can therefore assign tasks where students have to evaluate their own understanding and create new ideas based on their grasp of resilience, self-efficacy and social connections. Examples include justifying and creating scenarios where the concepts are applicable. Role-play activities emulating the clinical environment and reflective journaling are excellent methods to engage in this level of learning (Armstrong, 2010).

6.2.2 Working phase

The aim of the working phase is to equip students with coping mechanisms and support systems to facilitate focused mindsets, confidence in abilities, skills to organise and execute planned actions and establish social connections and positive interpersonal relations. This comprehensive approach aims to enable the development of resilience in radiography students, ensuring their capability to navigate challenges in the clinical environment.

6.2.2.1 Guideline 3: Encouraging and nurturing focused mindsets

According to McEwen and Schmidt (2007:6), mindset refers to the cognitive patterns in making meaning and increasing knowledge and skills associated with a current mindset. Moreover, the construct underpins personal beliefs, attitudes and values. Dweck (2007:6) has further contributed to the understanding of mindset by developing a theory that specifically centres around the relationship between mindset and motivation. The theory asserts that beliefs about mindsets are viewed as either fixed traits (fixed mindset) or attributes that can be developed (growth mindset) through effort. Consequently, these mindset assumptions have a direct influence on an individual's actions, and behaviour levels of engagement (Yeager & Dweck, 2012:302).

Students with a growth mindset view their knowledge, understanding and skills as abilities that can be improved through effort whereas those with a fixed mindset view these abilities as stable and unchangeable over time (Dweck, 2007:7). It is thus crucial

for radiography students to intentionally focus their mindsets during learning as a fixed mindset can be limiting in the radiography setting where being adaptable is critical to dealing with diverse interactions, the fast pace and the continued evolving technology. Ackerman (2018) asserts that consciously adopting a growth mindset is about incorporating both positive and negative perspectives and still choosing to be optimistic. Drawing students' attention to positive coping skills like self-motivation and focusing on the end goal is specifically useful in creating a growth mindset and resilience (Delaney et al., 2015:1309). The notion of focusing on the end goal as motivation to push through when dealing with challenging interactions was specifically highlighted by participants of the current study. While Dweck (2007:6) asserts that a growth mindset is important in resilience development, the author stresses that a focused mindset alone is not sufficient but that effort by the individual and effective teaching strategies need to be in place.

Another construct known to have an immediate and positive effect on the mind is mindfulness (Lloyd et al., 2016:606). Mindfulness, defined as the capacity to focus attention on the present moment both externally and internally significantly contributes to resilience (Liu et al., 2022:1). When one engages in mindfulness they have an improved sense of focus, attention, and problem-solving-orientated outlook, which allows them to better cope with thoughts and emotions without getting overwhelmed or shutting down (Liu et al., 2022:1). The current study demonstrated that the clinical environment is an increasing source of stress and anxiety to first-year radiography students and they would thus benefit from mindfulness awareness and practice. Through this manifestation, students will be consciously engaged in calming and gathering their thoughts and emotions, and critical thinking rather than operating on autopilot and suppressing emotions. Gathering thoughts and emotions focuses attention (Saraff et al., 2020:332).

The following actions are recommended to achieve Guideline 3.

Table 6.3: Actions to fulfil Guideline 3

i.	Structured study plans	Without a clear plan outlining how growth is envisioned, it may be challenging for students to focus their efforts and progress. Consequently, implementing structured schedules, such as timelines and developing study plans with realistic deadlines can assist with growth within a realistic timeframe. This approach not only enables students to track their progression but reassesses their commitment to their plan.
ii.	Set goals	The cultivation of focused mindsets can be facilitated by engaging students in activities that focus their mindsets on specific outcomes. Setting goals, and being committed to achieving goals can serve as a roadmap to follow and promote the adoption of a growth-oriented perspective towards the outcomes. Moreover, setting goals helps students with a clear sense of purpose (Mansfield, 2020:285). Tracking progressions towards goals can be done by introducing the “SMART” acronym. This acronym stands for specific, measurable, achievable, realistic and time-based goals (Rubin, 2002:26). It is particularly helpful for providing direction, motivation and a clear focus thereby enhancing the likelihood of achieving goals.
iii.	Mindfulness	Incorporating regular coordinated thinking moments where students submerse themselves in what they have learned, can help focus their mindsets. For example, after a scenario of an extremely rude patient is presented ask students to stop and reflect on their feelings, emotions and thoughts. This practice can help them view the experience in a new way and not be overly reactive or overwhelmed by thoughts and emotions (Saraff et al., 2020:332). Furthermore, intentional thinking moments

		serve as an effective method to deal with stress and stimulate critical thinking among students.
iv.	Promote growth mindset language	Dweck (2014) advocates the frequent use of the word "yet" in the classroom as a cultivating a transformative shift in mindset. This word serves as a motivational tool and conveys the notion that, although students may not have attained a particular achievement at present, it does not imply an inherent lack of capability. Thus, encouraging students to employ the word “yet” encourages a growth-oriented perspective, thereby instilling confidence, persistence and resilience in striving towards achieving their goals even when facing setbacks. For example, students can activate a transformative mindset by expressing that while they are not able to work as efficiently as a qualified radiographer “yet”, competence will develop with practice and experience, promoting a positive outlook to their learning journey.
v.	Reflection	Reflection serves as a valuable tool for identifying strengths and weaknesses, learning from experience and identifying ways to improve practice. When employed purposefully, reflection supports ongoing personal and professional development, and fosters practitioners capable of demonstrating their progression towards learning and professional standards (Helyer, 2015:15). Reflective practices are often challenging, therefore, a scaffolded framework such as using narratives can be applied, starting with posing structured questions and gradually progressing towards utilising reflective models like Gibbs reflective cycle and portfolios of active reflection (Helyer, 2015:16). However, Carter et al. (2014:370) assert that critical thinking need to adopt a multi-method approach and be integrated as a habitual process during actions. This assertion aligns well with Schön's (1987:26) reflection-in-action which involves

	critical reflection and practice while the action is taking place, thereby immediately influencing actions. Specifically, these methods can be utilised beyond the academic setting, to encourage lifelong learning and professional development.
vi. Continuous learning	Students should aim to continuously improve their knowledge and skills. By regularly engaging with theory and practice the chances of confusion are diminished, leading to improved confidence and resilience (Bwanga & Lidster, 2019:372). Moreover, keeping abreast of technology, practical skills, communication skills and managing oneself more effectively in an ever-changing profession contributes to resilience (Wareing et al., 2017:58). Continuous learning and practice should be actively encouraged, especially in health professions were consistent and ongoing commitment to lifelong learning is essential through a process of continuing professional development (CPD) (HPCSA, 2021).

6.2.2.2 Guideline 4: Nurturing a mindset that cultivates confidence in students' abilities

The resilience of students in the present study was notably affected by a lack of confidence in their abilities. The literature demonstrates that students with confidence in their abilities are more likely to take chances, engage in conversations and demonstrate more resilient behaviour when faced with difficulty (Martin & Marsh. 2008:55, Cleary et al., 2018:114, Jeyandrabalan et al., 2022:499). Consequently, it becomes imperative to emphasise that radiography students develop confidence in their own abilities to facilitate resilience.

Bandura's (1977:195) self-efficacy theory advocates that a person can develop confidence in their abilities through four sources, namely (1) mastery experience, (2) vicarious experience, (3) verbal persuasion, and (4) physiological states. The theory is classified as a motivational theory and further asserts that when one has confidence

in their abilities it determines and drives decisions in a positive manner. Thus, when students have confidence in their abilities, they are likely to have a positive outlook and experience lower chances of anxiety and stress. Bandura (1977:195) describes mastery in experience as the most influential element in developing confidence. This confidence development is due to actual experience and demonstration of own abilities. In keeping with the social learning theory, Bandura further suggests that students observe, learn, imitate and model others mediating their confidence development. Therefore, through observing and working with their peers and qualified radiographers, students can develop their own confidence.

Developing confidence in abilities can further be enhanced through verbal persuasion. The research advocates motivation and advising students on how to progress as a positive confidence-boosting factor that lessens self-doubt. When students experience a motivational culture, it improves their confidence and impacts their perceptions of chances to succeed (Ibrahim et al., 2016:507). Another form of verbal persuasion is through constructive feedback. Feedback is a powerful tool for learning and plays a significant role in students' confidence (Prochazka et al., 2020:1). If conducted properly and effectively it can enhance students' performance. Bartimote-Aufflick et al. (2016:947) explain that when positive feedback is given students' confidence in their skills is fostered and their productivity increases.

To adhere to Guideline 4, the following actions are recommended.

Table 6.4: Actions to fulfil Guideline 4

i. Simulation-based learning	Simulation-based learning plays a critical role in fostering confidence in students. It allows students to develop competence in a safe learning environment (Hazell, 2020:238). Scenarios replicating the stress-inducing situations in the clinical environment, like engaging with a difficult patient and dealing with nervousness, students can gain an understanding of what to expect and how to respond effectively in such circumstances. Experiencing success in the simulated environment enhances students' confidence and skills

		as they navigate these scenarios with assurance in the clinical environment.
ii.	Clinical learning	Clinical learning immerses students into the physical space, teaching and learning structure, psychosocial and interaction factors and organisational structure of the clinical environment (Flott & Lindon, 2016:501; Lundvall et al., 2021:446). Moreover, Lundvall et al. (2021:442) emphasise that professional learning is best achieved through active participation in practice and the ongoing construction and reconstruction of knowledge. Therefore, a scaffolded approach from simulation-based activities to real-world clinical practice is recommended allowing students to acquire professional knowledge gradually. This methodical progression ensures that students develop a solid foundation of professional competence and resilience through first-hand experiences in the clinical environment.
iii.	Plan moderately challenging tasks	The task should be pitched at the correct difficulty level, to prevent students from feeling either bored and disengaged or overwhelmed with fear and anxiety. According to Margolis and McCabe (2006:220), tasks should be slightly above students' current performance levels to challenge them, encouraging them to invest energy into the task while also enhancing their willingness to dedicate time to completing it.
iv.	Constructive feedback	Feedback on students' performance plays a significant role in achieving clinical outcomes. Therefore, when feedback is given it should be constructive not to break students' confidence or leave them feeling demoralised and lacking self-worth (Chowdhury & Kalu, 2004:243). The sandwich feedback approach can be used which partners positive feedback with negative feedback.

		Thus, during the feedback session, the educator starts with praise, followed by corrective feedback and ends with praise (Prochazka, 2020:2). This way the feedback does not only focus on negative aspects includes a focus on the student's strengths. Structuring opportunities for student-radiographer interaction is essential. Radiographers have extensive knowledge of the field and are well-suited to share their knowledge, and insights, and help them with the transition to the clinical environment with students (Bwanga & Lidster, 2019:371). When staff are approachable and take an interest in students it not only encourages communication between students and supervisors but students feel acknowledged and experience emotional support, leading to improved understanding, collaboration and working relationships (Jeyandrabalan et al., 2022:502).
v.	Radiographer/ clinical supervisor interaction	Structuring opportunities for student-radiographer interaction is essential. Radiographers have extensive knowledge of the field and are well-suited to share their knowledge and insights and help students with the transition to the clinical environment (Bwanga & Lidster, 2019:371). When radiography staff are approachable and take an interest in students, it not only encourages communication between students and them, but students feel acknowledged and experience emotional support, leading to improved understanding, collaboration and working relationships (Jeyandrabalan et al., 2022:502). To enhance interaction, it is recommended that dedicated time be allocated for radiographers and students to engage and that teambuilding events involving radiographers and students be organised.

vi.	Learned optimism	Promoting an optimistic outlook is beneficial for students to thrive. Seligman's model of 3Ps promotes positive perspectives embracing permanence (the idea that a difficult situation will pass), pervasion (difficult situations refer to one aspect of life and do not affect all areas of one's life) and personalisation (looking for external causes of difficult situations rather than blaming self) (Seligman, 2006:44). When one integrates positive thinking into efforts this can significantly improve confidence as one moves away from their limitations and focuses on their strengths. An example of the 3 Ps, in a scenario where a radiography student feels completely hopeless after producing poor results in a practical assessment, looks like this: Personalisation: Instead of harsh blame and self-criticism they take responsibility for their poor performance and commit to better preparation for the next assessment. Pervasion: Despite the poor performance the student refrains from generalising the poor results to all aspects of their practical ability but rather recognises it as a specific area that needs attention and improvement. Permanence: While the student has performed badly in this practical assessment, they acknowledge the temporary nature of the situation, and that dedicated practice and commitment to enhancing their skills will change the outcome.

