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Faculty of Education

Exploring teaching, learning, assessment and practices of the acupuncture programme to improve children's health

by

Zijing Hu

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PHILOSOPHIAE DOCTOR

in the

FACULTY OF EDUCATION

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August 2022

Supervisor: Dr Roy Venketsamy

Co-supervisor: Dr Janice Pellow

DECLARATION

I, Zijing Hu, hereby declare that this PhD thesis: ***Exploring teaching, learning, assessment, and practices of the acupuncture programme to improve children's health*** is my original work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I declare that this is the first time I have submitted this thesis to the Department of Early Childhood Education, Faculty of Education, University of Pretoria, for the degree of Philosophiae Doctor and that I have not previously submitted it for a degree at any other university.

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CLEARANCE CERTIFICATE	CLEARANCE NUMBER: **EDU137/21**
DEGREE AND PROJECT	PhD Exploring teaching, learning, assessment and practices of the acupuncture programme to improve children's health
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Dr Roy Venketsamy

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- Data storage requirements.

ETHICS STATEMENT

Zijing Hu has obtained, for the research described in this work, the applicable research ethics approval. I declare that I have observed the ethical standards required in terms of the University of Pretoria's '*Code of ethics for researchers and the Policy guidelines for responsible research'.*

Signature

2 August 2022

Date

DEDICATION

I dedicate this study to my late paternal grandma Mrs Shaohua Luo Hu (胡羅芍華), a true virtuous lady and matriarch who cared, loved and supported her family unrelentingly. She dedicated her entire life to ensuring that all her children and descendants receive education against all odds. This included her seven sons and daughters, and nineteen grandchildren and great-grandchildren.

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Mr Shangda Hu (胡尚達)*: February 1933 - January 1980*

Mrs Shaohua Luo Hu (胡羅芍華)*: May 1934 - April 2021*

Mr Shiyan Tsang (曾仕燕)*: September 1926 - November 2016*

Mrs Waichun Wu Tsang (曾胡惠珍)*: October 1933 -*

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ABSTRACT

Children are our future and must be protected and cared for by all sectors of society. In Africa, 52% of young children under the age of five contribute to the highest child mortality rate. To provide quality healthcare services to young children, higher education institutions must ensure that their students are competent and capable of implementing the knowledge and skills gained in their respective programmes. The focus of this study was to explore an acupuncture programme presented at a higher education institution to improve children's health. Acupuncture is performed by inserting needles on specific points of the body to treat and prevent various childhood diseases. Acupuncture is widely used on children with confirmed efficacy and few adverse effects for various medical conditions. The Technological Pedagogical Content Knowledge model was used as a lens to explore students' experiences of the *teaching, learning, assessment, and practices* of the acupuncture programme to improve children's health. The researcher believes that to ensure students' competencies in improving children's health using acupuncture, higher education institutions must provide high-quality acupuncture educational programmes through their teaching, learning, assessment, and practices.

A descriptive qualitative single case study design was employed in this study to explore students' experiences and perceptions of the delivery of the acupuncture programme at the identified institution. A purposive sampling technique was adopted. Participants were recruited from the students who were registered in the acupuncture programme. The research instrument included an online text-based questionnaire, observation, participants' reflective journals, field notes, and document reviews. Data were analysed through thematic analysis. The qualitative validity criteria, which include credibility, transferability, dependability, and confirmability, were ensured in this study. The findings of this study will contribute to the improvement in the quality of teaching, learning, assessment, and practices of acupunctures programmes, which will further ensure students 'competencies in promoting children's health. This study will also ensure that future acupuncture programmes are aligned to international standards while maintaining the requirements as outlined in the South African higher education institution policies.

Keywords: children's health; teaching; learning; assessment; practice; TPCK model; acupuncture

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ABBREVIATIONS

AHPCSA	Allied Health Professions Council of South Africa
BHScCM	Bachelor Degree of Health Sciences in Complementary Medicine
CHE	Council on Higher Education
CK	Content Knowledge
CM	Complementary Medicine
CMRA	Chinese Medicine Registration Act 2000
CMRBV	Chinese Medicine Registration Board of Victoria
DHET	Department of Higher Education and Training
ERE	Emergent Remote Education
FJTCM	Fujian University of Traditional Chinese Medicine
HEIs	Higher Education Institutions
IPE	Interprofessional Education
KSVA	Knowledge, Skills, Values and Attitudes
LCA	Lecturer-centred approach
MRTEQ	Minimum Requirement for Teacher Education Qualifications
NJUCM	Nanjing University of Chinese Medicine
OSCE	Objective Structured Clinical Examination
PACCARB	Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria
PCK	Pedagogical Content Knowledge
PK	Pedagogical Knowledge
PRC	People's Republic of China
SA	South Africa
SCA	Student-centred approach
TCK	Technological Content Knowledge
TCM	Traditional Chinese Medicine
TK	Technological Knowledge
TPK	Technological Pedagogical Knowledge
TPACK	Technological, Pedagogical and Content Knowledge
TPCK	Technological, Pedagogical, Content Knowledge
UJ	University of Johannesburg
UK	United Kingdom
UNICEF	United Nations Children's Fund
USA	United States of America
UWC	University of Western Cape
WHO	World Health Organization
WIL	Work Integrated Learning
WSU	Western Sydney University

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CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

There is a dire need to improve teaching, learning, assessment, and practices in skills programmes at higher education institutions (HEIs). The quality of these programmes directly impacts the learning outcomes in the world of work. Therefore, Dicker et al. (2018) and Ludigo et al. (2019) agree that HEIs are responsible for ensuring their students receive a quality education. With this in mind, this study aimed to explore an acupuncture programme's teaching, learning, assessment, and practices to improve children's health. Children are our future and must be protected and cared for by all sectors of society. However, children's health is crucial since many die from preventable and treatable diseases (Goga et al., 2019). According to the World Health Organization [WHO] (2019), an estimated 5.2 million young children died globally due to a lack of appropriate treatment and support (WHO, 2020a). Children's health is particularly critical in Africa, according to Goga et al. (2019) and WHO (2020b); they report a high mortality rate in Africa that contributes to 52% of deaths in children under the age of five years. For this reason, the researcher believes that it is of great significance to study the teaching, learning, assessment, and practices of educational programmes at HEIs to ensure graduates are competent to improve children's health through the quality delivery of their programmes.

This study provides strategies and guidelines to strengthen, develop, and improve the teaching, learning, assessment, and practices of an acupuncture programme in South Africa (SA). The significance of this study is that students will be empowered with the necessary knowledge, skills, values, and attitudes (KSVA) to become competent acupuncture practitioners. In addition, they will be able to provide quality acupuncture services delivered through the acupuncture programme to improve children's health. Abelha et al. (2020) state that students' competencies are ensured by a sound programme that is based on well-defined learning outcomes and skills.

According to Maphumulo and Bhengu (2019), promoting quality teaching and learning is receiving increased attention nationally and internationally. Despite this increased attention, Hénard and Roseveare (2012) mention that there has been much criticism against young university graduates because they lack the appropriate knowledge, skills, and practices necessary to be competent in the real world. Similar views are expressed by Dicker et al. (2018) and Govender and Wait (2018), who agree that there is non-alignment between teaching, learning, assessment, and practices and the real-life work setting. According to the Department of Higher Education and Training [DHET] (2015), SA recognises and acknowledges the importance of quality teaching, learning, assessment, and practices to prepare young adults for work. The researcher contends that quality teaching, learning, assessment and practices are fundamental to ensuring a programme's quality at HEIs.

Flórez and Sammons (2013) and Rajagopalan (2019) articulate that quality teaching and assessment positively affect students' learning outcomes in preparation for practice. Rajagopalan (2019) agrees with Coe et al. (2014) that teaching aims to strengthen students' knowledge and understanding to assure the future success of graduates. Similarly, Dicker et al. (2018) and Schunk (2012) believe that knowledge is empowering, thus allowing students to perform their skills appropriately in the world of work. Abelha et al. (2020) concur with Schunk (2012) that when students acquire appropriate KSVA in their degree programmes, they will become competent to apply the relevant KSVA in an actual work situation. Therefore, the researcher opines that the appropriate KSVA for an acupuncture programme is crucial to optimise relevant learning outcomes.

According to the DHET (2015), in their policy on the Minimum Requirement for Teacher Education Qualifications (MRTEC), every programme delivered at HEIs needs to meet minimum standards and criteria for assessment. This policy aligns with the Department of Basic Education (2012), which states that quality assessment indicates and ensures students achieve the appropriate KSVA and understand the (subject) programme. It is imperative to employ quality assessment in the learning process, as it reflects teaching and learning (Flórez & Sammons, 2013). The researcher believes that teaching, learning, assessment, and

practices are inseparable elements for acupuncture programmes to ensure the competencies of graduates to promote children's health.

This study focused on the teaching, learning, assessment, and practices of an acupuncture programme in SA to improve children's health. Acupuncture aims to treat diseases by inserting needles into specific points of the body (Magram & Deng, 2019). As a complementary medicine (CM) professional, acupuncture has been receiving increased public interest (Li et al., 2019). The researcher believes that the reason is due to the effectiveness and low cost of acupuncture treatment in various diseases, including paediatric diseases (He et al., 2013; Moeen, 2016). Complementary medicine is defined as "a broad set of healthcare practices that are not part of that country's tradition or conventional medicine and are not fully integrated into the dominant healthcare system" (WHO, 2019:8). According to the Allied Health Professions Council of South Africa (AHPCSA), there are various CM professions in SA (AHPCSA, 2022a). The diagram below represents different CM professions in SA, as defined by the AHPCSA (see Figure 1-1).

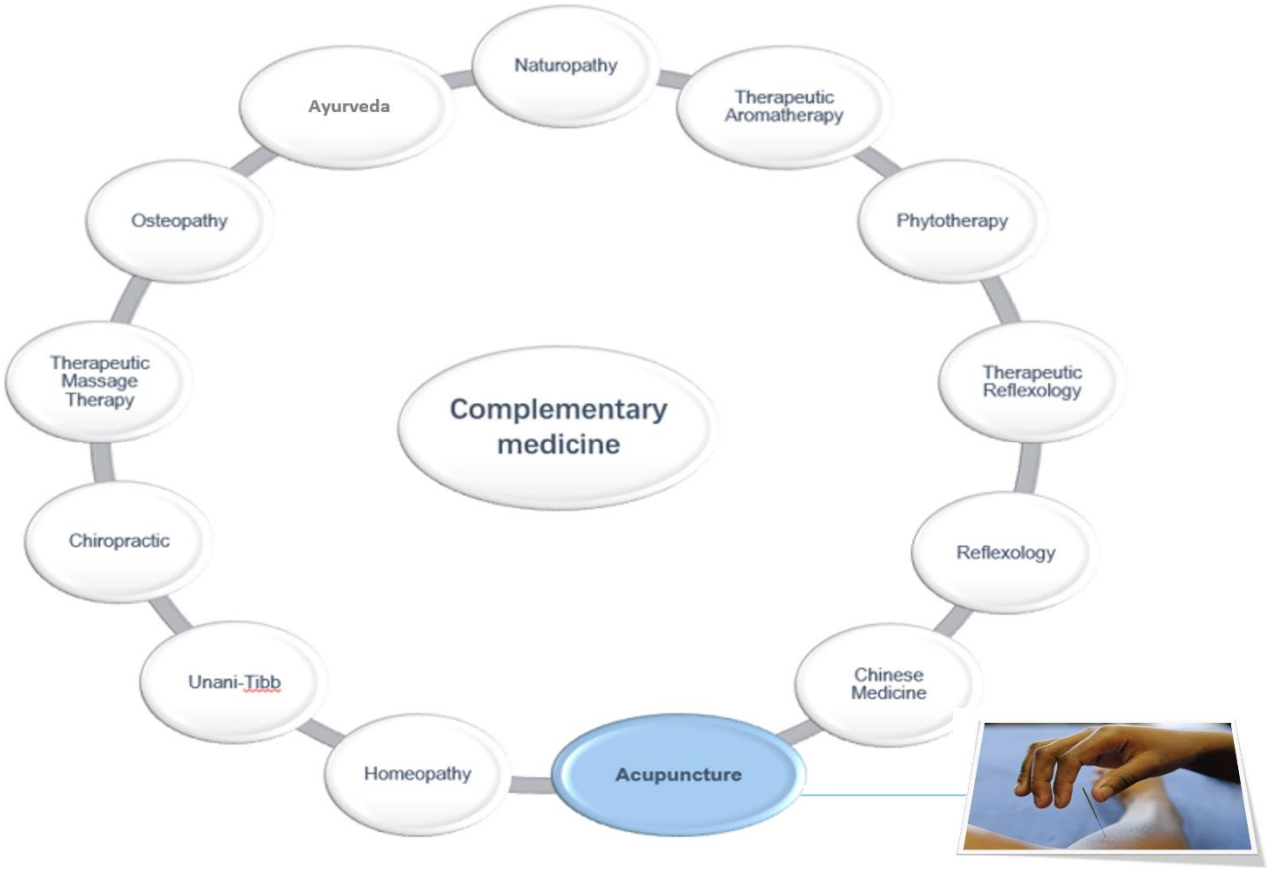


Figure 1-1. Complementary medicine professions in SA (As adapted from Allied Health Professions Council of South Africa, 2022b)

1.2 BACKGROUND

The need for quality teaching, learning, assessment, and practices in university programmes cannot be overestimated. Rajagopalan (2019) concurs with Fry et al. (2009) that there are challenges in the quality of teaching and learning at some HEIs. In their respective studies, Ko et al. (2014) and Venketsamy and Sibanda (2021) reveal that some lecturers do not acquire an in-depth understanding of how students learn. Furthermore, Marton and Booth (1997), as cited in Fry et al. (2009:8), argue that "learning is not a single thing; it may involve mastering abstract principles, understanding proofs, remembering factual information, acquiring methods, techniques, and approaches, recognition, reasoning, debating ideas, or developing behaviours appropriate to specific situations." In the researcher's opinion, learning is about how we perceive and understand the world.

According to García-Peñalvo et al. (2013), learning in higher education is a function of both formal and informal experiences. These authors agree that formal learning occurs due to classroom activities structured by lecturers to assist students in achieving a particular objective. On the other hand, informal learning includes all other outcomes of students' participation in a higher education experience. Foko (2015) states that HEIs have a significant role to play in ensuring the competencies of graduates in the real work. These institutions are expected to train graduates who contribute significantly to nation-building by applying knowledge and skills acquired at these HEIs (Scott & Ivala, 2020). Despite the significant role higher educations have in producing competent graduates and preparing them for the world of work, Tewari and Ilesanmi (2020) believe that several factors are responsible for poor quality education. They argue that there is a need to re-examine teaching and learning in HEIs.

This study focused on exploring the delivery of an acupuncture programme to improve children's health at a South African HEI. Acupuncture is one of the professions within CM. Complementary medicine is widely used for many medical conditions in East Asia and the western world. The reasons cited for using CM are due to CM being cost-effective and increased patient satisfaction and wellness (WHO, 2019). Hu et al. (2022) state that the demand for acupuncture is gaining increased attention globally because of the safety and

efficacies of acupuncture treatment (Gold et al., 2009; He et al., 2013). Saunders and Berry (2020) concur with Moeen (2016) that acupuncture contributes to children's physical and mental health. Therefore, the researcher opines that acupuncture is crucial in promoting children's health since it is practical and cost-effective.

Acupuncture is classified into the 'scarce skills' category in SA because of the limited number of qualified acupuncturists (AHPCSA, 2022b; AHPCSA, 2022c; Hu et al., 2022). The researcher contends that the reason for the limited number of qualified acupuncturists is due to the lack of a well-developed, sustained programme in acupuncture in HEIs. One HEI in SA has developed a four-year acupuncture programme to address the existing gap and improve the capacity of acupuncture. It is envisaged that there will be more qualified acupuncturists in the future who will be providing quality acupuncture services to both adults and children to improve their health conditions. Consequently, to ensure public health through appropriate acupuncture treatment for adults and children, there is a need to offer a quality acupuncture programme at their respective HEIs.

Studies by Goga et al. (2019) and Landrigan and Miodovnik (2011) reveal that there is a global interest in improving children's health. However, children's health is still critical and particularly crucial in Africa. Evidence supporting this view can be found in a report from WHO (2020b), which states that the mortality rate of children under the age of five in African countries is almost eight times higher than those of European countries. In SA, the mortality rate of children under five years contributed to 32 per 1000 live births in 2017 (Lake et al., 2019). According to the Sustainable Development Goals (2016-2030), there is much emphasis on maintaining optimal children's health (Singh, 2016). Subsequently, it is of profound significance that teaching, learning, assessment, and practices research on acupuncture programmes are conducted in SA to improve children's health.

To be an effective and qualified acupuncturist, HEIs must shoulder the responsibility of presenting quality teaching, learning, assessment, and practices. Chen (2019) states that each student should complete a minimum of 1905 hours of study to be a competent acupuncturist. These 1905 hours include 705 hours of theoretical studies, 450 hours of biomedical sciences, and 660 hours of clinical training. Similarly, Zheng (2014) highlights that

acupuncture requires a minimum of a four-year training programme for the undergraduate degree programme. The researcher contends that the knowledge gained at the undergraduate level should prepare students to practise acupuncture to improve patient outcomes.

To achieve the best outcomes for the acupuncture programme's teaching, learning, assessment, and practices, students must be taught effectively, which requires sufficient Pedagogical Content Knowledge (PCK) and practice. Govender and Wait (2018) and Pournara et al. (2015) agree that Content Knowledge (CK) in an educational programme is crucial to promoting effective teaching and learning. The researcher believes that appropriate CK will assist in improving students' KSVA in a specific educational programme. Therefore, the researcher argues that it is imperative that acupuncture programmes, especially teaching, learning, assessment, and practices, should be effectively taught and assessed at HEIs.

1.3 RATIONALE FOR THE STUDY

The researcher is a qualified Traditional Chinese Medicine (TCM) practitioner with a degree from the Fujian University of Traditional Chinese Medicine (FJTCM) in China. Acupuncture was one of the key focus areas of the researcher's studies. He joined an HEI in SA in 2015 as a part-time lecturer for TCM. He observed significant differences in acupuncture education between China and SA, especially concerning CK and PCK, skills, and practices. During informal discussions with acupuncturists, he noticed their discomfort in practising acupuncture confidently. A significant gap observed was the limited training in clinical practice and the depth and scope of CK. As a lecturer of the acupuncture programme at the HEI, the researcher noted that students seemed to lack the necessary KSVA for acupuncture. In 2019, the researcher joined another HEI as a lecturer and coordinated a newly developed four-year acupuncture programme at this university.

Practical application is fundamental for all medical education, mainly clinical practice. Govender and Wait (2018) emphasise the importance of a well-designed, coordinated, and organised programme for high-quality medical training. In their respective studies, Al-Zumor et al. (2013) and Lalima and Dangwal (2017) articulate that university programmes should

follow a hybrid model to accommodate and prepare students' competencies in the 21st century. The researcher opines that employing various appropriate pedagogical techniques in the acupuncture programme is of great significance in improving learning outcomes, particularly using technology during the COVID-19 pandemic.

The outbreak of the COVID-19 pandemic in 2020 has resulted in the widespread movement to online learning in educational fields, which posed challenges for educational programmes that require practical training, such as acupuncture (Hu, 2022b; Mpungose, 2020). Paideya (2020) highlights that technologies have shifted students' and lecturers' teaching, learning, assessment, and practice space. Therefore, it is imperative that technologies are introduced into the acupuncture programme to effectively prepare students with both theory and practice knowledge.

The study aimed to explore how the identified HEI ensured the quality delivery of the acupuncture programme to improve children's health through effective teaching, learning, assessment, and practices. It was envisaged that this study would recommend strategies for the quality delivery of acupuncture programmes and the appropriate design of the acupuncture programme. This study's outcome may close the gap between the teaching, learning, assessment and practices of acupuncture programmes and the quality of the acupuncture services in the South African context.

1.4 AIMS AND OBJECTIVES

The aim of this study was to explore students' experiences with the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health.

The objectives of this study were to:

- Describe students' views and perceptions of the acupuncture programme presented at the HEI with regards to teaching, learning, assessment and practices;
- Develop a conceptual framework from Shulman's (1986) PCK model and Mishra and Koehler's (2006) Technological, Pedagogical and Content Knowledge (TPACK) model

as a lens to explore students' experiences with the teaching, learning, assessment and practices of the acupuncture programme;

- Identify strategies to strengthen the quality of existing teaching, learning, assessment and practices of the acupuncture programme;
- Recommend innovative strategies to strengthen the delivery of the acupuncture programme focusing on the CK, PCK and technological content knowledge (TCK): and
- Present a model for a future envisaged acupuncture programme for HEIs to implement.

1.5. PROBLEM STATEMENT

Many practitioners indicate that they possess inadequate knowledge and skills to confidently put theory into practice and feel incompetent to practise acupuncture skillfully. For this reason, the researcher intended to investigate the quality of the delivery of the acupuncture programme at an HEI to provide strategies to strengthen the teaching, learning, assessment and practices of future programmes to optimise children's health. The researcher formulated primary and secondary research questions to guide this study.

1.5.1 Primary research question

- How do students experience the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health?

1.5.2 Secondary research questions

- What are students' views and perceptions on the teaching, learning, assessment and practices in the acupuncture programme?
- What strategies can be used to strengthen the quality of teaching, learning, assessment and practices in the acupuncture programme?
- How can Shulman's (1986) PCK and Mishra and Koehler's (2006) TPACK model be used as a lens to facilitate the delivery of an acupuncture programme?

1.6. CONCEPT CLARIFICATION

The following concepts are explained for clarity, proper understanding, and alignment to the study.

1.6.1 Teaching

Teaching is the process of assisting individuals in acquiring KSVA (Gallie & Keevy, 2014; Venketsamy, 2000). This view is agreed upon by DHET (2015) and Rajagopalan (2019). They concur that teaching is the action of imparting information and transferring knowledge and practices within a particular programme at an HEI. In this study, teaching refers to the lecturing of the acupuncture programme at the HEI in SA to improve students' KSVA.

1.6.2 Learning

Learning is a process that leads to change, resulting from experience and enhancing the potential for improved performance for prospective learning (Bacanli, 2016). Schunk (2012) and Venketsamy (2000) concur that this change is based on individual experiences and how an individual adapts to a new environment. Behlol and Dad (2010) argue that change is a quantitative accumulation of KSVA in the real world. This study defines learning as acquiring new knowledge, skills, and attitudes of acupuncture at an HEI, focusing on a deeper understanding of the CK rather than memorisation and recall.

1.6.3 Assessment

Assessment is defined as the process of collecting and analysing data to make inferences about teaching and learning (Liljedahl, 2010; Stăncescu & Drăghicescu, 2017). This process is further accepted by Capraro et al. (2012), who articulate that assessment is the action of documenting students' KSVA in a measurable approach. Umar (2018) and Yambi (2018) explain that assessments are academic activities that aim at strengthening teaching and learning. In this study, assessment refers to an integrated approach to facilitating and evaluating students learning in the acupuncture programme using various types and methods of assessment techniques.

1.6.4 Practice

Practice is the actual application or use of an idea, belief or method, as opposed to theories relating to it. It is the act of repeatedly rehearsing a behaviour or engaging in an activity repeatedly for the purpose of improving or mastering it (Fletcher-Wood, 2017). Jesse (2016)

concurs that practice is an action rather than a thought or idea. It is the actual application of the idea, belief or method in doing or performing what has been learnt. Steadman (2018) supports this view that practice is the practical work done by students that are exclusive to theoretical work. Fletcher-Wood (2017) and Jesse (2016) explain that practice is doing something and behaving differently due to newly acquired learning. For the purpose of this study, practice refers to the clinical processes of applying theoretical acupuncture knowledge into action on patients in the clinic at an HEI.

1.6.5 Acupuncture

Chon and Lee (2013) and Magram & Deng (2019) define acupuncture as a therapeutic technique of inserting and manipulating filiform needles on the body to treat various diseases. In their study, Chon et al. (2019) and Jun et al. (2015) argue that acupuncture applies different stimulators to the body, including needles, pressure, electric current, laser or ultrasound. In this study, acupuncture refers to techniques of inserting filiform needles onto specific points of the body for therapeutic and maintaining health purposes for adults and children (see Figure 2-1).

1.7 LITERATURE REVIEW

A literature review of recent publications, texts, and other sources was addressed to gain an in-depth understanding of teaching, learning, assessment and practices.

1.7.1 Importance of teaching, learning, assessment and practices of acupuncture programmes

It is widely acknowledged that good quality educational programmes are fundamental to ensuring positive learning outcomes in any HEI programme. According to the DHET (2015) and Dicker et al. (2018), the quality of teaching, learning, assessment, and practices is crucial. It should be well developed and aligned with the necessary learning outcomes for the programme. Devlin and Sammarawickrema (2010) articulate that effective teaching ensures students achieve learning outcomes. Jones et al. (2010) emphasise that learning must be authentic, focusing on presenting real-world contexts through different academic activities.

Therefore, the researcher contends that it is crucial to ensure students in the acupuncture programme achieve learning outcomes through effective teaching and learning. Watagodakumbura (2013) explains that learning with in-depth understanding can be motivated and enhanced through assessment, provided that the assessments are appropriately aligned to the learning outcomes of the programme.

Assessment includes various approaches to determine students' KSVA in an education programme (Umar, 2018; Yambi, 2018). The researcher concurs with Amua-Sekyi (2016) that evaluating students' KSVA through assessment is very important to ensure an educational programme's quality. On the contrary, Khan (2012) argues that the aim of assessments is to facilitate and promote students' learning. Stăncescu and Drăghicescu (2017) further assert that the quality of assessment is vital as they clearly reflect students' progress in the learning content. These authors emphasise that assessment is one of the most effective approaches to enhancing student learning outcomes. In the researcher's opinion, the quality of an acupuncture programme significantly relies on how it is delivered. Consequently, it is of profound significance to ensure the effectiveness of teaching, learning, assessment, and practices in the acupuncture programme.

Govender and Wait (2018) indicate that students' learning outcomes will be improved by practising, which is also considered as 'learning by doing'. The ability to convert theories into practice is crucial for students' clinical competencies (Dicker et al., 2018). This view concurs with Tolsgaard (2012), who reveals that there is a need to ensure students are competent to use CK to analyse problems in the real world. In 2020, the outbreak of the COVID-19 pandemic resulted in the widespread move to online learning, which poses unique challenges for educational programmes that require practical training (Hu, 2022b). However, the researcher believes that online teaching, through modern technologies, may not be able to replace contact classes for practical purposes. To ensure the quality of the acupuncture programme, it is proposed to conduct a combination of online teaching and contact classes (hybrid model). This view is supported by Lalima and Dangwal (2017) and Hu and Venketsamy (2022a), who agree that it is crucial to ensure the effective use of technologies in education.

1.7.2 Explanation of acupuncture

Acupuncture, as one of the modalities of TCM, is performed by inserting needles on specific points of the body, namely acupoints, to treat diseases (Chon & Lee, 2013; Magram & Deng, 2019). In South Africa, Traditional Chinese Medicine is classified as CM, which treats diseases with various interventions, including Chinese herbal medicine, acupuncture, moxibustion, Chinese therapeutic massage, cupping, food therapy and exercise (Hu et al., 2022; Hu & Venketsamy, 2022b). Li et al. (2019) further explain that acupuncture not only focuses on treatments for diseases but also on the prevention of diseases. In the healthcare system, CM professions, such as acupuncture, are recognised as vital in improving public health (WHO, 2019).

Acupuncture has gained increasing attention from the public in children's health due to the low cost and fewer side effects of acupuncture treatment (Moeen, 2016; Saunders & Berry, 2020). Moeen (2016) further articulates that acupuncture contributes to children's health as a nonpharmacological treatment. The researcher contends that the cost-effectiveness and fewer side effects of acupuncture treatment will assist in improving children's health. Therefore, it is necessary to ensure quality acupuncture services through high-quality acupuncture educational programmes. This will further assist in promoting children's health using acupuncture.

To promote acupuncture and patient care, the Allied Health Professions Act has regulated acupuncture practice since 2001 in SA (Hu, 2022a; Regulations in terms of the Allied Health Professions Act 1982, 2001). Even though acupuncture is practised in many African countries, SA is the only country that provides formal acupuncture education programmes for the purpose of training professional acupuncture service providers (Hu et al., 2022). Acupuncture higher education was first introduced in 2003 at the University of Western Cape (UWC) (Traditional & Natural Health Alliance, 2018). However, this institution discontinued all new enrolments as of 2019 (Traditional & Natural Health Alliance, 2018). These authors express that there is a lack of capacity to provide quality acupuncture services to the public in SA. The researcher opines that the historical lack of capacity for providing acupuncture programmes may be the reason for the limited number of practitioners in SA, which impacts

children's health. Subsequently, to ensure public health, particularly children's health, there is a need to offer quality acupuncture education in SA.

1.7.3 Children's health and acupuncture

The World Health Organization (2020a) reveals that children's health is critical as many children die from preventable and treatable diseases. Furthermore, children's health represents unequal development in different countries, and it is particularly critical in Africa (WHO, 2020b). The number of affected children keeps increasing and counts for around 40% of the children in Africa (United Nations Children's Fund [UNICEF] et al., 2019). The researcher avows that South African children also experience critical health issues. This view concurs with Lake et al. (2019), who state that young children in SA are experiencing risks due to many factors such as HIV, malnutrition, and an unhealthy diet. Consequently, there is a need to promote and improve care among children through accessible and affordable services (Landrigan & Miodovnik, 2011).

Singh and Kumar (2017) and WHO (2019) assert that the high healthcare cost worsens the burden of poverty. This is particularly critical in Africa, where poverty is still prevalent (Salmi, 2020). Both general health and the financial burden of medical services will be relieved by attainable and affordable quality acupuncture services (Kwon, 2014). Potential savings on the cost of medical services is an important reason for people to choose acupuncture services (WHO, 2019). These authors agree that there is a need for affordable quality CM services for children. Therefore, the researcher believes that acupuncture, as a form of CM service, will positively contribute to improving children's health in Africa.

Hu et al. (2022) concur with WHO (2019) that there is an increased need for acupuncture worldwide due to its critical role in promoting health. The researcher opines that this is with no exception in SA, mainly due to the vital role of acupuncture in promoting children's health. Gold et al. (2009), Saunders and Berry (2020), and WHO (2003) affirm that acupuncture is widely utilised to treat various medical conditions in children, such as nausea and vomiting, digestive disorders, bedwetting, cerebral palsy, autism spectrum disorder, asthma, and neonatal care. In the researcher's opinion, there is a need for quality acupuncture services

that should be available for young children to improve their health, which may further improve children's development in the world of work in the future.

1.8. CONCEPTUAL FRAMEWORK

A conceptual framework is a theoretical foundation that anchors the phenomenon of the study (Cohen et al., 2018; Maree, 2020). Brynard et al. (2014) indicate that a conceptual framework provides a logical approach to analysing information, which assists in clarifying and constructing the researcher's worldview of a phenomenon. For the purpose of this study, a conceptual framework was used to explore students' experiences with the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health. This conceptual framework, namely the Technological Pedagogical Content Knowledge (TPCK) model, was adapted from Shulman's (1986) PCK model and Mishra and Koehler's (2006) TPACK model.

The TPCK model places much emphasis on CK, PCK, and TCK, which provided an opportunity to analyse students' experiences with the delivery of the acupuncture programme. Shulman (1986) contends that it is a necessity to accommodate a particular subject's CK with various Pedagogical Knowledge (PK) in education (Hu & Venketsamy, 2022a). The reason is that the employment of appropriate PK in teaching and learning will improve students' learning experiences and promote learning outcomes (Pompea & Walker, 2017). Consequently, Shulman (1986) proposed the concept of PCK, which is defined as the knowledge utilised for particular CK to enhance learning outcomes (Kultsum, 2017).

Mishra and Koehler (2006) developed the TPACK model from the PCK model first proposed by Shulman (1986) to understand how to integrate technology in teaching and learning. Bhukuvhani (2018) and Glowatz and O'Brien (2018) agree that the TPACK model is recognised as the most widely used framework when integrating educational strategies and technology into specific modules. According to Mishra and Koehler (2006), there are seven elements in the TPACK model: namely PK, CK, technological knowledge (TK), TCK, PCK, Technological Pedagogical Knowledge (TPK), TPCK, and TPACK. Oner (2020) concurs with Glowatz and O'Brien (2018) that CK, PK, and TK are the basic premises of the TPACK model.

This model presents technology as the third core domain, along with content and pedagogy knowledge (Harris & Phillips, 2018). The TPACK model can be used to analyse various aspects of teaching, learning, and assessment in different contexts, particularly with the high impact of the use of technology (Elas et al., 2019). The researcher believes that the TPCK model provided an opportunity to identify the importance of appropriate CK, PCK, and TCK in the acupuncture programme to ensure students are competent in the real world.

1.9. RESEARCH METHODOLOGY

According to Cohen et al. (2018), research methodology is the bridge that connects the philosophical stance and the research methods. The information in this section further outlines the research methodology that was employed in this study.

1.9.1 Qualitative approach

Qualitative research focuses on interpreting a phenomenon's experiences, meaning, or rich descriptions (Creswell, 2014; Maree, 2020). The interpretive paradigm is an approach used to understand and comprehend the truth and knowledge of the real world through interpreting the researchers' experiences (Hu, 2022a). Qualitative research of a descriptive nature was adopted, and an interpretivist paradigm was employed in this study as the researcher aimed to explore the views and perceptions of participants on the teaching, learning, assessment, and practices of the acupuncture programme at an HEI to improve children's health.

Epistemology is a term used to explain how we know the fact or truth, which focuses on extending the researcher's knowledge or understanding in the field of research (Kiyunja & Kuyini, 2017). Maree (2020) highlights the importance of epistemology since it assists in establishing faith in the data analysis of a study. Kiyunja and Kuyini (2017) and Creswell (2014) further explain that an interpretivist paradigm is a subjectivist epistemology that relies on the researcher's own understanding and comprehension when making sense of data. In this study, the researcher employed a subjectivist epistemology to enable clarity on the interpretation of participants' experiences.

1.9.2 Research design

The research design refers to the process of selecting a project, conducting the research, and ensuring the practicability of the project (Hu, 2022a). A case study method is used to investigate and examine a context over time in one or a few sites and provides in-depth explorations of programmes (Yin, 2018; Venketsamy & Hu, 2022). Cohen et al. (2018) explain that studying a single case will provide a particular in-depth investigation of significant factors of the phenomenon or programme. In this study, a case study design was employed to gain an in-depth understanding of participants' experiences with the teaching, learning, assessment and practices of the acupuncture programme presented at an HEI.

1.9.3 Research setting

The research setting is the environmental context where the study will take place and where the data will be collected (Yin, 2018; Maree, 2020). An HEI in South Africa that provides acupuncture programmes where the researcher had access was selected as the research setting.

1.9.4 Sampling technique

A sampling technique is a process of selecting participants from an entire population, which the study intends to explore (Brynard et al., 2014). This study employed a purposive sampling strategy based on volunteers to identify participants. The researcher selected participants who met the specific need of the study (Hu & Venketsamy, 2022a; Maree, 2012). Cohen et al. (2018) further explain that volunteer sampling may be used in a situation with difficult access to participants, and volunteers can be someone who is attending a course.

The focus of this study was the teaching, learning, assessment, and practices of the acupuncture programme integrated into the CM programme towards the four-year Bachelor Degree of Health Sciences in Complementary Medicine (BHScCM) at the identified HEI. The researcher invited the 2nd, 3rd, and 4th years students who were studying the acupuncture programme to participate in the study by displaying the research invitation poster on the campus (Annexure A). Only those who voluntarily consented to participate in the study were recruited. Ten (10) participants agreed to participate in this study by signing the research consent form (Annexure C).

1.9.5 Data collection procedure

Data collection is a systematic process of gathering information to answer research questions and evaluate outcomes (Hu, 2022b; Maree, 2012). Data collection instruments that were employed to gather data for this study included online text-based interviews, observation, participants' reflective journals, field notes, and documentation. To those who accepted the invitation to participate, the researcher emailed the links to the Google Forms [consent form and online text-based interview questionnaires] (Annexures C & D). Participants were requested to read and sign the research study information letter and the consent forms before participating in this study.

1.9.6 Data analysis

Data analysis is an approach to explaining and interpreting the meaning of raw data from the study to answer research questions (Creswell, 2014; Maree, 2020). Nieuwenhuis (2020) explains that thematic analysis is the process of identifying similar and dissimilar opinions with qualitative data. This will assist the researcher in making sense of the data and identifying important aspects of the research (Cohen et al., 2018). For the purpose of this study, the six-step framework of thematic analysis, proposed by Creswell (2014), was followed (see Figure 1-2 on the next page). The data from different sources were inductively interpreted.

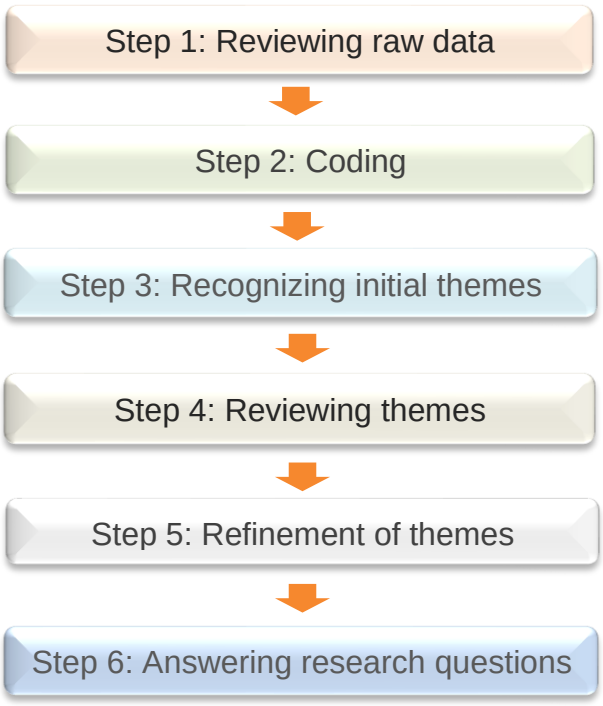


Figure 1-2. An overview of six-step thematic analysis (As adapted from Creswell, 2014)

1.9.7 Role of the researcher

The researcher was responsible for designing questions for the online text-based interviews and preparing and conducting the text-based interviews. In qualitative research, the researcher is considered a research instrument through data collection (Crewell, 2014; Maree, 2012). In this study, the researcher collected and analysed data rigorously to ensure the trustworthiness of the study. The researcher concurs with Cohen et al. (2018: 20) that, in the interpretivist paradigm, the researcher is to “understand and interpret the social world through the eyes of different participants”.

1.9.8 Criteria for qualitative validity

Qualitative validity criteria for all qualitative research studies are credibility, transferability, dependability, and confirmability (Brynard et al., 2014; Yin, 2018). Quality criteria are the specific functions that will be chosen, tested, and measured to ensure that quality objectives are met (Cohen et al., 2018). According to Maree (2020), there are four principles of quality criteria. These are the truth value of the evidence, the applicability of evidence, consistency of evidence, and neutrality of evidence.

The truth value of evidence links to credibility. Credibility is the extent to which the study's findings are trustworthy and believable to other individuals. Applicability of evidence relates to transferability. Transferability is the extent to which the findings can be transferred or applied in different environmental settings. Consistency of evidence links to dependability. Dependability is the extent to which findings are consistent in relation to the settings in which they are created. Lastly, the neutrality of evidence relates to confirmability. Confirmability is the extent to which findings are based on the study's participants and setting instead of the researcher's biases (Maree, 2020).

In this study, the research ensured that these quality criteria were adhered to ensuring the participants were not deceived (truth); the reporting was accurate (credible), and all the information collected from the participants was only shared (transferred) through the dissemination of the thesis and presentations at conferences and workshops.

Triangulation

Triangulation is defined as using multiple sources to analyse the same phenomenon or research topic. It assists in reducing biases from researchers or methodologies, thus, improving the transferability of the findings (Cohen et al., 2018; Yin, 2018). The data collected in this study was triangulated by means of methodological triangulation (see section 4.5.8.1).

1.10 CONTRIBUTION OF THE STUDY

This study will contribute to:

- the improvement of quality teaching, learning, assessment, and practices of an acupuncture programme at HEIs;
- ensuring that the acupuncture programme is delivered through a hybrid model;
- developing strategies that enhance the confidence and competencies of acupuncturists; and
- ensuring that future acupuncture programmes are aligned to international standards while maintaining the requirements as outlined in the South African HEI policies.

1.11 ETHICAL CONSIDERATIONS

Research ethics refers to the moral and legal principles that govern the researcher's behaviour when conducting research (Cohen et al., 2018). The guidelines for research ethics using human participants proposed by Creswell and Poth (2016) were followed in this study.

Ethical approval was obtained before the data collection part of the research. The researcher adhered to the ethical principles of informed consent, rights of privacy, anonymity and confidentiality, and ensured no harm in participating in this study. The researcher also adhered to the Protection of Personal Information Act. No personal information was requested from any participant. Participants were invited through printed and displayed invitation posters (Annexure A) on the walls of classrooms and clinics where students attended their contact classes and practice. Potential participants contacted the researcher via email, and thereafter, the researcher emailed them the link to the research information and informed consent letter (Annexures C). This study was not funded by any organisation or institution. The proposal for this study was subjected to the University of Pretoria's ethics committees: The Faculty of Education Ethics Committee and the Faculty of Health Sciences Research Ethics Committee (Ref: EDU137/21).

1.12 LIMITATION OF THIS STUDY

This study focused on exploring students' experiences with the teaching, learning, assessment, and practices in the acupuncture programme at one identified HEI in the Gauteng Province. Therefore, there were limited comparisons across different contexts. In this study, the researcher followed rigorous strategies to ensure the trustworthiness of the findings. However, the subjective interpretation brought by the interpretivist paradigm was also seen as a limitation.

1.13 OUTLINE OF CHAPTERS

Chapter 1: Introduction and background

This chapter provides an overview of the study, which is inclusive of the purpose of the research, research approach, and methodology. It also provided some explanation of the research process that was followed.

Chapter 2: Literature review

This chapter presents concise explanations and analysis of the existing literature on national and international acupuncture programmes and teaching, learning, assessment, and practices to ensure the quality of the delivery of the programme.

Chapter 3: Conceptual framework

This chapter provides a detailed discussion of the conceptual framework that underpinned this study. The researcher employed the TPCK model, which was developed from Shulman's PCK model and Mishra and Koehler's TPACK model. The TPCK model assisted the researcher in analysing data from this study, focusing on CK, PCK, and TCK in the acupuncture programme.

Chapter 4: Research methodology

This chapter provides comprehensive information on how the data collection methodology fits into the narrative research framework and qualitative research approach. It establishes the correlation between the data collection strategy and the purpose of the inquiry.

Chapter 5: Findings and discussion

Chapter 5 presents an analysis of the data. It focuses on students' views and understanding of acupuncture, and the importance of CK, PCK, and TCK to ensure the quality of the delivery of the acupuncture programme. This study also included challenges in the acupuncture programme at the identified HEI from data analysis.

Chapter 6: Conclusions and recommendations

This chapter presents the conclusions that were gathered from the data. It discusses the possible contribution to knowledge generation, recommendations based on the findings, and the limitations presented.

1.14 SUMMARY

This chapter served as an introduction and orientation for the study as the synopsis. In this chapter, the researcher presented the background, rationale, problem statement, research

questions, and concept clarification. A literature overview, conceptual framework, and research methodology were also considered and briefly explained in this chapter. A brief description of the ethical considerations was presented. Finally, the chapter outline was briefly discussed. In the next chapter, the researcher continues to present a discussion on relevant literature for this study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In chapter 1, the researcher presented the introduction and orientation to the study. This included the background, problem statement, rationale, research questions, aims and objectives, and a brief outline of the research methodology used in this study. This chapter focuses on the literature review. The researcher consulted relevant literature to present a detailed discussion and argument for the importance of teaching, learning, assessment, and practices in an acupuncture programme to improve children's health. The researcher provided a comprehensive explanation of acupuncture and its importance in children's health to support and enhance the teaching, learning, assessment, and practices of the acupuncture programme at an HEI. The discussion is followed by a global perspective of acupuncture and the importance of a well-coordinated acupuncture programme to ensure students are competent to practise acupuncture to improve children's health. Finally, strategies are presented on how to improve the quality of teaching, learning, assessment, and practices of acupuncture programmes to improve children's health.

2.2 EXPLANATION OF ACUPUNCTURE TO IMPROVE CHILDREN'S HEALTH

In this section, the researcher discusses the background of acupuncture and its role in improving children's health.

2.2.1 Explanation of acupuncture as a therapeutic approach

Acupuncture is a component of TCM in which thin needles are inserted into the body to prevent and treat various diseases [see Figure 2-1] (Chon & Lee, 2013; Hu & Venketsamy, 2022b). It adopts multiple philosophical theories to analyse human health, such as the theory of yin and yang, the theory of five elements, and the theory of essence and qi (Jiang et al., 2016). Acupuncture is widely accepted as a healthcare service that benefits children's health. Li et al. (2019) and Xue et al. (2015) reveal an increasing global demand for acupuncture services for several reasons, such as efficacy and cost-effectiveness. Positive experiences

also contribute to the acceptance of acupuncture services (Shumer et al., 2016). To ensure the quality and safe practice of acupuncture services, many countries develop regulations to promote acupuncture in their counties, including the People's Republic of China (PRC), Australia, Canada, the United Kingdom (UK), the United States of America (USA), and Italy (Xue et al., 2015; WHO, 2019).

Figure 2-1. Acupuncture treatment

In SA, acupuncture is classified as a 'scarce skill' because of the limited number of acupuncturists in this country (AHPCSA, 2022a; Hu et al., 2022). According to the AHPCSA (2022b; 2022c), there were 207 acupuncturists in SA up until 2021, 156 of whom were registered as Chinese medicine and acupuncture practitioners. In other words, there are only approximately 200 qualified acupuncture service providers in the entire country. The researcher believes that the limited number of acupuncturists in SA has significantly disadvantaged children's health since acupuncture plays a critical role in promoting children's health.

2.2.2 Importance of acupuncture to improve children's health

The health and well-being of children are important because they are the future of society. This view concurs with the Constitution of the Republic of South Africa, which enshrines every child the right to appropriate healthcare (Doolan & Came, 2020). The researcher agrees that many children die from preventable and treatable diseases due to the lack of appropriate healthcare services and the high cost of healthcare services. According to the WHO (2020a), an estimated 5.2 million children died in 2019 globally due to the lack of attainable and

affordable health care services. Children's health is particularly critical in Africa since poverty and rurality are still prevalent in African countries. Africa contributes the highest child mortality rate, with 52% of deaths in children under the age of five (WHO, 2020b). WHO (2020a) agrees with Landrigan and Miodovnik (2011) that there is an urgent need for quality and alternative treatment for optimising children's health.

Acupuncture, as a form of alternative treatment, is widely used for children with confirmed efficacy and few adverse effects for various medical conditions. Moeen (2016) and Saunders and Berry (2020) affirm that acupuncture is suggested for use in children to treat nausea and vomiting, digestive disorders, bedwetting, cerebral palsy, autism spectrum disorder, asthma, and neonatal care. Moeen (2016) further highlights that as a nonpharmacological treatment, acupuncture contributes to children's physical and emotional health due to its efficacy. Gold et al. (2009) report that acupuncture can effectively treat chronic pain, paediatric migraine, procedural stress, enuresis, constipation, epilepsy, allergies, neurologic disability, laryngospasm, postoperative vomiting, and cancer-related conditions. These authors agree that acupuncture plays a crucial role in promoting children's health, as evidenced by its efficacy in various diseases. He et al. (2013) and WHO (2003) further state that a wide range of conditions can be treated using acupuncture with evidence from controlled clinical trials. These conditions include paediatric disorders, pain, infections, neurological disorders, respiratory disorders, digestive disorders, blood disorders, urogenital disorders, gynaecological and obstetric disorders, cardiovascular disorders, psychiatric disorders and mental disturbances, disorders of the sense organs, skin diseases, and cancers. The researcher contends that it is significant to ensure that acupuncture services are attainable and affordable to children due to their crucial role in promoting children's health.

Landrigan and Miodovnik (2011) reveal an increase in childhood chronic diseases because of the absence of appropriate healthcare services and poverty. The number of affected children keeps increasing and counts for around 40% of the children in Africa (UNICEF et al., 2019). Singh (2016) points out that the Sustainable Development Goals (2016-2030) emphasise maintaining optimal children's health to address the critical health issue among children. The researcher believes there is a need for quality and affordable treatment to

improve children's health. Tosuncuoglu (2018) concurs with Mellor (2014) that the cost-effectiveness of administering an acupuncture treatment will benefit children's health.

Since Africa is undergoing a severe financial crisis, the cost-effectiveness and the efficacy of a reliable treatment will become an optimal option for most parents. Potential savings on the cost of medical services is an important reason for people to choose acupuncture services (WHO, 2019). Singh and Kumar (2017) and WHO (2019) concur that the high healthcare cost impels the already poverty-stricken families in Africa. The researcher opines that effective acupuncture treatment will improve the general health of young children, and the financial burden of medical services will be minimised. Sav et al. (2015) agree that reducing the financial burden of medical services may optimise health outcomes. These authors agree that acupuncture will positively contribute to improving children's health due to its efficacy and cost-effectiveness.

The right to health is a fundamental human right for all individuals entrenched in the Constitution of the Republic of South Africa (Dhai & Mahomed, 2018; Doolan & Came, 2020). However, Amzat and Razum (2018) believe that due to the inaccessibility of health services, lack of qualified health practitioners, and the high cost of medical treatment, many young children in SA are not privileged in their right to health as enshrined in the Constitution of the Republic of South Africa. Lake et al. (2019) agree that all children should be able to access quality healthcare services, including acupuncture. These authors affirm that the lack of healthcare providers has disadvantaged children's health, which further results in the high mortality rate of children (WHO, 2020a; WHO, 2020b). The researcher believes that the attainability of acupuncture services is pertinent in ensuring the entitlement of a part of children's right to health.

Subsequently, the researcher contends that there is a need to improve the capacity of training acupuncture service providers through quality acupuncture educational programmes. Maphumulo and Bhengu (2019) reveal that there is a challenge in the increased need for quality medical services and the shortage of healthcare service providers. One of the most critical levers is ensuring that there is appropriate capacity and competencies within the field of acupuncture service. There is a need for training institutions to provide high-quality

teaching, learning, assessment, and practices of acupuncture programmes; because the quality of acupuncture services relies on the excellent quality of acupuncture educational programmes.

2.3 GLOBAL PERSPECTIVES OF ACUPUNCTURE PROGRAMMES

Acupuncture is gaining recognition across the globe. The section presents a global perspective of acupuncture programmes focusing on the following countries: PRC, Australia and SA.

Scholars, such as Lim et al. (2015), acknowledge the importance of acupuncture in improving children's health due to its effectiveness and cost-effectiveness. Evidence of the global development of acupuncture can be found in the field of education, enhancing the capacity of training acupuncture service providers. Xue et al. (2015) report that the PRC, UK, Canada, and Malaysia have offered acupuncture programmes to provide professional acupuncture education to train acupuncturists to improve their population's health and well-being. In PRC, qualifications in acupuncture are provided in TCM universities, western medical universities, and comprehensive universities, all of which are public higher education institutions (Lim et al., 2015). Kim (2017) further states that more than ten private higher education institutions offer acupuncture programmes at Bachelor or Diploma levels in Malaysia to achieve the need for alternative health care services in their countries.

The first guideline on acupuncture training was published in 1999 by the WHO to ensure the quality of acupuncture services to the public (Janz & Adams, 2011; WHO, 2020c). In 2020, the WHO published a second set of guidelines for acupuncture to promote continuous improvement in acupuncture education and practice (WHO, 2020c). The reason cited by WHO for the second publication was to ensure that acupuncture professional education is recognised internationally by providing high-quality training criteria. The researcher contends the acceptance of international standards for training acupuncturists will further ensure the quality of acupuncture services, which will benefit children's health. This view concurs with Flesch (2013) and Lim et al. (2015), who agree that the professionalisation by professional education of acupuncture contributes to the increasing acceptance of acupuncture. In the

updated guideline, a minimum of 1568 hours is recommended for full training in acupuncture to ensure students acquire adequate CK in the field of acupuncture. The core modules include knowledge of TCM, acupuncture, conventional medicine, and other relevant areas, such as laws, regulations, and ethics. According to WHO (2020c), a minimum of 400 clinical hours is required for entry-level acupuncture training due to the critical role of clinical training in acupuncture in ensuring students' competencies.

It is of great importance that students receive good quality training to ensure their competencies in promoting children's health. WHO (2020c) proposes that acupuncture service providers at the entry level should acquire knowledge in the following four categories. Firstly, they must be able to discuss the history of acupuncture, and they should understand meridians and acupoints. They should also be able to demonstrate various needling techniques and prescribe and perform acupuncture treatment. Secondly, acupuncturists should understand the fundamental theories of TCM, such as the theory of yin and yang, the theory of five elements, the theory of essence and qi, and diagnostic methods. Thirdly, knowledge of biomedicine is essential, including anatomy, physiology and biochemistry of the human body; basic understanding of diagnostic procedures, their uses and limitations from a conventional medical perspective; and hygiene and patient safety principles. Lastly, practitioners should comprehend laws and regulations related to acupuncture practise, ethical considerations, and professionalism.

Since the WHO acknowledged qualifications in acupuncture, which has gained international recognition, HEIs in PRC, Australia, and SA recognised the value of acupuncture treatment and the need for quality acupuncture programmes to train students. For this reason, universities in these countries have included renowned higher education qualifications in acupuncture. The researcher understands that to ensure the quality of acupuncture education, many countries develop more detailed standards and criteria for acupuncture programmes in higher education.

2.3.1 People's Republic of China

The People's Republic of China is the forerunner of acupuncture treatment. Since time immemorial, PRC has focused much of its treatment of patients with acupuncture. Jiang et al. (2016) explain that acupuncture has been continuously practised since 475 BC, significantly promoting the Chinese nation's health for thousands of years till today. Due to its efficacy and cost-effectiveness, acupuncture is integrated into the Chinese national healthcare system, serving as a crucial medical practice to improve public health.

In 1954, the Nanjing University of Chinese Medicine (NJUCM), a public university, started to provide acupuncture programmes symbolising the beginning of acupuncture in higher education in the PRC (Lim et al., 2015; Wang et al., 2021). Currently, there are 43 TCM public HEIs and another 215 tertiary institutions that provide acupuncture programmes in the PRC (Xue et al., 2015). Wang et al. (2021) further state that there is an increasing trend of providing TCM subjects, including acupuncture in western medicine and non-medical universities. The researcher asserts that the PRC government acknowledges the significant role of TCM (including acupuncture) in promoting public health, including children's health.

Consequently, the PRC government developed various TCM and acupuncture programmes in HEIs to promote the training capacity of acupuncture service providers. For example, undergraduate programmes generally consist of five years, while Master's and Doctoral programmes are three years each. There are also seven-year and nine-year TCM programmes that integrate undergraduate and masters or doctoral study (FJTCM, 2018; Xue et al., 2015). In the first year of the seven- or nine-year programmes, students will study at a comprehensive university and relocate to a TCM university during the second to fourth years of study. At the end of the fourth year, students must participate in an entrance examination, determining their eligibility for further enrolment into the masters or doctoral programmes. All successful graduates must pass the Chinese National Board Examination for Chinese Medicine and Acupuncture before being registered as TCM practitioners, which allows them to practise acupuncture.

Therefore, all universities must follow the same standard and curricula for acupuncture education. According to the Bachelor of Acupuncture and Moxibustion curriculum plan from the FJTCM, students must obtain 260 credits over five years, which equals 4160 notional

hours (FJTCM, 2018). The theoretical study contributes 200 credits (3224 notional hours), of which 72.5% (2336) notional hours directly relates to acupuncture professional content. This comprises both TCM content knowledge and biomedicine. The remaining 27.5% (888) of notional hours of credits are from the study of Liberal Arts Education, which refers to the knowledge of humanities, social sciences, natural sciences, and formal sciences (Yang, 2021). Additional to the credits mentioned above, there are 60 compulsory credits for clinical practice in the form of eight weeks of clinical observation and 50 weeks of internship in hospitals. Thereafter, successful graduates will be eligible to participate in the Chinese National Board Examination.

The researcher believes that the high requirements for acupuncture training, reflected in the extensive hours of study, ensure students acquire substantial CK for their competencies in clinical practice. Lim et al. (2015) and Xue et al. (2015) concur that studying the development of acupuncture education in the PRC is very important because international acupuncture educational programmes are significantly influenced by the PRC, where acupuncture originates. With the acceptance and need for acupuncture services globally, many countries absorb and contextualise acupuncture programmes in their educational framework at higher education levels (Brosnan et al., 2016).

2.3.2 Australia

Acupuncture is one of the most popular treatments in Australia as a form of complementary medicine (Xue et al., 2009). Xue et al. (2009) reported that there were over ten million visits to acupuncturists annually. Zheng (2014) further reveals that medical practitioners referred 70-80% of these visits as primary care. The researcher avows that medical practitioners acknowledge limitations in conventional medicine; therefore, they recommend acupuncture as an alternative treatment to maintain health. This view concurs with Zheng (2014), who reports that most medical practitioners in Australia agree that acupuncture is effective and safe for primary care.

The Australian government also recognise the importance of acupuncture and its value as an alternative form of treatment in promoting public health. In 2000, acupuncture became a

registered healthcare profession in Australia after adopting the Chinese Medicine Registration Act 2000 (CMRA) in the State of Victoria (Fang & Wang, 2019; Janz & Adams, 2011). The researcher believes that adopting the CMRA significantly consolidates the support for acupuncture development in Australia from a policy perspective. However, Fang and Wang (2019) point out that there were no national acupuncture curricula in Australia. The researcher is of the opinion that there is a need to develop standardised criteria for acupuncture training to ensure all students receive adequate training and are competent before commencing in the working world. The standardisation process will eliminate unprofessional acupuncture treatment, especially by medical doctors, chiropractors, and podiatrists who are allowed to practice acupuncture (Janz & Adams, 2011; Xue et al., 2015). This view concurs with WHO (2013; 2020c), which promotes the international standards of TCM training to ensure all professionals are competent before entering the acupuncture field.

Acupuncture rapidly gained recognition in Australia, despite the lack of national standardised curricula. Australian universities acknowledged the need to collaborate with Chinese medical universities in the PRC to benchmark the international standards of acupuncture training. This collaboration and partnership with China allowed Australian HEIs to develop their TCM programmes according to the standards of the PRC (Fang & Wang, 2019). One example is the Royal Melbourne Institute of Technology, which implemented a five-year undergraduate programme based on the syllabus from NJUCM, PRC. In this programme, 50-65% of courses are in TCM, and 35-40% are in biomedicine. Due to the lack of national educational standards for acupuncture, the Chinese Medicine Registration Board of Victoria (CMRBV) proposed an accreditation standard for Chinese medicine and acupuncture in Victoria (Brosnan et al., 2016; Janz & Adams, 2011).

An accreditation standard refers to criteria used to assess the quality of education, ensuring that the programme provides adequate knowledge, skills, and professional attributes to practise the profession (Chinese Medicine Board of Australia, 2012). According to this standard, a minimum of four years of full-time study with at least 500-800 hours of clinical training for entry-level Chinese Medicine and acupuncture registration is required (Brosnan et al., 2016). Furthermore, according to the accreditation standard, substantial courses must

be conducted in contact classes. At the Western Sydney University (WSU), the Bachelor of TCM programme is accredited for registering acupuncturists, Chinese Herbal Medicine Practitioners, and Chinese Herbal Dispensers (WSU, 2019). It consists of a duration of four years with 320 credits. The syllabus includes both TCM and biomedicine.

2.3.3 South Africa

The South African government recognised the importance of acupuncture in promoting public health. Therefore, in 2001, the South African Minister of Health adopted the Regulations in terms of the Allied Health Professions Act, 1982 (2001) to regulate acupuncture education and practice to promote public health (AHPCSA, 2020). According to the Regulations in terms of the Allied Health Professions Act, 1982 (2001), a three-year diploma in acupuncture followed by an internship is a minimum qualification requirement for the registration of acupuncturists. However, this regulation does not specify the required duration of the internship. The minimum curriculum requirement was further stated in the Act, which were listed as follows: (i) anatomy; (ii) biochemistry; (iii) botany; (iv) chemistry; (v) electro-stimulation; (vi) evaluation and treatment of myofascial pain syndromes; (vii) moxibustion; (viii) needling techniques; (ix) neuroscience; (x) pathology; (xi) pain research; (xii) physics; (xiii) physiology; (xiv) psychology; (xv) theory of myofascial pain syndromes; and (xvi) zoology; and the ancillary subjects of - (i) emergency care; (ii) ethics and jurisprudence; and (iii) practice management.

In alignment with the Regulations in terms of the Allied Health Professions Act, 1982 (2001), TCM (including acupuncture) higher education was first introduced at the UWC in 2003 (Traditional & Natural Health Alliance, 2018). This was a five-year double bachelor's degree programme which consisted of 420 credits (UWC, 2021). This programme consisted of two separate degrees: The Bachelor of Science Degree (Complementary Health Sciences) and the Bachelor of Complementary Medicine Degree in Chinese Medicine and Acupuncture. The Bachelor of Science Degree was designed for three years, followed by the Bachelor of Complementary Medicine Degree in Chinese Medicine and Acupuncture, which was completed over two years. The core curricula focused on both TCM and biomedicine content (UWC, 2021). However, this institution has discontinued all new enrolments as of 2019

because of the failure to satisfy the quality evaluation (Traditional & Natural Health Alliance, 2018). In 2019, the University of Johannesburg (UJ) started offering an acupuncture programme as an integrated part of the BHScCM programme (UJ, 2021). Another acupuncture postgraduate programme, the Postgraduate Diploma in Acupuncture, is offered since 2021 (UJ, 2021).

The BHScCM is a four-year, full-time course with a total of 480 credits (one credit equals ten notional hours) offering training in acupuncture therapeutics with the choice of electives in other complementary medicine modalities. According to the South African Council on Higher Education [CHE] (2011), a professional bachelor's degree aims at preparing graduates for professional training, postgraduate studies or professional practice in a wide range of careers. The BHScCM programme was designed in consultation with the AHPCSA, which was in alignment with the requirement of CHE (2011). A minimum of 480 credits is required for this degree. This programme comprises theoretical and practical content in acupuncture and biomedicine. Students are required to participate in no less than 370 notional hours of clinical practice to undertake the requirement in this programme. Table 2-1 provides a comparison of the core CK of acupuncture programmes to ensure students acquire adequate knowledge and skills for acupuncture clinical practice, according to the recommendations from WHO, FJTCM, and a South African HEI.

Content	Descriptions	WHO (Hours)	FJTCM (Hours)	South African HEI (Hours)
The history of Chinese Medicine	The comprehensive Chinese Medicine history is introduced.	16	32	10
The Basic Theory of Chinese Medicine	Various theories in Chinese Medicine are explained.	96	80	80
The Diagnostics of Chinese Medicine	The key diagnostic techniques are explained, including inspection, listening and smelling, inquiry and pulse diagnosis.	96	80	80

	Various syndrome differentiation methods are explicit.			
General Introduction to Chinese Materia Medica	Knowledge of Chinese Materia Medica is introduced briefly.	-	80	4
General Introduction to Chinese Medicinal Formulas	Knowledge of Chinese Medicinal Formulas is introduced briefly.	-	80	4
Acupoints and Meridians	Extensive knowledge of acupoints and meridians, as well as different needling techniques, are explained	128 (Locations & indications) 128 (needling techniques)	176	165
Therapeutics of Acupuncture and Moxibustion I	The definition, aetiology, symptoms and signs, treatment principles and treatment plans of various diseases are explained, including gynaecology, paediatrics, dermatology and internal medicine.	208	304	48
Therapeutics of Acupuncture and Moxibustion II	The definition, aetiology, symptoms and signs, treatment principles and treatment plans of various diseases are explained, including gynaecology, paediatrics, dermatology and internal medicine.	-	-	112
Guideline for sterilization and disinfection	Guideline for the sterilisation and disinfection is introduced briefly	-	-	2
General Introduction to Chinese Medicine	Knowledge of Chinese Medicine Food Therapy is introduced.	-	Elective	4

Food Therapy				
The Legal Framework of Acupuncture in South Africa and Code of Ethics	The legal framework of acupuncture in South Africa and code of ethics are discussed.	80	48	10
Clinical Practice 1	Students are required to see 120 patients under supervision, including a minimum of 40 new patients and ten follow-up patients. The rest of the case can be calculated in the form of case presentation or clinical observation.	400	960 (Internship)	240
Qigong exercises	The Qigong exercise is introduced	-	48	2
Total hours		896	1888	761

Table 2-1. Comparison of core content knowledge of acupuncture programmes among WHO, FJTCM and a South African HEI (FJTCM, 2018; Gower & Hu, 2021; Hu, 2021; Pellow et al., 2021; Razlog, 2021; WHO, 2020c).

In this section, the researcher consulted international and national standards of acupuncture higher education with a particular focus on the entry-level. Multiple requirements for acupuncture education are proposed and implemented in different contexts. In this study, the researcher focused on teaching, learning, assessment, and practices of the acupuncture programme to improve children's health in the South African context. Therefore, there was a need to acquire an in-depth perception of the current acupuncture education in SA. This view concurs with Brosnan et al. (2016), who highlight the importance of studying the contextualised experience of acupuncture programmes to adapt to particular contexts.

The researcher contends that both the appropriate design and the effective delivery of the programme are fundamental for the success of an acupuncture programme to improve

children's health in SA. This view agrees with McCowan (2018) and Miguel and Mark (2018), who state that education quality has gained increasing concerns globally, especially in developing countries, owing to the degradation of educational quality. Therefore, the researcher further presents a critical review on the importance and challenges in teaching, learning, assessment, and practices and strategies to strengthen the delivery of the acupuncture programme to improve children's health.

2.4 IMPORTANCE OF TEACHING, LEARNING, ASSESSMENT AND PRACTICES OF AN ACUPUNCTURE PROGRAMME

In this section, the researcher provides a detailed discussion on the importance of teaching, learning, assessment, and practices of an acupuncture programme.

Acupuncture is a specialised skill in health sciences; therefore, the demands for quality teaching, learning, assessment, and practices cannot be underestimated. The researcher concurs with Hénard and Roseveare (2012) and Ludigo et al. (2019) that HEIs are obligated to deliver quality acupuncture programmes to ensure students are competent and confident in administering acupuncture treatment to improve children's health. Govender and Wait (2018) and Pournara et al. (2015) argue that to ensure good quality education and competencies, it is crucial for effective teaching, learning, and assessments to be implemented in all higher education programmes. The researcher believes that the quality of teaching, learning, assessment, and practice will prepare students with the necessary KSVA in the acupuncture programme.

2.4.1 Teaching

Teaching is the deliberate intervention of an adult in the life of students to lead them into responsible, accountable adulthood with a focus on achieving the desired learning outcomes (Gallie & Keevy, 2014). It is a process of transmitting knowledge, skills, and understanding from a knowledgeable other to a student or learner in a particular field of study (Ko et al., 2014; Rajagopalan, 2019). The researcher believes that teaching is a systematic and organised presentation of CK in the acupuncture programme.

Devlin and Sammarawickrema (2010) agree that effective teaching is goal-orientated and is focused on achieving the desired learning outcomes. Therefore, it can be argued that effective teaching refers to goal-oriented teaching and learning for learning success. Bhowmik et al. (2013) and Gallie and Keevy (2014) agree that effective teaching refers to teaching that successfully assists students in achieving specific learning outcomes. Therefore, the researcher opines that effective teaching emerges from a vision for teaching and learning that comprises policies and educational goals. There are three components in the teaching-learning situation: the educator (lecturer), the student, and the teaching content. These components cannot be separated since they are interrelated to ensure the successful achievements of the learning outcomes (Venketsamy, 2000).

Rajagopalan (2019) further states that effective teaching is an essential element in ensuring an educational programme's quality. In this study, the quality of the acupuncture programme is evidenced in students' competencies in acupuncture clinical practice to improve children's health. Venketsamy (2000) argues that since effective teaching focuses on achieving learning outcomes, there is a need to have criteria to evaluate the effectiveness of the outcomes. These criteria can be the objectives of education, especially the subject, module or programme of teaching and learning. Lumpkin (2020) and Rajagopalan (2019) agree that lecturer effectiveness is a crucial element for quality teaching at HEIs. Consequently, it is important to understand what lecturer effectiveness is and the fundamental dimensions of lecturer effectiveness towards ensuring quality teaching and learning at HEIs.

Scholars, such as Ko et al. (2014), express various views on lecturer effectiveness owing to the different contexts in which they teach. Killion and Hirsh (2011) indicate that lecturer effectiveness refers to promoting students' learning outcomes, with a particular focus on lecturers' behaviours and the teaching process. As suggested by Hénard and Roseveare (2012), there are some shared characteristics of lecturer effectiveness. They agree that effective lecturers should share a clear understanding of instructional goals, adequate CK of the education programme, and pedagogical knowledge of how to deliver the content knowledge effectively to promote and ensure quality teaching (Goe et al., 2008; Ko et al., 2014). These authors further state that effective lecturers should acquire adequate CK and

pedagogical skills to deliver their learning content in a manner their students comprehend and understand (Venketsamy & Sibanda, 2021). They should have clear learning objectives and good skills, such as planning, time management, and articulation of content. The researcher avows that effective lecturers are of profound importance because their content knowledge of the subject (acupuncture) and pedagogical skills will significantly influence students' learning in the acupuncture programme.

In their study, Kember and McNaught (2007, as cited in Devlin & Samarawickrema, 2010) summarise ten principles of effective teaching strategy involving sixty-two experts in the educational field worldwide. They are:

- Teaching and curriculum design must be focused on achieving students' future needs, such as critical thinking, teamwork, and communication skills;
- Students must acquire an in-depth understanding of concepts in particular programmes or fields;
- Contextualised examples from real-life should be utilised in teaching to explain the application of theories into practice;
- Misconceptions must be corrected even challenging student beliefs;
- Various pedagogical approaches must be employed in teaching to meet the specific needs to optimise learning outcomes;
- Individual students should be encouraged to actively engage in teaching and learning;
- Educators should present their enthusiasm in the particular field by providing interesting, enjoyable, and active classes;
- Curriculum design should ensure that aims, concepts, learning activities, and assessments are consistent with achieving learning outcomes related to future student needs;
- Each lesson must be thoroughly planned but flexible so that necessary adaptations may be made based on feedback during the class; and
- Assessment must be consistent with the desired learning outcomes and should, therefore, be authentic tasks for the discipline or profession.

The researcher agrees that the promotion of quality teaching depends on multiple elements, which significantly contribute to lecturer effectiveness. However, this effectiveness refers to different perspectives; for instance, Emmanouil et al. (2014) focus on lectures' roles regarding the management in the educational system. The South African Department of Education (2000) and the United Kingdom Department of Education (2010) argue that there are other responsibilities of lecturers that may contribute to the effectiveness of teaching, such as lecturers' leadership roles, administrative roles, and their professional development. In this study, lecturer effectiveness focuses on the lecturers' pedagogical role and their abilities to present the acupuncture programme to promote students' competencies to improve children's health. The reason is that this study aimed at exploring the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health, rather than lecturers' personal development or their roles from a management perspective.