6.2.2.3 Guideline 5: Fostering skills to effectively organise and execute planned actions

Students have communicated challenges in managing anxiety and fears when confronted with emotionally charged scenarios in the clinical environment. Adapting to a fast-paced and unfamiliar environment has had a significant impact on their ability to execute tasks and, consequently, on their self-confidence. Furthermore, students noted their surprise at the severity of patients' illnesses and expressed uncertainty about how to respond effectively in such situations. These reflections highlight how emotional and practical challenges affect the organisation and execution of tasks in the clinical environment, emphasising the importance of addressing support interventions.

The implementation of the following actions is recommended to foster skills to effectively organise and execute goals (Guideline 5).

Table 6.5: Actions to fulfil Guideline 5

i. Emotion regulation strategies	Maintaining control over one's emotions is crucial in the clinical environment, where individuals frequently encounter a variety of emotion-provoking situations such as challenging patient encounters, difficult relationships or team interactions. Responding in a manner that communicates respect, empathy, and kindness during these moments can be demanding and necessitates deliberate emotional regulation. According to Koole (2010:29), strategies such as shifting attention away from negative thoughts and redirecting it towards positive thoughts, engaging in breathing exercises, and focusing on personal goals are identified as methods that effectively promote emotional regulation and functional coping in such circumstances.
ii. Solution-focused coaching models	Seligman’s ABCDE model seeks to replace students' negative beliefs with helpful and encouraging beliefs (2006:270). The stages of the ABCDE model refer to,

		• A - Adversity: identifying the specific event or action that triggers negative thought patterns. • B – Beliefs: recognising the underlying belief system that becomes active when encountering triggering situations. For instance, when someone has a negative perspective, they tend to believe that a situation will have a negative outcome. • C – Consequence: understanding the repercussions that these beliefs have on actions and emotions. • D - Disputation of beliefs: at this stage, students comprehend the triggers influencing their dominant belief system. • E - Effective new approach: here the focus is to replace unhelpful beliefs with more constructive and helpful beliefs. By encouraging students to engage in the solution-focused coaching approach, a positive shift in students' thinking can be achieved allowing them to organise and execute their actions more effectively.
iii.	Self-awareness of one's limitations	A realistic understanding of one limitation of knowledge and skills affects a student's actions. Students should therefore be given the opportunity to identify challenges and undesired outcomes. This can be done through discussion with the educator, radiographer or a peer. These discussions can facilitate thinking and considerations for improving student's performance and problem-solving skills.
iv.	Using peer models	As per Margolis and McCabe (2006:221), peer models can be categorised as mastery or coping models. Mastery models are particularly valuable for effectively

	demonstrating a skill in action. Therefore, being guided by a peer acting as a mastery model can significantly assist students in preparing to execute the task themselves by observing correct demonstrations of the skill. For instance, pairing a senior student, such as a fourth-year, with a first-year student can serve as an effective strategy, as being guided and supported by a peer has been acknowledged as a significant contributor to student resilience and continued support (Del Prato et al., 2011:112; Mansfield et al., 2016:80).
v. Reinforce effort and correct strategy	With continuous practice and employing a systematic approach, student's resilience can be improved. Through reinforcement, the correct behaviours are more likely to be consistently displayed. For example, following a particular sequence when conducting an X-ray on a patient can help students remember to apply the lead protection apron and correctly place markers, which are elements often forgotten or incorrectly positioned.

6.2.2.4 Guideline 6: Nurturing social connections and positive interactions

Deitz et al. (2020:2) describe social connections as the relationships one creates with his or her community and environment, and the support he or she receives in return. Additionally, Lee et al. (2001:301) assert that social connections give people a sense of belonging and contribute to their overall well-being. Consequently, it can be deduced that social connections are vital when students integrate into a community and seek support to navigate the clinical environment. In addition, existing research underscores the significance of social ties with family, friends, and colleagues in fostering resilience (Fuller-Iglesias et al., 2008:181; Boss et al., 2015:545; Holt-Lunstad, 2018:1308). However, a need for nurturing social connections and positive interactions was gauged from study participants' responses when they indicated their challenges to start conversations and reported experiencing isolation and a lack of belongingness as it relates to the clinical environment.

In light of these findings, the following actions are recommended for implementing the guidelines related to social connections and positive interactions.

Table 6.6: Actions to fulfil Guideline 6

i. Starting conversations	The lack of conversational skills significantly impacted their social integration and overall resilience. New environments can be challenging, thus Mendler (2013) suggests introducing tips guiding students in initiating conversations aimed at broadening their knowledge, enhancing understanding and building community. Introductory conversations with a radiographer or patient, for example, stating one's name and status as a first-year student and expressing a desire to learn more about a certain skill or imaging equipment can be demonstrated and performed. Additionally, students can engage in practising posing open-ended questions and be reminded about the significance of making eye contact during conversations, as it conveys engagement and genuine interest (Steber, 2019).
ii. Teamwork	The integration of regular team activities where students connect and interact socially is essential for resilience development in healthcare (Tawfik et al., 2017:541; Fuller-Iglesias et al., 2008:181). Effective teams require strong communication, leadership, clearly defined roles and a willingness to work together to achieve a common goal. To facilitate interactions and communication hypothetical scenarios like requiring a team to transfer a patient from a stretcher to the X-ray to the table in the clinical environment can be used. Within these scenarios, students can be designated as team leaders, a role that necessitates guiding the team in explaining what is expected from the team, listening and responding to questions, giving instructions and

		taking charge of the situation. Such structured interactions will prepare students for similar situations in the clinical environment thereby enhancing their ability for effective communication and interaction, ultimately leading to improved patient care (Tawfik et al., 2017:541).
iii.	Discussions	Engaging in discussions serves as an effective way to initiate interactions among students. For example, students who find it difficult to communicate may benefit from participating in social activities. The "think-pair-share" method facilitates independent thinking before involving students in interactive and collaborative problem-solving within paired groups, followed by the sharing of ideas with the wider group (Cooper et al., 2021:2). This approach is especially advantageous as it contributes to improving students' self-confidence in communication and encourage the development and critical evaluation of arguments within both small and large group settings, thereby enhancing their overall confidence in engaging and interacting with others.
iv.	Introduce protected time with peers, clinical supervisors and educators	The literature suggests that support in the clinical environment can be improved by instituting protected time (Hyde, 2015:246). Allocating time for non-work related conversations, eating, unwinding together, playing sports together, and getting advice from supervisors and peers on how to improve yourself enhances social integration and nurtures a sense of belonging (Litt et al., 2020:5). This can be facilitated by establishing regular scheduled one-on-one sessions with clinical supervisors and educators, creating recreational areas, and setting aside specific time slots for peer-to-peer check-ins.

v.	Promote connecting with friends and family	Generally, people yearn for deep and meaningful relationships which serve as a foundation for strong and supportive interactions. Relationships with friends and family are deemed critical for promoting health and emotional outcomes (Litt et al., 2020:2). Research indicates that individuals tend to demonstrate enhanced social coping mechanisms in the presence of strong interpersonal bonds (Fuller-Iglesias et al., 2008:181; Litt et al., 2020:9). In their study, Litt et al. (2020:13) underscore that effective interaction can transpire through various communicative channels, be it in-person, via online platforms, or through phone or voice-based conversations. Recommending these diverse forms of interactions to students who are away from family and friends is crucial as they serve as foundational elements for social cohesion.

6.2.3 Termination phase

In the termination phase, the students are assessed to determine whether they have acquired resilience skills thereby effectively demonstrating self-efficacy and the ability to establish/ascertain social connections. As per the model instructions, the termination phase indicates that the student is ready to perform an assessment independently, demonstrating knowledge regarding coping and enactment of resilience.

Careful consideration of assessment processes is imperative, as it serves as a judgment of students' understanding and their subsequent progress. Moreover, it upholds the assurance of public safety and the proficiency of healthcare professionals (La Chimea et al., 2020:84). According to Fischer et al. (2023:1), assessment drives learning and essentially shapes what learners learn. Hence it is important that (1) the intended learning outcomes are clearly stated and that (2) the teaching and learning activities and (3) assessments are aligned (Croy, 2018:50). These three fundamental components are known as constructive alignment, benefitting both educators and learners by ensuring that assessments are thoughtfully planned, and students know what they are expected to learn. Croy (2018:50) asserts that constructive alignment

ensures congruence among these three pillars, ensuring that learners are evaluated based on what they have been taught.

6.2.3.1 Guideline 7: Assessing resilience in the context of its association with self-efficacy and social connections in the clinical environment.

The evaluation of clinical competencies can be effectively carried out by following Miller's pyramid of clinical competence (Wass et al., 2001:946). Miller's pyramid is structured to assess the four levels of clinical competence, represented in a pyramid format. The foundational levels of the pyramid focus on knowledge components, starting with "knows" (the recall of factual knowledge), followed by "knows how" (the application of knowledge through problem-solving) (Wass et al., 2001:946). Moving upwards, the subsequent levels of the pyramid describe: “show how” (performance in a simulated environment or patient) and “does” (action). “Does/action” is the highest level of clinical competence, therefore placed at the top of the pyramid, and evaluating the students' actual performance in the clinical environment (Witheridge et al., 2019:191).

The assessment of resilience can be determined through (1) reflective journaling and (2) scenario-based group essays. Both these assessments are essential for assessing students' resilience as it relates to self-efficacy and social connections.

Table 6.7: Actions to fulfil Guideline 7

i. Reflective journals	Bartimote-Aufflick et al. (2016:1934) suggest reflective journals as a valuable tool for the assessment of self-efficacy. Assessing self-efficacy and resilience through reflective journaling is particularly beneficial for appraising a positive mindset, self-awareness, motivation to achieve goals, the assessment of one's abilities, and adaptability in rapidly changing environments (Rivera et al., 2020:146). This structured approach enables a systematic assessment of the depth and breadth of reflective thinking, knowledge, professional judgement and application. Furthermore, it serves as good evidence of self-awareness (Biggs, 2003:18).

ii. Scenario-based assessment	The assessment involves a scenario-based group essay. Scenario-based cases are considered an effective assessment method, as scenarios are easily identifiable and discussable as they represent everyday encounters (Haynes et al., 2009:3). The scenario is presented using a short video recording, depicting communication and interactions within the clinical environment. The decision behind a scenario-based group essay format is to draw from diverse experiences and promote collaborative reasoning and problem-solving among students. Furthermore, the essay assesses students' comprehension of managing social interactions, starting conversations and establishing meaningful relationships relevant to the radiography clinical environment.

6.3 CONCLUSION

The guidelines set for the operationalisation of the resilience model were presented. The researcher hopes that these guidelines will be embraced and implemented by educators so that a positive transformation can happen in radiography students, thereby facilitating their resilience.