2.4.2 Learning

Learning refers to acquiring knowledge, skills, and attitudes that result in behavioural changes (Bacanli, 2016; Schunk, 2012). According to Bacanli (2016) and Venketsamy (2000), learning involves a change of behaviour as a result of what an individual has experienced, and this becomes observable in the way the individual thinks (cognitive) and acts (psychomotor) or feels (affective). Successful learning is only possible if there is educative intervention by the educator. Educative intervention must be deliberate and purposeful, and it must be guided by certain norms and values. This intervention implies action on the part of the educator, and the educator's behaviour should reveal either approval or disapproval of the learner's (student's) action (Venketsamy, 2000).

Effective learning has gained increased attention from scholars in the educational field nationally and internationally. Jeyaraj (2019) and Watkins et al. (2002) point out that effective learning focuses on transferring CK with students' active involvement and successful application of that knowledge in the real world. Govender and Wait (2018) and Pournara et al. (2015) opine that adequate CK is crucial to improving teaching and learning. These authors agree that students should be competent in applying their knowledge in the working world through practical learning. To improve the acupuncture programme's learning,

Gardner's multiple intelligence framework will cater for and accommodate students' different learning styles. This framework is discussed in detail in section 2.6.1.4.

2.4.3 Assessment

Assessment refers to the processes to promote students' learning, measure students' knowledge and understanding, and evaluate students' competencies in programmes. This study focuses on an acupuncture programme to improve children's health in the working world. Khan (2012) acknowledges the importance of assessment in enhancing students' learning. He agrees that assessment will clarify the goals of the study and report on students' learning progress, and it will reflect on the quality of teaching (Liljedahl, 2010; Stăncescu & Drăghicescu, 2017). According to Umar (2018) and Yambi (2018), assessment refers to the activities teachers and students undertake to get information that can be used to improve teaching and learning.

Amua-Sekyi (2016) further points out that assessment plays several crucial roles in education. For example, assessment facilitates measuring students' achievement in a programme, which ensures that successful graduates meet specific learning outcomes in a particular programme (Yambi, 2018). Khan (2012) agrees with Black and William (1998) that assessment is a practical approach to enhance learning and identify gaps and challenges in the students' understanding and application of the content. The researcher believes that the ultimate goal of all assessments is improving students' learning and strengthening their learning outcomes for application in the real world. The researcher avows that assessment should be used effectively to promote students' learning process and investigate students' achievements to strengthen the teaching and learning of the acupuncture programme. Furthermore, assessment should provide an opportunity for students to self-reflect on their competencies and skills to meet learning outcomes in the acupuncture programmes.

2.4.4 Practice

Practice is of pertinent importance to ensure the high quality of an educational programme in healthcare fields since it further assures the optimal outcomes and safety of the patients. Jesse (2016) explains that practice is the actual application or the use of an idea, belief or

method to improve or rehearse a behaviour. In the acupuncture programme, students can practise or engage collaboratively, allowing them to apply theory to practice (practicum). According to WHO (2013), HEIs, which provide education in Health Sciences, should focus on increasing the number of professionals while ensuring their competencies to address the population's health needs, including children's health.

Similarly, Tolsgaard (2012) reveals that much time is dedicated to ensuring sufficient clinical skills in clinical training, which is reflected as measurable actions performed by healthcare providers to improve patient care. Novice students require close supervision to apply their theoretical knowledge effectively and safely develop their clinical skills, which in turn requires clinical instructors to possess abilities in teaching and clinical practice (WHO, 2013). Consequently, clinical instructors should be competent in introducing CK, demonstrating practical skills, and consulting patients in the working world.

2.5 CHALLENGES IN EFFECTIVE DELIVERY OF THE PROGRAMME TO IMPROVE CHILDREN'S HEALTH

In this section, the researcher presents a discussion on challenges that influence the teaching, learning, assessment, and practices of the acupuncture programme.

2.5.1 Inappropriate content and pedagogical content knowledge

The researcher believes that not all lecturers can translate what they have learned in their respective programmes and practice it in teaching activities. Kasim and Abdurajak (2018) reveal that some lecturers are incompetent to teach effectively, negatively affecting the quality of education. Lecturers experience issues such as lack of experience and confidence, difficulty applying effective pedagogical approaches in teaching, and inability to evaluate students in practice (Cakmak, 2013; Goh, 2013). Govender and Wait (2018) state that lecturers' CK is crucial to ensure their confidence in teaching and learning. Furthermore, Eteläpelto et al. (2015) and Hu et al. (2022) argue that there is a need to enhance lecturers' PCK to promote effective teaching and improve learning outcomes. Subsequently, the researcher believes that there is an urgent need to ensure lecturers' competency in teaching and learning in the acupuncture programme. Lecturers should acquire adequate CK of the

programme and be able to apply various pedagogical approaches for a specific need in teaching activities.

So et al. (2019) concur with Munroe et al. (2016) that post-simulation debriefing between instructors and students is of great importance for students to gain an in-depth understanding of the topic presented. The researcher opines that this will require clinical instructors to acquire adequate CK and PK to effectively deliver clinical simulation activities. This view is further supported by Motola et al. (2013). Motola et al. (2013) emphasise the importance of instructors' knowledge of specific content to provide feedback to students during the debriefing after clinical simulation. Munroe et al. (2016) further point out that clinical simulation may increase anxiety among instructors and students if clinical instructors possess inadequate content knowledge. The lack of CK in clinical instructors also results in the deficiency of implementation of the Socratic method in debriefing (Boghossian, 2012). Delić and Bećirović (2016) indicate that the Socratic method of questioning is an effective technique to develop student's critical thinking by analysing and exploring given text. In the Socratic questioning method, lecturers do not provide students with all the necessary information, and students will need to explore the information by themselves.

Nabolsi et al. (2012) explain that training in health sciences consists of theoretical and practical components (content and pedagogical content knowledge). Jamshidi et al. (2016) emphasise students' competencies in clinical practice to ensure that they (students) are competent, confident, and capable of performing their clinical duties with the support of their lecturers. The researcher avows that it is crucial for students to possess appropriate clinical experience by attending sufficient and adequate clinical training. This view concurs with Kane et al. (2021) and Roberts et al. (2019), who emphasise the importance of clinical experience and engagement with competent clinicians. They report that there are barriers to clinical training, such as unclear learning outcomes for the clinical training, lack of time to teach students, and students' lack of essential content knowledge that is required in clinical practice. The researcher believes the lack of clinical experience significantly affects students' competencies to improve children's health. The limited time in the acupuncture programme also inevitably results in students' lack of clinical experience (CHE, 2011; UJ, 2021).

2.5.2 Lack of technological competencies

'Digital inequality' is an actual situation in the world, which means that not all students have internet access and acquire computer skills. Technological competencies in this study include computer skills, infrastructure, and resources. The outbreak of the COVID-19 pandemic has significantly impacted education in HEIs. Rashid and Yadav (2020) and Salmi (2020) state that the pandemic greatly affected both developed and developing countries. Although many HEIs have tried to implement online learning programmes, most programmes are still delivered face-to-face (European University Association [EUA], 2020). Hu and Venketsamy (2022a) and Mpungose (2020) highlight that education in HEIs has been transformed to accommodate Emergency Remote Education (ERE) due to the impact of the pandemic. Emergency remote education is defined as the urgent but temporary adjustment to an alternative mode of delivery in education (Hu et al., 2022).

The sudden adoption of ERE places challenges on both academic staff and students. This view concurs with Paideya (2020), who reports that more than half of academic staff had never taught online before the pandemic, from studies conducted in the United Kingdom, the United States, and Ireland. According to Mpungose (2020), most universities in SA conduct face-to-face teaching and learning with minimal online or virtual teaching and learning. Paideya (2020) agrees with Scott (2020) that the shift to ERE may be overwhelming, resulting in anxiety and uncertainty among students. Different forms of online learning have been proposed to adapt to the changes due to the pandemic (Aristovnik et al., 2020). Aristovnik et al. (2020) found that students have expressed negative experiences with ERE, for instance, lack of devices, computer skills and focus during online learning.

Thaba-Nkadimene (2020) further asserts that infrastructure plays a critical role in ensuring distance study; however, SA is still experiencing poor infrastructure in many regions. Students face challenges with online teaching and learning, especially students who are more comfortable and confident with face-to-face lectures (Marinoni et al., 2020). The researcher believes that this challenge is particularly critical among African universities. The reason being is that most African universities have poor infrastructure and lack appropriate resources due to the high poverty rate (Salmi, 2020). Very few African universities are well-equipped to conduct academic activities online. Therefore, the researcher is of the opinion that the outbreak of COVID-19 places new challenges on the teaching and learning of acupuncture in SA.

2.5.3 Absence of knowledge and understanding of assessment techniques

Assessment is vital to the education process. The researcher contends that assessment should be utilised effectively to promote students' learning process and investigate students' achievement. In education, the most popular assessments are summative (Yambi, 2018). Summative assessment, as defined by Earl (2006) and Yambi (2018), refers to an assessment taking place at the end of an educational activity. The primary purpose of summative assessment is to measure students' overall performance by summarising students' achievements (Umar, 2018). It often takes the form of examinations or tests and is referred to as the assessment of learning (Amua-Sekyi, 2016). However, Umar (2018) criticises that summative assessment does not offer appropriate and timely feedback to students during the learning process since it only takes place at the end of a module. It fails to identify students' competencies after a period of learning (Yambi, 2018). The researcher concurs with Amua-Sekyi (2016) and Umar (2018) that various appropriate assessment approaches should be explored to assess and evaluate students' learning.

2.5.4 Paucity of interprofessional collaboration

Scholars acknowledge the importance of Interprofessional Education (IPE) in the field of health sciences. Interprofessional education refers to the integration of two or more healthcare professions in learning activities for the purpose of strengthening healthcare outcomes (see Figure 2-2) (Kitto et al., 2013; Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria [PACCARB], 2021). PACCARB (2021) points out that there is a lack of shared vision of an educational framework for IPE, even though scholars agree on the importance of IPE. Most professions are still trained separately, which limits students' exposure to other disciplines. This may negatively affect students' competencies in clinical practice and communications with professionals in other fields. For instance, the inconsistencies in terminology and lexicons may result in misunderstandings and misinterpretation among professionals. The research opines that the lack of IPE in the acupuncture programme may negatively affect students' competencies in clinical practice to

improve children's health. This may particularly affect communications with professionals in other medical fields.

Figure 2-2. An example of IPE (adapted from PNGHUT.com, 2022)

Therefore, there is a need to develop an effective strategy to bridge the gap, which is students' competencies to improve children's health using acupuncture and communications with other modalities in healthcare. On the other hand, Ratka et al. (2017) state that the transformation of IPE into practice relies on clinical instructors. The successful transformation of IPE will be achieved only if clinical instructors possess adequate CK and skills of the specific modality to train students. These authors agree that implementing IPE in healthcare education enhances students' competencies in clinical practice. The researcher asserts that there is a need to support staff to effectively conduct IPE in the acupuncture programme.

2.5.5 Effects of socio-cultural factors

The researcher notes that South African students are experiencing challenges from a socio-cultural perspective when studying acupuncture. Socio-cultural factors originate from the unique circumstances surrounding their social environments, such as language, culture, university or home (Odanga, 2018). Vygotsky saw culture and social environment as crucial elements in the construction of human knowledge (Burhanuddin et al., 2021; Hassad, 2011). The society where an individual lives and the social settings in which he or she is part of are

the elements that determine what the individual learns about the world and acquires as knowledge.

According to Aigbavboa and Thawala (2016), group study seems to be a cultural practice among African students. It can be concluded that there is a close connection between students' CK, attitudes, and service students' clinical competencies using acupuncture to promote children's health. This agrees with Díez-Palomar et al. (2020), who reveal a positive relationship between attitudes and academic achievement. Therefore, to improve students' competencies in clinical practice, there is a need to facilitate students to develop positive attitudes towards acupuncture and strengthen their content knowledge and skills. In the delivery of the acupuncture programme, lecturers should take into consideration the socio-cultural factors that may negatively affect the effective delivery of acupuncture programmes in SA. Consequently, lecturers should create opportunities and encourage students to learn in groups to promote effective teaching and learning of the acupuncture programme.

2.6 STRATEGIES TO IMPROVE TEACHING, LEARNING, ASSESSMENT, AND PRACTICES

The researcher argues that various approaches should be implemented in the teaching, learning, assessment, and practices to strengthen acupuncture programmes at HEIs. In this section, the researcher provides a detailed discussion on approaches to strengthen the teaching, learning, assessment, and practices of the acupuncture programme.

2.6.1 Participatory teaching and learning

Participatory teaching and learning is a pedagogical approach that encourages students to construct knowledge during the learning process (Concina, 2019; Kucharcikova & Tokarcikova, 2016). According to Trauth-Nare and Buck (2011), participatory teaching and learning allows students to collaborate and reflect during the teaching process, aiming to improve students' learning. This view concurs with Kucharcikova and Tokarcikova (2016) and Pain et al. (2011). They articulate that participatory teaching and learning is an effective approach to strengthening teaching by improving students' engagement in teaching and learning. The reason is that students are actively involved in planning and discussing the

objectives, knowledge, skills, attitudes or modes of teaching to achieve particular learning outcomes (Adu-Gyamfi et al., 2020). Furthermore, participatory teaching allows students to request particular learning styles (see section 2.6.1.4) to adapt to their specific needs during the learning process (Gal et al., 2018). Kucharcikova and Tokarcikova (2016) explain that there are primarily two categories of teaching approaches, namely lecturer-centred and student-centred. Subsequently, the researcher further discusses participatory teaching and learning from lecturer-centred and student-centred perspectives. To strengthen teaching and learning, the researcher believes it is necessary to embed participatory teaching in both lecturer-centred and students-centred approaches. Figure 2-3 illustrates a participatory teaching and learning activity.

Figure 2-3. Participatory teaching (Students are actively involved in the learning activities)

2.6.1.1 Lecturer-centred approach

Emaliana (2017) and Mpho (2018) claim that in the Lecturer-Centred Approach (LCA), lecturers dominate the entire teaching and learning process. The LCA is based on the behavioural learning theory and positivist philosophy (Ludigo et al., 2019). These authors agree that all behaviours, what people say and do, can be observed and measured quantitatively (Kitiashvili, 2020; Ng'andu et al., 2013). Ludigo et al. (2019) further explain that the behavioural learning theory aims to understand the connection between the LCA and students' learning outcomes. However, they focus on only overt behaviours and ignore the behaviours that cannot be observed, such as motivation and psychological activities, since these behaviours cannot be measured objectively. According to Kitiashvili (2020) and Ludigo

et al. (2019), in the LCA, students are neither encouraged to express themselves nor direct their learning process since the process of learning is highly structured. Figure 2-4 presents a typical lecturer-centred classroom.

Figure 2-4. Lecturer-centred class (Students were listening to the lecturer's presentation in a class.)

In the LCA, lecturers play a critical role in the learning process, while students passively receive information (Emaliana, 2017; Kitiashvili, 2020). Ludigo et al. (2019) further explain that in this approach, all decisions are made by lecturers, such as curriculum design, teaching methods, and assessment. During the teaching and learning process, lecturers follow a well-structured plan, which includes rules, routines, punishments or techniques for motivation (Emaliana, 2017; Mpho, 2018). In their study, Ludigo et al. (2019) report that some strategies in the LCA indicate a significant positive relationship with students' learning outcomes. These include immediate feedback, continuous practice, and reinforcement. Reinforcement, as defined by Ng'andu et al. (2013), refers to strategies that strengthen students' behaviours, such as verbal praise, physical rewards or publishment. The researcher believes that engaging students in the LCA through participatory teaching will significantly strengthen students' learning outcomes while maintaining the advantages of the LCA.

Schreurs and Dumbraveanu (2014) point out that there are several advantages of the LCA. For example, from the well-structured outlines, students will clearly understand what is expected at the end of the course or programme, which can be identified from the learning outcomes (Mpho, 2018). Other benefits include that the LCA is suitable for large classes and

takes less time to complete class activities (Kitiashvili, 2020). The researcher believes this approach is particularly useful in the teaching and learning of acupuncture at HEIs because there is limited time in the programme, as explained previously in section 2.3.3. Islam (2019) affirms that the LCA is effective for transmitting knowledge that is difficult for students to explore on their own. This approach is also suitable for learning that does not require errors. The researcher believes that the LCA is of particular significance for teaching and learning the theoretical knowledge in the acupuncture programme since it involves ancient Chinese philosophies, which may be difficult for African students to explore by themselves.

The primary purpose of this approach is to transfer knowledge to students. Owing to its benefits, the researcher contends that the LCA is of great value for effective teaching. This view concurs with Lak et al. (2017). They reveal that the LCA is still the dominant teaching method that is widely accepted and utilised in HEIs globally because of its effectiveness in delivering knowledge to students. Despite the advantages of the LCA, Cover et al. (2019) and Zeki and Güneyli (2014) criticise students' passive receiving of information in this approach. Subsequently, scholars propose another approach to support effective teaching, namely the Student-Centred Approach (SCA).

2.6.1.2 Student-centred approach

The SCA has become widely accepted among lecturers and educational institutions in recent decades. Kitiashvili (2020) concurs with Zeki and Güneyli (2014) that the SCA is considered the most effective approach in teaching and learning, which positively promotes learning outcomes. Khadidja and Nachoua (2016) reveal that the SCA is grounded in the constructivist epistemology, which significantly facilitates development from behaviourism to constructivism in education. As one of the most eminent experts, Vygotsky developed and promoted the constructivism theory (Emaliana, 2017). Vygotsky states that students actively produce knowledge in response to interactions with their existing knowledge and environment (Kitiashvili, 2020).

According to the constructivism theory, students construct their knowledge with the influence of their experiences. Therefore, students should be encouraged to be actively involved in the teaching and learning process (see Figure 2-5). Contrary to the LCA, students are the focus of the SCA who are actively involved in the teaching and learning process (Emaliana, 2017; Kitiashvili, 2020). Vygotsky also integrates the cultural perspective into the constructivist theory to promote learning (Khadidja & Nachoua, 2016). The researcher believes that considering the cultural perspective in teaching and learning is of particular significance since this study focused on an acupuncture programme to improve children's health in the South African context.

Figure 2-5. Student-centred approach (Students were actively involved in the learning.)

Within the SCA, students take ownership of their learning process by developing the course syllabus, prioritising topic areas, establishing peer accountability, facilitating class sessions, and engaging in ongoing evaluation (Hains & Smith, 2012). Therefore, lecturers serve as facilitators who coordinate students' learning instead of dominant experts as in the LCA (Kitiashvili, 2020). Lecturers provide feedback on learners' progress and conduct assessments to improve learning; learners develop self-assessment skills (McCombs & Whisler, 1997; Weimer, 2002). Students feel accepted and supported; learning is based on participation. The more actively students can participate, the more they are empowered and responsible for their learning (Hackathorn et al., 2011).

Despite the SCA being the dominant teaching approach in several western countries, there are some challenges related to the application of this approach (Zeki & Güneyli, 2014). The

researcher believes that lack of resources, time consumption or negative attitudes of students and staff may result in a reluctance to implement the SCA. This view is further supported by Kitiashvili (2020), who states that many developed countries spend extensive amounts on resources to support the SCA in education. This can be a disadvantage in the African context due to limited resources as a result of poverty (Amzat & Razum, 2018). As discussed earlier, scholars share various views on the LCA and SCA, which further influences their attitudes towards these teaching approaches. The researcher believes that there is no particular approach to teaching that is superior to another without taking the context into consideration. This view concurs with Murphy et al. (2021), who report that students show a preference for a combination of the LCA and SCA from a study consisting of 507 participants. Subsequently, the researcher believes there is a need to effectively integrate the LCA and SCA in the acupuncture programme to promote teaching and learning.

2.6.1.3 Interprofessional education

To improve students' competencies in clinical practice, knowledge from different medical fields is integrated into many acupuncture programmes globally (Lim et al., 2015; Wang et al., 2021; WHO, 2020c). Barr and Low (2013) emphasise that in IPE, knowledge and skills of different disciplines should be taught simultaneously by engaging students and lecturers from multiple professions. The researcher believes that IPE will equip students with knowledge from different professional fields, which will significantly strengthen students' competencies in clinical practice to promote children's health in the working world. This view concurs with Kitto et al. (2013) and WHO (2013), which state that optimal healthcare delivery is measured by positive patient care outcomes, improved community health, and decreased healthcare costs. Implementing IPE in the acupuncture programme will promote students' competencies in the working world in improving children's health.

2.6.1.4 Multiple intelligence (Learning styles)

Yavich and Rotnitsky (2020) concur with Wilson (2018) that learning is based on experiential, behavioural, and cognitive characteristics that indicate how students perceive, interact, and respond to learning environments. The researcher believes there is a need to develop a

variety of practical approaches to accommodate different acupuncture CK and students' learning styles. Learning styles are defined as the way students perceive and process information in learning situations. According to Gardner's multiple intelligences theory, there are various approaches that can be adopted to strengthen teaching and learning to meet the educational goals (Davis et al., 2011; Gardner & Hatch, 1989).

Figure 2-6 below illustrates the nine identified intelligences (Benazira et al., 2021; Gardner, 1999; Yavich & Rotnitsky, 2020). These authors agree that a combination of several intelligences together affects students' abilities and, in particular, their abilities to deal with challenges and problem-solving. For the purpose of this study, the researcher focused on those intelligences that pertain to the acupuncture programme.

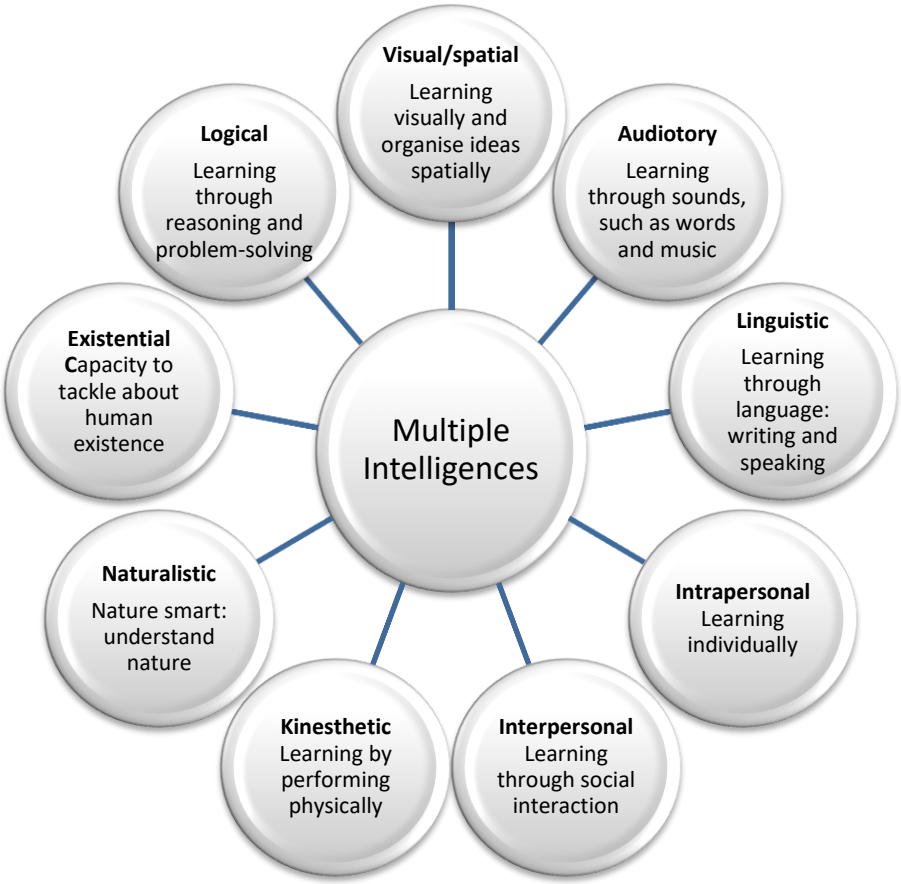


Figure 2-6. Gardner's multiple intelligences (As adapted from Benazira et al., 2021; Gardner, 1999)

Visual approach

The visual approach refers to the technique of employing various visual elements in the process of teaching and learning (Benazira et al., 2021). These elements include presentations, images, and the lecturer's body language (Calik & Birgili, 2013). Davis et al. (2011) explain that this technique allows students to gain insightful information from what they see. The researcher believes that PowerPoints, flipcharts, and videos are valuable techniques to facilitate a visual approach in the teaching and learning of the acupuncture programme. Clinical observation is also beneficial for the visual approach, which is further explained in section 2.6.3.1.

Auditory approach

Davis et al. (2011) define an auditory approach as the ability to acquire information through sounds, such as words and music. Sener and Cokcaliskan (2018) further explain that this technique ensures students gain knowledge from what they hear, including the volume, frequency, and speed of speech. The researcher believes that traditional classroom teaching and learning is an example of the auditory approach. Information can be delivered successfully and efficiently if lecturers are able to use this approach effectively to explain acupuncture CK and skills.

Linguistic approach

Students who prefer a linguistic approach acquire knowledge best through language: writing and speaking (Davis et al., 2011). These students focus on the content they read and make notes while listening (Sener & Cokcaliskan, 2018). Jensen and Calvert (2014) articulate those linguistic approaches can be employed in teaching and learning, including group discussions, guided reading, and writing exercises. The researcher concurs with Jensen and Calvert (2014) that the linguistic approach can be utilised to improve teaching and learning by instructing students to read materials and then use guided questions to unpack themes to obtain an in-depth understanding of the content knowledge.

Logical approach

Calik and Birgili (2013) state that the logical approach aids students in acquiring the ability of critical thinking and problem-solving in the real world. The researcher believes that participatory learning, such as clinical simulation (see section 2.6.3.3), is a suitable technique for the logical approach. This view concurs with Jensen and Calvert (2014), who state that the logical approach focuses on cause and effect. They agree that the logical approach facilitates students to analyse different ways of thinking. The researcher believes the post-simulation debriefing will further encourage students' critical thinking.

Intrapersonal approach

The intrapersonal approach allows students to study individually for a deeper understanding of knowledge. This technique assists students in expressing their learning process and personal feelings (Benazira et al., 2021). Davis et al. (2011) further highlight that this technique improves students' self-discipline in their studies. The researcher believes that self-reflection and self-evaluation are two effective ways of the intrapersonal approach since it allows a longer, quiet response time for students in their learning process (Sener & Cokcaliskan, 2018).

Interpersonal approach

Sener and Cokcaliskan (2018) explain that an interpersonal approach allows students to learn in groups through social interaction. This approach assists in improving students' communication skills. Students integrate their learning into memory through social cues, conversation, and discussion (Yavich & Rotnitsky, 2020). The researcher believes that small group discussion, in-person discussion, collaborative learning, and post-simulation debriefing are effective ways to facilitate students learning in the acupuncture programme (Calik & Birgili, 2013).

Kinesthetic approach

The kinesthetic approach refers to learning by performing physical activities (Benazira et al., 2021). This approach facilitates students' learning by doing. Sener and Cokcaliskan (2018)

agree that this approach assists students' learning and improves their practical skills. The researcher believes this approach is of particular significance in the acupuncture programme since practical skills are of pertinent importance. The researcher believes that clinical simulation and clinical practice under supervision are effective ways of administrating the kinesthetic approach.

In this section, the researcher explains different approaches individually, according to Gardner's multiple intelligences theory. However, the researcher believes that these intelligences are connected to each other. Different types of intelligences can be applied to teaching processes, where teaching is based on student skills and aims to advance students' individual abilities (Yavich & Rotnitsky, 2020). This view concurs with Jensen and Calvert (2014) and Sener and Cokcaliskan (2018), who articulate that the effective collaboration of these intelligences will improve teaching and learning. The researcher believes that various approaches can be employed to strengthen the teaching and learning in the acupuncture programme.

2.6.1.5 Hybrid learning

Al-Zumor et al. (2013) and Lalima and Dangwal (2017) define hybrid learning as the integration of online learning and traditional face-to-face learning (see Figure 2-7). The use of modern technology in education at HEIs has significantly eliminated the risk of COVID-19 infection by means of maintaining social distancing. These authors concur that hybrid learning promotes efficient and effective learning. The researcher contends that the COVID-19 pandemic encourages adopting hybrid learning among HEIs. Evidence supporting this view can be found in the global adoption of online teaching and learning to accommodate education during the pandemic (Hu & Venketsamy, 2022a; Mpungose, 2020).

There are several advantages of hybrid learning using technologies, such as online learning through videos and audio (Lalima & Dangwal, 2017). Students benefit from online learning whilst maintaining social interaction with lecturers and classmates in the face-to-face sections (Al-Zumor et al., 2013). Students will also strengthen their professional capabilities by developing qualities like self-motivation, self-responsibility, and discipline (Lalima & Dangwal,

2017). Adopting hybrid learning in the acupuncture programme will promote students' competencies in theoretical knowledge and practical skills to improve children's health. The reason is that online learning allows students to learn at their own pace; the online videos and audios also allow students to revisit theoretical and practical content as often as they require until they feel competent with the content (Hu & Venketsamy, 2022a). The traditional face-to-face classes offer students an opportunity to learn and demonstrate their skills physically. This also allows lecturers to correct any possible mistakes in their practical skills, provided that lecturers possess adequate content knowledge and skills in acupuncture practice.

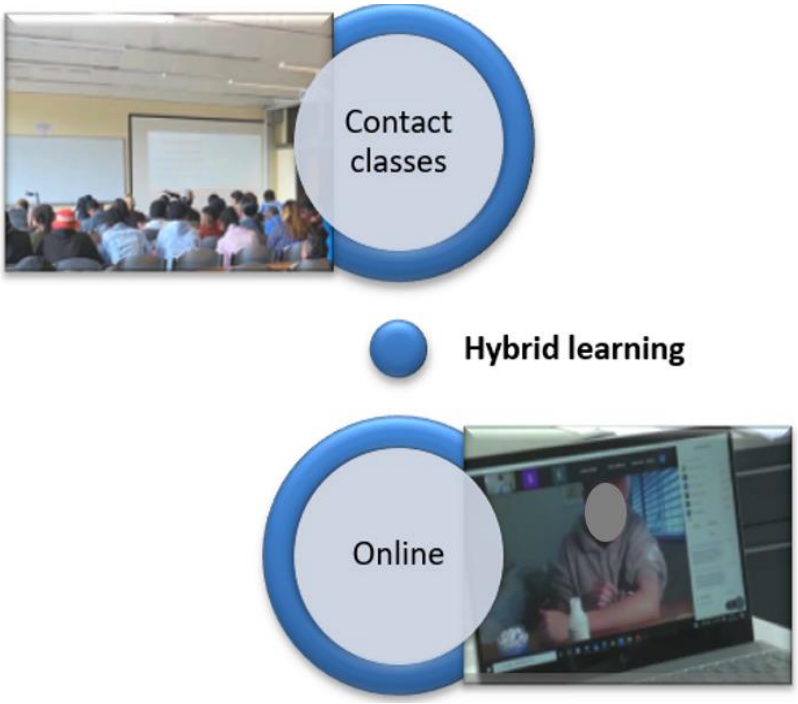


Figure 2-7. Hybrid learning

2.6.1.6 Peer learning

Peer learning is a practical approach to strengthening teaching and learning. Keerthirathne (2020) explains that peer learning refers to students learning with and from each other as fellow learners without any implied authority to any individual. Carvalho and Santos (2021) agree with Keerthirathne (2020) that most students find interacting with their peer groups interesting. They ask questions without hesitation and are comfortable while learning with

their peer group. Peer learning may assist in increasing marks in assessment, developing reasoning and critical thinking skills, and improving confidence and interpersonal skills (Kodabux & Hoolash, 2015). Therefore, the researcher believes adopting peer learning in acupuncture teaching will improve students' learning outcomes.

2.6.2 Strategies to improve assessment

In recent years, scholars have acknowledged the importance of assessment in enhancing students' learning (Earl, 2006; Khan, 2012). They agree that assessment will clarify the study's goal, report students' learning progress, and reflect the quality of teaching (Stăncescu & Drăghicescu, 2017; Umar, 2018). According to Liljedahl (2010) and Yambi (2018), assessment refers to the activities lecturers and students adopt to obtain information that can be used to reflect teaching and learning. Amua-Sekyi (2016) further points out that assessment plays several important roles in education. For instance, assessment will facilitate measuring students' achievement in a programme, ensuring that successful graduates meet specific learning outcomes of a particular programme (Amua-Sekyi, 2016). Although assessment provides information on students' learning achievement, Khan (2012) and Flórez and Sammons (2013) argue that the ultimate target of assessment is improving students' learning. Khan (2012) agrees with Black and William (1998) that assessment is a practical approach to enhancing learning.

The researcher believes that assessment is of great importance to enhance learning and reflects students' competencies to meet learning outcomes in the acupuncture programme. In this study, assessment refers to the approaches that promote students' learning, measure students' content knowledge, and evaluate students' competencies in the acupuncture programme to improve children's health in the working world. The researcher believes that assessment instruments should be able to evaluate how well the student can recall and explain acupuncture CK directly (remembering and understanding), how well the student can apply this knowledge to a new situation (application), how well a student can differentiate and critique the information of a topic (analysis and evaluation), and how well a student can extend their learning to new areas (creating). These skills represent different, progressive levels of understanding that fall along an abridged hierarchy as outlined in the revised version

of Bloom's Taxonomy developed by Anderson and Krathwohl (see Figure 2-8) (Barari et al., 2020; Chandio et al., 2016).

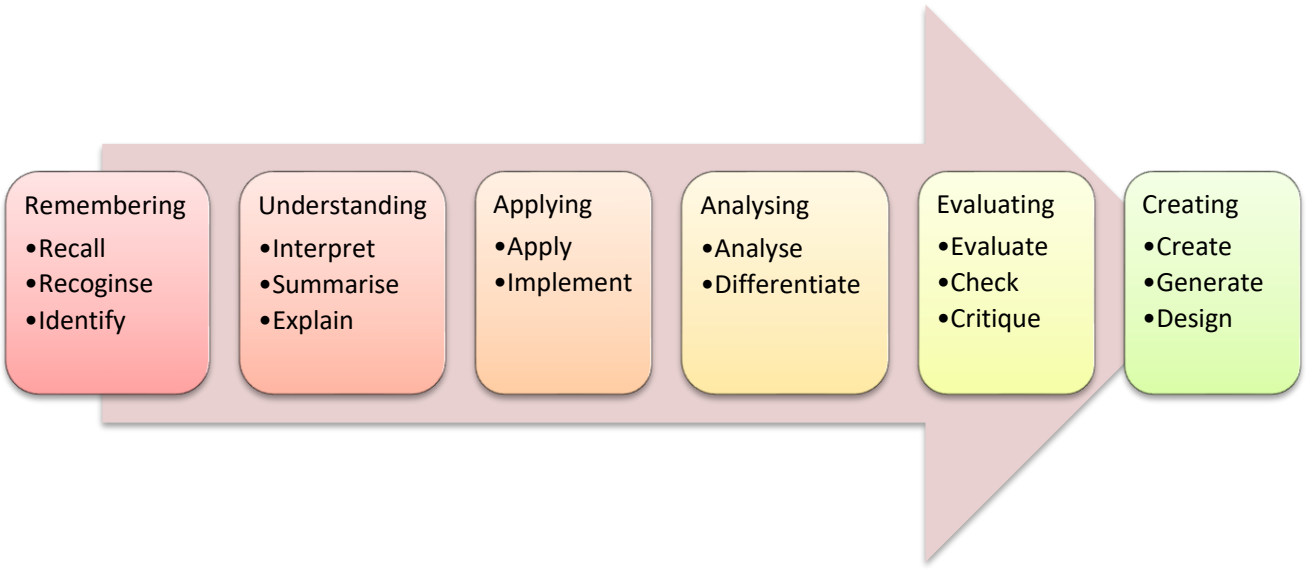


Figure 2-8. Revised Bloom's Taxonomy (As adapted from Barari et al., 2020; Chandio et al., 2016)

2.6.2.1 Diagnostic assessment

Diagnostic assessment in education focuses on identifying students' strengths and weaknesses for improvement (Jang & Wagner, 2013). Esomonu and Eleje (2020) explain that there are various classroom assessment techniques that contribute to diagnostic assessment, such as quizzes, student interviews, student reflections, and classroom discussions. The researcher believes that different types of classroom assessments play a critical role in diagnostic evaluations. They should be an integral part of the daily learning process. The view concurs with Yambi (2018), who agrees that classroom assessment will reflect how students learn, their motivation to learn, and how lecturers teach. Yambi (2018) further explains that classroom assessment will assist lecturers in identifying students' status in the learning process, which promotes teaching and learning. The reason is that lecturers prefer to use the results for the assessment to strengthen teaching since lecturers develop, administer, and analyse the questions in classroom assessment (Khan, 2012). Despite the critical role of classroom assessment for diagnostic purposes, Earl (2006) argues that there is no direct evidence that increasing time on assessment will strengthen learning. Therefore, lecturers must determine appropriate assessments to strengthen the acupuncture

programme to improve children's health, which requires that assessments be valid and reliable.

Validity of assessment refers to the degree the test measures what is to measure, while reliability focuses on the consistency with which it measures what is intended to be measured (Tosuncuoglu, 2018). Yambi (2018) agrees with Earl (2006) that a valid and reliable assessment has the following characteristics. Firstly, there must be explicit purposes for assessment, which is an essential requirement to promote effectiveness in the assessment. Secondly, there should be coherence in classroom assessment that meets the purpose of learning goals and criteria. Thirdly, classroom assessment will be in various forms that best suit students' learning goals and needs. These forms include questioning, feedback, self-assessment, and the formative use of summative assessment (Flórez & Sammons, 2013; Umar, 2018). Classroom assessment can be utilised to assess students' knowledge in remembering, understanding, applying, and analysing. According to the revised Bloom's taxonomy, the researcher believes that different depth of knowledge should be framed in diagnostic assessment in the forms of various types of classroom assessment.

2.6.2.2 Formative assessment

The term formative assessment refers to the continuous process of assessing students in a course, which provides feedback to responsible lecturers to enable them to judge how well students are learning (Earl, 2006). Formative assessment is most appropriate where the results are used internally by those involved in the learning process (students, teachers, and curriculum developers) (Yambi, 2018). It also provides information on teaching effectiveness, which will help to determine an appropriate remedial action where necessary. For this reason, Amua-Sekyi (2016) states that formative assessment is appropriately referred to as assessment for learning. Yambi (2018) concurs with Amua-Sekyi (2016) that the purpose of formative assessment is to enhance the learning process by providing feedback to students.

Therefore, formative feedback is exploratory, provisional, and aims at prompting further engagement from the students as part of ongoing communications between and amongst students and lecturers (Amua-Sekyi, 2016). This implies that the feedback process in the

learning cycle commences with the production and submission of student work, followed by lecturer assessment and feedback provision on it (Yambi, 2018). Earl (2006) points out that students are more likely to be motivated by having their learning progress acknowledged compared to merely the success or failure in summative assessment.

2.6.2.3 Formative use of summative assessment

Despite the difference between formative and summative assessment, Payne (2014) points out that summative assessment can be used for formative purposes. This is achieved by assessing students periodically throughout a subject or topic. Lecturers need to provide feedback to students for their further improvement. The researcher agrees that purposeful planning and implementation of formative and summative assessment in the classroom will contribute to improvement in student learning, further promoting their competencies in improving children's health. Flórez and Sammons (2013) suggest that integrating summative and formative assessments will promote students' success in education. The reason is that students tend to apply information from the summative assessment to facilitate their learning and measure their achievement at a particular time and level of study. The researcher believes that it is of significance to adopt summative assessment in the acupuncture programme due to the importance of summative assessment. The view concurs with both Amua-Sekyi (2016) and Yambi (2018), who point out that summative assessment not only provides formal evidence for grading and measuring students' progress but also indicates students' abilities to external stakeholders, such as employers. Therefore, they are considered to have a socially high value.

2.6.2.4 Objective structured clinical examination

The Objective Structured Clinical Examination (OSCE) was developed and introduced into the medical field to improve the validity and reliability of assessment for students' competencies (Khan et al., 2013). According to Khan et al. (2013), there are multiple stations in one examination, where each station tests a single topic within a few minutes. Students move from one station to another in a pre-designed order. The purpose of OSCE is to assess students' clinical competence in simulated environments, where components are presented

as broken-down objectives (Ten Cate et al., 2010). These authors agree that OSCE does not replace traditional assessment, such as formative and summative assessment, but rather serves as a supplement for traditional assessment. The researcher believes that OSCE is critical in the acupuncture programme since it provides an effective way to assess students' clinical competence, which is a higher level of knowledge according to the revised Bloom's taxonomy. This approach is of particular significance because it takes place in a simulated environment, which ensures the safety of patients and students when assessing clinical skills.

2.6.2.5 Portfolio assessment

Haldane (2014) reveals that portfolio assessment is progressively accepted in health sciences education. According to McDonald (2012), portfolio assessment refers to a written collection of students' work, which reflects their efforts, progress, and achievement in the education programme. These authors concur that portfolio assessment is more effective in evaluating areas that are difficult to be assessed by traditional methods in a wide range of clinical contexts. These areas include attitudes, personal attributes, reflection, and professionalism (Haldane, 2014; Mokhtaria, 2015). The researcher agrees that portfolio assessment effectively measures students' competencies in clinical practice since it allows them to reflect on their learning process. In 2012, a portfolio approach was adopted in the United Kingdom, which requires licensed doctors to keep a portfolio of evidence of their practice to evaluate licensed doctors' competencies (General Medical Council [GMC], 2012).

2.6.3 Strategies to strengthen practice

Practice is of great importance to ensure the high quality of an educational programme in the healthcare field since it further assures the best possible treatment and safety of children's health. WHO (2013) states that HEIs that provide education in health should not only focus on increasing the number of professionals but also the quality of these professionals should be stressed to address the population's health needs, including children's health. In this study, practice refers to activities that involve practical skills, which consist of both clinical training in the laboratory and the clinic. In the acupuncture programme, students develop their practical skills in the training laboratory before commencing with patients in a clinic.

Scholars agree that the training in the training lab, such as a simulation centre, plays a crucial role in promoting students' competencies in clinical practice, further assisting in improving children's health (Tolsgaard, 2012; WHO, 2013).

In their clinical training, much time is dedicated to ensuring sufficient clinical skills, which is defined as measurable actions performed by healthcare providers to improve patient care (Tolsgaard, 2012). Novice students require close supervision to effectively apply their theoretical knowledge and develop their clinical skills safely, which in turn requires clinical instructors to possess abilities in both teaching and clinical practice (WHO, 2013). Consequently, clinical instructors should be competent in introducing CK, demonstrating practical skills, and consulting with patients in the working world.

Clinical instructors' competencies in CK and clinical skills are critical to promoting students' competencies. This view concurs with Getie et al. (2021), who suggest that a clinical protocol should be developed to improve the supervision of clinical instructors. Halls et al. (2012) and WHO (2020c) agree that clinical hours positively relate to students' clinical competencies. The researcher believes providing adequate clinical hours for students and supporting clinical instructors' competencies will enhance students' competencies in clinical practice, which will further benefit children's health using acupuncture. The researcher also discusses the different approaches that improve students' competencies in clinical practice.

2.6.3.1 Clinical observation

Clinical observation is recommended as one of the best approaches for students to acquire clinical skills. The researcher believes the adoption of clinical observation in the acupuncture programme will positively promote students' competencies in their clinical skills. This view is supported by Pierce et al. (2013), who reported that clinical observation is a useful approach to strengthening students' learning. In their study, students reported that they preferred more observation exercises in a real clinical setting. Pierce et al. (2013) concur with Chen et al. (2008) that clinical observation will promote students' confidence and competencies in clinical practice. Furthermore, the observation can also take place online in the form virtual observation.

2.6.3.2 Work Integrated Learning

Atkinson (2016) points out that Work-Integrated Learning (WIL) is prevalent in medical training since it provides lived experiences and knowledge in the working world. Jeong and McMillan (2015) explain that WIL is organised through practice-based learning activities in real contexts. Scholars, such as Freudenberg et al. (2010) and Govender and Wait (2018), concur that WIL improves students' competencies in the working world since the role of WIL is to encourage learning for performance. These authors agree that WIL offers an opportunity for students to identify their learning needs and optimise their practical skills from actual practice in the real world. The researcher believes that the authentic practice context provides opportunities for students to connect their practice to the course curriculum through novel situations arising from the dynamic environment in which professionals work. Therefore, adopting WIL in the acupuncture programme will strengthen students' competencies in clinical practice.

2.6.3.3 Clinical simulation

Clinical simulation is a model used to replicate real-world healthcare scenarios in an environment that is safe for education and experimentation. It is an important form of WIL (see section 2.6.3.2). Cook et al. (2011) define simulation as a tool, device, and environment that mimics aspects of clinical care. It is an education model of a phenomenon or activity that allows students to rehearse behaviours without placing their patients at risk or harm (Kapucu, 2017). Persico (2018) states that there are different forms of simulations, for example, using manikins, standardised patients, role-playing, skill stations, and technological-based critical thinking (see Figure 2-9). In support of the previous statement, Martinez et al. (2020) add that simulation is an activity that discusses content knowledge of a specific modality in a clinical context. They further emphasise that this activity takes place in a clinical setting, allowing students to apply theory to practice.

The researcher concurs that clinical simulation is a pedagogical approach to bridging theoretical content knowledge and actual clinical practice. Applying clinical simulation in the acupuncture programmes is significant in improving students' clinical practice competencies to promote children's health. So et al. (2019) point out that clinical simulation assists students in acquiring critical thinking in clinical practice and encourages them to participate in clinical decision-making. Martinez et al. (2020) agree with the WHO (2013) and So et al. (2019) that clinical simulation is an effective method to deliver and enhance clinical content knowledge. The adoption of simulation in the acupuncture programme also aligns with the CHE requirement (2011). In its document, CHE indicates that in the professionally-oriented qualifications, WIL may be employed using simulation and workplace learning.

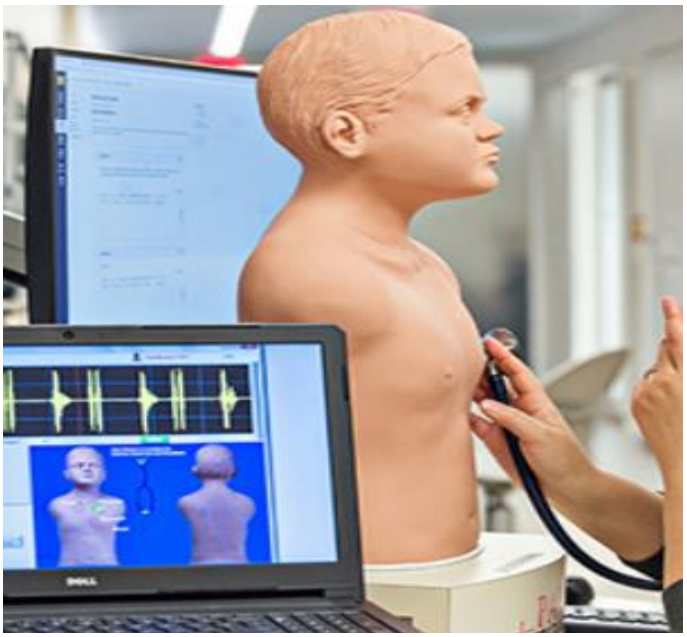


Figure 2-9. An example of clinical simulation (As adapted from Fatane, 2021)

2.6.3.4 Grand rounds

Grand rounds have been accepted as a pedagogical approach in medical education to provide authentic experiences to students and emerging clinicians (Black et al., 2017; Stanyon & Khan, 2015). It is defined as the formal presentation or discussion of clinical cases by an expert in the presence of selected patients (see Figure 2-10) (Black et al., 2017). In recent years, some grand rounds have been conducted without the patient present to protect patients' dignity and confidentiality (Stanyon & Khan, 2015). The researcher believes the

employment of grand rounds in acupuncture programmes will benefit students and patients. This view agrees with Black et al. (2017) who further explain that grand rounds promote patient care and facilitate students learning in an authentic clinical environment.

Figure 2-10. An example of grand rounds (One expert was discussing clinical cases with a group of students.)

2.7 SUMMARY

The researcher presented a comprehensive review of relevant literature in this chapter. The researcher introduced acupuncture and explained its importance in promoting children's health. International and national outlines of acupuncture programmes were discussed. The researcher then discussed the importance and challenges in teaching, learning, assessment, and practices of acupuncture programmes. From the relevant literature that was reviewed, it was evident that there were gaps in the delivery of the acupuncture programme. Therefore, this study aims to bridge the gap between South African and international acupuncture programmes to improve children's health by focusing on teaching, learning, assessment, and practices. In chapter 3, the researcher discusses the conceptual framework anchored in this study.

CHAPTER 3

CONCEPTUAL FRAMEWORK

3.1 INTRODUCTION

In Chapter 2, the researcher discussed relevant literature based on the study. He presented a detailed critical discussion on the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health. The literature included a comprehensive explanation of the importance and value of quality teaching, learning, assessment, and practices at HEIs. The researcher wanted to ensure effective implementation of the CK and pedagogical practices in acupuncture programmes. The researcher used multiple sources, such as academic and scholarly articles, relevant books, and other reference materials. These sources allowed the researcher to present appropriate arguments and justification for promoting high-quality teaching, learning, assessment, and practices of an acupuncture programme to improve children's health.

In this chapter, the researcher focused on the conceptual framework underpinning this study, namely the TPCK model. The TPCK model was developed from the PCK model proposed by Shulman (1986) and the TPACK model by Mishra and Koehler (2006). The TPCK model in this study emphasises CK, PCK, and TCK as the foundation for strengthening teaching, learning, assessment, and practices in an educational programme. For this reason, the researcher opted to use the TPCK as a conceptual framework to underpin this study. Figure 3-1 illustrates the outline of the contextualised TPCK model in this study.

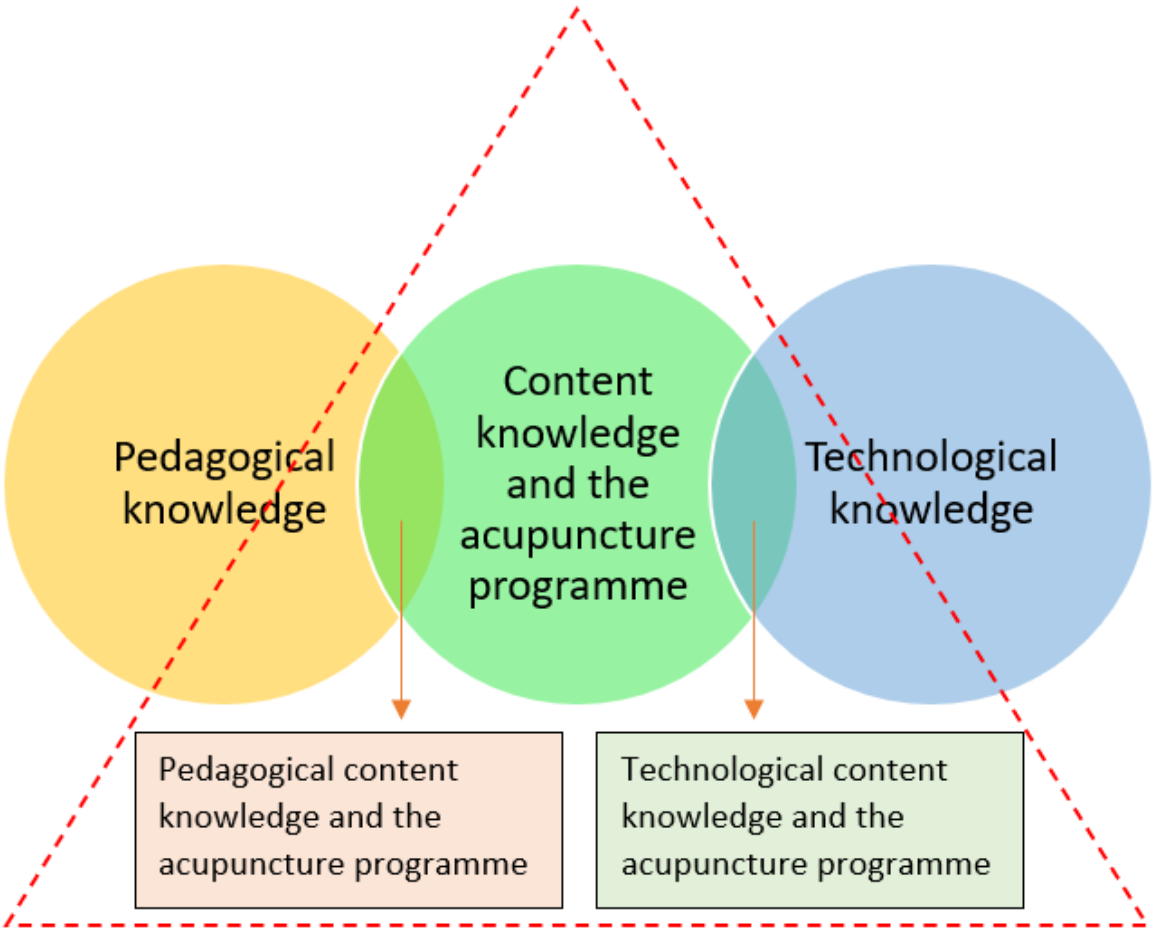


Figure 3-1. The TPCK model (Own model adapted according to Shulman [1986] and Mishra & Koehler [2006])

3.2 EXPLANATION OF CONCEPT: CONCEPTUAL FRAMEWORK

A conceptual framework refers to a system of concepts, assumptions or theories the investigator develops to explain the phenomenon to be studied (Brynard et al., 2014; Ferreira et al., 2012). Maree (2020) agrees with Yin (2018) that a conceptual framework is linked to the concepts, empirical research, and critical theories used in promoting and systemising the knowledge espoused by the investigator. They concur that conceptual frameworks facilitate investigators in identifying and constructing their worldviews on the phenomenon to be explored. Adom et al. (2018) further explain that a conceptual framework describes the relationship between the core concepts of a study. Therefore, the researcher believes that an appropriate conceptual framework should illustrate that the proposed concepts are relevant to the research questions and presented logically. Yin (2018) and Cohen et al. (2018)

concur that conceptual frameworks focus on descriptions, explanations, and predictions of the phenomenon.

In this study, the researcher explored students' experiences of the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health. Therefore, the researcher opines that the TPCK model in this study will assist in analysing the teaching, learning, assessment, and practices of the acupuncture programme. This was done by carefully exploring CK, PCK, and TCK. The researcher believes this would validate the findings and recommendations of the study to strengthen the teaching, learning, assessment and practices of the acupuncture programme. Cohen et al. (2018) and Yin (2018) concur that a conceptual framework helps investigators render research questions testable and ensure the extension of knowledge to research inquiry, indicating which findings and conclusions appear to be valid and reliable.

3.3 RATIONALE FOR THE CHOICE OF THE TPCK MODEL

In the section below, the researcher explains the rationale for developing and adopting the TPCK model by integrating Shulman's (1986) PCK model and the TPACK model proposed by Mishra and Koehler (2006).

The PCK model, developed by Shulman (1986), is critical in education since it emphasises the relationship between specific CK and PK. The view concurs with Pompea and Walker (2017), who state that PCK is very important in promoting effective teaching. Thinzarkyaw (2020) explains that CK was predominant in education in the 19th century, with a strong emphasis on CK. It was believed that adequate subject content knowledge was sufficient for teachers to teach. Ball et al. (2008) reveal that at the end of the 20th century, perceptions of knowledge in education shifted from merely CK to the integration of content and pedagogical knowledge (Pompea & Walker, 2017). Shulman (1987) argues that the importance of PCK has attracted the attention of most scholars and academics. He agrees that the PCK is of profound importance (Pompea & Walker, 2017); because 'it represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues

are organised, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction' (Shulman, 1987: 8).

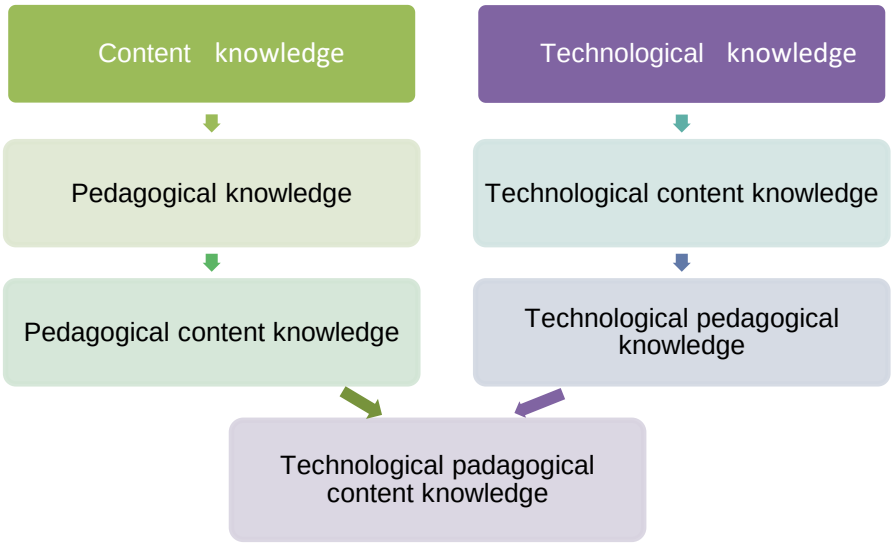


Figure 3-2. A flow chart of the TPCK model

Kathirveloo et al. (2014) explain that PCK emphasises lecturers' competence in delivering the subject's conceptual approach, relational understanding, and adaptive reasoning. The researcher believes that lecturers' CK and PK are pertinent to ensuring the effective delivery. of the acupuncture programme. The quality teaching and learning of the CK in the acupuncture programme would improve students' knowledge, understanding, and competencies to improve children's health. Subsequently, the researcher believes that the PCK model will assist in analysing the teaching, learning, assessment, and practices of the acupuncture programme. However, the rapid increase in technologies has changed the world significantly, influencing the use and implementation of technology for teaching and learning (Venketsamy & Wilson, 2020). Therefore, the researcher highly advocates the integration of technology into this model. This view is supported by Mishra and Koehler (2006), who emphasise the value of technology for teaching and learning in their TPACK model. In this study, the TPCK model places emphasis on the importance of CK, PCK, and TCK in the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health. A detailed discussion of the elements of the TPCK model is presented below (see Figure 3-2).

3.4 CONTENT KNOWLEDGE

Content knowledge refers to knowledge of specific subjects for achieving required learning outcomes for teaching and learning (Bhukuvhani, 2018; Mishra & Koehler, 2006). Content knowledge includes the body of knowledge – facts, theories, principles, ideas, and vocabulary– which students and lecturers in the acupuncture programme must master to be effective in applying in teaching and clinical practice. Wardle et al. (2011) point out that the knowledge of complementary medicine, such as acupuncture, positively influences the public's attitude towards acupuncture. Therefore, the researcher is of the opinion that it is of significance for students to acquire adequate acupuncture CK to develop a positive attitude. Ball et al. (2008) state that CK is crucial for lecturers since it offers essential elements for students' learning, which includes concepts, theories, and practices of specific domains (Rice & Kitchel, 2016).

For this reason, the researcher contends that lecturers should have a deep understanding of the subject and the corresponding curriculum (subject CK). In this study, the CK refers to particular knowledge directly related to acupuncture in the 1st, 2nd, 3rd, and 4th year of study; since the programme is designed to be completed within a minimum period of four years. To strengthen students' CK in the acupuncture programme, the following subjects have been developed: History of Chinese Medicine, Basic Theories of Chinese Medicine, Diagnostics of Chinese medicine, Acupoints and Meridians, and Acupuncture Therapeutics. These modules focus mainly on the concepts and essential principles to gain a deeper and profound understanding of the programme.

The researcher opines that lecturers should be in possession of appropriate CK in a specific subject to be competent in teaching. Wang (2019) supports this view and claims that it is necessary to enhance the lecturer's CK required for teaching and learning. The researcher contends that the lack of CK may be prohibitive; for instance, students may acquire incorrect information and develop critical misconceptions in the field of acupuncture. This will negatively affect students' understandings in the latter stage of study and clinical practice, which may negatively impact children's health. This view concurs with Koehler et al. (2013) and Rice and Kitchel (2016), who emphasise the importance of an adequate, comprehensive

base of CK to ensure the correct information is shared with students during the process of teaching and learning.

Although CK may differ significantly in various fields of study, lecturers should possess adequate CK for the specific subjects they are teaching (Rice & Kitchel, 2016). In the researcher's opinion, the CK should not only consist of facts about a particular topic but also incorporate a more comprehensive understanding of the background, development and rationale of the concepts. Shulman (1986) claims that lecturers who are teaching specific subjects must be able to explain the fundamental CK in the subject and ensure the explanations are correct regarding the topic. Regarding the teaching of the acupuncture programme, the researcher concurs that it is expected that lecturers should acquire in-depth and profound CK to be able to present the programme. According to the Minimum Requirement for Teacher Education Qualifications, the evidence of sound CK will result in the lecturer being able to meet the learning outcomes as described in the policy document (DHET, 2011).

Acupuncture is a specialised skill. Therefore, the demands for quality teaching, learning, assessment, and practices cannot be underestimated. The researcher concurs with Hénard and Roseveare (2012) and Ludigo et al. (2019) that HEIs are obliged to deliver quality acupuncture programmes to ensure students are competent and confident to administer acupuncture treatment. Govender and Wait (2018) and Pournara et al. (2015) emphasise the importance of effective teaching, learning, and assessments in all higher education programmes to ensure good quality education and competencies. The researcher is of the view that the effectiveness of quality teaching, learning, assessment, and practices will prepare students with the necessary knowledge, skills, values, and attitudes towards acupuncture.

3.5 PEDAGOGICAL KNOWLEDGE

Pedagogical Knowledge is defined as knowledge regarding the processes, strategies, practices, or techniques for teaching and learning (Mishra & Koehler, 2006; Hannaway, 2017). Shulman (1986) points out that PK includes techniques of presenting CK to students

and making it understandable to them. Both Wang (2019) and Shulman (1986) agree that PK encompasses the lecturers' ability to apply various approaches to assist students' learning. In this study, the PK is defined as techniques that consist of knowledge of classroom management, teaching methods, assessment, and programme structure, namely lecture process, lecture planning, and evaluation.

Kathirveloo et al. (2014) concur with Koehler et al. (2013), who state that the purposes, values, aims, and learning outcomes are critical factors of PK. These factors ensure the educational objectives facilitate student learning, planning lectures, course assessment and practices. Koehler et al. (2013) further explain that PK is about techniques used in the process of teaching and learning, considering the target audience (students) understanding. To effectively manage the classroom, the researcher believes that it is crucial to select appropriate teaching methods and knowledge of how to assess students. For this reason, the researcher argues that lecturers should acquire an in-depth understanding of diverse pedagogical approaches.

This view concurs with other scholars in the educational field; for instance, Al-Zumor et al. (2013) and Lalima and Dangwal (2017) emphasise the adoption of hybrid learning by integrating online and face-to-face learning. They claim that the lecturers should effectively share an in-depth understanding of hybrid learning to implement it in the working world. Similarly, Persico (2018) agrees with Atkinson (2016), who states that clinical simulation will assist in promoting students' competence in clinical practice, provided lecturers have a comprehensive understanding of this approach. These approaches will teach acupuncture lecturers how students make meaning of the content and develop skills and critical thinking in the acupuncture modules. Burhanuddin et al. (2021) and Koehler et al. (2013) argue that learning theories should be integrated into the pedagogical approach and recommends learning through modelling, peer learning, social learning, and constructivism.

3.6 PEDAGOGICAL CONTENT KNOWLEDGE

Pedagogical content knowledge refers to knowledge of particular teaching techniques utilised to deliver specific content to strengthen learning outcomes (Kultsum, 2017; Shulman, 1986).

Pedagogical content knowledge is the blending of content and pedagogy to enhance the understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and various levels of students' abilities. Since Shulman (1986) developed this ground-breaking concept, PCK has received much attention from scholars in education because it successfully promotes teaching and learning from both CK and PK perspectives (Koehler et al., 2013; Venketsamy & Wilson, 2020).

Harris and Phillips (2018) agree with Shulman (1986) that there are five processes in PCK. This process includes:

- the pedagogical reasoning and comprehension (of the CK of specific lectures and aims of teaching the particular CK);
- transformation (of specific CK, teaching and learning approaches and adaptions to the unique context);
- instruction (the observable acts of teaching);
- evaluation (for students learning and lecturers' instructions); and
- reflection (upon teaching and learning of specific CK).

In this study, PCK refers to the knowledge of utilising particular teaching and learning methods to accommodate specific CK in the acupuncture programme to improve children's health. The researcher believes that PCK is crucial in promoting the learning outcomes of the acupuncture programme, which further enhances children's health. The researcher is of the view that when educationists (lecturers and other academic staff) have sound PCK, there is a high probability of effective delivery of the acupuncture programme. This view concurs with Shulman (1986). Therefore, the researcher advocates the importance of profound PCK among academics presenting the acupuncture programme.

Furthermore, the researcher agrees with Shulman (1987) that PCK plays an integral part in how lecturers present their CK in novel and interesting ways to enhance students' understanding of the content. Kultsum (2017) explains that PCK comprises core elements in teaching, learning and assessment, which are appropriate techniques to strengthen learning

and the connection among teaching, learning, assessment, and practices. Pompea and Walker (2017) concur with Koehler et al. (2013) that the PCK refers to the concept of transformation of the CK teaching. According to the researcher, this transformation of content knowledge assists lecturers in selecting appropriate teaching methods for specific CK to suit students' prior knowledge, motivation, and level of ability. Shulman (1986) argues that this transformation occurs when lecturers represent the specific CK seeking appropriate approaches to interpret it and adapting to the instructional materials (Jones & Moreland, 2015).

Thinzarkyaw (2020) agrees with Jones and Moreland (2015) and Kultsum (2017) that lecturers' PCK may vary from each other, depending on the context of teaching activities, CK, and their experience. The researcher believes that lecturers in the acupuncture programme should be able to select the most effective techniques to meet the requirement for specific CK. For instance, clinical simulation should be utilised among students in the third year of study in the Therapeutics of Acupuncture module before immersing into the actual clinical practice with patients. This will assist in developing students' clinical thinking in a clinical setting. This view is further supported by Eyikara and Baykara (2017), who state that clinical simulation is an effective approach to integrating theoretical knowledge into clinical practice.

3.7 TECHNOLOGY KNOWLEDGE

Technology knowledge refers to basic knowledge of the various technologies from pencil and paper to interactive whiteboards and high-tech with computers, internet and software programmes, and other digital devices (Hannaway, 2019; Wang, 2019). The researcher concurs with the views of Hannaway (2019) and Schmidt et al. (2009) that lecturers and students should adapt to and use technologies for teaching and learning. Oner (2020) confirms every lecturer and student should be prepared to adapt and adopt new technologies for teaching and learning.

In this study, TK refers to knowledge related to high technology, including computers, digital devices, the internet, and software programmes utilised for teaching and learning in an

acupuncture programme. The researcher believes that most universities have adopted technologies to deliver their programmes on various platforms, such as Blackboard Collaborate, Zoom, Microsoft Teams, and Clickup. As a result of the COVID-19 pandemic and lockdown, most academic activities have migrated from contact to online teaching and learning (Aristovnik et al., 2020). The researcher thereafter believes that the effective use of technologies in the acupuncture programme is of significant importance.

3.8 TECHNOLOGICAL CONTENT KNOWLEDGE

Technological content knowledge demonstrates the knowledge of applying appropriate technology to represent particular CK in education to promote effective teaching and learning (Koehler & Mishra, 2009; Koehler et al., 2013). Technological content knowledge focuses on understanding the relationship between technology and specific content and how these domains support or constrain each other (Bhukuvhani, 2018). In this study, TCK refers to the knowledge of employing technology effectively for the delivery of teaching and learning of the acupuncture programme. Bhukuvhani (2018) reveals that developments in particular fields, such as medicine and education, have been influenced and have influenced the development of technology since technology has become an integral part of the 21st century skills in the real world (Venketsamy & Hu, 2022).

The researcher agrees with Hannaway (2019) that it is crucial to understand the impact of technology on the CK of a given context. She argues that various technologies are required to meet specific requirements for different CK. This view concurs with Mishra and Koehler (2006), who affirm that using technology in teaching depends on the nature of the content. For the effective use of technology in an acupuncture programme, the researcher believes that it is necessary for lecturers to not only perceive CK but also to be able to apply technological tools for strengthening effective teaching and learning in a specific programme. In the acupuncture programme, lecturers should use appropriate technologies to assist in the effective delivery of CK of acupuncture. Educationists (lecturers), according to Koehler and Mishra (2009), adopt creative perspectives to the explicit phenomenon in particular content by effectively taking advantage of technology. Lecturers can consequently select the most appropriate technologies for acupuncture CK teaching.

3.9 TECHNOLOGICAL PEDAGOGICAL KNOWLEDGE

The TPK refers to the knowledge of using different forms of technologies that can enhance effective teaching and facilitate students' learning (Koehler et al., 2013; Wang, 2019). This domain focuses on the perception of technology used in the process of teaching and how it can be a useful by means of promoting teaching and learning (Mishra & Koehler, 2006; Venketsamy & Wilson, 2020). In this study, TPK refers to various technologies employed in the acupuncture programme to enhance teaching and learning, such as online collaborations, pre-recorded lecture videos and presentations.

Bhukuvhani (2018) states that TPK represents the changes in teaching and learning due to the utilisation of technology in teaching. Mishra and Koehler (2006) assert that TPK is the application of technologies in teaching to change teaching approaches to promote students' learning. The researcher believes that it is important for lecturers to possess an in-depth understanding of applying technology for pedagogical purposes. This view concurs with Elas et al. (2019). They emphasise that lecturers need to be creative and understand how the existing technologies can be used to strengthen the understanding of specific CK.

3.10 TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE

Technological Pedagogical Content Knowledge is defined as the knowledge related to the comprehensive relationship among various elements in teaching and learning (Elas et al., 2019; Koehler et al., 2013). These elements encompass technology, pedagogy, and content required for lecturers to develop appropriate and content-specific teaching approaches in a particular context (Harris & Phillips, 2018). Mishra and Koehler (2006) claim that TPACK is a fundamental concept of effective teaching, integrating technological, and pedagogical techniques to construct new comprehension from students' current knowledge. The researcher is of the view that TPACK provides a way to illustrate the correlation among TK, PK, and CK of the acupuncture programme, which allows further exploration of students' experiences of the delivery of the programme.

The identified acupuncture programme in this study is a unique field in the South African context. Therefore, the researcher believes that exploring the contextualised teaching,

learning, assessment, and practices of the programme is of great significance. This view concurs with Harris and Phillips (2018), who affirm that each teaching and learning situation is unique, and there is no universal technology that can be used in all contexts. The integration of TK provides another dimension to promote effective teaching: the lecturer's perception of how technology interacts with their PCK for specific content (Koehler & Mishra, 2008). The researcher believes that the TPCK model can be developed by exploring students' experiences in the previous years of study regarding how technologies were applied to adapt the CK and PCK in the acupuncture programme.

3.11 TECHNOLOGICAL, PEDAGOGICAL AND CONTENT KNOWLEDGE MODEL

Mishra and Koehler (2006) proposed an approach to develop TPACK by starting from PCK and introducing technology into the PCK (Koehler et al., 2014). They agree that this may be an ideal choice for experienced lecturers who have accumulated a repertoire of PCK of a specific programme to integrate various technologies in their teaching. The TPACK arises from the interaction among the three components, TK, PK, and CK, in the teaching and learning process. Koehler and Mishra (2009) explain that TPACK offers an opportunity for all educationists (in this study, lecturers) to comprehensively understand each component of the model and how to integrate the three domains for effective teaching and learning. In this study, the researcher believes that TPACK allows lecturers to manipulate and coordinate technological, pedagogical, and content knowledge in teaching and learning the acupuncture programme. It is pertinent for lecturers to have an in-depth understanding of TPACK with regard to the dynamic interactions that occur amongst content, pedagogy, and technology. With an extensive understanding of CK, PCK, and TCK, according to the TPCK model, lecturers can effectively facilitate teaching and learning in the acupuncture programme.