The following chapter, Chapter 7, presents the limitations, recommendations and conclusions of this research study.

CHAPTER 7:

CONCLUSION, CHALLENGES, RECOMMENDATIONS, AND ORIGINAL CONTRIBUTION

“It’s your reaction to adversity, not adversity itself
that determines how your life’s story will develop.”
Dieter F. Uchtdorf

7.1 INTRODUCTION

Chapter 6 described the recommended guidelines to facilitate resilience in DR students. These recommendations were developed in response to the research question: “How can resilience be developed in first-year DR students?”. It is envisioned that these guidelines will be embraced by educators to support the development and enhancement of students' resilience, specifically in relation to self-efficacy and social connections. Chapter 7, the final chapter of the thesis, provides an overview of the research process, the challenges and limitations encountered during the research process and recommendations for future research. This is followed by a description of the original contribution of the research to knowledge and personal reflections of the researcher.

7.2 OVERVIEW OF THE RESEARCH PROCESS

A qualitative, explorative, descriptive, contextual and theory-generative research design was adopted for the research study. This design facilitated a comprehensive exploration of participants' experiences, offering insights and a deeper understanding of their reality. Subsequently, this led to the generation of a theory and the development of a model to enable the facilitation of resilience supporting radiography students in the clinical environment.

Through inductive reasoning, a central concept was identified, which was deemed crucial for the development of resilience in radiography students. Subsequently, a model was developed, serving as a framework of reference to facilitate resilience in students. This model was evaluated by a panel of experts.

The process of model development was achieved following four steps (Chinn et al., 2022:137-158). Step 1, concept analysis, necessitated the completion of two phases, namely (1) identifying central concepts and (2) defining and classifying central concepts. In phase 1, FGIs were conducted with first-year radiography students. The FGIs explored the influences of students' resilience and what resilience means to them as it relates to the clinical environment. Twenty-one students voluntarily participated in five FGIs. Interviews were audio recorded and transcribed verbatim by a professional transcriber. Data analysis ran concurrently with data collection. At all stages of the research process, the researcher engaged in bracketing, thereby reserving her personal biases, keeping a reflective journal and engaging in regular debriefings with the research supervisors.

After analysis, the following four themes were identified:

1) Students' understanding of resilience
2) Students’ readiness for workplace learning
3) Interpersonal interactions as they relate to the clinical environment
4) Factors affecting the transition to the clinical environment

The central concept evolved by reflecting on the four themes and observing pertinent patterns representing a critical need in the study context (Walker & Avant, 2019:170). These patterns were reviewed in conjunction with the researcher's reflective notes which predominantly highlighted the students' lack of confidence in their abilities and a need to feel like part of a team. Subsequently, generalisations were made resulting in the finalisation of the central concepts: facilitation, self-efficacy and social connections.

Phase 2 of concept analysis necessitated a search for definitions of the concepts of facilitation, self-efficacy and social connections in dictionaries and literature sources delineating the use of the concepts in various contexts. Using these definition searches, the defining attributes of each concept were isolated. Classification of the concepts was done following Dickoff et al.’s (1968:415) classification criteria.

In Step 2 of model development, the relationship statements were expounded on, indicating how concepts structurally connect. These statements played an important role in developing the conceptual model which served as a framework for the research. To foster simplicity within the theory, the number of relationship statements was constrained to a minimum of five.

Step 3 presented the visual representation of the theory, accompanied by a comprehensive and detailed description thereof. The description of the theory involved expanding on the purpose, concepts, definitions, relationships, structure and assumptions of the theory. The researcher believes that the purpose of the model "to facilitate the process of resilience development" was achieved.

In the fourth step, the guidelines for operationalising the model were extended. Specifically, these guidelines were developed for educators providing practical actions guiding the facilitation of resilience amongst radiography students as it relates to the clinical environment.

The guidelines are:

- ❖ Facilitating a positive and trusting relationship between the educator and the student within a supportive learning environment
- ❖ Facilitating understanding of the core concepts: resilience, self-efficacy and social connections
- ❖ Encouraging and nurturing focused mindsets
- ❖ Nurturing a mindset that cultivates confidence in a student's ability
- ❖ Fostering skills to effectively organise and execute planned actions
- ❖ Nurturing social connections and meaningful interactions
- ❖ Assessing resilience in the context of its association with self-efficacy and social connections in the clinical environment

In summary, the research question: "How can resilience be developed in first-year DR students?" was achieved through two key approaches:

1. The development of a teaching model that demonstrates the facilitation of resilience amongst radiography students.
2. The formulation of guidelines to assist radiography educators with cultivating resilience amongst radiography students as it relates to the clinical environment.

It is envisioned that educators will actively support and guide students, fostering an environment in which students can wholeheartedly engage in the learning process. This collective effort is expected to lead to a positive transformation in the cognitive, mental, and social aspects, contributing to the gradual development of resilience over time.

7.3 CHALLENGES

No significant factors can be isolated as adversely affecting the research process. However, initially, the recruitment of study participants happened at a very slow pace. Two potential attributing factors were conceivable: firstly, participants' unfamiliarity with research and FGIs, resulted in a delayed response to volunteering for participation in the research. This challenge was mitigated by the independent recruiter who provided detailed explanations regarding the research process to alleviate concerns among participants. Additionally, the researcher addressed all inquiries received promptly, honestly and in a non-judgmental manner.

The second possibility for the delay in recruitment was attributed to the study being conducted during the COVID-19 pandemic and participants fearing viral infection. To address this concern, participants were provided with the option to partake in either online or face-to-face interviews, with the assurance that all COVID-19 regulations would be prioritised and adhered to throughout the research process. process.

7.4 LIMITATIONS

Two limitations are noted. The first limitation pertains to the absence of an assessment regarding the implementation of the resilience guidelines, a gap that, if addressed, could have offered valuable feedback for educators to consider during the implementation of the recommended guidelines.

The second limitation is that the research focused on first-year radiography students associated with a single HEI in SA. Despite achieving data saturation, the inclusion of a study population from a different HEI in SA would have been preferable to yield greater transferability of the research results. However, the study being contextual, yielded data that is both valuable and substantial.

7.5 RECOMMENDATIONS FOR RADIOGRAPHY EDUCATION, RESEARCH AND PRACTICE

7.5.1 Recommendations for radiography education

The resilience model responds to the need to integrate resilience methods into the radiography curriculum, equipping students to navigate challenges inherent to the clinical environment. It specifically addresses recurring concerns among radiography

students, such as fear of the unknown, uncertainty, lack of confidence, a lack of belonging, and challenges in communication (Hyde, 2015:246; De Witt, 2017:43; Bwanga & Lidster, 2019:374).

Given the diverse contextual definitions associated with resilience (Masten, 2001:228; Ungar, 2005:15; Sanderson & Brewer, 2017:65; Van Breda, 2018:9), it is crucial to establish a comprehensive understanding of the concept. This includes recognising resilience as a positive construct for learning and emphasising its relevance in managing challenges within the clinical environment (De Witt, 2017:43).

The model takes a social constructivist approach to fostering resilience, emphasising active engagement in constructing knowledge, skills, and attitudes. Radiography educators are recommended to cultivate a conducive learning environment by incorporating educational theories, resilience models, active student-centred teaching methods, simulation-based learning, role-play scenarios, emotion-regulation strategies, and reflection. Discussions on educational theories and models contribute to an enhanced comprehension of resilience. Student-centred methods like role-play and simulation-based learning facilitate the development of confidence and practical skills essential for resilience. Additionally, emotion-regulation strategies and reflection foster resilient behaviours, particularly in confronting challenges within the clinical environment.

Recognising that resilience is a dynamic and not a static state, with the possibility of regression, prioritising self-awareness and coping mechanisms becomes crucial. The resilience guidelines thus serve as a valuable guide offering practical insights and strategies to enhance resilience in the face of evolving challenges.

7.5.2 Recommendations for radiography research

The model serves to address the gap in the literature, specifically the limited guidance available for fostering resilience in radiography students to navigate challenges of the clinical environment. However, further research is warranted to investigate educators' experiences in implementing the resilience model. The outcomes of such investigations will contribute valuable insights regarding the practicality of the guidelines and shed light on potential challenges encountered by educators.

Research exploring first-year students' resilience in other radiography disciplines, such as radiation therapy, nuclear medicine, and ultrasound, is also warranted. Additionally, radiography research could benefit from exploring radiography students' resilience

across various year levels and replication of the study at other HEIs offering radiography programs.

Furthermore, it is recommended to conduct research to evaluate first-year radiography students' resilience after exposure to the resilience model process and guidelines. This assessment should particularly explore aspects which were identified in the present research and frequently associated with radiography students' resilience such as fear of the unknown, anxiety, confidence, self-awareness, communication and connecting with others within the clinical setting. Additionally, given that the research was conducted during the COVID-19 pandemic, further investigation is warranted to ascertain whether COVID-19 had an impact on participants' resilience and the resultant study findings. Additional research aimed at exploring the identified concepts within the framework of existing scholarly literature, particularly concerning health sciences education, is warranted.

7.5.3 Recommendation for radiography practice

Radiography education incorporates WIL, necessitating radiography students to engage in learning in the clinical environment. Since students at the study site commence learning in the clinical environment from their first year of studying radiography, they are exposed to the inherent challenges of the profession very early on. Within this setting, radiography students who operate under the supervision of radiographers, seek guidance and support from radiographers whom they perceive as mentors and role models (Challen, 2017:27; Jeyandrabalan et al., 2022:502).

Notably, the literature highlights that the communication, guidance and support provided by radiographers to students are overshadowed by workload and increasing numbers of students (Doughty & Hodgson, 2009:30; Shiner, 2018:263; Bwanga & Lidster, 2019:373; Legg & Cohen, 2020:535). This situation could result in radiographers providing inadequate clinical support to students. Given the escalation in workload, staff shortages and technological advancement it becomes imperative that radiographers implement interventions that assist them in managing and alleviating the effect of work pressures, thereby enhancing their resilience. Consequently, the provision and availability of well-being services by employers become crucial. Regular debriefing sessions where radiographers can share and discuss experiences and work pressures to counter the effect of emotional distress should be prioritised (Jeyandrabalan et al, 2022:502). Robertson et al, (2021:26) assert that although radiographers are often aware of support services, programs frequently run over lunch

times and after-hours making attendance difficult. Therefore, careful and practical coordination by the employer that will enable radiographers to utilise the services should be prioritised.

This proactive approach to resilience is essential, enabling radiographers to communicate, guide and support students effectively amidst the demanding clinical environment. Radiographers should be mindful of the significant influence they hold over students, who look up to them, seek guidance and consider them as role models. Recognising that radiographer conduct potentially affects the patience and guidance extended to patients, it is crucial that support mechanisms are in place to strengthen radiographers' resilience as students often emulate observed behaviours.

7.6 ORIGINAL CONTRIBUTION OF KNOWLEDGE TO THE RADIOGRAPHY PROFESSION

While many studies in radiography research constantly report that students experience stress related to the clinical environment, no study presents a set of guidelines for managing these stressors that are grounded in evidence to guide radiography educators in fostering resilience among radiography students. The resilience model uniquely contributes to the field of radiography knowledge by incorporating methods to promote resilience within the undergraduate curriculum of radiography students as they navigate the clinical environment. The model encompasses psychological, social and academic factors associated with students' resilience. Furthermore, the model provides practical guidance, assisting students to achieve the goal of resilience.