Oner (2020) and Koehler et al. (2014) claim that using different learning activities can be a starting point for this approach, such as group discussion and role-playing. The recent lockdown due to COVID-19 forced HEIs to review, adapt, and accommodate their teaching, learning, assessment, and practices in their programmes. There has been an increasing shift in the use of technologies for teaching and learning in higher education institutions, exacerbated by the recent lockdown.

Aristovnik et al. (2020) state that most HEIs embraced the implementation of various pedagogies and approaches to teaching and learning. In the researcher's experience, he has noted the extensive use of online teaching and learning technologies and technological devices to support students' learning. Hu et al. (2022) agree with Aristovnik et al. (2020) and Hu and Venketsamy (2022a) that most South African universities have shifted to online teaching and learning since the outbreak of the pandemic in 2020 – therefore, emphasising the integral role of using technology for education. The use of technology has increased significantly in all 14 HEIs in South Africa.

As a result of the influence of COIVD-19, lecturers and students had to quickly learn to migrate from contact classes to online teaching and learning. The TPACK model encourages the use of technology in education. However, Mishra and Koehler (2006) argue that all users (lecturers and students) of technology must have appropriate knowledge and understanding of using technology. The TPACK model is arguably the most widely utilised model in education to promote effective teaching and learning in different contexts (Elas et al., 2019; Koehler & Mishra, 2009). This model was developed from Shulman's (1987) explanations of several categories of knowledge for professional teacher education (Harris & Phillips, 2018).

The researcher opines that since technologies have exponentially increased how classes are presented at HEIs, it is pertinent to integrate and consolidate technological knowledge into pedagogical and content knowledge in the acupuncture programme in SA. This view concurs with Thinzarkyaw (2020) and Venketsamy and Hu (2022), who highlight that education institutions have incorporated technology to accommodate education in the 21st century to improve learning outcomes. The researcher argues that to gain a profound understanding of the delivery of the acupuncture programme, the students' views regarding the elements of CK, PCK, and TCK are of significance. Figure 3-3 below illustrates an outline of the TPACK model.

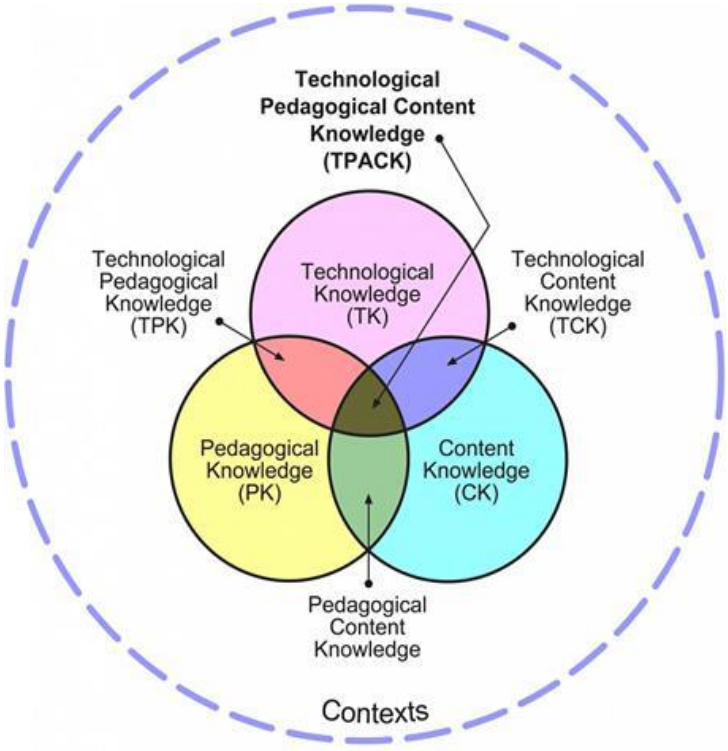


Figure 3-3. The TPACK model (Adapted from TPACK.org, 2012)

There are three core components to the TPACK model: CK, PK, and TK (see Figure 3-3 and Table 3-1) (Koehler & Mishra, 2009; Mishra & Koehler, 2006). Elas et al. (2019) agree with Koehler and Mishra (2009) that the primary claim of the TPACK model is that through an appropriate combination of these components for teaching, learning, and assessment, four other types of knowledge can be strengthened. They refer to the content knowledge (what), pedagogical knowledge (how), and technological pedagogical content knowledge (which technology/ies) (Elas et al., 2019). Harris and Phillips (2018) argued that various other blended knowledge domains could be derived from these three domains, such as TCK, TPK, PCK, and TPACK.

The TPACK model presents technology as the third core domain of teacher knowledge, along with content and pedagogy (Oner, 2020). In this study, the ‘PCK’ refer to the Pedagogical Content Knowledge, while the ‘PCK model’ is defined as Shulman’s PCK framework. The ‘TPACK model’ is defined as the entire Technological, Pedagogical and Content Knowledge framework; ‘TPACK’ components refer to the specific knowledge that consists of the TPACK

framework, which is a specific intersection of technological, pedagogical, and content knowledge. A summary of the TPACK model is presented in Table 3-1.

The conceptual framework proposes effectively integrating CK, PCK, and TCK to strengthen teaching and learning. In this study, the researcher identified the importance of using CK, PCK, and TCK for teaching and learning. Therefore, he argues for the validity of developing a conceptual framework, the TPCK model. This framework focuses on CK, PCK, and TCK developed from the PCK and TPACK model.

Components of TPACK	Descriptions
Content Knowledge	Knowledge of the subject matter to be learned or taught includes concepts, theories, and other required knowledge essential for establishing the subject matter.
Pedagogical Knowledge	Knowledge of the processes and practices or teaching and learning approaches, such as classroom management, lesson plans, and assessment selections.
Technology Knowledge	Knowledge of the use of technologies, such as skills to install, uninstall, and operate particular software programmes.
Pedagogical Content Knowledge	Knowledge of pedagogy that is appropriate for specific content.
Technological Content Knowledge	Knowledge of the connection between technology and content that is related to each other.
Technological Pedagogical Knowledge	Knowledge of the application of the appropriate technologies in a specific teaching and learning setting
Technological Pedagogical Content Knowledge	Knowledge of the interaction among CK, PK, and TK when employing technologies in teaching and learning

Table 3-1. Summary of the TPACK model (Mishra & Koehler, 2006; Venketsamy & Wilson, 2020)

3.12 SUMMARY

In Chapter 3, the researcher explained the conceptual framework, the TPCK model, that was employed in this study. The researcher focused on the justification for developing the TPCK model in this study. The elements of the TPCK model were further discussed. The researcher believed that using the TPCK model would assist in strengthening the findings of this study and strengthening the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health. The significance of applying the TPCK model in this study was also highlighted. In the next chapter, the researcher focuses on explaining and discussing the research methodology adopted in this study.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

In Chapter 3, the researcher presented an in-depth discussion of the conceptual framework used in this study, adapted from Shulman's (1986) PCK model and Mishra and Koehler's (2006) TPACK model. The rationale for using these two models as a lens for this study was presented in detail. The researcher also argued the validity of these models and their significance and contribution to strengthening the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health.

In this chapter, the researcher explains the chosen research methodology and its appropriateness for this study. It also outlines the research design, methodology, and ethical components of this study. This chapter includes a detailed discussion of the research paradigm, research approach, and research design. Furthermore, the researcher discusses the procedure used to recruit and select the participants, data collection methods, and the data analysis process. Finally, the chapter expounds on how issues of trustworthiness and ethical considerations were addressed throughout this study.

4.2 RESEARCH METHODOLOGY

According to Okesina (2020), the research methodology is a bridge that connects the philosophical worldview and the research methods used in a study. Creswell (2014) and Maree (2012) concur that the research methodology is a systematic procedure that consists of identifying, selecting, collecting, and analysing data in studies. In essence, the research methodology seeks to explain how data are generated and analysed in a particular study. The researcher agrees with Ferreira (2012), who indicates that the importance of the research methodology cannot be overemphasised because it determines the mechanism used for data collection.

This chapter examines the research design and how data related to the research focus was collected, collated, and analysed. The research questions guided the researcher's investigation throughout the study. The researcher applied a single case study design using a qualitative approach in this study. The reason was that the researcher focused on exploring the lived experiences of students regarding the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health. The selection of the qualitative approach is supported by Brynard et al. (2014) and Cohen et al. (2018). They agree that a qualitative approach focuses on exploring participants' experiences and perceptions of a phenomenon. Figure 4-1 below illustrates a brief outline of the research methodology that was adopted in this study.

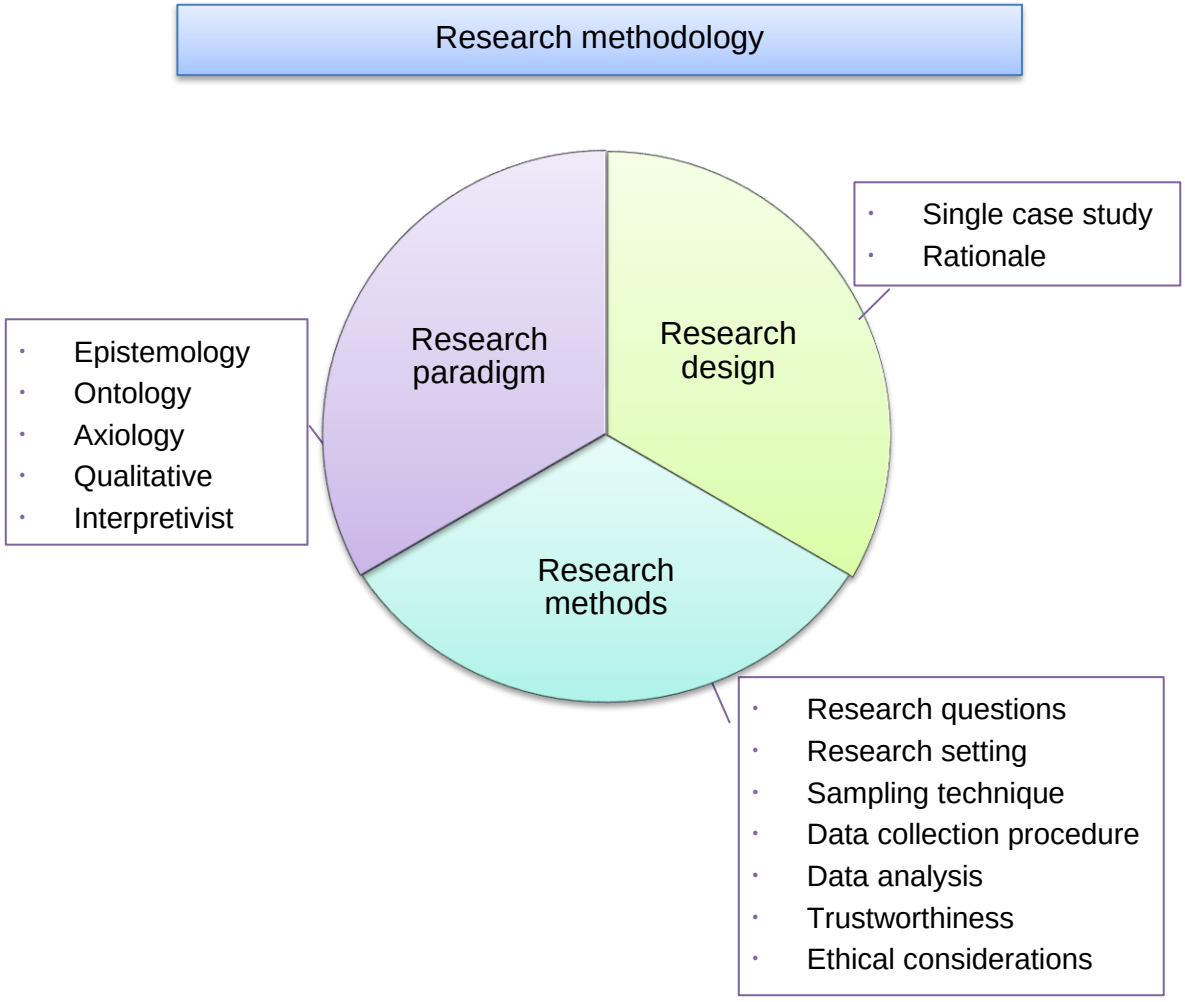


Figure 4-1. A brief outline of the research methodology

4.3 RESEARCH DESIGN

The research design refers to the process of selecting a project, conducting the research, and ensuring the practicability of the project (Ferreira, 2012). The function of a research design is to ensure that the evidence collected enables the researcher to address the research problem as accurately as possible (Denzin & Lincoln, 2017). Kinnear (2022) agrees with Denzin and Lincoln (2017), who point out that an appropriate research design makes the research process explicit and trustworthy. Maree (2020) posits that qualitative research allows the researcher to explore the underlying reasons related to research problems to improve the situation. This was relevant to this study as the researcher aimed to strengthen the delivery of an acupuncture programme to improve children's health. Consequently, the researcher employed a qualitative case study design in this study to explore students' lived experiences regarding the teaching, learning, assessment, and practices of the acupuncture programme.

4.3.1 Rationale for the case study design

A case study design is a method used to investigate and examine a context over time in one or few sites, thus providing an in-depth exploration of programmes (Creswell, 2014; Yin, 2018). In this study, the researcher asked the primary research question, 'How do students experience the teaching, learning, assessment and practices of an acupuncture programme to improve children's health?' The researcher believed the case study design was suitable for exploring this phenomenon since the identified programme was a unique and crucial case in South Africa. Venketsamy and Miller (2021) articulate that a case study is descriptive as opposed to a single view of an individual in a survey. The researcher believed that a single case study design allowed for an in-depth investigation of the significant factors related to the delivery of an acupuncture programme and was an appropriate methodology for exploring this phenomenon.

Therefore, the researcher adopted a single case study design in this study, focusing particularly on the views of students regarding the teaching, learning, assessment, and practices of an acupuncture programme. This view concurs with Creswell (2014), who states

that the research problem determines the type of design a researcher could use for data collection and analysis. Cohen et al. (2018) and Yin (2018) explain that a case study design is suitable for answering 'how' and 'why' research questions. In the field of education, a case study design assists in understanding the impact of educational programmes and offers evidence for policy and practice decisions (Brynard et al., 2014).

Yin (2018) further highlights that a single case study design is recommended when studying a critical, unusual, common, and revelatory case. The researcher believed that in the selected case, the teaching, learning, assessment, and practices of the acupuncture programme were critical since they ensured that pre-service students were competent to promote children's health in the real world. The selected case was unusual because the identified university was the only HEI in SA that provided an acupuncture programme. This programme was introduced at the HEI for the first time in 2019. The value of this case can be connected to promoting children's health and the development of acupuncture programmes in the South African context. The researcher believed that the identified case was also common since the quality of all educational programmes relied on their teaching, learning, assessment, and practices. The reason being revelatory was that the researcher is an academic staff for the acupuncture programme at the identified HEI, who had an opportunity to observe and analyse the teaching, learning, assessment, and practices of the programme.

In this study, the researcher employed an embedded single case study design. The embedded single case study design consists of multiple units of analysis within one selected case (Cohen et al., 2018; Yin, 2018). The selected case was an acupuncture programme at an identified HEI in SA. The units of analysis included students in the 2nd, 3rd, or 4th year of their studies. The embedded single case study design enabled the researcher to investigate the participants' experiences in their different years of study. The researcher aimed to elicit participants' responses and experiences of the teaching, learning, assessment, and practices of the acupuncture programme. The researcher believed that the design allowed him to analyse the students' experiences of the acupuncture programme to improve children's health. Figure 4-2 illustrates the embedded case study of the acupuncture programme.

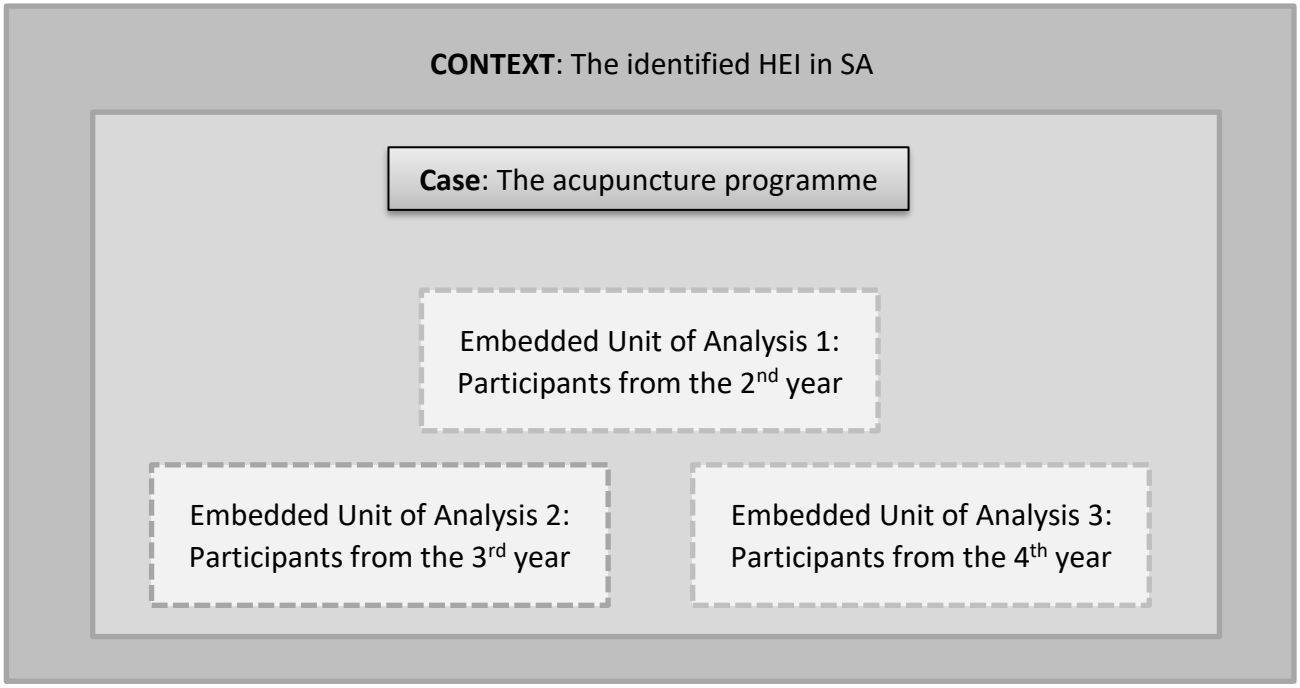


Figure 4-2. An embedded single case study design (As adapted from Yin, 2018)

Nieuwenhuis (2020) states that the case should be described in-depth and within a specific context to ensure validity in this design. There are several advantages to employing a case study design. Brynard et al. (2014) and Yin (2018) concur that the strengths of case studies are mostly related to their methodology, interpretation of data, particular population, and the longitudinal effect. One of the advantages of this design is that it allows for various data collection methods since a case study typically employs a multi-method design (Kinnear, 2022).

In this study, the researcher adopted a variety of instruments for data collection, which allowed for data triangulation. The researcher concurs with Cohen et al. (2018) that the use of multiple data collection instruments consequently strengthened the validity of the findings. Other strengths of case studies are that the outcomes of a case study can be easily comprehended (Yin, 2018); a single investigator can manage and investigate the case; and the selection of a case, methodology, and nature of the case are versatile - in other words, one person, organisation, or country can be viewed as a case (Brynard et al., 2014). For these reasons, the case study design was adopted since it focused on a cohort of students registered for an acupuncture programme at a selected HEI in SA.

Despite the numerous strengths of a case study design, Yin (2018) agrees with Brynard et al. (2014) that there are also weaknesses that investigators need to consider in their decision. Kinnear (2022) argues that the findings from a single case study cannot be generalised to other contexts. Since the identified university in this study was the only HEI in SA offering an acupuncture programme, the researcher concurs with Kinnear (2022) that the findings of this study cannot be generalised to other institutions globally. However, the responsibility of the researcher is to provide detailed descriptions of the case, which will allow readers to make decisions based on their judgement (Maree, 2020). Therefore, the researcher provided detailed descriptions of participants' experiences and perceptions of the teaching, learning, assessment, and practices of the acupuncture programme aimed to assist readers in transferring the findings from this case to their own context. Detailed descriptions of the case can be an advantage of a case study design; however, this may also be a disadvantage (Yin, 2018). A large amount of data could simultaneously become a disadvantage as the researcher would have to make sense of massive data. In this study, the researcher strictly followed the guidance from the research questions and focused on the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health as the boundary of this study.

4.4 RESEARCH PARADIGM

Creswell (2014) and Maree (2020) elucidate that a paradigm is a philosophical framework that explains a particular theoretical approach to research. Cohen et al. (2018) further explain that a paradigm is an approach to how the investigator perceives the world. The researcher believes that the qualitative approach was suitable for this study since the researcher explored the participants' lived experiences on the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health within a real-world context. According to Hu and Venketsamy (2022a), qualitative research refers to a systematic research technique that studies the meanings, characteristics, and understanding of subjects. They agree that a qualitative approach aims to explore participants' experiences and perceptions of a phenomenon. An interpretivist paradigm aims to understand individual experiences in the subjective world (Maree, 2020).

The interpretivist paradigm allowed the researcher to interact with participants to gain an in-depth understanding of their views and experiences on the teaching, learning, assessment, and practices of the acupuncture programme. This view concurs with Venketsamy and Hu (2022), who articulate that the qualitative approach enables the researcher to interpret and describe the lived experiences of participants in the study. Subsequently, the researcher employed a subjective epistemology with a relativist ontological assumption. This section further explains the epistemology, ontology, axiology, and methodology of the paradigm in this study.

4.4.1 Epistemology

Epistemology is a term that explains how humans know the fact or truth, which focuses on extending the investigator's knowledge or understanding in the field of research (Kiyunja & Kuyini, 2017). Nieuwenhuis (2020) and Okesina (2020) highlight that epistemology assists in establishing faith in the data analysis of a study by emphasising the link between the investigator and the objects (phenomenon or participants). The researcher believed that an interpretivist paradigm was a subjectivist epistemology that relied on the investigator's own understanding and comprehension when making sense of data. This view concurs with Kiyunja and Kuyini (2017), who assert that subjectivist epistemology should be utilised when interpreting qualitative data, which relies on the investigator's interpretation. The researcher contends that the subjectivist epistemology allowed him to explain students' experiences of the teaching, learning, assessment, and practices of the acupuncture programme through his perception and comprehension of data. Therefore, a subjectivist epistemology was adopted in this study.

4.4.2 Ontology

Epistemology relates to how reality can be known, whereas ontological assumptions focus on what is reality (Okesina, 2020). Cohen et al. (2018) and Brynard et al. (2014) point out that ontology is the philosophical foundation that is related to the assumptions of research. It identified the investigator's belief in the nature of existence and reality, which is critical to comprehending how the data was analysed (Creswell, 2014). Maree (2020) explains that

there are three primary ontological viewpoints; these are realism, materialism, and idealism. Kiyunja and Kuyini (2017) specify that these realities could be explored through interactions between the investigator and participants. These authors agree that interpretivists widely accept idealism since they believe that reality is only understood through human perceptions. The researcher believed that individuals would have different experiences of the teaching, learning, assessment, and practices of the acupuncture programme, which were understood through the researcher's interpretation. For this reason, the researcher employed an idealistic ontological assumption in this study.

4.4.3 Axiology

Axiology refers to concerns on ethical matters involved in research, including identifying the value of the research (Kiyunja & Kuyini, 2017). The researcher believed that it was crucial to ensure trustworthiness and ethical concerns in the research because they strengthened the validity and reliability of a study. In a similar vein, Cohen et al. (2018) and Okesina (2020) concur that in a balanced axiological assumption, the findings of the study must reflect the situation or phenomenon without bias brought by the researcher. In this study, the researcher presented a neutral and authentic report of the findings of this study. To minimise bias in interpretations and ensure the rigour and quality of this study, the researcher employed multiple techniques to enhance the trustworthiness, such as frequent debriefing with supervisors, audit trails, and triangulation (see section 4.5.8.1). In this study, the researcher collected data through multiple instruments, including online text-based interviews, observation schedules, participants' reflective journals, field notes, and documentation.

4.4.4 Qualitative approach

A qualitative approach is a technique used to investigate and comprehend the meaning and characteristics of phenomena attached to a social or human problem (Venketsamy & Hu, 2022). The researcher contended that qualitative research was suitable to explore individuals' experiences, situations, and values to gain an in-depth understanding of the participant's viewpoint within their natural context. Okesina (2020) and Maree (2020) agree that qualitative research is widely used to analyse complex phenomena and improve the understanding of

the phenomenon being studied. The researcher believed that the qualitative approach was concerned with the interpretation and meaning of a phenomenon, which referred to students' experiences of the teaching, learning, assessment, and practices of the acupuncture programme in this study. In this study, the researcher collected data from the participants in their natural environment (Brynard et al., 2014). In this study, that was the HEI where they were studying. The reason was that the participants were relaxed and comfortable within their environment to respond to the questionnaires without fear, duress, or intimidation (Creswell, 2014).

Through the primary question, 'How do students experience the teaching, learning, assessment, and practices of an acupuncture programme to children's health?', the researcher aimed to take a qualitative research approach to gather the opinions, perceptions, attitudes, and experiences of the participants and not the views of the researcher (Nieuwenhuis, 2016). A qualitative approach is often used to support or prove an agenda that is naturalistic, constructivist, or interpretivist (Lodico et al., 2010). The qualitative design allowed for an interpretivist approach to the study. Collins and Stockton (2018) agree that case studies take a flexible approach when conducting qualitative research. They state that the theory can influence both the research methods and the approach used to analyse the data. Thanh and Thanh (2015) support the view of Brynard et al. (2014). They claim that using an interpretivist research approach, the participants' views, background, and experiences helped create reality during the research process. In this study, the researcher applied an online text-based interview to elicit participants' experiences and perceptions of how the acupuncture programme was delivered to prepare their competencies in clinical practice to optimise children's health. The qualitative approach is justified further in Table 4-1.

One of the secondary research questions in this study was, 'What strategies can be used to strengthen the quality of teaching, learning, assessment and practices in the acupuncture programme?' To answer this question, the researcher had to explore the gaps in the delivery of the acupuncture programme at the identified HEI. The researcher also had to explore participants' experiences and attitudes towards the teaching, learning, assessment, and

practices of the acupuncture programme. The findings were analysed, and recommendations are provided in Chapter 6.

Characteristics	Applicability to this study
Natural setting	This study was conducted at an identified HEI in SA, where the acupuncture programme was delivered.
Experiences, understanding and meaning should be emphasised	The primary focus of this study was students' experiences of the teaching, learning, assessment, and practices of the acupuncture programme at an identified HEI in SA.
The researcher plays a critical role in the study, especially in the process of data collection and analysis	The researcher was the only investigator involved in collecting, analysing and interpreting the data in this study. The researcher utilised multiple methods to collect data in this study.
Data should be analysed inductively	The collected data were categorised into themes according to the six-step thematic analysis proposed by Creswell (2014).
Thick descriptive information should be obtained in data collection	Multiple data collection techniques were employed in this study, including online text-based interviews, observation schedules, participants' reflective journals, field notes, and documentation.
Participant perspective	The researcher tried to understand the gaps in the teaching, learning, assessment and practices of the acupuncture programme to improve children's health. The researcher understood the phenomenon from the perspective of students who were studying in the programme.

Table 4-1. Characteristics of qualitative research (Adapted from McMillan & Schumacher, 2010; Merriam & Grenier, 2019)

4.4.5 Interpretivist paradigm

An interpretivist paradigm refers to an approach to understanding and comprehending the truth and knowledge in the real world through the investigator's interpretation (Brynard et al. 2014; Okesina, 2020). Research in the interpretivist paradigm implies exploring real-world situations that unfold naturally. Creswell (2014) argues that the research in this field is non-manipulative, unobtrusive, and non-controlling. The advantage of the interpretivist paradigm includes establishing a partnership with the research participants to ensure the richness of the data of the phenomenon (Maree, 2012).

Interpretivism is based on observing and interpreting multiple realities by the researcher. Therefore, investigators must use multiple data collection methods to explore the relationship between the research question and the phenomenon being studied. The researcher applied purposeful sampling so that he could control the conditions, impact, and values, which were central to the study's context. Inductive reasoning was used to sort through the data. Inductive reasoning allowed the investigator to explore the different realities present in the data (Ferreira, 2012). It also ensures accountability and honesty in the data analysis process (Maree, 2020). Once themes emerge during the data analysis process, the researcher re-evaluates the data to uncover more evidence supporting the findings. Hence, deductive analysis is useful when doing inductive reasoning (Creswell, 2014). For this reason, the interpretivist paradigm was employed in this study since the researcher aimed to explore students' lived experiences of the delivery of the acupuncture programme to improve children's health.

This study focused on an acupuncture programme integrated into a four-year BHScCM programme at the identified HEI. The researcher invited all 2nd, 3rd, and 4th years students to participate in this study by displaying a research invitation post (Annexure A) on the notice board of the campus of the identified HEI. Ten (10) participants agreed to participate in this study by signing the research informed consent form. The researcher opined that an interpretivist paradigm was suitable in this study to gather in-depth lived individual experiences of participants. This view concurred with Brynard et al. (2014) and Hu and

Venketsamy (2022a), who highlight that employing an interpretivist paradigm allows the researcher to interpret detailed descriptions of data within a small sample size.

The small sample size in this study allowed the researcher to collect information-rich descriptive data on participants' experiences with the acupuncture programme. Nieuwenhuis (2020) concurs that detailed descriptions and in-depth explorations are advantages of the interpretivist approach, which are also critical criteria of good qualitative research. Therefore, the researcher employed an interpretivism paradigm with subjective epistemology, relativist ontology, and balanced axiology, which provided detailed descriptions of the phenomenon as a worldview. Table 4-2 presents a summary of the applicability of the interpretivist paradigm in this study. The trustworthiness of this study is further discussed in section 4.5.7 to ensure its validity and reliability.

Characteristics (Morgan, 2007; Kinnear, 2022)	Applicability to this study
The researcher supports that the social world can only be understood from the perspectives of different individuals.	This study invited students who were registered for the BHScCM programme at an HEI. The participants included 2nd, 3rd, & 4th-year students. Since there were three different cohorts of students, their perspectives and worldview of the acupuncture programme will be invaluable to this study. The different perspectives and views of the participants would strengthen the quality of the acupuncture programme to improve children's health.
The agreement on the characteristics of realities which are multiple and socially constructed.	The researcher believed that participants' experiences in the teaching, learning, assessment and practices of the acupuncture programme would vary from each other and be influenced by their existing experience.
The acceptance that there is inevitable interaction between the researcher and his or her research participants.	The researcher believed that the interaction between the researcher and participants was beneficial in this study. The researcher was actively involved in this study as a non-participant observer.
The emphasis on the importance of the context of knowledge and knowing.	This study was conducted at an identified HEI, which was the only HEI in SA that offered an acupuncture programme. The researcher believed that it was noteworthy to explore students' experiences of the identified acupuncture programme within the HEI where the programme was taking place.

The belief that knowledge is created by the findings can be value-laden, and the values need to be made explicit.	The researcher was of the view that the findings of this study would benefit the improvement of quality teaching, learning, assessment, and practices of an acupuncture programme to improve children's health. The findings of this study were explicated through the researcher's interpretation.
The need to understand the individual rather than universal laws.	Participants had different experiences of the acupuncture programme, which were all authentic. This study explored the teaching, learning, assessment, and practices of the acupuncture programme from the individuals' experiences.
The belief that causes and effects are mutually interdependent.	The researcher was of the view that students' competencies to improve children's health (effects) significantly depended on their experiences of teaching, learning, assessment and practices of the acupuncture programme (causes).

Table 4-2. Characteristics of interpretivist paradigm

4.5 RESEARCH METHODS

The terms 'method' and 'methodology' are often used interchangeably in many contexts, which may cause unnecessary challenges in describing research (Brundrett & Rhodes, 2013). It is crucial to clarify the difference between these two terms to avoid ambiguity and misunderstanding. Maree (2020) agrees with Brundrett and Rhodes (2013) that methodology refers to the comprehensive strategy in conducting the research process, such as selecting a philosophical worldview and techniques. Thomas (2010) further explains that the methodology is specific to the context, purpose, and nature of the research, and its appropriateness needs to be determined so that valid generalisations and representations can be derived from the data collected in the study. Methods refer to the description of

fundamental approaches used in the research process to analyse data received from the investigation. To provide quality assurance for this study, a detailed audit trail of the research methods is explained in this section.

4.5.1 Research questions

This study is guided by the following research questions:

Primary research question:

- How do students experience the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health?

Secondary research questions:

- What are students' views and perceptions on the teaching, learning, assessment and practices in the acupuncture programme?
- What strategies can be used to strengthen the quality of teaching, learning, assessment and practices in the acupuncture programme?
- How can Shulman's (1986) PCK and Mishra and Koehler's (2006) TPACK model be used as a lens to facilitate the delivery of an acupuncture programme?

4.5.2 Research setting

The research setting is the environmental context where the study takes place and where the data are collected (Hu, 2022a). The researcher concurred with Yin (2018), who further expressed that a 'case' must be contextualised by investigating its real-world setting. The focus of this study was students' experiences with the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health at an identified South African HEI. The research setting selected for this study was an HEI that offered an acupuncture programme in SA. Consequently, the researcher selected this institution because it had an acupuncture programme in the health science faculty. Furthermore, it was the only institution that presented a full-fledged four-year acupuncture programme.

4.5.3 Sampling

Sampling techniques is a process of selecting participants from an entire population the study intends to explore (Venketsamy & Hu, 2022). The sample represents the entire population that the study is aimed at since participants are selected from the population (Cohen et al., 2018). Purposive sampling is a technique whereby an investigator selects participants purposively to meet the specific needs of the study (Brynard et al., 2014). Maree (2020) and Yin (2018) suggest that purposive sampling should be utilised in qualitative studies since this technique allows investigators to select participants with the best understanding of the phenomenon. The researcher opined that the purposive sampling technique should be utilised since this study focused on students' experiences of the specified programme at a particular HEI. Subsequently, the researcher adopted a purposive sampling strategy because the researcher was very specific about who the participants in this study had to be.

4.5.4 Participants

Ferreira (2012) and Hu and Venketsamy (2022a) define participants as individuals who are selected from the population to participate in the study. Participants were firstly selected by looking at the population appropriate for this study. The participants of this study were the 2nd, 3rd, and 4th year students studying acupuncture in the BHScCM programme. The reason for selecting this group of students was because they would have already experienced the teaching, learning, assessment, and practices of the programme. The 1st year students were excluded from this study because the researcher believed they had minimal exposure to the programme and lacked an in-depth understanding of the acupuncture programme when data collection occurred.

Morgan and Sklar (2012) suggest the need for pre-selected criteria relevant to the research questions to be used when selecting participants. The researcher identified specific inclusion criteria to ensure an appropriate selection of the participants. Only those participants who met the inclusion criteria were invited to participate in the study. The criteria included:

- students who were registered in the acupuncture programme for the BHScCM degree
- participants had to be in the 2nd, 3rd, or 4th year of study in the BHScCM programme

- they should have had access to internet facilities to complete the online open-ended interview on Google Forms; and
- they had to voluntarily agree and consent to participate in the study.

Those participants who did not meet the above criteria were excluded from participating in the study.

To invite participants to the study, the researcher displayed a research invitation post (Annexure A) on the notice board that students had access to. Afterwards, the researcher shared the research information and informed consent letter (Annexure C) through Google Forms to students who met the inclusion criteria and expressed their willingness to participate in this study. Participants were requested to read and sign the research information letter and the consent forms before participating in this study. Only those who voluntarily consented to participate in the study were recruited.

4.5.5 Data collection instruments

Data collection is a systematic process of gathering information to answer the research questions and evaluate outcomes (Brynard et al., 2014). The researcher agrees with Maree (2020) that data collection is important to ensure that the research questions are answered. Nieuwenhuis (2020) highlights that research questions will only be answered by interpreting data. For this study, the researcher applied multiple data collection instruments, including online text-based interviews, observation schedules, participants' reflective journals, field notes, and documentation (Cohen et al., 2018).

4.5.5.1 Online text-based interviews

Text-based interviews can maintain the depth of inquiry required in qualitative studies and encourage more sensitive areas to be addressed anonymously (Cohen et al., 2018). In this study, the researcher applied text-based interviews to probe participants' experiences of the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health. The researcher believed this technique was suitable for this study since the researcher was an academic staff member involved in this programme. The anonymous nature of the online text-based interview would minimise the potential coercion between the

interviewer as a lecturer of the identified programme and interviewees who were students studying acupuncture.

Open-ended questions help generate information-rich data, which is a vital feature for high-quality qualitative interviews (Creswell, 2014; Yin, 2018). The interview questions in this study were designed using the TPCK model. To prevent the spread of the COVID-19 pandemic and achieve anonymity, an online text-based interview with open-ended questions administered through Google Forms was employed in this study. Participants were given two months, between March 2022 and April 2022, to answer the interview questions at their most convenient time.

One of the advantages of this method is that it offers excellent flexibility regarding time and location for both the interviewer and interviewees (Cohen et al., 2018; Pearce et al., 2013). Pearce et al. (2013) further assert that participants may feel comfortable with the anonymity it offers, allowing participants more time to develop coherent responses. The researcher contended that the non-visual method would encourage participants to express themselves more openly about sensitive areas related to the delivery of the acupuncture programme.

Despite several strengths of the online text-based interview, there were a few weaknesses of this method, as specified by James and Busher (2016) and Pearce et al. (2013). For instance, the interviewer has no control over the interviewee, who may not be the person that was intended to be interviewed. To address this matter, the link for the Google Forms containing the interview questionnaire was emailed directly to the selected participants. Another weakness of this type of interview might be that some interviewees may not wish to read the questions or type their responses (Cohen et al., 2018; James & Busher, 2016). To address this issue, the purpose and significance of this study were explained to students to encourage them to participate. The detailed requirements and information of this research were verbally explained to participants before participating in this study. This was to assist students in understanding what to expect, which may potentially encourage them to complete their participation in this study. The data collected from the online text-based interviews were transcribed, analysed, organised into themes, and reported on as textual data, with themes

and sub-themes reflecting the patterns found. These were later used to make recommendations in Chapter 6.

4.5.5.2 Observation

Observation is the process of collecting direct information on participants' behavioural phenomena without communicating with them at the research sites (Maree, 2012; Nieuwenhuis, 2020). Maree (2020) further explains that observation is a systematic process where researchers take field notes of occurrences using their senses. The researcher opined that observation enabled him to obtain deeper insight and understanding of the phenomenon, which in this study referred to participants' acupuncture practical skills in a clinical setting. The researcher contended that observation was a critical technique for evaluating students' clinical skills, such as communication with patients and needling techniques. Creswell (2014) states that observation is crucial to comprehending people's behaviours and obtaining potentially useful information. In this study, observation focused on participants' practical skills in acupuncture.

Maree (2020) and Seabi (2012) explain that neutrality in observations and findings is improved by non-participant observation. In the process of non-participant observation, Nieuwenhuis (2020) concurs with Cohen et al. (2018) that the investigator visits the site and makes notes without engaging in the participants' activities. In this study, non-participant observation was achieved by the researcher observing participants' clinical practice under another clinician's supervision. During observation, the researcher collected information directly from the participants by watching them engage in daily activities. During observation, the researcher took field notes, which allowed the researcher to gain deeper insight and reflection into the phenomenon. However, Nieuwenhuis (2020) argues that the limitation of non-participant observers who are the 'outsiders' of the situation do not really understand what they observe. In this study, the researcher was an academic staff and lecturer of the acupuncture programme and a registered acupuncturist. Therefore, the researcher understood what he observed even though he was a non-participant observer in this study.

One of the advantages of using observations is that it allows the investigator to see, hear, and experience the natural environments of the participants (Seabi, 2012). However, observations can be biased as the investigator may see only what he chooses to (Cohen et al., 2018). To minimise this, the researcher was made aware of his own biases, looking at the situation as a whole and not just a fragment. It is vital for the investigator to create a natural environment in which the participants feel relaxed (Creswell, 2014). The investigators must be conscious of how their presence influences the participants' behaviour, actions, and responses. Thus, the researcher played a crucial role in creating a natural, relaxed environment for the participant that was characterised by trust. In this study, the researcher strictly followed the instructions on the pre-designed observation form (Annexure E) to maintain the observation's focus and minimise biases.

To minimise the Hawthorne effect, the researcher adopted the recommendations made by Bateman et al. (2019), Harrell et al. (2013) and Oswald et al. (2014), whereby the researcher developed a rapport with the students being observed so that they felt comfortable with the researcher being present in the clinic. Harrell et al. (2013) and Bateman et al. (2019) state that the Hawthorne effect refers to participants' behavioural changes in response to their awareness of being observed. The researcher assured that the participants were fully informed of the study's purpose, which is to improve and strengthen the quality of teaching, learning, assessment, and practices of the acupuncture programme at a university. He also assured them that no judgement would be passed on the participants' performance during the observation of the acupuncture practice.

There were four observations for each participant's group (embedded case) between March and April 2022. Since the observations were conducted over two months, this allowed students to settle in and become comfortable with the researcher's presence in the clinic. The researcher also employed naturalistic observation, which involved observing the participants in their natural environment without intervening. During the observation sessions, photographs were taken with the participants' consent. Data from the first two observation sections were excluded from the analysis to reduce the Hawthorn effect. During the

observation, field notes were used to record the researcher's important thoughts and observations, which are further explained in section 4.5.5.4.

4.5.5.3 Participants' reflective journals

A reflective journal is a written record on a regular basis that participants use to keep account of their thoughts and experiences (Seabi, 2012). Participants' reflective journals are considered natural as they include personal meanings and understandings of their situations (Nieuwenhuis, 2020). Reflective journals are an important source of data collection as they allow the participants to note their observations, occurrences, behaviours, ideas, successes, and weaknesses (Amirkhanova et al., 2016; Bashan & Holsblat, 2017). These authors agree that keeping reflective journals will enhance students' learning and will also provide a better understanding of their progress during their studies. The researcher opined that reflective journals could be used to understand the link between participants' knowledge and their personal experiences (see Annexure F).

In the researcher's view, using reflective journals as a data collection method enabled him to establish and understand participants' experiences and their views to strengthen the acupuncture programme in the situated context. Participants' reflective journals were contextualised as they were the real-world record of their experiences in the teaching, learning, assessment, and practices of the acupuncture programme at the identified HEI. Reflection allowed the participants to think about their problems and limitations (Farrah, 2012). Mainly, participants recognised that keeping reflective journals was their way of documenting their responses to questions about their views, opinions, and consideration of their experiences of the teaching, learning, assessment, and practices of the acupuncture programme. In this study, participants recorded their reflections on the teaching, learning, assessment, and practices of the acupuncture programme. Participants were requested to keep reflective journals for two months between March 2022 and April 2022. The frequency of journal recordings was not made mandatory so that participants did not feel threatened by what they had reflected on. These journals were further utilised as a source of data in this study.

4.5.5.4 Field notes

Field notes are defined as records where investigators document their thoughts and observations (Seabi, 2012). Phillippi and Lauderadale (2018) state that field notes are a valuable source of information in qualitative research as they comprise of detailed descriptions of the study. Bergold and Thomas (2012) articulate that investigators are important contributors to the data in qualitative studies, particularly when there is an overlap between the phenomenon and the context being studied. These authors agree that field notes assist investigators in reflecting on their thoughts and events as they occur. In the researcher's opinion, field notes were of great importance as it documents the lived reflections of phenomena that the researcher encountered. Therefore, field notes were documented by the researcher in this study to maintain records on phenomena, relevant questions, and thoughts during the entire study period. These field notes added valuable insight into the impact of students' experiences on acupuncture practice. Field notes included written records and photographs to capture participants' behaviours to gain insight into their skills, knowledge, attitude, and value towards the teaching, learning, assessment, and practices of the acupuncture programme to optimise children's health.

As set out by Mills et al. (2010), the guidelines on how to take field notes were noted and adhered to. These guidelines highlight the importance of documenting the unique phenomenon and the most interesting events in a subsequent manner. These field notes were later used to create conceptual links and cluster evidence into clear categories in preparation for data analysis and findings, which are discussed in Chapter 5. During the data collection period, all factual information from the participants' engagement, personal reflections, experiences, considerations, and feelings about what the work meant were documented. Photographs taken during observation were labelled, and explanatory notes were made for later referencing. Higginbottom and Liamputtong (2015) refer to this as an iterative reflective process, where the collaboration, sharing, and exchange between the researcher and the participants are used to ensure the continued agenda and goals of the engagement. The researcher was cognisant of the caution about the interpretive crisis, where research data is not accepted and agreed on (Denzin et al., 2017).

4.5.5.5 Documentation

In qualitative research, documents (textual data) focus on written communications that bring insight into the phenomenon being investigated (Nieuwenhuis, 2020). The researcher opined that documents might provide additional information about the acupuncture programme, which may be challenging to obtain from participants. This view concurs with Yin (2018) and Maree (2020). They claim that published or unpublished documents provide different information that cannot be obtained from interviews and will further strengthen the findings. In this study, documentation was utilised as a data collection method. Relevant documents were collected and used, including policy and project-related documents, letters, newsletters, and annual and special reports. Yin (2018) highlights that documents play a vital role in data collection when conducting case study research. Nieuwenhuis (2020) is in support of this view. He further explains that using document analysis for triangulation will strengthen findings.

Maree (2012) contends that document analysis elicits meaning, gives concrete understanding, and contributes to empirical knowledge from data provided in the documents. Investigators analyse information from literature as part of their research, and this data can then be organised into major themes (Cohen et al., 2018). Lincoln and Guba (2013) and Nieuwenhuis (2020) concur that there are mainly two categories of documents, namely primary and secondary sources. Creswell (2014) postulates that the investigator is the primary instrument in data collection and generates primary data sources (Lincoln & Guba, 2013; McMillan & Schumacher, 2010). Kinnear (2022) states that a primary source is an original or first-hand account of the investigator's experience of an event or engagement with a phenomenon. Primary sources include materials originally generated or written by the investigator/s based on their own experiences and observations. The researcher and participants in this study provided important data as primary sources for drawing on findings and making recommendations. These sources included the information from the online text-based interviews, observation schedules, participants' reflective journals, and field notes.

Secondary data sources are all other sources used in a research study. Creswell (2014) suggests that secondary data sources refer to literature that provides summaries or support

for primary sources and do not include sources published by the investigator. Secondary sources are those sources that the investigator identifies as being useful data, having relevance to the topic of the study, and supporting the role of the study (Maree, 2012). Secondary sources include materials, such as books, reports, other published research, or articles for referencing. In this study, secondary resources include the international and national acupuncture and HEI policies, learning guides for the identified acupuncture programme, related reports from the identified HEI, and other published literature on acupuncture programmes. During this study, different documents were used as valuable data that reflected participants' perceptions of the acupuncture programme. These documents included the Allied Professions Act 63 of 1982, The Higher Education Qualifications Framework 2011, Department of Higher Education documents on BHScCM, South African Qualification Authority Qualification documents on BHScCM and learning guides for BHScCM, and BHScCM Learning Guides.

4.5.6 Data analysis

Data analysis is an approach to explaining and interpreting the meaning of raw data from the study to answer the research questions (Cohen et al., 2018). The most commonly used analysis techniques in qualitative research are inductive and deductive analysis (Anney, 2014). The inductive approach starts from specific observations and moves toward making broad generalisations and postulating theories. On the other hand, the deductive approach proposes working from more general to more specific observations. Inductive analysis is recommended in studies within an interpretivist paradigm (Maree, 2020). Inductive analysis has the advantages of condensing and summarising raw data to create links between the research objectives and the study's findings (Nieuwenhuis, 2020). Nieuwenhuis (2016) further explains that inductive data analysis clarifies the interacting realities and experiences of the researcher and the participant and elucidates what 'mutually shaping influences' have on that interaction. Therefore, the collected data in this study were analysed inductively through identified themes.

Thematic analysis assisted the researcher in exploring the participants' perspectives through data coding, which allowed for new impressions and the interpretation of data in different

ways. This view concurs with Nieuwenhuis (2020), who specifies that thematic analysis is the process of identifying similar and dissimilar opinions with qualitative data. The researcher contended that the thematic analysis would assist him in making sense of the data and identifying essential themes of the study. The six-step framework of thematic analysis proposed by Creswell (2014) was followed (see Figure 4-3). The researcher coded the data and identified appropriate themes and sub-themes, which are presented in Chapter 5. The section below explains the detailed process of data analysis in this study.

Firstly, the researcher reviewed all data collected, including the online text-based interviews, observation schedules, participants' reflective journals, field notes, and documents, several times to obtain a sense of the data (Step 1). Secondly, data were coded with an inductive data analysis approach (Step 2). This approach is defined by identifying themes in data using systematic procedures, and it assists in developing categories of the phenomenon being studied (Maree, 2020). Creswell (2014) and Nieuwenhuis (2020) further explain that the process is achieved by reading and interpreting raw data in order to generate themes based on the interpretation of data. After coding, different themes were recognised and developed according to their similarities and differences (Step 3). Thereafter, different themes were reviewed to ensure coherence and distinctions from each other (Step 4). In Step 5, the final refinement of themes was conducted to understand what the themes indicated. In the last step, the identified themes were used to answer the research question (Step 6), and conclusions were drawn from the findings of this study. The following figure depicts this data analysis procedure that is evident throughout Chapter 4 (Figure 4-3).

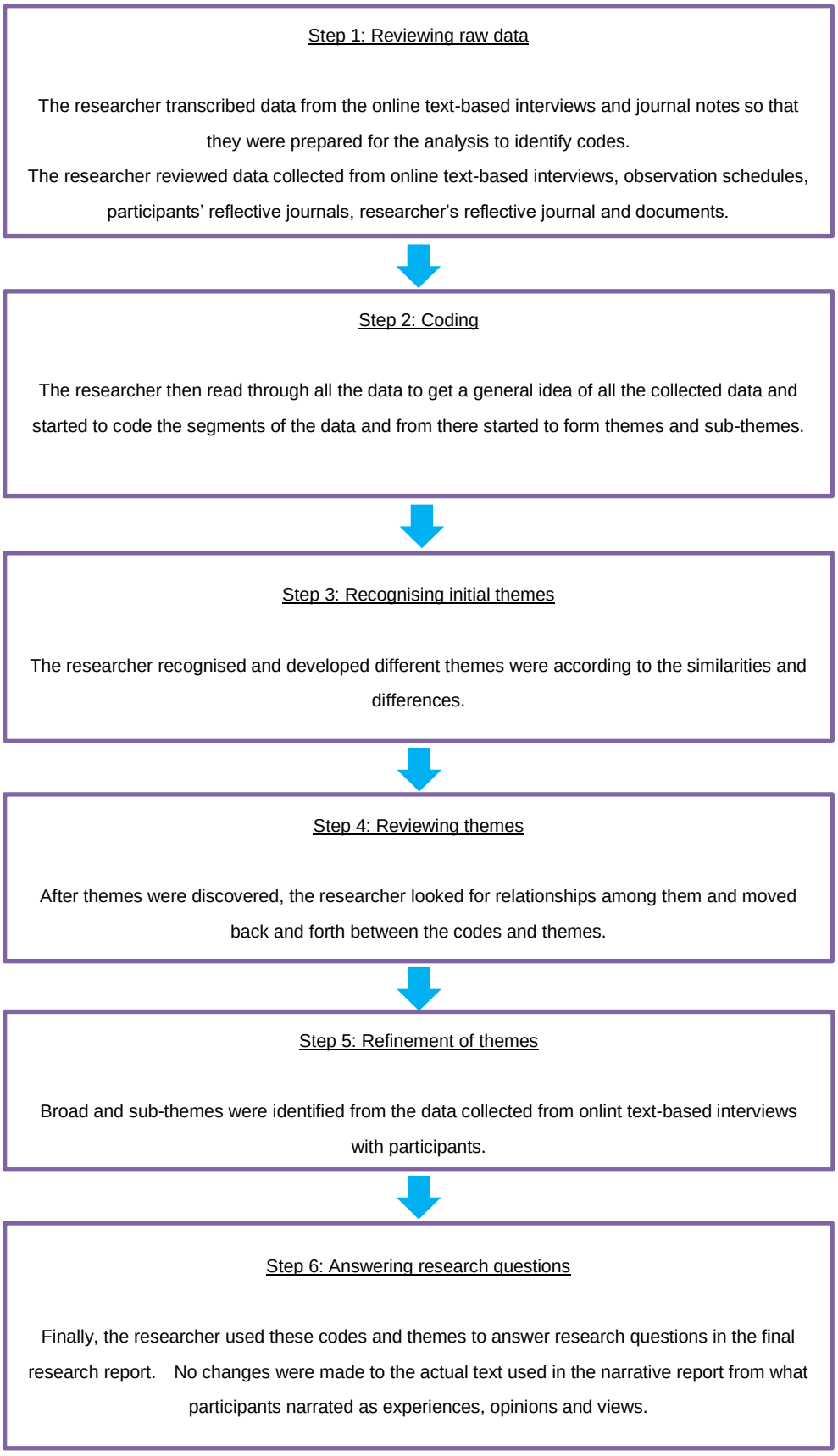


Figure 4-3. Data analysis procedure (Adapted from Creswell, 2014)

4.5.7 Role of the researcher

According to Nieuwenhuis (2020) and Cohen et al. (2018), the investigator is viewed as the research instrument in collecting qualitative data. The researcher was responsible for designing questions for the online text-based interviews and preparing and conducting the text-based interviews. In this study, the researcher was a non-participant observer who collected and analysed data rigorously to ensure the trustworthiness of the data. Furthermore, the researcher played a subjective role in data analysis during the analysis process. In this study, the researcher engaged with students studying for the BHScCM programme at a South African HEI to understand their lived and authentic experiences of the teaching, learning, assessment, and practices of the programme. The primary goal of this study was to acquire an in-depth understanding of the lived experiences of participants at the identified HEI. As a result, the researcher was the main research instrument and collected first-hand data from the participants.

Thanh and Thanh (2015) assert that investigators are likely to take an interactive role where they get to know the participants and the social context in which they live. However, in this study, the researcher took the role of non-participant observer (during observation of students in the clinic) and reflective practitioner (through the self-reflective journal of the researcher) (Ritchie et al., 2013; Brown et al., 2009). The researcher analysed the data to establish any trends or common themes that emerged from the findings; and, thereafter, established a framework against which recommendations could be made to strengthen the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health.

Given the research methods used, the researcher had to be sensitive to how the engagement during the observations was handled. This was to prevent students from becoming anxious, stressed or unwilling to participate in the study. Furthermore, the researcher conducted several observations to minimise the Hawthorne Effect before finally accepting the data. The researcher ensured that all online text-based interview questions were structured to ensure that they were open-ended and allowed for open engagement by the participants. The researcher was cognisant that often and unintentionally, investigators may assert their own

beliefs when they choose the research topic, the research approach, and process, as well as how they interpret the data (Creswell, 2014). The researcher remained guided by evidence from the literature review that questions are structured to ensure that the role of the researcher was to remain objective.

The research was further guided by the postulation of Scotland (2012) that data may be compromised and that the findings may not be credible if participants felt that they needed to please the researcher; therefore, the researcher was cognisant of the Hawthorne Effect throughout the study. Cohen et al. (2018) postulate that the investigator's subjectivity, as well as that of those participating in the study, become part of the research process and, as such, the investigator's reflections on their actions and observations, their feelings, biases or opinions form part of the data and so should be part of the investigator's analysis and findings. All the data analysed, research findings, and recommendations were reported and shared with participants at the end of the study.

4.5.8 Trustworthiness

Trustworthiness refers to the confidence and accuracy in the research findings (Maree, 2020). In this study, the researcher employed quality assurance techniques to ensure rigour in this qualitative study. Creswell (2014) and Mandal (2018) agree that qualitative research should be trustworthy by using four evaluation criteria: credibility, conformability, dependability, and transferability. Table 4-3 provides detailed descriptions of the techniques employed to ensure this study's trustworthiness.

Criteria	Descriptions	Application in this study
Credibility	Credibility is defined as the truth value of research, which refers to the accuracy of the research findings (Maree, 2012). Cohen et al. (2018) and Mandal (2018) explain that persistent observation, member checking, frequent debriefing, audit trail, and triangulation can be used to strengthen the credibility of a study. Furthermore, Nieuwenhuis (2020) points out that the credibility of a study can be ensured by the adoption of well-established research methods and appropriate research design. In this study, the researcher employed a single case study design, which was appropriate to explore the identified case (see section 4.3.1). The researcher utilised the pre-designed observation schedules to observe participants over a period of ten weeks. The researcher believed the persistent observations would also minimise the risk of the Hawthorne effect in the data, which might result in the inaccuracy of findings (Bateman et al., 2019). An audit trail refers to the detailed descriptions of the research process that has taken place (Cope, 2014). By documenting the audit trail in this study and the researcher's field notes, credibility was added to the observation procedures. In this study, the researcher adopted the triangulation technique to ensure the accuracy of the findings (see section 4.5.8.1).	Appropriate research design Well-established research methods Detailed descriptions of the study Persistent observation Triangulation Frequent debriefing Audit trail

Confirmability	Confirmability refers to the neutrality of a study in the process of data collection and analysis, which ensures the results are based on the phenomenon or participants and not the investigator (Cohen et al., 2018; Mandal, 2018). Cohen et al. (2018) concur with Cope (2014) that confirmability can be improved by employing an audit trail, which explains the links between data and findings. Nieuwenhuis (2020) and Mandal (2018) further explain that the application of triangulation is useful for achieving confirmability. For the purpose of this study, the researcher utilised an audit trail and triangulation to ensure confirmability.	Triangulation Audit trail
Dependability	Dependability is similar to reliability in quantitative research, which focuses on consistency and ensures the stability of data (Mandal, 2018; Maree, 2020). The extent to which research findings are replicable in similar contexts is referred to as dependability (Kinnear, 2022). Both Cope (2014) and Nieuwenhuis (2020) highlight the importance of documenting an audit trail to improve the dependability of a qualitative study, which includes detailed information on the research design and implementation. In this study, a third-party auditor was selected to examine the data collection and data analysis process. The auditor scrutinised the fairness and accuracy of the process to enhance the dependability of the research.	Detailed descriptions of the study Field notes Audit trail
Transferability	Yin (2018) and Cohen et al. (2018) define transferability as the degree of similar findings that can be obtained in different contexts. Both Cope (2014) and Nieuwenhuis (2020) propose that detailed descriptions of the research and	Detailed descriptions of the study

	purposeful sampling will support the transferability of a study. Nieuwenhuis (2020) further explains that thick descriptions refer to detailed information on research, which includes descriptions of the phenomenon, context, participants, and research design. However, the researcher concurred with Cohen et al. (2018) that the transferability judgement, which referred to the decision of generalisation of the finding of a specific study, should rest on the readers. The researcher believed that his responsibility as an investigator in this study was to provide a detailed description of the participants and the research process. This process would allow readers to make their own judgement on whether the findings of this study were transferable to their own contexts. Kinnear (2022) and Yin (2018) argue that case studies provide results that can only be generalised to theories rather than to other cases in the population. These theories, in turn, help the investigator to identify other possible instances in which the results may be generalisable. The findings that developed out of this case study should ultimately be tested with other case studies. If direct replications occur, the theoretical findings presented will gather support. This is similar to the replication logic of conducting repeated experiments in quantitative research.	Purposeful sampling Audit trail

Table 4-3. Descriptions of detailed trustworthiness criteria

4.5.8.1 Triangulation

Triangulation is defined as using multiple sources to analyse the same phenomenon or research topic; it will assist in reducing biases from investigators or methodologies, improving the transferability of the findings (Cohen et al., 2018). This view concurs with Johnson and Christensen (2015), who state that triangulation ensures validity and establishes the trustworthiness of data when using various data collection methods. In order to facilitate the generic quality criteria of findings, the data collected in this study were triangulated (Brynard et al., 2014).

In this study, triangulation was established by using multiple data collection methods. The researcher utilised various methods for data collection to explore students' experiences in the teaching, learning, assessment, and practices of the acupuncture programme. These methods included online text-based interviews, observation schedules, participants' reflective journals, field notes, and documentation.

4.5.9 ETHICAL CONSIDERATIONS

'Researchers need to protect their participants, develop a trust with them, promote the integrity of the research, guard against misconduct, and cope with new challenging problems' (Creswell, 2014:87). The guidelines for research ethics when using human participants, as proposed by Creswell and Poth (2016), were followed in this study. Ethical approval was obtained from the Faculty of Education Ethics Committee University of Pretoria and the Faculty of Health Sciences Research Ethics Committee University of Pretoria before the data collection of the research (Ref: EDU137/21). The researcher adhered to the ethical principles of informed consent, rights of privacy, anonymity and confidentiality, and there were no risks to participating in this study. The following information is a general summary of the ethical principles that were followed in this study.

4.5.9.1 Informed consent

Informed consent refers to obtaining permission from the participants regarding their willingness to voluntarily participate in the study. This consent can be either verbal or written. Included in the informed consent is information regarding how the investigator will maintain their privacy and what the study entails and expects from them as participants (Robson, 2011). The researcher upheld all the ethical principles of informed consent during the research and interview process. This included confidentiality, privacy, honesty, openness, access to findings, and avoiding harm. The ethical principles of informed consent,

confidentiality and privacy, honesty and openness, access to findings, and avoiding harm, as described by Maree (2012), were adhered to throughout the research and interview process.

A research study information and informed consent letter (Annexure C) was provided to every participant detailing the study and what was expected from them before participating in the study. Participants were requested to sign the research consent letter before participating in the study. Participants were advised of their right to withdraw from the study at any stage without prejudice. Permission to conduct the research (Annexure B) was obtained from the Head of the Department where the acupuncture programme took place.

4.5.9.2 Privacy and confidentiality

Johnson and Christensen (2014) agree that confidentiality is how the participants are protected from harm by having their identity and privacy protected. Confidentiality refers to when no participant's identity is revealed, and the investigator makes use of pseudonyms or code names to refer to a particular participant in the study. To uphold the principles of privacy and confidentiality, the researcher used codes and pseudonyms during the data analysis process. The researcher ensured anonymity by explaining the measures for keeping information anonymous to participants and getting agreement between participants and the researcher (Brynard et al. 2014).

In this study, the text-based online interview was anonymous. All participants were able to answer the online text-based interviews (Annexure D) on Google Forms at their most convenient time. All information was handled strictly professionally, ensuring privacy was maintained, and only the researcher and supervisors had access to the information. The confidentiality of participants was also guaranteed during and after data collection. All data were locked away and stored in a safe place on a password-protected computer that only the researcher had access to, ensuring confidentiality. All data will be stored for ten years from the commencement of this study. Confidentiality was assured, and no names or identifying data were requested as the questionnaire was anonymous.

4.5.9.3 Risks and benefits

The researcher has an obligation to prevent or minimise harm by refraining from subjecting the participants to unnecessary discomfort during the study. The researcher honoured all agreements; participants who withdrew from the study at any study point were respected. The participants were treated fairly. The study used supervisors' expert knowledge to ensure the good quality of the research process. The study was conducted with honesty and integrity.

There were no anticipated risks, and the cost of participation in the study was the students' time. There were no direct benefits to participating in the study. However, participation would assist in exploring and strengthening the teaching, learning, assessment, and practices of the acupuncture programme to promote children's health in South Africa.

4.6 SUMMARY

In this chapter, the researcher explained in detail the methodology used in this study, guided by the research questions. The research paradigm and its relationship to this study were discussed, followed by the specific data collection methods used in this study. Thereafter, the researcher explained the reason for selecting the identified case and justified using the single case study design. The trustworthiness of the research was defended, and a description of the ethical procedures followed in the research process was given. The analysis of the data will be described and discussed in the next chapter, Chapter 5.

CHAPTER 5
FINDINGS AND DISCUSSION

5.1 INTRODUCTION

In Chapter 4, the researcher presented a detailed discussion of the research methodology that was employed in this study. This discussion included the research paradigm, research design, and research methods. The researcher adopted a qualitative approach in this study since he aimed to explore the lived experiences of participants (Maree, 2020). Data were collected through online text-based interviews, observation, participants' reflective journals, field notes, and documentation. The multiple data collection techniques allowed data triangulation to ensure this study's trustworthiness (Brynard et al., 2014).

In this chapter, the researcher focused on the analysis of data and findings from participants. The researcher further presented brief profiles of the participants of this study. The results of this study were presented and discussed in detail through thematic analysis. During the data analysis process, the researcher established trends and patterns, which aided in verifying the findings that concurred with or refuted the literature in the study (Creswell, 2014; Yin, 2020). This verification is presented in the literature control section in Chapter 6. This study was guided by the primary research question and secondary research questions below.

5.2 RESEARCH QUESTIONS

To guide this study, the researcher formulated the following research questions.

5.2.1 Primary research question

- How do students experience the teaching, learning, assessment and practices of an acupuncture programme to improve children's health?

5.5.2 Secondary research questions

- What are students' views and perceptions on the teaching, learning, assessment, and practices in the acupuncture programme?
- What strategies can be used to strengthen the quality of teaching, learning, assessment and practices in the acupuncture programme?
- How can Shulman's (1986) PCK and Mishra and Koehler's (2006) TPACK model be used as a lens to facilitate the delivery of an acupuncture programme?

5.3 ANALYSIS OF THE RESEARCH SETTING AND DATA COLLECTION PROCESS

The research setting of this study was a public HEI in SA, as explained in Chapter 4. The participants for this study were students who were registered for the 2nd, 3rd, and 4th year of the BHScCM programme. Students who did not sign the research consent form were excluded from this study. Participants were requested to participate in an online text-based interview and keep reflective journals between March to April 2022. The researcher utilised observation schedules to reflect students' clinical practice. Field notes were documented by the researcher to retain a record of his reflection during the entire process of this study. This study also consulted relevant documents, as disclosed in Chapter 4.

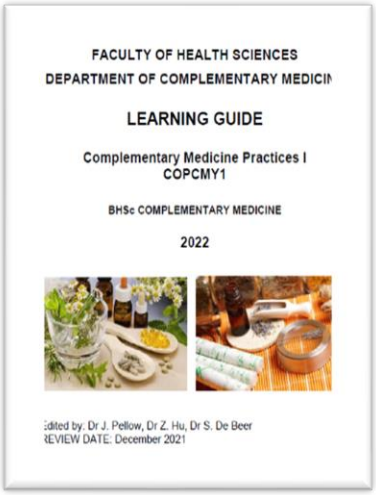
5.4 PROFILE OF PARTICIPANTS

The researcher invited all students registered in the 2nd, 3rd, and 4th years of the BHScCM programme to participate in this study. There were ten (10) students who agreed to participate in this study. The sample of this study included three (3) 2nd-year, three (3) 3rd-year and four (4) 4th-year students. The researcher believes that the sample size was adequate to provide an in-depth understanding of the ***teaching, learning, assessment, and practices*** of the acupuncture programme. This view concurred with Weller et al. (2019), who stated that a sample size of ten participants was sufficient for saturation in a descriptive case study design. Pseudonyms were used during the reporting phase of the study. Table 5-1 below illustrates the codes used for each participant to ensure anonymity and confidentiality.

Pseudonyms	Gender	Year of study
P1-Y2	Female	2nd-year
P2-Y2	Male	
P3-Y2	Male	
P4-Y3	Female	3rd-year
P5-Y3	Female	
P6-Y3	Male	
P7-Y4	Female	4th-year
P8-Y4	Male	
P9-Y4	Female	
P10-Y4	Female	

Table 5-1. Biographical data of participants

P1-Y2, P2-Y2 and P3-Y2: These three participants were registered for the 2nd year of study in the BHScCM programme. The core acupuncture CK in their 1st year of study consisted of the History of Chinese Medicine, Basic Theories of Chinese Medicine, Diagnostics of Chinese Medicine and General Introduction to Chinese Materia Medica, according to the Complementary Medicine Practice 1 Learning Guide [see Figure 5-1] (Pellow et al., 2021).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2022
dited by: Dr J. Pellow, Dr Z. Hu, Dr S. De Beer
EVIEW DATE: December 2021

Figure 5-1. Complementary Medicine Practices 1 Learning Guide

P4-Y3, P5-Y3 and P6-Y3 were registered for the 3rd year of study in the BHScCM programme. In their second year of study, the primary content knowledge included Acupoints and Meridians, Needling Techniques, General introduction to Chinese Medicine Formula, and Acupuncture Therapeutics, as indicated in the Complementary Medicine Practice 2 Learning Guide (Razlog, 2021).

P7-Y4, P8-Y4, P9-Y4 and P10-Y4 were registered for the 4th year of study in the BHScCM when the data collection of this study took place. In the third year, according to the Complementary Medicine Practice 3 Learning Guide (Hu, 2021), they mainly focused on the study of Acupuncture Therapeutics, Guidelines for Sterilisation and Disinfection, and General Introduction to Chinese Medicine Food Therapy. In the fourth year, students primarily focused on acupuncture clinical practice, according to the Clinical Practice 1 Learning Guide (Gower & Hu, 2021).

5.5 ANALYSIS AND DISCUSSION

This study explored the ***teaching, learning, assessment, and practices*** of the acupuncture programme to improve children's health at the identified HEI through students' views and lived experiences. Four major themes emerged from the data during the coding process, namely: a) Knowledge and understanding of acupuncture; b) Importance of CK for the

delivery of the acupuncture programme; c) Effects of the appropriate PCK and TCK in the delivery of the acupuncture programme; and d) Strategies to improve the delivery of the acupuncture programme. Direct quotes were included in this section. Table 5-2 below presents the themes and sub-themes of this study.

	Themes	Sub-themes
Theme 1	Knowledge and understanding of acupuncture	Views and attitudes toward the acupuncture programme Knowledge and attitudes toward acupuncture as a therapeutic approach
Theme 2	Importance of CK for the delivery of the acupuncture programme	Importance of CK to teaching and learning Students' perceptions and experiences of assessment Students' perceptions of the importance of CK for practice
Theme 3	Effects of the appropriate PCK and TCK in the delivery of the acupuncture programme	Students' views towards the teaching methodology Students' views and experiences towards the use of technology Students' challenges in the acupuncture programme
Theme 4	Strategies to improve the delivery of the acupuncture programme	Alternative approaches to teaching and learning Differentiated assessment techniques to improve learning outcomes Suggested approaches to enhance clinical practices

Table 5-2. A summary of themes and sub-themes

5.5.1 Theme 1: Knowledge and understanding of acupuncture

To elicit the participant's knowledge and understanding of acupuncture, the researcher invited participants to explain their views and experiences of the acupuncture programme at their university and acupuncture as a therapeutic approach (treatment). The findings of this study revealed that all participants shared positive attitudes towards the acupuncture programme at the university and acupuncture treatment. Although they shared a high positive attitude towards the acupuncture programme, some participants indicated that they experienced challenges in their studies.

Below is the presentation of the voices of the participants regarding their knowledge and attitudes towards the acupuncture programme. The researcher will also present the views of the participants and their experiences in the acupuncture programme. In this section, the researcher further explains the two sub-themes that emerged during the analysis of data:

a) Views and attitudes toward the acupuncture programme; and

b) Knowledge and attitudes toward acupuncture as a therapeutic approach.

5.5.1.1 Sub-theme 1: Views and attitudes toward the acupuncture programme

In this section, the researcher presents a discussion on students' views of the acupuncture programme and attitudes towards the acupuncture programme.