While initially designed for radiography educators to cultivate resilience in their students, the guidelines have the potential for broader applicability across disciplines where students are confronted by challenges inherent to clinical environments impacting their resilience. The broad potential was highlighted by a panel of experts from the nursing and radiography profession evaluating the resilience model. Particularly, the suitability of the guidelines to be applied across the radiography undergraduate curriculum and by radiography professionals who experience a lack or decline in resilience was emphasised.

7.7 PERSONAL REFLECTIONS

I have always taken immense pride in identifying as a radiographer. Despite experiencing that the profession is often under-recognised and undervalued, it is the

small opportunities to make a meaningful difference that brought me immense personal satisfaction. Whether it be in the lives of the patients I served and touched with kindness or the students who passed through my classroom, I want to leave a lasting impression, so I regularly pose a self-reflective question: what difference am I making? To me, making a difference simply means being kind, smiling, expressing empathy, and showing genuine interest in people.

Reflecting on my student years, I recollect feelings of excitement upon embarking on the radiography journey. Despite being enthusiastic I vividly remember feelings of anxiety and fear during my first encounter with a severely injured patient. Everything happened so fast in the trauma department leaving me with no time to pose questions. I recall the moment when a qualified radiographer looked at me and reassured me saying, “Do not worry; I will explain everything once the patient is settled.” Encouragement also came from the third-year students who patted me on the back, saying, “Soon you will learn how to deal with these challenging situations.” While I did not fully realise it at the time, it became evident that the support from my team was crucial in nurturing my resilience.

Several years later, after always wanting to complete a doctoral degree in radiography, the journey started in 2021. While I am blessed to say that my journey was one without many logistical obstacles, it tested my personal resilience. Numerous days brought feelings of hopelessness, low self-belief, lack of focus, fatigue, and moments of seemingly insurmountable challenges. Yet, it was the unwavering focus on my goal that fuelled my progression.

One day, close to completing the final chapters of this thesis, my five-year-old daughter asked me how far I was from completing my thesis (the resilience book as she fondly calls it). Feeling fatigued and disheartened, I thought of a random number and mentioned I was on page 80. The question which followed was how many pages the completed book has. Again, I made up a number and said 100 pages. Curious, she inquired how far 80 was from 100. As we counted together, reaching 100, her response was, "Still a long way to go, Mommy." Sensing my disappointment, she quickly added, "But that's okay Mommy, just imagine if you were still on page 1. Great job, you can do this." Her response filled me with pride, a broad smile, and an immediate boost in spirits, reigniting my motivation and enthusiasm.

This experience made me realise several key insights:

- Recognising the progress I had already made.
- Understanding the uplifting power of positive words.
- Appreciating how focusing on the positive can alleviate tension.
- Acknowledging the role of motivation in redirecting enthusiasm to persevere.
- Embracing the idea that while I may not be there yet, I possess the capability to complete the task.
- Understanding that maintaining an optimistic outlook is crucial for success.
- Realising the importance of experiencing support, even from unexpected sources.
- Recognising we all need that one person who sees the best in us.
- Appreciating that engaging in reflections can help you gain perspective and identify constructive avenues to maintain focus.
- Accepting that occasional moments of resilience regression are part of the journey, even for mothers.

7.8 CONCLUSION

The chapter concludes with the fulfilment of the study's aim, which was to develop a model to enable the facilitation of resilience among radiography students in the context of the clinical environment. This model provides simple and practical steps guiding educators on the facilitation of resilience. As students adopt the resilience methods, it is envisaged that they will be able to navigate clinical challenges more effectively and enhance their coping and well-being. Ultimately, this positive development is expected to have a beneficial impact on the quality of care provided to patients by radiography students.

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APPENDICES

APPENDIX A: COMMUNICATION FOR PERMISSION TO CONDUCT RESEARCH WITH STUDENTS IN THE DEPARTMENT OF MEDICAL IMAGING AND THERAPEUTIC SCIENCES

To:	Dr Merlisa Kemp
Designation:	Head of Department Medical Imaging and Therapeutic Sciences (MITS)
From:	Heidi Thomas
Topic:	Permission to conduct research in the department of MITS
Date:	May 2021

Dear Dr Kemp

I am currently enrolled as a student at the Cape Peninsula University of Technology (CPUT) for the degree Doctor of Radiography. In fulfilment of the degree, I am required to conduct research under my approved supervisors, Dr Kathleen Naidoo and Professor Penelope Engel-Hills.

I hereby would like to request your consent to conduct research in the department of Medical Imaging and Therapeutic Sciences (MITS), Faculty of Health and Wellness Sciences.

The research titled “Facilitating resilience to support first year radiography students in the clinical environment” seeks to explore and describe the concept of resilience as experienced by radiography students within the clinical environment and aims to develop a teaching model to assist radiography lecturers with the facilitation of resilience.

To do this, I will need to conduct focus group interviews with first-year diagnostic radiography students. The face-to-face focus group interviews will last approximately one hour during which all COVID-19 safety-related guidelines will be adhered to. A suitable time will be arranged with the participants so that the interview does not

coincide with academic and clinical time. Participation in the research is voluntary and signed consent will be obtained from participants prior to interview commencement. All participants will participate anonymously. Interviews will be audio-recorded, transcribed and stored on a password-protected computer.

Ethical clearance will be obtained from the Research Ethics Committee (REC) of CPUT prior to data collection.

I hope you consider this request favourably.

Kind regards

Ms Heidi Thomas

Contact number: +27 72 049 4428

Email: thomashe@cput.ac.za

APPENDIX B: CPUT ETHICAL CLEARANCE

Cape Peninsula
University of Technology

HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HWS-REC)
Registration Number NHREC: REC- 230408-014

P.O. Box 1906 • Bellville 7535 South Africa
Symphony Road Bellville 7535
Tel: +27 21 959 6917
Email: sethn@cput.ac.za

29 August 2024
REC Approval Reference No:
CPUT/HWS-REC 2021/H27 (renewal)

Faculty of Health and Wellness Sciences

Dear Ms. Heidi Thomas - 198116659

Re: APPLICATION TO THE CPUT HWS-REC FOR ETHICS CLEARANCE

Approval was granted by the Health and Wellness Sciences-REC to Ms. **H Thomas** for ethical clearance. This approval is for research activities related to research for Ms. **H Thomas** at Cape Peninsula University of Technology.

TITLE: **Facilitating resilience to support and prepare first-year diagnostic radiography students for the clinical environment.**

Supervisors: Dr. K Naidoo and Prof. P Engel-Hills

Comment:
NB: Title change in the application:
Previous Title: A resilience model to support radiography students in the clinical environment

Approval will not extend beyond 30 August 2025. An extension should be applied for 6 weeks before this expiry date should data collection and use/analysis of data, information and/or samples for this study continue beyond this date.

The investigator(s) should understand the ethical conditions under which they are authorized to carry out this study and they should be compliant to these conditions. It is required that the investigator(s) complete an **annual progress report** that should be submitted to the CPUT HWS-REC in December of that particular year, for the CPUT HWS-REC to be kept informed of the progress and of any problems you may have encountered.

Kind Regards

Dr. Samantha Meyer
Deputy Chairperson – Research Ethics Committee
Faculty of Health and Wellness Sciences

APPENDIX C: PERMISSION TO CONDUCT RESEARCH IN THE DEPARTMENT OF MITS

Department of Medical Imaging & Therapeutic Sciences
Faculty of Health & Wellness Sciences
Health Science Education building
Symphony way
Bellville
7535
Western Cape
South Africa
Tel: +27 21 959 6538
Email: kempme@cput.ac.za

21 October 2021

Dear Mrs Heidi Thomas (Doctoral student #198116659)

RE: PERMISSION TO CONDUCT RESEARCH IN THE DEPARTMENT OF MITS

This letter serves to confirm that permission to conduct your research study titled: "Facilitating resilience to support first year radiography students in the clinical environment" within the Department of Medical Imaging and Therapeutic Sciences has been granted.

The Department wishes you all the best.

Kind regards.

Dr Merlisa Kemp
Head of Department

APPENDIX D: PARTICIPANT INFORMATION SHEET

To:	First year diagnostic student (2021)
Department:	Medical Imaging and Therapeutic Sciences
From:	Heidi Thomas
Content:	Research study information
Date:	June 2021

Dear Student

My name is Heidi Thomas, and I am a registered Doctor of Radiography student at Cape Peninsula University of Technology (CPUT). In fulfilment of the degree the qualification I am required to conduct research under my approved supervisors, Dr Kathleen Naidoo and Professor Penelope Engel-Hills.

You are being invited to take part in the research study on the "Facilitation of resilience to support first year radiography students in the clinical environment". This research has been approved by the Research Ethics Committee (REC) of Cape Peninsula University of Technology (CPUT) and will be conducted under the research principles of Helsinki.

PLEASE FIND BELOW INFORMATION THAT WILL EXPLAIN DETAILS OF THE RESEARCH. READING THE INFORMATION SHOULD TAKE BETWEEN 15 TO 20 MINUTES.

The purpose of this study: The purpose of the study is to explore and describe the concept of resilience as experienced by radiography students within the clinical environment. Based on the findings a model to facilitate resilience will be developed.

Why have you been invited to participate? You have been invited to participate because you are student who have been exposed to the clinical environment as a diagnostic radiography student for the first time in 2021. Your participation will provide insight on the stressors that students experience so that strategies can be developed to support future first year diagnostic radiography students.

What will be your responsibility if you decide to partake? Your participation is voluntary. After informed consent, you will be required to partake in a focus group interview with the researcher. The interview will be audio recorded and will last approximately 1 hour. The audio-recording will allow the researcher to reflect on what was said during the interview. Furthermore, your responsibility will be to respond to questions that will draw on your experiences in the clinical environment.

What will happen if you withdraw? Participants may withdraw from the study at any stage without any consequence of any kind. You may withdraw without giving any explanation, you should however inform the researcher of your withdrawal as soon as possible.

Will there be any consequences if you choose not to participate? No, participation is completely voluntary. No consequences will follow even after you have agreed to participate.

Are there any risk involved participating in this research? There is no foreseeable risk to participants involved in this study.

Will you be paid if you participate and will there be any expenses to you?

No, you will not be paid to participate in this study and you will not bear any expenses.

Will my participation in this study be kept confidential? Yes. Any names revealed during the interview will be anonymised. All data and back-ups of the interview will be kept on password protected computer. Only the researcher will be authorised to use and/or disclose your anonymised information in connection with this research study. Any other person wishing to work with your anonymised information as part of the research process (e.g. an independent data coder) will be required to sign a confidentiality agreement before they will be allowed to do so.

What will happen to the results of the research study? The results will be written into a research report that will be assessed. In some cases, results may also be published in a scientific journal. In either case, you will not be identifiable in any documents, reports or publications. You will be given access to the study results if you would like to see them, by contacting me.

Is there anything else that you should know or do? You will receive a copy of this information and consent form for your own records. If you have any questions you can direct it to the researcher via the contact details which is provided below.

My contact details are:

Heidi Thomas

+27 049 4428

thomashe@cput.ac.za

APPENDIX E: RESEARCH CONSENT FORM

RESEARCH CONSENT FORM

“Facilitating resilience to support first year diagnostic radiography students in the clinical environment”.

By signing below, I agree to take part in the research study entitled: Facilitating resilience to support first year diagnostic radiography students in the clinical environment.

Please initial each box below:

1. I confirm that I have read and understand the information letter for the above-mentioned study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

☐

2. I understand that my participation is voluntary and that I am free to withdraw from this study at any time without giving any reason and without any consequences to me.

☐

3. I agree to take part in the above study and have not been pressurised in any way.

4. I understand that I will be partaking in focus group interviews and give consent to be audio recorded.

5. I understand that my personal details and identifying data will be changed in order to protect my identity.

_____	_____	_____
Name of Participant	Signature of Participant	Date
_____	_____	_____
Name of Researcher	Signature of Researcher	Date

APPENDIX F: PARTICIPANT CONFIDENTIALITY AGREEMENT

CONFIDENTIALITY AGREEMENT – STUDY PARTICIPANT

I, _____ hereby declare that I understand and agree to the following conditions with regards to partaking in the focus group interview.

1. I understand that the information discuss in the interview is confidential and for the purposes of the research study.

2. I undertake to treat all information of the focus group as confidential content which I may not discuss beyond the interview room.

Name: _____

Signature: _____

Date: _____

APPENDIX G: TRANSCRIBER CONFIDENTIALITY AGREEMENT

Cape Peninsula University of Technology

CONFIDENTIALITY AGREEMENT – TRANSCRIBER

I, ELIZABETH DE GRAAF hereby declare that I understand and agree to the following conditions with regards to the transcription of the audio recordings.

1. I understand that the audio recordings are received for the purpose of transcribing records of interviews held with the participants in a research study.
2. I undertake to treat all audio tapes received as confidential content to which only I will have access. I will keep the audio tapes and any copied material securely in a locked cupboard.
3. I will return all copies back to the researcher on completion of the transcriptions.

Name: ELIZABETH DE GRAAF

Signature:

Date: 23 January 2022

APPENDIX H: INTERVIEW GUIDE

INTERVIEW GUIDE

In order to gain an understanding of the concept of resilience amongst first year diagnostic radiography students, the interview will be guided by the following questions.

1. Please tell me about your first clinical rotation.
2. How did you feel after the first day?
3. How did you feel about your interactions with patients?
4. Please describe a difficult day or stressful event you encountered in the clinical environment.
5. How did you cope with this and was it effective?
6. Now describe a good day/ event you experienced in the clinical environment?
7. What do you think educators can do to assist students in the clinical environment?
8. Describe to me your understanding of resilience.
9. What do you think will enable students to be resilient?

APPENDIX I: SAMPLE TRANSCRIPT

Interviewer 00:00

Focus group interview 2, 19 November. Okay, so good afternoon everybody and thank you for coming. I would just like to confirm that you have read the informed consent and that you are giving your consent.

All participants 00:17

Yes.

Interviewer 00:18

Okay thank you for the yes and also for the nodding. So as I said we're just going to focus on your clinical experience. So I'm going to pose a question and then I would like you to respond to it. Okay. So it's been a whole year since you've started radiography. So do you remember how you felt when you first entered compared to how you are feeling now? Anybody wants to go?

Participant 1 00:53

So the first day I entered I was very nervous because I didn't know the hospital, how the hospital environment was. And for a while I was lost in terms of what to do, how to position a patient, how to greet a patient and all those things. But now I'm more confident in the way I handle the patients, the way I do my work, and the way I take the criticism from the other radiographers and the other students who help me with the patients and the X-rays as well.

Interviewer 01:27

Thank you.

Participant 2 01:34

Yes ma'am there's a lot that has changed since I first came here now because first time when I got here in the hospital, okay I'm familiar with the hospital so I was a bit relaxed about that, but I was a bit nervous with patients because it was my first time working with a patient so I would want to be as careful as possible, at the same time to avoid making mistakes, but then which was not easy to avoid mistakes because you'll do them now and then. The other thing will be to get used to the senior radiographers and how they respond to us, how they talk to us and all. Because sometimes you feel like if you make a mistake they going to lash at you or something, so I was still learning that behavior and how they talk to us. And the other thing was doing the patients, obviously, getting to make the mistakes. The mistakes were too much for me to do to actually do the patient. I felt like, okay if I do something wrong then everything is just wrong but most radiographers will just correct you and everything will be normal. So now I'm just confident I can do patients on my own, and a lot has changed ma'am.

Interviewer 03:02

Anybody else want to respond to that?

Participant 3 03:12

Okay. My first day I was excited to be at hospital, to experience what radiography is all about, and to know more about it. So for me, I wasn't confident, I only knew theory, I didn't know how to apply it practically. But now I'm confident enough to do patients independently. The first day I was excited, but now I'm confident.

Interviewer 03:49

Okay. Thank you for sharing your first day and compared to where you are now. I'm so happy to hear. I can see most of you are not where you were anymore. You've managed to work through it. So you said that you were very nervous. You also said that you said that you were very nervous. How did you deal with that? Or what helped it to make it better?

Participant 4/ 1 04:14

I think it was going back home and criticizing myself and going through some of the notes and studying more and listening to the radiographers from each department because sometimes the radiographer from ortho and general do patients differently so it was studying, as (participant name) said, studying what radiographers do and what they say and how they usually do a patient and different patients and all of that.

Participant 2 04:50

Okay. With me ma'am I always made sure that I breath in and out and it did help, believe you me ma'am, it did help. And most of the times when I do patients I would always ask a senior radiographer to come with me. So they got used to me that (participant name) will call someone to go with just to make sure that everything is correct. Because I learn faster when I go with someone and I observe them when they are doing something then next time I'm going to do it right. So I just check what they did and I check what they did. From there I'm sure I'm going to be better so I always whenever I do patients and it's an extremity that I haven't done or it's an examination that I haven't done I will always ask a senior radiographer to come with and do it for me, more like aided, and I'll ask questions from there on. And then asking questions, "If I do it there and there, or how and why is it wrong if I do it there and all?" And then they explain it to me and then from there. And I also ask patients, "Sorry I'm going to ask my senior radiographer here questions because I'm a student, and I'm a first year student." So that's how managed to get my confidence back and do patients from there on.

Interviewer 06:03

Somebody mentioned that they felt lost and not sure what to do. I'm sure most of you felt like that. Did you feel like that lost, not sure what to do?

Participant 2 06:16

Not me. With me ma'am, I wasn't really lost because every time when I feel like I'm a bit confused of what to do, I'll always make sure that I ask the patient nicely to go and ask the senior to come assist with something and they will come there and say, "Your mistake is there and there." If I see a mistake, that I see that I'm not sure of what I'm doing I always ask someone. I'm not scared to ask for help for whenever I need help. So I wasn't really lost.

Interviewer 06:52

I just want to ask you. You said that you have confidence, you felt confident, you now feel better. But where did that confidence come from?

Participant 1/ 3 07:09

No I said I didn't have confidence but I was excited to be. I was at hospital to know more about radiography. But now I do have confidence.

Interviewer 07:19

Somebody mentioned that it was difficult to deal with the staff's behavior. That it wasn't always easy to work with them. How do you deal with that?

Participant 4 / 3 07:31

For me I just tell myself that at work we all come from different backgrounds so we going to act differently so not everyone will be nice to you. So the best thing is to tell yourself that I'm here at work now so I rather focus and then whatever, after work whatever happens at work stays at work. So for me it was like that.

Interviewer 07:56

I just want to focus now—So you've read that my study is on resilience so I just want you to tell me in your own words what resilience means to you.

Participant 2/ 1 08:20

For me resilience is accepting criticism from other people but not allowing it to bring you down, but more to lift you up to improve yourself mostly to improve and better yourself more. That's resilience for me.

Interviewer 08:41

Okay. So it's accepting and not bringing you down. Anyone else?

Participant 2 08:58

Ma'am basically resilience is actually what the lady said there, accepting criticisms where it is required and then work on it and then do better than what you did last. So you accepting criticisms, mistakes and then work on it. Stand up, do better and then, do better from whatever the criticisms came from. So it's basically that.

Interviewer 09:27

So can you tell me where do you get that strength to get up and to move on. How do you get—

Participant 2 09:34

Sometimes ma'am is trying to prove someone wrong that actually you are wrong, it's just a mistake, everyone can do mistakes, I can do it better. Sometimes I would laugh and say, "Oh ma'am sorry it's a mistake. I forgot this and that and I'm going to do it better next time." So the confidence will always come from me, how I deal with stress and everything or when I'm not anxiety or whatever. I just laugh and talk to myself and say, "(participant name) you can do this." I actually do it better ma'am. And I will just tell them, "Ma'am I will do it right next time. If I get it right you are going to give me this. And like okay"

Interviewer 10:11

It’s like you challenge yourself.

Participant 2 10:12

Ja I challenge myself.

Interviewer 10:14

And you prove to them.

Participant 2 10:15

And I prove them. “That’s nice (participant name) that’s what they will usually say.

Interviewer 10:20

Do you? Okay we’re going to come back to you (Participant’s name).

Participant 1 10:29

What was the question?

Interviewer 10:30

So the question is where--. You were saying that you were accepting the criticism. Related to resilience, where do you get that strength from?

Participant 3 10:48

For me I just tell myself that if maybe sometimes someone needs to be very hard on you so that you can learn more. Because sometimes if maybe they were too soft to us or something, we are also going to relax and say, “Ah, it’s just a mistake.” I think that is where I got my strength. If maybe they shout or something I know next time I won’t

do the same thing because I will be afraid of them, they're going to shout at me. So, something like that.

Participant 1 11:23

For me where I gain my confidence is I think at the end, at the four years, I want to get there. So whatever comes my way I just push through and go through all the challenges they give me.

Interviewer 11:36

So you're looking at the bigger picture.

Participant 1 11:38

Ja the bigger picture, the money.

Incoherent chatter by all.

Participant 2 11:51

And ma'am yes, I wanted to say my first examination, the senior radiographer was a bit harsh and then— I think she's the main reason for me to actually do better because first time when I did my first examination the radiographer was like, "The first patient is yours." I was like, "Mine ma'am?" "Exactly!" And then I did my abdomen and then she said, "Okay do everything, I'm just watching." And then she was, "No, your centering is wrong, your SID is wrong." And then I was like, "Okay ma'am." But I knew the centering point but everything the bucky, not the bucky, the IR was actually— I don't know, I didn't centre it correctly with the bed and everything and so. She was a bit harsh and then from there she made sure that I know everything. Even today I feel for some reason I might be her favourite because whenever there's a thing like, (participant name) can you please come explain to this, can you please do this." And I think the senior radiographers also help us with gaining our confidence because

sometimes they ask us questions while there are no patients and then we get to answer.

Interviewer 13:02

So you do get some support?

Participant 2 13:04

Ja we do get support from them, from the senior radiographers. Yes, they do give us the support.

Interviewer 13:13

Anything on that question you want to add? what would you consider as your worst day in the clinical department?

Participant 4 13:53

My worst day. My worst day was when, I don't remember the date, but I was working with a white lady, a third year student. So one qualified radiographer came inside and we didn't position correctly, so she was speaking Afrikaans and then they excluded me because I don't understand Afrikaans.

Interviewer 14:28

So you felt very excluded?

Participant 4 14:30

I felt very excluded.

Interviewer 14:32

How did you deal with that?

Participant 4 14:34

I just kept quiet and looked at what they do so but after all I just look and then maybe if I can say that they need my help I do something, even though they speak Afrikaans and I don't understand what they—

Interviewer 14:55

So looking back now. Do you think you would have handled it differently now that you at the end of the year?

Participant 4 15:05

Ja, I think I would handled it differently. I would have asked them to speak English. But I think, the qualified radiographer will say that' "This boy is mean." I'm a first year student. So that's why I was scared to telling them to change how they speak.

Interviewer 15:27

So say you were scared then but now you would ask them. So what's the difference now?

Participant 4 15:34

Now I'm confident.

Interviewer 15:36

You're confident? Alright, thank you.