Views of the acupuncture programme

The findings of this study indicate that participants had a clear and accurate understanding of the outcomes of the programme. They acknowledged that successful graduates in this programme will be eligible to be registered with the AHPCSA as acupuncturists. To this, P2-Y2 wrote: "*After this course, we will be able to register with AHPCSA as acupuncturists*."

P5-Y3 stated:

> *The Acupuncture programme is a course structured to equip its students with all the basic, practical, and clinical theories used in acupuncture treatment. The first two years of the programme are structured to make the student competent in the basic theory and diagnostic theory of acupuncture. The last two years are focused on applying the learned theory to clinical practice. These years focus on teaching the student how to think and approach clinical encounters. Above the academic side of the programme,*

> *the acupuncture programme also educates the student about Chinese history and culture, which adds an appreciation and deeper understanding of the medical practice*.

P7-Y4 wrote:

> *The acupuncture programme is a programme that has been designed to educate students on the theoretical and practical applications of acupuncture. They will provide a holistic approach to healing using philosophy, physiology, and pathological concepts to human health and diseases.*

P9-Y4 added: "*This programme is designed to train acupuncturists who will apply acupuncture to bring about cure. They will provide a holistic approach to healing using philosophy, physiology, and pathological concepts to human health and diseases*."

According to the South African CHE (2011) and UJ (2021), the acupuncture programme at the identified HEI in this study is designed for professional training as acupuncturists. This programme further promotes the capacity of training experienced acupuncturists in SA, as indicated by UJ (2021). Hénard and Roseveare (2012) and Ludigo et al. (2019) state that HEIs must ensure the quality of the educational programmes they offer to prepare students to become competent and capable of rendering the service. Subsequently, the researcher opines that it is of significance to strengthen students' competencies through the ***teaching, learning, assessment, and practices*** of the acupuncture programme at the HEI. The researcher believes that adequate CK and practical skills will assist in ensuring students' competencies in improving children's health using acupuncture as a treatment modality. This view concurs with Bhukuvhani (2018) and Govender and Wait (2018), who assert the importance of CK in every educational programme to promote the success of graduates.

Attitudes toward the acupuncture programme

All participants in this study expressed positive views toward the acupuncture programme. Despite the positive views on the acupuncture programme, participants indicated some challenges in their study. In this section, the researcher primarily focused on discussing the challenges of insufficient time in the programme, as highlighted by participants. Other barriers with regard to PCK and TCK were further explained in sections 5.5.3.2 and 5.5.3.3.

P1-Y2 added:

> *The programme is great because it gives us a complete medical background. I have completely enjoyed learning and studying this programme, even though it has been*

> *tough at times. I have learnt a lot about the topic and how it is used to treat patients. It has given me a better understanding of Traditional Chinese Medicine and acupuncture. This programme has given me an understanding of what will be required of me later in life*.

In her reflective journal, P1-Y2 wrote: "*The entire programme is very good and informative. I am constantly learning new things and enjoying myself*." Both P2-Y2 and P3-Y2 agreed that they enjoyed studying the programme since they felt that there was always something new to learn every day. In her reflective journal, P5-Y3 wrote:

> *I feel the programme is very exciting and well-constructed in terms of how it is laid out for the student. I also find the clinical aspect of the subject the most exciting aspect. I have noticed learning Chinese medicine and acupuncture during a pandemic has proven to be a very useful practice to know*.

P7-Y4 stated: "*The knowledge, both practical and theoretical, which I have gained from this programme, has been truly incredible*."

The findings of this study reported that the participants acknowledged that insufficient time in the programme negatively influenced their competencies in clinical practice. Participants agreed that there was a need to provide adequate time in the programme as they needed more time to better understand acupuncture. To this, P3-Y2 wrote: "*A lot of new terms and theories are explained that can be overwhelming sometimes*." P4-Y3 stated: "*We have a lot of theoretical and practical modules in this year [the 3rd year], which make this year more difficult than the previous two years*."

P7-Y4 added:

> *This programme has been a lot of hard work. I do wish that we had more time to engage with the topics that we covered in the second year, as I feel it would have created a far stronger foundation to lean on when dealing with therapeutics later on*.

In her reflective journal, P7-Y4 wrote: "*I feel that it [the acupuncture programme] didn't give many of the students enough time to fully grasp those concepts, which become crucial when diagnosing and treating a patient further down the line.*"

As discussed in the literature, the duration of acupuncture education in SA is less than in other countries, such as PRC and Australia (Brosnan et al., 2016; FJTCM, 2018; Yang, 2021) (see section 2.3.3). According to the Regulations in terms of the Allied Health Profession Act,

1982 (2001), there is a minimum curriculum requirement for acupuncture education in SA. However, the Regulations in terms of the Allied Health Profession Act, 1982 (2001) do not specify the minimum requirement for the duration of the programme and internship. The researcher avows that a lack of specific requirements for the internship significantly affects the quality of the acupuncture programme in SA. The lack of internship requirements for acupuncture professional education places additional pressure on the training of acupuncture. Without the requirement for an internship before being registered as an acupuncturist, the clinical training must be integrated into the four-year programme, which reduces the time in the theoretical study of this programme. The researcher believes that the limited time in this programme may further disadvantage students' competencies in promoting children's health with acupuncture. This view is supported by the WHO (2013), which emphasises the importance of quality educational programmes in health sciences to ensure students' competencies in promoting health. In agreement with Janz and Adams (2011) and WHO (2020c), the researcher agrees that there is a need to ensure all acupuncture programmes are in alignment with international standards (Annexure G).

5.5.1.2 Sub-theme 2: Knowledge and attitudes toward acupuncture as a therapeutic approach

In this section, the researcher discusses students' knowledge and attitudes towards acupuncture.

Knowledge of acupuncture as a therapeutic approach

Since this study focused on ***teaching, learning, assessment, and practices*** of acupuncture to improve children's health, the researcher explored students' understanding of the concept of acupuncture. The findings revealed that participants had an in-depth understanding of acupuncture as a therapeutic approach to treating diseases and maintaining good health. They also recognised the process of how acupuncture treatment was performed. All participants acknowledged the purpose of acupuncture treatment was to treat and prevent diseases. The researcher observed that participants in the 2nd year of study lacked an in-depth understanding of acupuncture; however, the 3rd and 4th year students provided a more comprehensive and accurate understanding of the concept of acupuncture. Below are the actual words of the participants on the concept of 'acupuncture'.

In their online text-based interviews, P1-Y2 and P2-Y2 did not explain their understanding of the concept of 'acupuncture', while P3-Y2 wrote: "*Acupuncture is a unique way of treating*

diseases through needling and moxibustion with herbs. The meridians are pathways that contain acupoints that are used for needling that treats different diseases of the organs."

P4-Y3 indicated:

> *Acupuncture is a medical therapy like any other you know, which aims to alleviate, mitigate, modify, and prevent diseases. It focuses on relieving the cause of a disease. I trust acupuncture is better for patients since it treats the root causes of diseases, while conventional medicine is palliative.*

P6-Y3 added: "*Acupuncture is an alternative medicine where we learn how to insert needles into certain points on the body to cure some diseases*." P8-Y4 agreed: "*Acupuncture is a component of alternative medicine by which thin needles are inserted into the body to maintain health and treat various diseases*." The participants' views agree with Magram and Deng (2019) that acupuncture, a form of CM, is accepted globally for treating the well-being of patients. Chon and Lee (2013) and Xue et al. (2015) state that acupuncture is performed by inserting thin needles into acupoints on the body to prevent and treat diseases (see Figure 5-2).

The researcher believes that the globalisation of acupuncture and the acknowledgement of its effectiveness enhances awareness in the public domain. This view concurs with Flesch (2013) and Lim et al. (2015), who articulate that the professionalisation of acupuncture education has resulted in global acceptance as an alternative therapeutic approach. The researcher avows that the acupuncture CK in the first year of study provided students with the opportunity to gain an in-depth perception and understanding of acupuncture as a therapeutic approach.

Figure 5-2. Acupuncture treatment

The acquisition of comprehensive CK in the 3rd and 4th year of study contributed to their deeper understanding of acupuncture as a therapeutic approach. This was evident in P4-Y3's explanation when she stated that the core concept of acupuncture was to treat the cause of disease instead of the palliating symptoms.

According to the TPCK model, the CK in a specific programme is of significant importance in promoting students' understanding and perceptions of the profession (Koehler et al., 2013; Rice & Kitchel, 2016). Therefore, the researcher opines that it is of pertinent significance to ensure students acquire adequate and appropriate acupuncture CK in the acupuncture programme. This will further ensure that successful graduates are competent to use acupuncture to improve children's health.

Attitudes toward acupuncture as a therapeutic approach

The findings of this study also revealed that the participants who had a better understanding of acupuncture possessed a positive attitude towards acupuncture. Participants concurred that the sound CK of acupuncture inspired their interests in this profession. To this, P2-Y2 wrote: "*Everything is starting to feel interesting as I have been in the clinic for the past week. I am more interested and want to learn acupuncture*."

In her reflective journal, P4-Y3 indicated:

> *Acupuncture is fun and exciting, but that is only when you are equipped with a theoretical basis and experience. When observing in the clinic, I also see how effective acupuncture is for different diseases.*

P5-Y3 mentioned:

> *At first, I felt a bit confused by the relations of the theories we were learning. However, by the second year, I understood the bigger picture. This was when the course became increasingly more interesting*.

P6-Y3 explained: "*I find acupuncture is interesting, and being able to apply the knowledge in future as a professional is fascinating*." P7-Y4 indicated: "*After three years of study in acupuncture, I already have a positive attitude towards acupuncture*."

Rice and Kitchel (2016) agree with Ball et al. (2008), who emphasise the significance of CK of a specific subject in promoting the recognition of an educational programme. The finding of this study agrees with Wardle et al. (2011), who report the positive relationship between CK and attitude towards a programme and profession. According to the TPCK model, acupuncture CK is of significant importance to students' understanding of acupuncture, which further influences their attitudes towards acupuncture as a profession. The researcher believes it is paramount to strengthen students' CK of acupuncture to develop a positive attitude towards acupuncture treatment.

The findings of this study discovered that participants' attitudes to acupuncture were influenced by their previous experiences. This study found that positive experiences of acupuncture treatment significantly promoted participants' positive attitudes towards acupuncture. Participants acknowledged that acupuncture played an important role in promoting children's health. To this, P5-Y3 added:

> *In 2016, I was diagnosed with a condition called chondromalacia, which affected my ability to walk and play sports. It left me in a large amount of pain daily. After going to a biokineticist for five months and being cleared to play sports again, I was still in an excruciating amount of pain after my sports matches. It was at this point I decided to look at other alternative treatments, which was when I found an acupuncturist. After only three sessions with the acupuncturist, I found myself relieved of the pain and functioning very well in matches. I was in awe of the consultation technique, the questions asked, the use of the needling, and the TCM medicines prescribed to me after treatment. I knew immediately that this was a profession I must pursue*.

P7-Y4 stated:

> *I decided to pursue acupuncture because I have been brought up, since I was a baby, with an awareness of complementary medical practices. This is mainly due to my family*

doctor, who is a General Practitioner, Homeopath and an Acupuncturist. Through his treatment of my family over the years, I have really seen the value in the practice of both Homeopathy and Acupuncture, and he has inspired me to study this programme.

P8-Y4 mentioned that there was a growing demand for holistic healthcare services because of the high cost of conventional medical services. P9-Y4 wrote that she found that conventional medicine was not as effective as it was expected.

Acupuncture is widely used for various medical conditions in adults and children with confirmed effects (He et al., 2013; Moeen, 2016). The findings of this study concur with Shumer et al. (2016), who reveal that positive experiences of acupuncture treatment would improve the public's acceptance of acupuncture services. Therefore, the researcher believes that acupuncture plays a crucial role in improving children's health. This view concurs with He et al. (2013), Moeen (2016) and Saunders and Berry (2020), who highlight that acupuncture is suggested to be used for a wide range of diseases both in adults and children. Figure 5-3 illustrates an acupuncture treatment on a child. The findings of this study also agree with the WHO (2019), which reports potential savings on medical services is one of the most profound reasons for the public to choose acupuncture. The researcher opines that cost-effectiveness is a core contribution to the public from acupuncture treatment.

Figure 5-3. Acupuncture treatment on a child for constipation

5.5.2 Theme 2: Importance of content knowledge for the delivery of the acupuncture programme

In this section, the researcher focused on the analysis and discussion of the importance of CK in the ***teaching, learning, assessment and practices*** of the acupuncture programme. Within theme 2, the following subthemes emanated: Importance of CK to teaching and

learning; students' perceptions and experiences of assessment; and students' perceptions of the importance of CK for practice.

5.5.2.1 Sub-theme 1: Importance of content knowledge to teaching and learning

The findings of this study revealed that participants acknowledged the importance of CK and PCK in the teaching and learning of the acupuncture programme. They indicated that adequate and appropriate CK and PCK in the acupuncture programme enhanced their in-depth understanding of healthcare and prepared their competencies for future work. P4-Y3 stated: "*The theory we have been given has played a role in me knowing much about the acupuncture programme*." P7-Y4 further explained that possessing sound CK allowed her to think logically, which further strengthened her learning of acupuncture by means of perceptions and memorising. She believed that CK in the teaching of the acupuncture programme allowed her to learn using logical examples from nature, which enhanced her learning of concepts. In her reflective journal, P7-Y4 added: "*All of these modules are excellent and necessary to complement our knowledge that we are learning in acupuncture*." Both P5-Y3 and P8-Y4 stated that:

> The adequate CK of the acupuncture programme allowed students to obtain a whole picture of acupuncture, which significantly strengthened their learning. They agreed that the sound content knowledge assisted in developing their critical thinking in the teaching and learning process.

P4-Y3, P5-Y3, P7-Y4, and P9-Y4 all concurred that adequate acupuncture CK in the acupuncture programme allowed them to better understand acupuncture.

Koehler et al. (2013) and Wang (2019) state that adequate and appropriate CK is profoundly important to any educational programme. Bhukuvhani (2018) articulates that sufficient subject CK is essential to achieve the learning outcomes of an educational programme. The researcher believes that the main aim of the acupuncture programme at the HEI is to ensure students' competencies in the world of work. Ludigo et al. (2019) agree with Hénard and Roseveare (2012), who state that it is the HEIs' responsibility to ensure students are competent and confident in the working world. In this circumstance, the competencies in this study refer to students' ability to confidently use acupuncture to promote children's health. The researcher believes that students' sound CK ensures their profound understanding of acupuncture, enhancing their competencies. This view is supported by Govender and Wait

(2018) and Pournara et al. (2015). They articulate that sound CK in an educational programme at HEIs will prepare students to be competent in work.

The findings of this study highlighted the importance of lecturers' and clinical instructors' CK for effective teaching in the acupuncture programme. Participants indicated a need for competent lecturers to facilitate and supervise their learning, particularly regarding clinical content and skills. Participants believed that incompetent lecturers with insufficient CK negatively affected their learning in the acupuncture programme.

P1-Y2 indicated:

> *Having practicals [with lecturers] so that we can learn with the help of the lecturers. Having hands-on help from lecturers allows us to better understand the acupoint's location in the second year*.

P5-Y3 added: "*We understand that we are expected to practice needling at home. However, we do need a more experienced supervisor to indicate our errors."* P1-Y2 and P5-Y3 indicated that it was important for lecturers and clinical instructors to be able to identify and correct students' mistakes. To this, P5-Y3 further revealed the challenges that she experienced in her study when the clinical instructor did not possess adequate CK. She mentioned that the deficiency of clinical instructors' CK negative influenced her study.

In her reflective journal, she wrote:

> *We made many errors in practical classes that were only corrected by Dr X [another senior lecturer in the programme] when he supervised the class. Before that, we have been practising while making critical errors that are not corrected in class. Therefore, we learn the mistakes and not knowing it is an incorrect practice.*

According to the Minimum Requirement for Teacher Education Qualifications (DHET, 2011), lecturers' adequate CK and PCK are premises of the success of an educational programme. Killion and Hirsh (2011) and Ko et al. (2014) state that sufficient CK and PCK ensure educators (both lecturers and clinical instructors) are effective and competent in teaching activities in an educational programme. According to Rice and Kitchel (2016) and Shulman (1986), to strengthen effective teaching and learning, there is a need for lecturers to acquire adequate CK and PCK. The researcher opines that acquiring adequate CK and PCK enables lecturers' and clinical instructors' effectiveness in teaching the acupuncture programme. This

view is supported by Govender and Wait (2018), who emphasise the importance of lecturers' CK in teaching and learning to ensure the quality of the educational programme.

Similarly, Hénard and Roseveare (2012) and Lumpkin (2020) state that lecturer effectiveness is crucial in teaching to ensure learning outcomes, which refers to the educators' acquisition of adequate CK and PCK. The researcher agrees with Getie et al. (2021) that HEIs should develop comprehensive clinical guidelines for emerging lecturers and clinical instructors to ensure their competence in clinical supervision. According to the TPCK model, the CK and PCK play a critical role in ensuring the effective delivery of the acupuncture programme, which further ensures students' competencies in optimising children's health. Subsequently, the researcher believes that there is an urgent need to strengthen lecturers' competencies in the acupuncture programme.

5.5.2.2 Sub-theme 2: Students' perceptions and experiences of assessment

Findings revealed that assessment not only evaluated students' knowledge of acupuncture but also enhanced their learning. All participants in this study expressed a shared perception of the importance of assessment in the acupuncture programme. The findings of this study also affirmed participants' shared views on the importance of assessment in facilitating their learning process. Participants agreed that the assessment promoted their study and identified the shortages in their study. They believed assessment was one of the most critical perspectives in their studies since it served various purposes. To this, P1-Y2 wrote:

> *It [assessment] helped strengthen my knowledge because it ensured I was constantly revising and learning my work. It also gave me the practice of testing my knowledge and understanding*.

P2-Y2 indicated:

> *The assessments were fair and well-structured. However, I found it a bit of 'parrot learning' instead of applying the knowledge. I acknowledge that a lot of theory needs to be memorised and thus taught this way*.

P3-Y2 stated: "*If I struggle to answer a question in an assessment, then I know where I should focus my study more. It helps me see which content I know and lack.*"

P5-Y3 added:

> *It has helped me identify areas of the content I do not know as well as I thought I did. I also found I learned clinical knowledge from the assessments as they required the*

student to apply the content they have learnt so far. I find assessments in this subject very helpful as a growth factor for the student.

P6-Y3 added: "*We need all the theory that we have been taught in order to apply acupuncture in practice efficiently. The assessment also serves as proof of how far I am with the knowledge of acupuncture*." P7-Y4 stated: "*It [assessment] aided me because it allowed for an opportunity to write a test, which was a true reflection of my knowledge*."

Both P7-Y4 and P9-Y4 concurred that assessment served as an effective way to monitor their progress in learning. P9-Y4 indicated assessment was an effective way to revise the acupuncture content. From the assessment, they believed that lecturers would also be able to identify their competence, which may be used to reflect teaching and learning in the acupuncture programme.

According to the Regulations in terms of the Allied Health Professions Act, 1982 (2001) and the CHE (2011), assessment is an effective approach to evaluate the learning outcomes of a programme. Liljedahl (2010) and Stăncescu and Drăghicescu (2017) agree that assessment assists students in identifying learning outcomes and promoting students' learning (Amua-Sekyi, 2016). In the researcher's opinion, assessment is of profound significance in investigating students' knowledge and skills. The researcher opines that there should be different levels and forms of assessment, which reflect students' competencies from various perspectives, such as memorising and perception of the CK. These competencies should meet the appropriate levels of the revised Bloom's Taxonomy of learning (Chandio et al., 2016) (see section 2.6.2).

This view concurs with Chandio et al. (2016) and Jang and Wagner (2013). They agree that there should be multiple levels and different forms of assessment to measure students' competence. According to the revised Bloom's Taxonomy, Barari et al. (2020) explain that students need to remember and understand CK before applying and analysing using their knowledge. The researcher believes that the acupuncture programme requires a solid theoretical foundation in order for students to be able to analyse, evaluate, and create the phenomenon using the knowledge (see Figure 5-4). Subsequently, memorising is emphasised in the assessment of the identified acupuncture programme.

Flórez and Sammons (2013) and Khan (2012) agree that assessment is an effective technique for promoting students' learning. Umar (2018) and Yambi (2018) are of the view that assessment promotes students' learning and further reflects the quality of teaching. The

researcher avows that assessment is a useful approach to enhancing students' learning. The reason is that assessment provides an opportunity for students to reflect on their challenges and gaps in their studies. This view agrees with Liljedahl (2010) and Stăncescu and Drăghicescu (2017), who state that assessment effectively assesses students' progress, provided the assessment is valid and reliable (Tosuncuoglu, 2018; Yambi, 2018).

Need for various assessment techniques

This study revealed that participants agreed that assessment was crucial in the acupuncture programme. They further highlighted their support for adopting various assessment techniques in the programme to assist them in evaluating their competencies. They believed various assessment techniques, such as classroom quizzes and mock assessments, facilitated their learning. In her reflective journal, P4-Y3 wrote: "*I have realised that during the assessment of the mock practical, we are given the freedom to ask anything or say anything, and that is what I liked most about it*."

P9-Y4 answered:

> *Doing case studies has helped me to evaluate my knowledge. Questions that are being asked are a good way of assessing us. Also, writing cases as a portfolio will be beneficial because it forces us to study*.

Since assessment is a crucial element of teaching and learning, the researcher concurs with Umar (2018) and Yambi (2018) that various assessment techniques should be adopted to achieve different levels of assessment, such as memorising, understanding, applying, analysing, evaluating, and creating [Barari et al., 2020; Chandio et al., 2016] (See Figure 5-4).

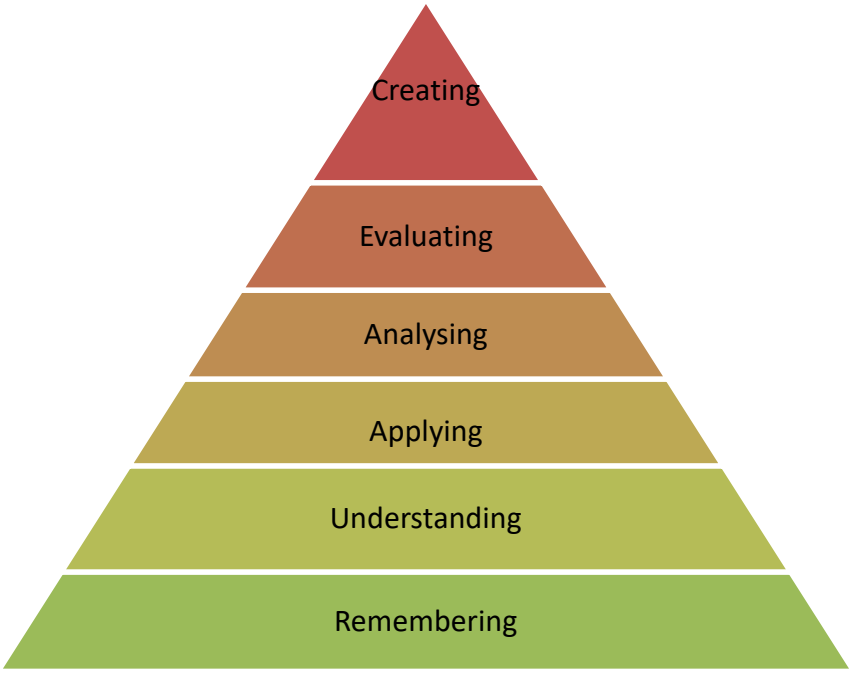

Figure 5-4. Revised Bloom's Taxonomy (As adapted from Barari et al., 2020)

Esomonu and Eleje (2020), Jang and Wagner (2013), and Payne (2014) point out that there are various assessment methods that can be adopted in teaching and learning. These approaches include classroom assessment, quizzes, formative use of summative assessments, and a portfolio assessment (Flórez & Sammons, 2013; Jang & Wagner, 2013; McDonald, 2012). Khan et al. (2013) further propose OSCEs in evaluating clinical practice. The researcher agrees that different forms of assessment serve different purposes. Therefore, there is a need to identify the most appropriate forms of assessment for specific purposes. This view concurs with Cakmak (2013) and Goh (2013), who state that lecturers should select the most effective assessment to evaluate students' learning outcomes.

The researcher is of the view that various forms of assessment offer an opportunity for students to receive timely feedback, which is crucial to their study. This view is supported by Umar (2018), who argues that the delayed feedback from summative assessments is one of the most critical disadvantages in teaching and learning. According to the TPCK model, the researcher believes that it is crucial to ensure all lecturers acquire sufficient PCK to determine the most suitable approaches in assessment in a specific programme. Venketsamy and Wilson (2021) agree with Eteläpelto et al. (2015) that sound PCK is essential for every lecturer to improve learning outcomes.

Need for frequent assessment

The findings of this study disagreed with Earl (2006), who reported that increasing time on assessment did not strengthen learning. Participants in this study revealed that increased time in assessment would enhance their learning. Therefore, participants indicated that there was a need to have frequent assessments to improve learning outcomes. To this, P5-Y3 stated: "*I feel smaller, more regular assessments are much more beneficial to have before the larger summative assessments*." When answering the question, 'Explain how you would prefer to be assessed in the acupuncture programme', P6-Y3 indicated: "*Have an assessment for each term and with the normal format that we are used to*."

P7-Y4 wrote:

> *The OSCEs, however, were very frustrating as I had never done an OSCE before in my whole life, nor had I even done a mock OSCE before the exam. This made me extremely nervous even though I knew and understood the theoretical content quite well. I did very badly in my OSCE for this reason*.

P9-Y4 indicated: "*We should be assessed more frequently during the year so that we can get used to how to answer questions and how are questions asked*." P10-Y4 added: "*Studying for the different assessments helped with my general knowledge as the test helped with showing me what I need to focus on and my strengths and weakness for me to work on.*"

P7-Y4, P9-Y4, and P10-Y4 expressed their desire to have more frequent assessments as they believe frequent assessment will not only strengthen their study but also reduce their anxiety during the assessment.

As discussed previously, assessment plays a crucial role in enhancing students' learning (Amua-Sekyi, 2016). According to the Complementary Medicine Practice 2 Learning Guides (Razlog, 2020; Razlog, 2021), students in the second year of study had mini classroom quizzes every second week that was implemented in 2021. Participants from the 3rd year, who were second-year students in 2021, reported that frequent assessments strengthened their learning and reduced stress in assessment. Therefore, the researcher avows that a lack of frequent assessment in the programme results in students' anxiety because they are not familiar with the structure of assessment.

Need for better instruction on assessment

One participant in this study reported a dissatisfactory experience related to assessment in her second year. She believed that appropriate and accurate instructions on each

assessment should be explained to students in advance. In the online text-based interview, P5-Y3 wrote:

> *As said previously, I found the second year very disorganised in terms of communication regarding tests and communication with the students overall. I felt very unprepared before tests and unsure about my level of competency before being assessed on needling. At times, we were being assessed on the content we had not covered in class, which was taught the week after the assessment. The teaching in the first year and third year (so far) is very satisfactory*.

She further stated: "*I would request a more prepared approach to assessments about the content and sufficient notice before a test. I feel as though students would do better in tests if provided with more opportunities to discover areas of the work*."

Hu et al. (2022) and Ko et al. (2014) agree with the Minimum Requirement for Teacher Education Qualifications (DHET, 2011) that lecturers should be able to communicate with students effectively. The researcher opines that lecturer effectiveness is exceptionally important in all aspects of ***teaching, learning, assessment, and practices***. Therefore, the researcher believes that effective communication with students is critical to ensuring the effective delivery of the acupuncture programme. Students in the 2nd, 3rd and 4th year all acknowledged the importance of assessment in the programme and opted for various forms of assessment. The researcher believes that this is because of the critical role of assessment in the acupuncture programme to promote students learning and investigate learning outcomes for qualification purposes, as specified by the CHE (2011).

5.5.2.3 Sub-theme 3: Students' perceptions of the importance of content knowledge for practice

Clinical practice is one of the most substantial perspectives in acupuncture education. All participants in this study agreed that adequate CK was essential for their practice. They acknowledged that the CK in previous years of study was of pertinent importance when it came to practice. To this, P1-Y2 agreed that CK is of paramount importance for their competence in clinical practice. P2-Y2 wrote: "*They [content knowledge] definitely allowed a good foundation for the more practical nature this year*." P3-Y2 indicated: "*The content of acupuncture really prepares me for what to expect in practice. The more knowledge I have, the better I will be in my practice"*

P5-Y3 described:

> *I also think using the first and second years to teach the basic theory and more advanced theory is very well-structured as in the third year, when the practical aspect of the subject becomes more prominent, it is much easier for the student to integrate all the knowledge easily*.

P4-Y3, P5-Y3, and P6-Y3 acknowledged the significance of structuring sufficient theoretical content knowledge in the 1st and 2nd year. They concurred that the theoretical foundation from the 1st and 2nd year ensured their competence in the 3rd year of study and clinical practice. P9-Y4 wrote:

> *Being in the clinic has proven to be the application of all the knowledge I have acquired through the years. It has given me the background knowledge to sharpen my skills. Learning where the acupoints are, their indications and their special functions have helped me apply them when choosing prescriptions and doing the treatment.*

In her reflective journal, P9-Y4 mentioned: "*They [postgraduate students] have more knowledge and are very helpful in explaining most of the things if we do not understand*." P10-Y4 added:

> *During this time [4th year] in the clinic, one could see the benefits of the previous years' teaching, learning, and assessments. The physical skills were learned, practised and repeated. We started with practising it on little pillows, ourselves, each other, and now on patients. The teaching of the theory behind needling helped us to understand when to use what length of the needle, what the angle of insertion should be, the location of the acupoints, and picking the right acupoints for prescription in the treatment*.

Jamshidi et al. (2016) and Nabolsi et al. (2012) agree on the significance of adequate CK in an educational programme to ensure their students' competencies in clinical practice. In the researcher's opinion, adequate CK in the acupuncture programme is crucial to students' competence to improve children's health in their future practice. This view is supported by Roberts et al. (2019), who emphasise educational institutions should provide quality training to students, equipping them with sufficient CK. They believe that the sound CK will significantly optimise students' competencies in clinical practice (Kane et al., 2021). Figure 5-5 illustrates a situation when a participant was consulting a patient in the clinic. From the observation, the researcher also noted that the good acupuncture CK of the participant

greatly contributed to his confidence in clinical practice. The researcher identified this when observing the participant's communication and interactions with the patient.

One participant in the 4th year highlighted that adequate CK improved his confidence in clinical practice. In his text-based interview, P8-Y4 wrote:

Figure 5-5. A 4th-year participant consulting a patient in the clinic under supervision.

> *It [content knowledge] has told me how to develop differentials. The content [knowledge] of acupuncture has taught me how to be confident with my work as it has taught me how to treat patients. For instance, when I'm asking a patient question, I already have an idea of what is happening with the patient. Then, I ask more questions to determine if my differential is right or wrong. It [sufficient content knowledge] also helped me to gain confidence in front of a patient*.

In her reflective journal, P10-Y4 mentioned: "*With the practicals, I realised my improvement in confidence and needling*." From the researcher's field notes, he described that there was evidence that students' adequate CK bettered their practical skills and debriefing with clinicians.

Kane et al. (2021) agree with Nabolsi et al. (2012) that adequate CK is essential for students to be able to perform appropriately in clinics. The 3rd and 4th-year students had a better understanding of the importance of CK for practice. The researcher believes this phenomenon is because the 3rd and 4th-year students spent more time in the clinic interacting with patients. According to the TPCK model, content knowledge plays a critical role in ensuring the quality of educational programmes, further improving students' competence in the world of work (Venketsamy & Wilson, 2020).

5.5.3 Theme 3: Effects of the appropriate PCK and TCK in the delivery of the acupuncture programme

In this section, the researcher presents the analysis of data and discussion regarding PCK and TCK. Three sub-themes emerged during the data analysis, namely a) Students' views toward the teaching methodology; b) Students' views and experiences toward the use of technology; and c) Students' challenges in the acupuncture programme.

5.5.3.1 Sub-theme 1: Students' views toward the teaching methodology

The researcher presents a discussion on hybrid learning, various pedagogical approaches, and a supported learning environment in this section.

Hybrid learning

Participants from the 3rd and 4th years concurred that hybrid learning enhanced their learning in the acupuncture programme. However, the findings of this study highlighted that participants agreed that online study primarily benefited them in learning theoretical content knowledge. They believed that theoretical components could be delivered online while the practical elements in the programme should be conducted face-to-face. To this, P5-Y3 wrote:

> *Weekly contact sessions would be beneficial to be able to ask the lecturer questions regarding the content covered. It is achievable if the student has a strong work ethic and motivation to learn the content online*.

P6-Y3 stated: "*I prefer the same old ways that we use; having pre-recorded lecture videos and also attending our classes and practicals works better for me*."

P10-Y4 added:

> *I prefer the method used during summer school to teach the acupuncture programme. I was had lectures on YouTube to listen to and study before class and then going to class to answer questions about the online lectures, the practice of the acupoints and theory. Mostly on-campus practices have benefited my practical skills. Technologies mostly helped to understand the theory behind the acupoints*.

Al-Zumor et al. (2013) state that hybrid learning is an effective method to promote learning. Hybrid learning is a pedagogical approach integrating distant and face-to-face learning, as explained by Lalima and Dangwal (2017). These authors concur on the significant role of hybrid learning in strengthening students' learning in the 21st century. Hybrid learning

strengthens students' learning by adopting both online and face-to-face approaches (Hu & Venketsamy, 2022a). Lalima and Dangwal (2017) and Mpungose (2020) state that this mode of teaching positively promotes students' learning. However, the researcher believes that lecturers need to select the most appropriate pedagogical and technological approaches when delivering specific CK in the acupuncture programme, including theoretical and practical CK. The view is supported by Hu and Venketsamy (2022a) and Koehler and Mishra (2009). They stated that lecturers should possess sound PCK and TCK to effectively achieve the learning outcomes of a programme.

The researcher opines that it is important to adapt the pedagogical approaches to the specific CK; for example, which CK could be introduced online, and which should be introduced on campus. Bhukuvhani (2018) further affirms that the selection of technologies in teaching should be suitable for specific CK. P9-Y4 indicated: "*I think we should continue with doing online teaching for the theory as I find it effective*." According to the TPCK model, PCK and TCK are of significant importance when designing a programme and determining how to deliver the specific content knowledge of the educational programme (Mishra & Koehler, 2006; Shulman, 1986; Venketsamy & Hu, 2022).

Some participants in the 2nd year did not emphasise the need for hybrid learning. P1-Y2 and P3-Y2 mentioned that online learning through technologies, such as pre-recorded lectures and the internet, was sufficient for them. On the contrary, P2-Y2 supported hybrid learning. He indicated:

> *The online classes [pre-recorded videos] were sufficient for the past year [theoretical study]. So far this year, a more contact approach is needed [because practical components were included in the 2nd year]. I enjoy the current method [the hybrid learning] thus far. Although I liked the online learning system, I do feel this course is explicitly grasped better with practicals*.

This finding agrees with Hannaway (2019) and Oner (2020), who emphasise the importance of technologies in teaching and learning. The researcher believes that students in the 2nd year mostly studied theoretical CK in the 1st year, according to the Complementary Medicine Practice Learning Guide 1 (Pellow et al., 2021). This content is suitable to be delivered through online learning. Therefore, some participants in the 2nd year believed that online learning was sufficient. However, all participants in the 3rd and 4th years were of the view that hybrid learning was needed to enhance their learning, particularly for practicals.