Participant 2 15:44

My worst day. I don’t recall having a worst day but I recall there was a patient. There was a patient who was actually swearing at everyone. And then while the patient was swearing, sometimes I just laugh because I was laughing, and said, “No relax, relax.” But I think that the fact that he was swearing was because of the pain, and then he kept asking for women to go out he wants only guys there, because he felt like, I don't know why he asked for guys, kept saying-- And then for some reason, he started crying. And then you didn't know, like, “Okay, what's going on?” And then we kept consoling him. I think the fact that he was swearing was some weird to me and then asking for only guys in the room and all and then started crying. I think I wouldn't say it's a worst, but okay, can be worst, but weird to me and then, but we managed to help the patient and then he was fine thereafter. And the other day was when I did patient, and I forgot to put my lead marker. And it was a female. But luckily, she was old. And it was worse because now the senior radiographer was not happy about it. But I said I would never repeat the same mistake ever again, and then I got better going forward from there.

Interviewer 17:11

So you’re saying like the patient was swearing and in the hospital we don’t always maybe expect a patient to act like that. And how did that make you feel?

Participant 2 17:22

Actually ma’am, I think my past experiences has, it's what has built me as a person to accept people. Because people react differently to situations. I think, from my side, I assume that okay, it's pain, making the patient to act the way because I myself was once in pain. And then I remember how I reacted, I would be so mean to everyone like, you don't know what I'm feeling and you're busy working around and whatever. So I think the patient was actually acting in such a way that, “You guys are busy going up and down. You don't understand the pain I'm feeling.” So. So I was okay with it. I understood it. I understood him very well. It was just pain because I don't think he would have swore at people who wants to help him.

Interviewer 18:04

You almost put yourself in the patient's--

Participant 2 18:05

Yes I put myself in the patient's situation.

Participant 3 18:13

My worst day at work, it's not really worst, but it wasn't a great day. It was my first day I did X ray of a foot so I placed my marker wrong. Yes, it was. It was AP but I placed it another way around. So the radiographer shouted at me like how come this time you still don't know how to place a marker. I overcame that by going back to my studies and then I study and see how to place marker, especially when you are doing extremities because the way you place a marker for maybe for an ankle is not the same where you place a marker for a foot. So I improved from there because now I know how to do it. I told myself that I'll never make the same mistake again.

Participant 1 19:05

I've never really had a bad day myself. Because I've always like-- I'm the type of person if you shout at me I'll forget about it and I'll laugh with you the next day. So it wasn't really that much of a bad day for me. Maybe like when I was in X block. I was sad that day because a patient came in and he had something on his chest and while I was doing his X ray he was crying because of his chest, I think shortness of breath was his problem. And then he was crying he was saying, "My chest my chest my chest." So you know it was sad because you see that and you think of your parents and you think of people that you love being in that same position. So yeah.

Interviewer 19:52

(Participant name) you mentioned that the radiographer shouted at you. How did you feel about that? Do you think there was a different way? Or?

Participant 1 / 3 20:06

Yes, I didn’t feel good about it because, I think maybe instead of shouting, maybe she's supposed to tell me now politely that okay next time try to do like this or what because now I feel like, “Oh okay, this is how you were taught or what. Why didn’t you like try and go through your notes before you come here or something like that. Why didn’t you ask before.” And yes she was right I suppose if I wasn’t sure I supposed to ask before I expose, so I didn't feel good that time but now I'm happy because it's the mistake that I’ll never make again.

Interviewer 20:41

I just want to ask you one question. You’re saying that you always have a positive attitude. How do you get that? How do you?

Participant 1 20:52

I don't know ma’am. I don’t know. I just I think I've lived my life dwelling on things and crying about things after they happen so I've gotten over that phase and just move on, even when the radiographer is like, “Why didn't you place the marker here? Don't you know the marker is supposed to be here? I didn’t see the marker here.” I’m like, “Okay, ma'am, it's fine. Move on.” The next day, she says that, maybe she said the same thing. I'm like, “Okay, ma’am, I'll fix it.” Or maybe if I make a mistake she’ll be like,”Don't make this mistake. You're supposed you've been here for a while now.” And stuff like that. So I just move on from it because I've become used to it already.

Interviewer 21:29

Okay. Thank you for that. So, when we spoke about resilience, you were talking about pushing through and you used the words “accepting criticism,” and “stand up to be better.” Okay. And “challenging yourself.” How do you motivate yourself to push forward, to push through?

Participant 1 22:00

I think the excitement is more. Like, every day when I come to work, like, it's exciting because there's a different patient, there's more like the work, it excites me, it makes me confident. And like when I see the X ray done, and I'm like, okay, I'm confident, I'm gonna push through it's fine, I'll push another day, and all that stuff.

Participant 3 22:30

For me, it's all about knowing what you want in life. And if you really want to achieve, if something that you really want, no one can stop you. So for me is to do better every now and then. If maybe I made a mistake and then I just told myself that I will do better because I really know what I want. So it's about doing better.

Interviewer 22:51

Do you talk to yourself about this? Do you write it down? Or it's just something that's always in your mind?

Participant 3 22:58

It's not really, okay. I don't talk to myself or something, that is just something that is in my mind that I really need to be somewhere in life, so nothing can stop me.

Interviewer 23:12

Determination.

Participant 3 23:13

Ja.

Participant 2 23:17

With me ma'am every time I wake up in the morning, and I come to the hospital, I always tell myself that I did not come here for any radiographer, I just came here to

help the patients and take the x rays and as good as possible for the doctors to be able to diagnose their patients and to know what's really going on on whatever examination that I'm doing. So I always motivate myself by saying, “I'm doing this for the patient.” So I'm not doing it for anyone. So the reason why I have to do it is for the patients, for for the doctors to be able to diagnose them very well because of the good X rays that they will receiving from the Department of X rays. And the other thing it’s me. Going forward to achieve what I want to achieve and me here and working at a hospital is something that I'm actually really happy doing like helping patients helping doing something the DOH and solving the diseases that are affecting the people and especially the ones that come to our departments. So the thing that motivates me is actually getting the patients better than anything else.

Participant 4 24:34

With me ma’am, I want to be good radiographer. So and then I know that to be a good radiographer not everything will go according to how you plan it. Some things will be difficult. Some people will shout at you. Some people will be mean. So but I told myself that this will pass. One day, it’s one day. So another thing ma’am, that some patients are mean, but I don’t want to say that because even when I go to a hospital as me as the patient. I told myself, “These people why are they going to lunch whereas we are still waiting here. Now I understand that. You are at clinicals. People have to go for lunch. They have to eat so that they will have energy to help people. If they don’t eat they won’t have energy.

Interviewer 26:07

And so if you don’t have anything to eat? And then?

Participant 4 26:10

If you don't have anything to eat you won’t have energy for a patient. They're going to be lazy. They are going to be lazy.

Interviewer 26:24

Okay. I'm just going to come back to resilience. So, what do you think a resilient student. If you will see a resilient student. What is the qualities that you see in a resilient student?

Participant 1 26:49

I think one of the qualities that I would see would be great work ethic, confidence in the work that they do. And yeah, mostly those two things.

Interviewer 27:04

So where do you get a great work ethic from?

Participant 1 27:08

I think from criticism, I think. Good work ethic.

Interviewer 27:12

Just criticism?

Participant 1 27:13

Excitement. If you're happy doing something, you always want to do it all the time and if it gives you pleasure like you happy like you satisfied with the work that you're doing, then you work ethic will be good.

Interviewer 27:31

So, you say that is like excitement that is something that comes from inside. Is there anything in your environment that you think contributes to?

Participant 1 27:43

People who are easy to work with. People who are not closed off to you or to other people.

Interviewer 27:51

Sorry, can I just ask you to refer to people. Who are these people?

Participant 1 27:55

I think students and everyone in the work environment. The porters as well.

Interviewer 27:59

So students, radiographers, porters. What would you like them to be?

Participant 1 28:05

Like greeting. Hello. Hi. Like smile. Hello. You can talk to them easily. Yeah, mostly that.

Interviewer 28:21

Okay (participant name) said a resilient student is somebody that can take criticism and has excitement. Okay.

Participant 2 28:34

A student who's resilient I've seen quite many of them. They actually accept criticisms when they actually doing their examinations. And most of them when they are doing something and they are not sure they always even asked the junior students or ask for second opinions from us or senior radiographers. And most of them they're always showing confidence and they always talk with the patient and hear what they say asking how they feeling. And they always have someone on their side too for any corrections if they make any mistakes, they are never alone. And good work ethics is

also there like showing respect to everyone and speaking well if everyone, especially the patients also.

Participant 3 29:38

They are qualities. They are dedicated on what they do and they also learn from their mistakes. And if they're not sure about something, yes they ask.

Interviewer 29:56

Nothing you want to add? So if I believe I heard that it’s a student that asks questions, a student that's dedicated and a student that can communicate with patients. Is it easy for you to communicate with patients?

Participant 2 30:14

With me, ma'am, it's always easy to communicate with my patients, I always introduce myself. And then sometimes ask them questions like, Do you know why you here? And they know and then some of them they like, no, they are clueless of what's really going on. And I always take my time to explain to them, why they’re there and then I-- Sometimes, because I take the history of the patients, I've always asked them questions like, if the patient has TB, or something related to TB, don't you have TB or something? And I want to hear from them? They always give an answer like, “Oh, ja I have TB.” And then I say, “Ja, the reason why you're here is because you want to check your lungs if everything's (intent?) or whatever if there's no any other infections there. So I always have a conversation with my patients and they always responds nicely. Every time when they say thank you after everything, I feel a lot better, like, “Okay, I did manage to explain something to the patient.”

Interviewer 31:10

So where did you get that confidence to speak to them?

Participant 2 31:13

Actually the confidence speaking to them how they respond to you when you talk to them. So sometimes when you greet them, they greet you back, and you can see that, okay, the patient is actually greeted you back nicely and in a polite way that you can say, “Okay, I can actually talk to this patient.” Other patients, you can see that, “Okay, this, I need to, I need to finish faster because of the pain or they need to take them back to wards.” And whatever. So. It depends on the patient that you meet.

Interviewer 31:45

There’s just one thing. You said that a resilient student is also somebody that talks easy. So do you think it's easy for everybody to talk easy, easily to patients?

Participant 2 32:02

No, it's not easy to talk to patients, sometimes I think you're if you are still, you have this low self esteem, you will still be feel like okay, you won’t talk, right to the patient. You don't what to say. And you also don't know what to say to the patient, you feel pity for them. So it's not easy to talk to everyone. So if there are patients who are resilient, they actually make it easy for you to say it's okay, you can talk with everyone. I won’t (bite?) you or something they just forming a communication so that you can get along to the working environment.

Interviewer 32:36

Okay. Did you want to add anything? So I've heard about low self esteem can hamper good communication. And some it’s not easy to talk to patients, but what can we do as lecturers to help you maybe overcome that. The low self esteem. To talk easier to patients. Be more determined.

Participant 1 33:14

I think one of the reasons why some of us are not confident is because we're not used to talking to new people introducing myself to people. So I think maybe if we would have had, like, if there was no COVID and we would have had everyone on Open Day,

would have gotten to know each other because you're nervous, you don't know anyone. When I came here, I didn't know like the girls that I was working with. And I was lost and I didn't know the radiographers and all of that. So it was hard for me. But then once I got to know them, I became more confident with the people around me and I could take the files and all of that stuff and talk to the patients more.

Interviewer 33:52

So if I hear you correctly, and you can correct me is like because you're not used to, because you were the online learning. And then you had to go into the hospital. Was, did that contribute to?

Participant 1 34:04

I think it did, yeah.

Interviewer 34:05

Low self esteem? Anybody want to?

Participant 2 34:14

I think the other thing that contribute to low self esteem, ma'am. It's because you are new, you are the first year there and most people there are seniors. And then sometimes they always have their own conversations, and then you don't know how to join into that conversation. And after that, there's a patient and you have to get patient and you are not involved in any conversation with anyone. So you feel like no one cares about how you feel. You should like whenever there's a patient just have to go do the patient and then when you come back, you just ask for them for to check the xray but that's not true. The lecturers can just tell the learners to actually, if they don't know what to join in on conversation they should just ask questions to radiographers like, “Ma’am based on the examination that I did, why is it important to do it this way? It isn't.” That way you can start having a conversation with them. Because with me, I always ask questions. That's why if now and then most radiographers would ask me

questions like okay, (participant name) here's a patient this and that and that and that." So most of the times I'll get the answers wrong, some, most of the times I will get them right and then and funny enough, there were some fourth-year students who didn't know the answers and then somebody radiographers said, "Okay (participant name) now the answer because he has been asking those questions. So (participant name) can actually answer you. So it felt good after that because I was able to engage with the senior radiographers, asking questions where applicable like why is it important to like see through knee. Why do we have to do see through knee? What are we looking for? The radiographer came forward and explained it better to say, "The reason we are doing it, we want to see air-fluid levels on the knee. You want to see if there's any fractures there. So most fourth-year students didn't know that. They didn't know. They just assumed that we just have to do a C through for the sake of because if it's a knee injury, most of the patients in trauma, trauma patient because if it's a knee injury, the patient fell whatever we already know that is a trauma. So, I think it help because by just asking questions.

Interviewer 36:21

But if I understand correctly, what you said is that maybe you would need advice on how to start those conversations. Or guidance.

Participant 2 36:32

I think they should just-- If they, for example, they are in general they can always ask which examination that they are doing mostly there, so that way they can answer them and ask the difference between each departments from either radiographer. I think that way you can actually start having a conversation with everyone. X block you already know it's for cancer, orthopedics mostly extremities. I think they should just ask those kind of questions.

Participant 1 37:03

Speaking on what (participant name) said, I feel like an introduction should be done on the hospital environment as well. Maybe not to say who's there but like to explain to the students, "Okay. Orthopaedics is on sixth floor. This types of patients, there's this

type of examination that you going to do there." And I feel like an introduction to the hospital is needed for first years.

Interviewer 37:32

I just want to. Just on that question. So I remember that you had like an introduction. So were you there or do you think it is too brief? You would need more of that or?

Participant 1 37:48

I think I wasn't there.

Interviewer 37:49

You weren't there?

Participant 1 37:51

Yeah, I think a physical introduction is needed before I start. Because the first day I came here I was lost because I didn't know-- No the first day I came to work, that's what I'm saying.

Inaudible 3 seconds

Interviewer 38:17

So it's because she wasn't there that she doesn't know, okay. But do you think that you would find benefit with, just before you start then maybe to come more before you?

Participant 38:30

It will actually help me to be calm. And who would do the examinations in the introduction, showing us the place. I think it will also give us an opportunity to know

each other as students. To have a conversation with each other. Ask questions. Which departments do what examination the most? And I think if you have a clear indication then you will know for sure, you can easily ask questions with the radiographers also.

Interviewer 38:59

So when you say get to know the students. Are you talking about the first years, or the second, third and fourth years?

Participant 2 39:05

The first years. The first years. Because I think this year we didn't know each other. We just went there and then your partner it's Kim, it's Cameron and then okay. “What's next?” Yeah, and then from there ,yeah, so we eventually had to start asking. I initiated the conversation like, “Okay, guys, you both scared now, so who's going to start now? So first question, I'm just going to start the patients.” And then—

Inaudible 4 seconds of talking by Participant 1

Participant 1 39:38

If I had the patient first and then someone else is going to have the patient, then it's going to come back to us. So the first day it was a bit tricky, because we didn't know who's going to go and tell the patient, who’s going to-- So now we’ve developed a system, “Okay, if you take then they’ll decide, is it Neo? Someone else?” So yeah.

Interviewer 39:59

So do you think your experience would have been better if you had known your peers, or you had more opportunity to connect with your peers?

Participant 2 40:12

Lot, lot, lot better because now, if I had the experience to have met them before, like, me, I'm referring to the students that I'm with now the ones that I'm doing my clinicals with. I think if I was given the opportunity to know them before going to the examination, to the to the clinicals I mean, it would have been better because now if we knew that actually, we're going to talk about something if-- Because sometimes to start a conversation in some one student will be there, the other will be there, and then you don't know what to talk about because now you're waiting for the patients. So you all scared, you don't know who's going to start the examination. So but if you got the opportunity to know each other, I feel like we just going to have a conversation and actually help each other on patients like, “Okay, this is a chest, okay, I'm going to go there with you and actually help when needed.” But some radiographers wouldn't allow that. They just want you to go there alone and then correct you and (sorry?), but I think if we were given opportunities to know each other, that's going to be easier for us, because we would have a conversation about something, perhaps with the examinations that we're going to be doing and everything so.

Interviewer 41:21

So I would just like to come back to what is that you think that we as lecturers can do to make your experience better?

Participant 2 41:30

I think, ma'am, for instance, for next year students who will be doing first year, I think it will be appropriate, if they meet first at somewhere, if there's going to be an online learning going on, I think it's going to be appropriate, I think it'd be nice actually, if they meet somewhere, introduce themselves there to just have a conversation in lecture hall, a big lecture hall, and then introduce themselves and then where they from and everything and then just to have a conversation with one another and then explain to them that they will have to go to the clinicals and then there's going to be a zigzag of students, you’ll be with different students there. So they need to have a conversation to one another.

Interviewer 42:13

And you think it’s because those discussions have happened online, but you feel that it needs to be--

Participant 2 42:18

Ja it needs to face to face.

Interviewer 42:21

You want more social interaction.

Participant 2 42:23

Yes ma'am. I think we need to bring that back. Because most of the students here I didn't know them, but I managed to connect with them. But they're my peers but I didn't know.

Participant 1 42:42

Also when they’re teaching somewhere ma’am maybe they can do activities, maybe those three or two groups that you're going to be putting in clinicals they do activities together so that they can break the ice and have a laugh and have fun and so that like they more comfortable with each other. So ja, some activities some fun.

Participant 3 43:10

I want to ask each other questions. I want to ask, if you say knowing each other is going to help you remember when you are (inaudible 6 seconds – mic moving around?) How is this going to help you because you know you are only working with two students while in first year. I’m only working with (Amanhle?) So how knowing—

Participant 1 43:32

I'm saying like, if the three of us going to be in the same department, going to be in ortho be like me and (names of two people) the three of us. So like when we meeting before we go to clinicals we have a meeting, like we go to Bellville campus and then these activities, maybe like a group work or something.

Participant 3 43:53

But even though you maybe you have done those activities, sometimes it's all about your preference. With me like when it comes to people, even though maybe you have played with me so many times, but I can still feel likei cant make a connection— (inaudible chatter amongst participants) Just break the ice.

Interviewer 44:16

So it seems like some need that social interaction, and others feel like you don't. You're very self-aware, you are okay to go on. But I would just like the ask. So like you know we are in COVID and we're not sure how long it's going to be here. Do you have any ideas of how we can breach that that barrier, that lack of social interaction and that you're currently experiencing? So you said something like, do some activities.

Participant 2 44:52

Yes ma'am there (inaudible 1 second) actually help like she said because some radiographers told us their experience of everything. They even told-- I didn't know that a long time before the (hospital name) building was actually the lecture halls. It was not done at campus I knew that by just asking the senior radiographer, like, " No man, we actually play those games to get to know each other. We did everything, those games were they put spoon, the eggs and whatever." They told us those things, so I think to break those barriers, I think they can actually try to do that or at least if we can have at least 50 students to actually do that. If this is diagnostic students they can just meet somewhere, do those interactions even if it's not games but to actually know each other. It can be anything but I don't know what it could be but I think the lecturers can actually plan on what it could be but at least let there be a gathering to introduce ourselves where we come from actually and then which department will be at and

everything. So I think that way it’s going to be easier because some don't want to play games.

Interviewer 46:07

(Someone’s name) doesn’t play games okay. But tell me this whole lack of social interaction, do you think that had an influence on how you experience clinical?

Participant 2 46:19

It has in a way because now like I said, I think the communication was the problem. Communication was mostly the problem because you are nervous first time and then you meeting new people which you don't know also. So you don't know who to talk to, you don't know how you should actually believe yourself to be normal to act normal so you just you don't know if I should greet the person and start a conversation with them because you don't know them. But I think that's how it affected us because we didn't know each other and then we both nervous we don't know what to talk about. So you just have to start a conversation with someone that you don't know and then hope that person doesn't snap or be rude to you. Because others are just cold.

Participant 4 47:04

So introducing yourself meaning you have to stand in front-- Meaning introducing yourself to the student, you have to stand in front-- (indistinct chatter) standing while you already have Low self-esteem.

Participant 2 47:24

No I think that’s where you’re going to get your self-esteem from because you just stand up there and then everyone like, “Hey guys.” Just stand up with confidence that like, “Hey guys name is (participant name) I’m from….” Okay, just anything and then from there, “And I'm very excited to meeting you guys. I hope you going to have a great year. Also.” That's it. I think that’s going to help. So even (indistinct chatter for 13 seconds)

Interviewer 48:04

So important for you to be able to make connections in the classroom, and then that will help you to slot into the clinical environment better because you know, somebody and you can make a connection to that person.

Participant 3 48:21

It’s not awkwardly sitting there while you’re waiting for a patient. There you standing and the radiographers are having a conversation and the fourth years and third years are having a conversation. So it’s weird.

Interviewer 48:33

Okay, so yeah, that's from me, but I just wanted to ask you like with the COVID, the patients that that influence how you felt about radiography, or was that a barrier to you? Or?

Participant 1 48:52

I feel like if COVID ever ends I would think it wouldn't-- Because it feels normal now that you’re going with the mask, you prepare the patient. I feel like it's better. It’s no barrier for me.

Interviewer 49:06

Did you feel like this in the beginning of the year as well?

Participant 1 49:10

I wasn't sure if we were going to have clinicals so I didn’t think much of it.

Interviewer 49:17

So you feel safe. You feel safer working with the mask.

Participant 1 46:23

It’s like a normal thing.

Interviewer 49:24

So it's almost like a norm for you working with it. Okay.

Participant 2 49:29

For me, I was never worried about COVID-19. I felt like, “Okay, there's a new enemy in the health department. So now that everything is under control we know what to do from going forward, you have to wear your mask.” And then the fact that we are told that you're not going to go anywhere near the COVID awards. I think also that helped. But otherwise I felt like as a health personnel, I think diseases shouldn't be something that scares you because you are working with people who are sick so you have to make means and ways to accept (the victim?). So I think with me I came with the mind to expect anything in the hospital. So with COVID being there in a picture I felt like, “Okay if for some reason I'm working with those patients I think I have to wear enough protection for myself to protect myself from the COVID-19.

Interviewer 50:24

Okay, so that is all from me. Is there anything anybody wanted to add? Before we close. No?

Participant 3 50:34

Can I add something? One of the challenges that I came across there, sometimes you find maybe there is someone who is checking your images. After doing X rays and then obviously there be a supervision to check if everything went well before they complete and then when it's time for them to sign our books becomes a problem. So I

want to know maybe if there is a way you can solve that or something because some people they're not really interested on signing our books, but they have to.

Participant 2 51:13

Yes ma'am, I've seen a radiographer asking a-- There was a patient-- A student who did a patient and then the everything was okay in the image. But because the student couldn't answer the questions that the radiographer was asking the radiographer was like, "Then I'm not going to answer, I'm not going to sign your logbook because you are only here to take pictures and we're not only here to take pictures." And with to me made sense to me that she was asking us, "Why do you think we took--," "What do you think is wrong there?" And then, "Why do you think we should do the lateral now? Because there's the lungs, there's no history there. But why do you think we should do lateral?" And the student was clueless and I think we had the information from the lecture stuff. You can do lateral whenever if you can see any pathologies on the lungs or if it's left then you have to do-- So I think that was another way of learning. (Inaudible 2 seconds)

Interviewer 52:15

So this logbook thing is a big thing. So does it influence your experience in the clinic?

Participant 1 52:21

It kind of does. Because you sometimes like for the first time, for my first time in ortho I did ankles, foot in all those patients but I didn't take stickers and sign, the radiographer didn't sign. And then I forgot so it kind of just-- Then the following day then I knew because the girls told me, "Okay you have to do, this have to do this." And I thought it was a lot of work. You have to take a sticker, you have to remember who checked and who helped you, is it aided, unaided and all that stuff, so it kind of hinders your experience a little bit.

Participant 2 52:59

The lecturers should also tell the students whenever they start doing their clinicals they have to know that they have to sign their logbooks, they have to get the sticker whenever they are done. When they're done with the patients they have to take the stickers for the senior radiographers to sign for them. Because most of us didn't know that. Actually we were told by other second year students and other senior students. So I think that it'll be very much important for the lecturers to tell the first years that when they doing their clinicals they have to get their stickers and get the senior radiographers to sign as well. Most of us missed that one.

Participant 1 53:37

Also ma'am the the day before I came to ortho, there was a system that they had so they put a page there and then they put a sticker and who did it and then who aided for that. So I feel like maybe that should be done in other departments if I don't know if it could be difficult I don't know like-- So that they can-- Because sometimes you say oh you forget to for them to sign the-- So today you forget to sign and then tomorrow you tell them, "Oh ma'am can you please sign?" And they say, "But I don't remember. I wasn't-- I don't remember doing the xray for you." So if that page is there and then they have all of that then we can just go to their page. "Oh, okay it was me." And then the can sign it on the book as well.

Interviewer 54:22

So that system you're talking about is that a form that was created in the department?

Participant 1 54:29

I think it was ortho that created that.

Interviewer 54:32

So the patient's name, the student who did it, and the radiographer? Okay, so thank you so much for your input. I am going to stop the recording now. Unless there's anything else you want to say.

Participant 3 54:53

Can I ask something? You find that especially when it comes to spines it's rare to find patient who want to do maybe c spines, and maybe-- Let's say maybe I'm at ortho or somewhere and then maybe we have two patients who need to do c spine. So obviously, senior student will need to do those spines for their logbooks. And us as a first year student end up not having those x rays, so I want to know, like, how are we're going to-- Is there another way, or? Because it's also a (master rule?) we must have at least a minimum in our books. So I want to know, when it comes to that, how is it-- What is it that must be done or something?

Interviewer 55:42

So if I've-- Just to clarify you're saying that there's not enough learning opportunities for everybody in the department, okay. And we need to be able to work around that challenge.

Participant 2 56:04

I think the communication is, with me, wherever I go, I always ask questions, I always tell the radiographers that at least if today I can do a certain examination. And whenever there is a particular examination the radiographer will call like, "No (participant name) will do it." So I think if you communicate, like the communication is what can actually break everything. If you talk to radiographers that there's something that you are lacking in your logbook and you actually need to do it, then the radiographers will give you that opportunity. I think--

Participant 3 56:38

But there are some times they don't need someone who's going to do it for the first time. They need a student. Sometimes in general maybe there's a spine, they just say, "Fourth year students." At least you know, right. I'm sure a lot of you know. Maybe there's something, "Oh a third year student here it." And then for first year a chest and whatsoever. So when it comes to that it's also a challenge.

Participant 2 56:58

I think with us they fix-- (inaudible 10 seconds) The first time when you go in there she wanted us to do the chest. (inaudible 13 seconds)

Participant 3 57:25

Maybe it also depends because in my department like this week I also got an opportunity to do like special views because the section head there is not that hard, she just say, “Everyone is here learn. So everyone can do anything here.” So it does not matter whether you're doing a third year or what. If there's some patient and you're not familiar with what you're going to do, she just helps you to do it.

Interviewer 57:54

Okay, so just to summarize, so what you're saying is that I heard you say you must tell the radiographers, however, your point is that even though you tell the radiographers they want students that already know how to perform. Not somebody that learns still. Okay, but what do you-- How are we going to-- What do you think? What can we do to bridge that?

Participant 3 58:22

I think every student must be given a room to learn more. Like maybe you can communicate them there at the hospital and let them know that, okay, each and every student must be treated equally, because, yes, for special views I understand. Okay, we don't know a lot about that. But for something like spines and whatsoever, you just need to communicate with them.

Interviewer 58:45

So you would, you say that maybe a radiographer can take the students and show them and make sure the students know how to do it? And then the next patient? Yeah.

Participant 3 58:57

Because what happened today-- Because they just showed me-- The radiographer showed me how to do a weight-bearing of an ankle and then the next patient I was able to do it myself. And she was also impressed.

Interviewer 59:10

So the first time it was just the practice and then you did the patient. Do you think something like tutorials, more tutorials would help?

Participant 2 59:20

I think more tutorials ma'am would actually help. And I think the other problem with that is because some radiographers are different, actually they are different. So some radiographers will ask us questions like, "Have you guys done this?" They spines. And if we haven't done the spines, they wouldn't allow us to do the spines because we didn't do them at school yet. So like this year, I think even the extremities some of them gave us extremities without even we doing them at the school. So they will just show us how to do it and then from there. I think it depends with the radiographer because with her I think it could be a specific radiographer, not everyone because most of them actually help us a lot. And I wanted to say something again ma'am, with the mobile chest. I think with that one also we have to tell the first years that they can either ask the senior radiographer who are actually going to the chest mobiles, because if there are chest mobiles they don't actually tell you, they just go there without informing us they are going. So I think it will help if you tell them that they can either ask the radiographers or you can tell the radiographers to actually tell the student.

Interviewer 1:00:37

Okay, that seems like that is it. Okay. So thank you so much. I'm going to stop the recording now.

APPENDIX J: SAMPLE REFLECTIVE NOTES

FIELD/ REFLECTIVE NOTES

FOCUS GROUP 2 (FG2)

LOGISTICS:

Focus Group 2 (FG2) were conducted at the [redacted] specifically within the confines of the basement floor. This location was intentionally chosen to ensure privacy from the radiography department, thereby mitigating any potential observation by the radiography community, including students, radiographers and lecturers. The selection of this venue aimed to safeguard the anonymity of the study participants. The arrangement of space was configured in a circular manner to facilitate unobstructed movement and to enable the recorder to move seamlessly.

To adhere to COVID-19 protocols, a meticulous approach was adopted. Upon entry to the building, students completed a comprehensive COVID-19 register. Throughout the interview session, strict adherence to pandemic regulations was maintained. Participants were strategically spaced to observe physical distancing guidelines, hand sanitisers were readily available, and participants were instructed to only remove their masks when actively speaking. These measures were implemented without encountering any unforeseen complications, ensuring a safe and controlled environment for the of the interview.

OBSERVATIONAL NOTES:

This group seemed very nervous; they were extremely quiet before we started the interview. Recognising the need to lift the mood, I started a conversation by asking about their plans for the upcoming holiday. Immediately I sensed a change in the environment as chatter started. Most were very forthcoming in talking about their plans and I could sense that they started to relax a little bit. As soon as I stopped talking, they were all very quiet again, at this stage I realised that they may just be a quiet group of participants. Despite this assertion, I made sure they were ready to start and were relaxed before I commenced the interview. They all agreed that they were relaxed and ready to start.

PERSONAL NOTES:

In contrast to the first FG interview, I felt more relaxed and calmer with the second interview. I attributed this to a more familiar understanding of the FG process. However, the unexpected initial quietness of FG participants threw me off guard and this induced some degree of nervousness and worry. At this stage I had to compose myself and realised that I needed to lighten up as my attitude could change the atmosphere, and it did. As soon as I communicated more with them, I realised that they are just a quiet group, who are willing to participate. During the interview, I observed that some engaged in conversation more than others. One participant wasn't very interactive and signalled that he did not have anything to say by nodding his head. I did not want him to feel excluded so I commented that he may want to share his experience at a later stage to which he nodded. Although he did not speak much, he nodded a lot when the other participants spoke which indicated to me that he was listening and shared their sentiments.

I had some challenges in bracketing my own ideas. At some stage I felt the urge to interrupt, I then had to remind myself that it's the participant's experience and not mine and that I want to encourage an open sharing of views and experiences without bringing my emotions and experience into play. This allowed participants to share their experiences freely.

There were a few missed opportunities to paraphrase more and ask probing questions. Going forward I will ask probing question immediately after a participant has spoken and before the next participant responds. This approach will aim to strike a balance between maintaining the conversational flow and ensuring a thorough exploration of participant experiences.

METHODOLOGICAL NOTES:

The focus group interview as a method of exploring participants' experiences worked well. Participants were comfortable with the audio recorder.

THEORETICAL NOTES:

Thoughts that are stuck in my head following the discussion are

- Language barriers
- Need for physical strength

- Need for interventions on how to start communications
- Importance of Encouragement and motivation from radiographers
- Need for more peer interaction/ engagement

Notes

Teambuilding exercises --- team building/ discussions are always between peers and do not include radiographers.

NB my model of resilience:

Some students may have some or no sense of resilience, but once we put them through my model, they will become more resilient and will be able to better cope with the challenges of the clinical environment.

APPENDIX K: PARTICIPANT FEEDBACK SESSION - NOTES

Preparation

After refining and naming the categories and themes, I presented them to my research supervisors to eliminate potential bias.

To adhere to the credibility and confirmability principles of qualitative research I prepared a presentation of the categories and themes to present to the study population. I therefore pre-arranged with a lecturer to address the study population. The session was well attended.

Feedback sessions

During the feedback session, I provided a brief overview of the study background and research questions to refresh the participants' memories. I then presented an outline of all themes and categories, supported by direct quotations from participants. I encouraged participants to ask questions and frequently checked their comprehension. Pertinent inquiries were raised, including discussions on study limitations and the mitigation, as well as interest in the dissemination plan for research findings. After concluding the presentation and addressing all relevant study-related queries, I invited those who participated in the focus group interviews to stay behind.

Debriefing component.

The debriefing component with the study participants were important to eliminate potential misunderstandings and affirming that the views and explanations of participants were correctly interpreted and recorded. 18 out of 21 participants who engaged in the focus groups attended the debriefing component. Participants concurred that the categories and themes accurately described their experiences. The quotations were also confirmed as true. Participants were also provided with the opportunity to review the study transcripts to confirm their correctness.

Conclusion

Following the feedback and debriefing sessions, it was determined that no adjustments were necessary to the analysis.

APPENDIX L: GRAMMARIAN CERTIFICATE

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29 February 2024

LANGUAGE & TECHNICAL EDITING

Cheryl M. Thomson

A RESILIENCE MODEL TO PREPARE AND SUPPORT RADIOGRAPHY STUDENTS FOR THE CLINICAL ENVIRONMENT

This is to confirm that I, Cheryl Thomson, executed the language and technical edit of the above-titled PhD thesis of **HEIDI THOMAS, Student number 198116659**, at the CAPE PENINSULA UNIVERSITY OF TECHNOLOGY in preparation for submission of this thesis for assessment.

Yours faithfully

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