Various pedagogical approaches

The findings of this study revealed different preferences in various pedagogical methods among participants. The findings supported that there was no specific pedagogical approach that was superior to others since different approaches facilitated different needs of participants. P1-Y2 and P2-Y2 reported that they benefited from various resources in the programme. In the online text-based interview, they indicated that the pre-recorded lecture videos allowed them to revise the content better. At the same time, there were also other available reading materials, such as lecture notes and textbooks. All these resources contributed to their further understanding of acupuncture. P1-Y2 wrote:

> *I was able to learn the module [acupuncture] really well because it was taught well. I could grasp the information and topics well because I had sufficient resources to reference and (to) study from.*

P9-Y4 and P10-Y4 indicated that debriefing benefited their learning and critical thinking. In her reflective journal, P9-Y4 wrote: "*Also the case discussions that we have when we don't have patients help more as I get to learn from my fellows because we give many different answers*."

According to Gardner's multiple intelligences theory, Davis et al. (2011) and Benazira et al. (2021) point out that students have different behavioural and cognitive characteristics that influence their learning preferences. There are diverse pedagogical approaches that can be employed to promote effective teaching and learning (Calik & Birgili, 2013; Yavich & Rotnitsky, 2020). The researcher believes that adopting multiple pedagogical approaches in the acupuncture programme is crucial to strengthening students' learning. The reason is that integrating several bits of intelligence will positively promote students' learning outcomes [Benazira et al., 2021; Gardner, 1999] (see section 2.6.1.4). The effective use of the Socratic method of questioning in the debriefing will also benefit students' learning (Boghossian, 2012).

Supported learning environment

The finding of this study also highlighted the importance of a supported learning environment. Participants performed better and felt more comfortable studying in a supported environment. To this, P10-Y4 mentioned:

> *I know that correction in class and in the clinic is very important, especially for my growth and development of skills and knowledge. This is how I can be supported through positive correction and reinforcement - talking about cases, practising different points, and getting on the opportunity to better my practical skills, all in a positive and non-judgmental learning environment.*

In the researcher's view, lecturers should take social-cultural factors into consideration in their teaching. This view concurs with Burhanuddin et al. (2021) and Hassad (2011), who state that the social environment is critical in constructing students' knowledge. Therefore, the researcher contends that there is a need that HEIs to provide a supported learning environment to promote students' learning.

5.5.3.2 Sub-theme 2: Students' views and experiences toward the use of technology

Due to the influence of COVID-19, HEIs globally adopted ERE, including South African universities, according to Salmi (2020) and Rashid and Yadav (2020). The findings of this study highlighted that participants shared ambivalent views on using technology in the acupuncture programme. In this section, the researcher further explained the analysis of data on the challenges and benefits of using technologies in this programme.

Challenges of using technologies

Although no participant in this study reported their concern about the quality of the acupuncture programme, there were still challenges in implementing ERE in the programme. The findings of this study revealed that there were a few barriers to adopting technology in the programme. Participants reported that they experienced barriers, such as a lack of personal interaction, a lack of data, poor infrastructure, and insufficient computer skills. Furthermore, one participant reported that the use of technologies in teaching and learning contributed to her increased stress in the study of the programme. For instance, P6-Y3 stated:

> *In my first year, we only relied on online classes because we could not have contact classes due to the COVID-19 pandemic. I found it very difficult to understand and grasp the work because the other reason was that I was not even that familiar with studying online.*

P10-Y4 added:

> *In my experience, the technologies have also caused more significant irritation and stress because of so many things able to go wrong. I have had data, internet, and*

> *connection problems; the worst was during the test. It was difficult to get used to as there was no interaction, no correction of understanding, and all the connection problems mentioned. I easily fell asleep or got distracted when I started bringing lectures or when I was too long in front of the computer, but it was also easy to catch up, stop, review, and learn for tests*.

Paideya (2020) and Scott (2020) reveal that adopting ERE through technology may increase students' anxiety because of the uncertainty about the quality of the programme. The researcher believes that some students are used to face-to-face teaching and learning, particularly students who prefer visual, auditory, and linguistic approaches (Davis et al., 2011; Jensen & Calvert, 2014). These characteristics are determined by their intelligence's nature, according to Gardner's multiple intelligences theory (Benazira et al., 2021; Yavich & Rotnitsky, 2020). The findings of this study concur with Aigbavboa and Thawala (2016) that the lack of face-to-face communication resulted in increased anxiety among students.

Apart from the influence of an individual's intelligence nature, the poor infrastructure, and poverty in some regions in SA also contributed to the students' anxiety about using technology. P8-Y4 stated: "*The disadvantage of it [using technology] is that you need gadgets. For instance, laptops and all of those things are expensive*." P9-Y4 added: "*The network was a challenge at home because I had to walk kilometres to go to a place that has a good connection*." As mentioned by P10-Y4, she always experienced problems with the internet connection, particularly during load shedding.

Aristovnik et al. (2020) and Thaba-Nkadimene (2020) report that infrastructure plays a critical role in ERE using technology since all activities rely on the internet. The researcher avows that there is a need to improve infrastructure and students' computer skills to implement teaching and learning through technology. The researcher believes that poverty in SA also negatively affects students' learning using technologies. This view concurs with Salmi (2020), who states that most African HEIs are not ready to shift online since there is a lack of appropriate resources, such as devices and appropriate infrastructure. The lack of computer skills also negatively influences students' ability to study online (Hu, 2022b; Venketsamy & Wilson, 2020).

Benefits of technology in the programme

Despite the challenges mentioned above, many participants believed study through technologies facilitated their learning. They agreed that studying online provided many

conveniences in their learning, which positively supported the learning process. To this, P3-Y2 wrote: "*Technology has been very good lately. It gives me easy access to recorded lectures. I can revise my work anytime*."

P5-Y3 wrote:

> *I found the uploaded lectures on YouTube very beneficial to the student as it allows you to move as fast as you want through the content and pause the lecture and takedown better-detailed notes and make sense of the content while the lecture is being taught. I think the lectures should always be uploaded as YouTube videos as much as possible. The YouTube videos have significantly assisted in making sense of and learning the content quickly*.

P7-Y4 added: "*The [online] learning as valuable as I could, at my own pace, go through the content on my own, which allowed me to have a strong theoretical base of knowledge so as to perform the practicals.*"

P8-Y4 wrote:

> *What I liked about online was that if you did not hear something, you could just rewind and listen to the lectures again. If there is something that you didn't understand, you can go back and watch the lecture and understand it better. Yeah, the funniest part is that you can listen to a lecture about three times.*

In her reflective journal, P7-Y4 indicated that learning through technologies made it easier for her to make additional notes by pausing the lecture videos. P7-Y4, P8-Y4, and P9-Y4 further highlighted one of the benefits of adopting technologies was that they could revise content in the previous study through pre-recorded videos. Figure 5-6 presents a situation where a participant was watching lecture recordings online.

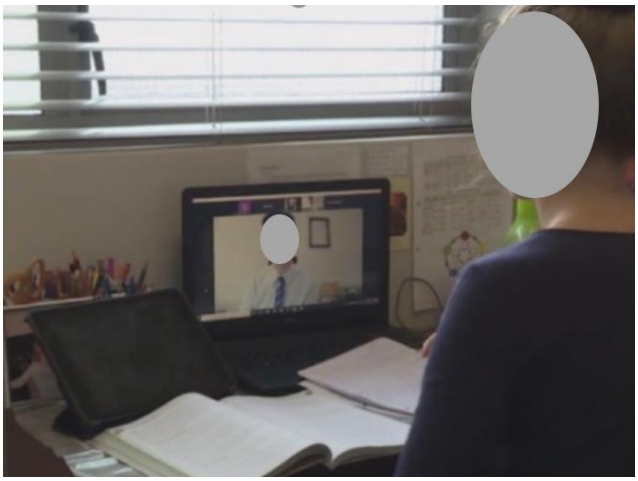

Figure 5-6. A participant watching lecture recordings

Koehler et al. (2013) and Venketsamy and Wilson (2020) state that technology plays a critical role in education in the 21st century to strengthen teaching and learning. The findings of this study disagree with Aristovnik et al. (2020) and Marinoni et al. (2020), who report that students are reluctant to adopt technologies in their learning. The researcher concurs with Thaba-Nkadimene (2020), who reveals that technology allows more convenient accessibility and flexibility in education. The researcher believes this is significant in the acupuncture programme, particularly during the pandemic. As explained in the TPCK model, the effective implementation of technologies will promote teaching and learning (Hannaway, 2019; Oner, 2020).

The researcher believes that technologies allow students with different intelligence natures to gain the most out of their studies. For instance, online pre-recorded lecture videos are better for students with visual, auditory, and linguistic intelligences' (Davis et al., 2011; Sener & Cokcaliskan, 2018). In the meantime, it also benefits students with intrapersonal intelligences since students can pause during the lecture, allowing them to reflect and gain a deeper understanding of the knowledge. In the researcher's opinion, teaching through online pre-recorded lectures, as a form of lecturer-centred approach, is an effective way to promote students' learning, provided that the CK is suitable to be delivered online. This view concurs with Emaliana (2017) and Kitiashvili (2020), who agree on the significance of a lecturer-centred approach in education. Furthermore, participants agreed on the importance of participatory teaching and learning in the acupuncture programme (see sections 5.5.4.1 and 5.5.4.3). The researcher concurs with Murphy et al. (2021), who state that the integration of lecturer-centred and student-centred approaches effective promotes students' learning.

Participants in this study agreed that technologies played an important role in ERE. They believed that the use of technologies also enabled efficient communication. To this, P3-Y2 wrote: "*The technology made it possible to study online and still be able to talk to my peers and discuss the content."* In the online text-based interview, P4-Y3 wrote: "*Technology had really helped us to learn when we were severely hit by the virus. If it were not for it, perhaps even today, we would have been at home without studying*."

P7-Y4 added:

> *In the 2nd year, it allowed me to complete tutorials, which were marked. This allowed me to see my mistakes and correct them and see where I did not fully understand a concept*.

P10-Y4 mentioned:

> *Technologies have made communication more efficient in knowing what to study and when to be on campus for practicals. As mentioned above, we could study at our own pace and had guidance whenever we had questions in class and over WhatsApp.*

P10-Y4 added:

> *The use of technologies has been very effective, especially during the COVID-19 period. The opportunity to study online made it easy to understand the lecture notes off-campus. Technology gave us a chance to stay on track even though we could not attend university.*

The COVID-19 pandemic significantly affected human health and resulted in stress, anxiety, and frustration due to isolation (Aristovnik et al., 2020). Hu (2022b) and Paideya (2020) state that the success of ERE relies on the effective implementation of technologies. The researcher concurs with Hu and Venketsamy (2022a) and Mpungose (2020). They believe that technologies make it possible to implement ERE during the COVID-19 pandemic, which positively allows the transformation of online teaching and learning. The researcher opines that effective communication is one of the advantages of adopting technologies. With technologies, students are able to communicate remotely, which may further assist in reducing the feeling of isolation when studying alone (Hu, 2022b; Hu & Venketsamy, 2022a).

The need for appropriate technological knowledge for specific purposes

Participants in this study also highlighted the need to investigate the use of technologies for a specific purpose. They believed that not all CK could be delivered effectively through

technologies. Notably, participants concurred that there was a need to select appropriate technologies to deliver CK related to practical skills since the online collaborations were not appropriate for practical content. Both P9-Y4 and P10-Y4 indicated that technologies neither benefited their assessment nor the practicals. Even though P5-Y3 strongly agreed on the benefit of adopting technologies in the programme, in her reflective journal, she indicated: "*I don't feel technologies have benefitted or not benefitted my practical skills*." P9-Y4 stated: "*Well, it hasn't helped much because at first, it was very easy for us to refer to our notes when writing so you won't reflect on what you don't understand*."

P10-Y4 indicated:

> *I would recommend studying online as it is more time-efficient and thorough, while I prefer tests offline/on campus as it is less stressful, gives better guidance if something is wrong, and also prevents cheating*.

Bhukuvhani (2018) and Hu and Venketsamy (2022a) agree with Koehler et al. (2013), who emphasise the importance of an in-depth understanding of TCK and TPCK. The researcher concurs with Venketsamy and Wilson (2020), who indicate that lecturers should have sound TCK and TPCK in teaching and learning in order to use technologies effectively. In the researcher's opinion, lecturers should take the specific need for particular CK into consideration when designing lessons in the acupuncture programme.

5.5.3.3 Sub-theme 3: Students' challenges in the acupuncture programme

The findings of this study revealed some challenges that students experienced in the acupuncture programme: The lack of competent lecturers/clinical instructors, the lack of frequent assessment, the lack of clinical practice, the need for interprofessional education, and social-cultural factors.

The limited number of competent lecturers/clinical instructors

The findings of this study revealed that a limited number of lecturers/clinical instructors in the acupuncture programme negatively influenced students' learning experiences. Participants believed they would benefit more if sufficient competent lecturers and clinical instructors were teaching in the programme. P3-Y2 stated: "*[It will be better for lecturers] to help one another in practical class and discuss it with one another*." When answering the question, 'Explain ways in which you can be supported to develop a positive attitude towards the acupuncture programme'; P6-Y3 indicated:

> *By being given attention during the practicals. When we do practicals, we should be in smaller groups so that the lecture can also give each one of us attention and help us where we don't understand*.

From the researcher's field notes, he described that many students were sitting without any instruction on what to do while the lecturer was discussing with one student for an extensive period of time. An informal discussion with one of the lecturers in the acupuncture programme explained that there was only one lecturer in a practical class with 40 students.

Lecturers play a critical role in teaching and learning all educational programmes (Kasim & Abdurajak, 2018). This view is supported by Cakmak (2013) and Goh (2013), who point out the importance of competent academic staff in an educational programme. The researcher believes that the limited number of competent academic staff in the identified acupuncture programme limits the best outcome of the programme (Killion & Hirsh, 2011; Lumpkin, 2020). However, the researcher opines that a limited number of lecturers and clinical instructors in the acupuncture programme in SA is inevitably influenced by the limited number of qualified acupuncturists in this country. According to the AHPCSA (2022b; 2022c), there is a significant lack of acupuncturists in SA. For this reason, the AHPCSA has classified acupuncture as a 'scarce skill', according to the Regulations in terms of the Allied Health Professions Act, 1982 (2001). The researcher believes that the limited number of competent acupuncturists in SA further highlights the significance of this study, which improves the capacity of training acupuncturists through quality ***teaching, learning, assessment, and practices*** in the programme to improve children's health.

The need for interprofessional education

The findings of this study also revealed that there was a need for IPE in the acupuncture programme. Some participants reported that adopting IPE would significantly strengthen their competencies in their studies. P7-Y4 and P9-Y4 indicated that they noticed a shortage related to CK from different subjects. P7-Y4 mentioned: "*I wish that in 3rd year the pathology and diagnostics that we were taught was linked a little bit stronger to our work in the acupuncture clinic."* She explained that she would benefit more if different modalities were taught simultaneously. P9-Y4 stated: "*Also, some conditions we have not done [studied] in pathology. Hence, it was quite a challenge [in an acupuncture class]*."

Hu et al. (2022) and Kitto et al. (2013) concur that IPE bridges the gaps among different modalities in health sciences. In the researcher's view, a lack of IPE in the acupuncture

programme negatively influences students' learning. This view agrees with Ratka et al. (2017), who state that IPE would positively improve students' competencies in the world of work. Therefore, the researcher opines that there is a need to adopt IPE in the acupuncture programme.

The lack of frequent assessment

The findings of this study revealed a lack of frequent assessment with various assessment techniques negatively affected students' learning experience. They believed that frequent assessment would promote students' learning. P7-Y4 indicated: "*The manners in which we are currently assessed are fine. I wish we had a 'practice run' of the OSCEs before my final OSCE in 3rd year*." In her reflective journal, P9-Y4 added: "*We can also have tutorials more frequently to check our progress in understanding regularly*." The researcher contends that the acupuncture programme needs to employ various frequent assessments, as discussed in section 5.5.2.2.

The lack of clinical practice

Clinical practice is of profound significance in promoting students' competence to improve children's health. The findings of this study highlighted a lack of practice in the identified programme. Participants indicated that they would benefit more if there were sufficient time for clinical practice in the programme. To this, P1-Y2 stated: "*The only practice we did in the 1st year was the live case studies*."

P2-Y2 added:

> *It is a pity that so few practicals were held last year [the 1st year] due to COVID-19. Thus, I feel I would have been better at pulse diagnosis and palpation with more guided practice. Due to the online nature of the first year, I do feel we are a bit behind in the practical sense. We were well-prepared in theory but a bit lacking in applying the theoretical knowledge [through practice]. This can be improved with more practice only*.

P4-Y3 indicated: "*There should be more practicals, which will allow students to solve cases*." P5-Y3 mentioned:

> *For the entire year [the 2nd year], we had only needled 4-5 points in 3 needling practical sessions, which we feel leaves us with almost no needling experience. We also have only done one cupping and moxibustion practical, but we would be assessed on our technique in our final assessment last year. We feel we are lacking experience in*

critical areas of practice. I also find more practical lessons motivate the student to learn.

All participants in the 4th year stated that they would benefit more if there were more practice in the programme. P7-Y4 indicated: "*We did not have enough practicals in the 2nd and 3rd year due to the COVID-19 pandemic*." When answering a question on recommendations for practice, P7-Y4 stated: "*Simply having and attending more practical sessions*." P9-Y4 added: "*Having more clinical practice may help my practical skills."* Figure 5-7 presents the situation when a participant was practising the pulse diagnosis on a patient.

Figure 5-7. A participant practising pulse diagnosis on a patient

Jamshidi et al. (2016) and Kane et al. (2021) stress the importance of clinical experience to be competent in the world of work. According to the clinical schedule at the Acupuncture Centre (an acupuncture teaching clinic at the identified HEI) where students attend their practice, the researcher noticed that the clinic was only open on Monday mornings and Tuesday and Friday afternoons, a total of 16 hours per week. These hours would need to accommodate 37 students, including undergraduate and postgraduate students (Gower & Hu, 2021; Hu, 2021; Razlog, 2021). According to the Clinical Practice 1 Learning Guide (Gower & Hu, 2021), the requirement at the identified HEI requires students in their 4th year to analyse 120 cases, of which only 40 are new cases/patients. The researcher opines that there is a significant lack of clinical practice in this programme. This view is supported by Nabolsi et al. (2012) and Roberts et al. (2019). They report a gap in clinical practice in many health sciences programmes, resulting in students' lack of clinical experience. The researcher agrees that the lack of clinical practice is due to the limited number of

lecturers/clinical instructors and the limited time in the programme (CHE, 2011; UJ, 2021) (see sections 2.5.3).

Social and cultural perspectives

The findings of this study highlighted that some students experienced barriers from social and cultural perspectives. Participants revealed a language barrier among students in learning acupuncture since acupuncture originated in the PRC, particularly regarding the terminologies in acupuncture which were direct translations from Mandarin. The theories used in acupuncture practice may also cause confusion if they do not fully understand. To this, P3-Y2, P4-Y3, and P5-Y3 all expressed a challenge in understanding terminologies in acupuncture. They indicated that they experienced a language barrier since many terminologies were in Mandarin.

P9-Y4 added:

> *It had been a very challenging journey because I couldn't understand the content because I didn't have a background in acupuncture. I thought it always contradicted what I already understood from the conventional side of medicine*.

Social and cultural factors are important perspectives in teaching and learning (Burhanuddin et al., 2021). The findings of this study concur with Vygotsky, who states that culture and the social environment would influence the construction of knowledge (Hassad, 2011). The researcher is of the view that lecturers should take social and cultural factors into consideration when delivering the acupuncture programme. This is of particular significance to teaching and learning in the acupuncture programme because the contextualised experience is valuable to every education (Brosnan et al., 2016). The findings also indicated that participants in the 3rd and 4th years acquired a better understanding of the acupuncture programme compared to the participants from the 2nd year study. This could be reflected in their extensive answers in the online text-based interview. The researcher believes that the increased CK in acupuncture assists in developing a positive attitude and in-depth perception toward acupuncture and the programme (Rice & Kitchel, 2016; Wardle et al., 2011).

5.5.4 Theme 4: Strategies to improve the delivery of the acupuncture programme

In this section, the researcher further presents an analysis of data on strategies that can be employed to improve the ***teaching, learning, assessment, and practices*** of the acupuncture programme. The researcher avows that the quality and successful delivery of

acupuncture CK in the programme will significantly promote students' competencies to improve children's health. Three sub-themes emerged from the data analysis: alternative approaches to teaching and learning, differentiated assessment techniques to improve learning outcomes, and suggested approaches to enhance clinical practices.

5.5.4.1 Sub-theme 1: Alternative approaches to teaching and learning

The findings of this study revealed that participants supported that diverse pedagogical approaches should be adopted in the programme. They believed that employing various approaches in teaching and learning the acupuncture programme would strengthen their study. In section 5.5.3.3, the researcher argued for the need to adopt IPE as an alternative approach to strengthen teaching and learning in the acupuncture programme. As discussed in section 5.5.3.1, the findings of this study also revealed that hybrid learning was an effective pedagogical approach in the acupuncture programme in the South African context.

This study's findings revealed various pedagogical approaches could be applied in the programme. Participants supported that adopting various pedagogical approaches would facilitate and strengthen their learning. To this, P3-Y2 stated:

> *The online classes in the 1st year sometimes made it difficult to grasp specific content. The live zoom sessions [online tutorials] helped a lot if certain things were difficult to understand*.

P6-Y3 added:

> *Acupuncture becomes easier when the lecture teaches us and explains more to understand it better. The lecture slides and the recorded lectures, plus some practicals, did a great job in improving my understanding of acupuncture*.

P9-Y4 wrote:

> *Also, doing presentations and writing cases every week has helped me understand how to analyse cases in the clinic and apply the knowledge I already have. I think having programmes will expose us to seeing acupuncture practised outside, like the trip we took to see mine workers at Rustenburg [community service]. I found it very exceptionally beneficial.*

P7-Y4 and P9-Y4 believed that using analogical examples for concept explanation in the acupuncture programme was beneficial since analogies made it easier to remember and understand. P7-Y4 indicated:

> *For example, when learning about dampness, he gave us the analogy of wearing a wet shirt and how heavy that feels. Using this analogy makes sense why someone with a problem with dampness would feel body heaviness.*

P10-Y4 stated: "[*Using] Apps, tricks, and practise from other students was beneficial. Because it assists in memorising and applying*."

Calik and Birgili (2013) agree with Davis et al. (2011) that various pedagogical approaches can be employed to strengthen teaching and learning. These approaches include PowerPoints, videos, flipcharts, formal lectures, group discussions, simulation, analogy, reading, and learning by doing (Benazira et al., 2021; Sener & Cokcaliskan, 2018). In the researcher's opinion, there is no particular approach to teaching that is superior to another without taking the context into consideration. This view concurs with Benazira et al. (2021) and Davis et al. (2011). They agree that there are a variety of effective approaches that can be utilised to strengthen teaching and learning, according to Gardner's multiple intelligences theory. The researcher contends that different pedagogical approaches contribute to students learning from various perspectives, such as linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal perspectives. Therefore, the influence from multiple perspectives improves students' abilities, particularly their ability to deal with challenges and problem-solving (Wilson, 2018; Yavich & Rotnitsky, 2020).

Peer learning

Peer learning is an effective approach to education. The findings of this study concurred that participants recognised the importance of peer learning, and they preferred peer learning, such as peer-tutoring, to become available in the programme. When answering the question, 'please describe the ways that you would like to be supported', P1-Y2 wrote: "*Constant help from fellow students is helpful. Constant interactions among students help each other*." P3-Y2 wrote: "*I believe that the acupuncture programme should be taught on campus where we can engage the content together and help our peers that need the help*." She further explained that peers also assisted in testing their knowledge which benefited their assessment. When answering the question, 'Explain ways in which you can be supported', P3-Y2 stated: "*Ask your peers to help you study by quizzing you on the content*." P4-Y3 and P5-Y3 highlighted that they would benefit more if there were some tutors/peers who could facilitate their studies. P9-Y4 stated: "*Repeatedly doing it with my classmates gave me an insight on what I was missing.*" P9-Y4 added: "*I think pairing postgraduate and undergraduate*

students each time when we are in the clinic might be helpful." Figure 5-8 represented a situation when participants were discussing with their peers.

Keerthirathne (2020) agrees that peer learning allows students to actively engage in their studies, further enhancing learning. The researcher concurs with Carvalho and Santos (2021) and Kodabux and Hoolash (2015). They reported that peer learning strengthened students' learning and critical thinking by interacting among students. The researcher believes adopting peer learning in the acupuncture programme will also relieve the burden of the limited number of academic staff in the programme. Therefore, the researcher believes that the

Figure 5-8. Participants in discussion with a peer

implementation of peer learning will strengthen teaching and learning in the acupuncture programme. According to the TPCK model, lecturers' sound understanding of CK, PCK, and TCK would significantly promote teaching and learning (Bhukuvhani, 2018; Hu & Venketsamy, 2022a). Consequently, the researcher opines that it is crucial for lecturers to gain an in-depth understanding of the TPCK model to develop effective approaches to support the teaching and learning of the acupuncture programme.

5.5.4.2 Sub-theme 2: Differentiated assessment techniques to improve learning outcomes

The findings of this study highlighted that all participants acknowledged the importance of assessment in the acupuncture programme. However, they indicated that various assessment techniques should be employed to enhance their learning and evaluate students'

knowledge effectively. Most participants agreed that various assessment techniques could facilitate their learning and practice, such as diagnostic assessment in the form of various classroom assessments, formative use of summative assessments, and OSCEs. They indicated that various forms of assessment were needed to serve different purposes in their studies. The findings of this study agreed that informal classroom assessment and formative use of summative assessment enhanced students' learning. However, participants in this study disagreed with Earl (2006), who reported that increased time on assessment would not strengthen learning, as discussed in section 5.5.2.2.

For example, P1-Y2 stated: "*The weekly reports [a short essay that students submitted every week] was good in order to keep us studying continuously and to make sure we understood the work*." P1-Y2 further indicated that the formative use of summative assessment "*allows enough time to grasp the content in tolerable segments before getting assessed. It made it easier to focus on certain portions of the contents. Despite a large amount of information to be memorised and understood, the work became bearable*." P2-Y2 mentioned: "*The online mini-assessments were great for achieving study goals and constantly assessing progress*." P3-Y2 mentioned: "*Personally, if I wanted to gain more knowledge and skills on acupuncture, I would revise my work frequently and quiz myself on it*."

According to the Complementary Medicine Practice 2 Learning Guide (Razlog, 2021), students in the 2nd year were assessed every second week. P5-Y3 indicated that she preferred the formative use of summative assessment in her second year when she was assessed every second week and got timely feedback on her assessment.

P5-Y3 explained:

> *I feel smaller, more regular assessments are much more beneficial to have before the larger summative assessments. Because they can improve students' confidence in tests and assist in identifying areas of the work we don't know very well*.

In her reflective journal, P5-Y3 wrote: "*This [practice in the classroom] could be used as an informal testing system to help the students identify their weak areas*." P5-Y3, P6-Y3, P7-Y4, and P9-Y4 concurred that they would prefer to be assessed more frequently. They believed that frequent assessment in the form of classroom assessment improved their confidence and competence practice. P10-Y4 added:

> *We are assessed via tutorials, quizzes, tests and even through blackboard collaboration. The practical part of it [acupuncture] we do tutorials online as it prepares*

> *us for tests and to retain the knowledge. Every week we send in a self-reflection to document our improvement and assess our knowledge and look at what areas to focus on.*

Amua-Sekyi (2016) and Khan (2012) articulate the importance of assessment in education. They assert that assessment enhances students' learning by identifying students' weaknesses in their studies (Flórez & Sammons, 2013). Stăncescu and Drăghicescu (2017) agree with CHE (2011) that assessment is an effective approach to evaluating learning outcomes, which further ensures the quality of education. The researcher concurs with these authors that assessment plays a critical role in all education programmes, which promotes learning and ensures learning outcomes. Subsequently, the researcher is of the view that a variety of different assessment techniques should be adopted in the acupuncture programme. The reason is that different forms of assessment serve various purposes in the acupuncture programme. This view is further supported by Chandio et al. (2016), who argue that valid and reliable assessment should be in alignment with different levels of study, according to the revised Bloom's Taxonomy. They further explain that different forms of classroom assessment can be utilised as a diagnostic approach to promote teaching and learning.

Therefore, the researcher argues that different forms of assessment should be implemented in the acupuncture programme. These approaches include quizzes, tutorials, formative assessment, formative use of summative assessment, self-reflection, portfolio assessment, and debriefing through Socratic questioning (Amua-Sekyi, 2016; Delić & Bećirović, 2016; Payne, 2014; Yambi, 2018). The researcher opines that it is necessary to have frequent assessment in the acupuncture programme to monitor students' learning. Students can have different forms of assessment every second week, according to the findings of this study.

Objective Structured Clinical Examination

The findings of this study also highlighted the need for OSCEs in the acupuncture programme. Participants agreed that OSCEs effectively evaluated their competencies in clinical practice since they represented authentic clinical scenarios. Furthermore, some participants indicated that mock OSCEs strengthened their learning. Because through mock OSCEs, they would be able to identify their weaknesses in clinical practice. In her reflective journal, P7-Y4 mentioned that she acknowledged the importance of OSCEs to ensure her competence in clinical practice. However, she indicated a need to have mock OSCEs before the actual assessment. She wrote: "*I feel it would have been more beneficial for us to do an individual*

'trial run' for the OSCE before we completed the final examination [of OSCE] at the end of 2021." P10-Y4 wrote: "*I prefer the combined assessment of theory and practical on one day just like an actual consultation [OSCE], as this is how the knowledge is implemented*." Figure 5-9 illustrates a mock OSCE in the acupuncture programme.

Khan et al. (2013) and Ten Cate et al. (2010) recognise the crucial role OSCEs play in training in medical fields since the stations in OSCEs represent authentic situations in clinical practice (see section 2.6.2.4). They concur that the effective use of OSCEs assists in identifying students' weaknesses in clinical practice. The researcher contends that OSCEs are an effective technique to evaluate students' competencies in clinical practice. Subsequently, the researcher believes that OSCEs should be formally adopted in the acupuncture programme. There is also a need to provide more opportunities for students to participate in informal OSCEs, such as mock OSCEs. Annexure J illustrates an example of OSCE in the acupuncture programme.

Figure 5-9. Participants attending a mock OSCE

5.5.4.3 Sub-theme 3: Suggested approaches to enhance clinical practices

In this section, the researcher further presents an analysis and discussion of data on approaches to improve clinical practice. These approaches include clinical observation, integration of clinical simulation and grand rounds, interprofessional education, and work-integrated learning.

Clinical observation

The finding of this study highlighted the importance of clinical practice in strengthening students' clinical practice. They agreed that through clinical observation, they better understood how to apply theories learned from the class into the world of work. Clinical observation also allowed them to learn how to communicate with patients effectively. The findings of this study also revealed that clinical observations could also be in the form of virtual observation. All participants from the 4th year concurred that clinical observation benefited their clinical skills and critical thinking. When answering the question 'Please describe the advantages and disadvantages of practice', P4-Y3 indicated:

> *We got an opportunity to go to the clinic to see real medical cases. This enhances our practical experience by just observing. I honestly do not have any disadvantages I have experienced or noticed yet*.

P7-Y4 explained in her reflective journal that she would prefer if there were more observations in her 3rd year of study. She stated: "*I wish we had observed more patients in 3rd year so that we could better our practical knowledge*." In the recommendation to improve practice, P7-Y4 again stated: "*observing more patients in 3rd year*." P8-Y4 indicated: "*I also got to learn from other people's mistakes because I was observing them doing practicals."*

P9-Y4 wrote:

> *My experience with the teaching has changed a lot since last year. Observing the postgraduate students' clinical practice is very beneficial, especially when it comes to learning about different conditions in the clinic*.

P10-Y4 added: "*Dr X [a lecturer in the programme] also uploaded some practical demonstration videos of techniques, insertions and dangerous points, which is very enriching for my practical experience*."

In her reflective journal, P10-Y4 stated:

> *We mostly observed and did case studies this week. I realised that I need to go through my physical exams again and also focus on the angle of insertion when needling. My diagnostic ability also needs some work*.

Figure 5-10 below presents a clinical observation activity in the acupuncture programme. In his field notes, the researcher wrote that students acquired practical skills better and could identify their classmates' strengths and weaknesses in clinical practice. Observing other students also allowed them to reflect on their own practices and identify their own shortcomings.

Figure 5-10. Participants observing a clinician's clinical practice in the Acupuncture Centre

Pierce et al. (2013) agree that clinical observation is important in improving students' competencies in clinical practice. According to the Clinical Practice 1 Learning Guide (Gower & Hu, 2021), students in their 4th year were required to attend clinical observation before they could see patients independently. In the researcher's view, it is essential to adopt clinical observation in the acupuncture programme to improve students' clinical skills. The view concurs with Chen et al. (2008), who emphasise the significant role of clinical practice in promoting students' competencies. However, the researcher believes that the clinical observation should be implemented from the 3rd year of study so that students can acquire a better understanding of acupuncture clinical practice before they consult patients in their 4th year.

Despite the importance of physical observation in the clinic, the researcher believes that some observations can take place virtually as a form of live collaboration or recordings. The virtual approach to clinical observation is of profound significance since it relieves the burden of the capacity for observation in physical clinical practice. This is of particular significance in SA because there is a limited number of competent lecturers and clinical instructors in this country, as explained in section 5.5.3.3. This view concurs with Hu & Venketsamy (2022a), who report that the effective use of technology would enhance teaching and learning.

Lecturers' and clinical instructors' in-depth understanding of TCK was of importance in ensuring the effective delivery of the acupuncture programme, according to the TPCK model.

Integration of clinical simulation and grand rounds

The findings of this study revealed that clinical simulation played a critical role in the acupuncture programme. Participants believed the clinical simulation significantly promoted their learning by providing authentic clinical scenarios in the simulation centre without placing patients at risk. They agreed that they acquired a deeper understanding of clinical CK through discussions in grand rounds. All participants in the 3rd and 4th years agreed that clinical simulation improved their critical thinking in clinical practice without any potential harm to patients. To this, P4-Y3 stated:

> *The advantage is we do mock practice [clinical simulation] in the class and also get an opportunity to go to the clinic to see a real case. I think this enhances our practical experience and also our critical thinking.*

P8-Y4 explained: "*I also got to make mistakes in a practical [clinical simulation], which was corrected by my supervisor without any harm to patients*."

P9-Y4 added:

> *Having more clinical practice may help [to improve clinical skills]. Even though it's not an actual patient, our classmates can play patient [clinical simulation]. We then do history taking, prescription and needle them under the lecturers' [clinical instructors'] supervision. This will serve as a way of learning and adapting to the habit of being confident. We can do this when we do not have patients [in the clinic].*

P10-Y4 wrote:

> *I also feel more comfortable as Dr X [clinician] explains that it is actually good if we make mistakes in the clinic because it is better to learn from your mistakes now, where you can learn and grow in experience*.

In his field notes, the researcher noted that clinical simulation strengthened students' critical thinking of clinical cases. This was of particular significance since there was no harm to patients and some rare cases also could be represented through clinical simulation. Figure 5-11 illustrates a clinical simulation activity.

Persico (2018) concurs with Cook et al. (2011) that clinical simulation improves students' competencies in clinical practice. Martinez et al. (2020), So et al. (2019) and the WHO (2013) all agree that clinical simulation is an effective pedagogical approach to clinical knowledge related to clinical practice. The researcher believes that the clinical simulation not only strengthens students' clinical practice but also enhances their content knowledge. The employment of clinical simulation in the acupuncture programme is of crucial significance because it effectively optimises students' clinical practice while maintaining the safety of patients (Kapucu, 2017).

Figure 5-11. Participants in a clinical simulation activity

As explained by Black et al. (2017) and Stanyon and Khan (2015), grand rounds can take place in the absence of a real patient to ensure the confidentiality and dignity of the patient. The researcher believes that the effective integration of clinical simulation and grand rounds will significantly improve students' learning and practice while maintaining the ethics requirement in clinical practice (Stanyon & Khan, 2015). The researcher contends that the integrated clinical simulation and grand rounds in the acupuncture programme can be recorded and made available for students to review at a later stage.

As discussed previously, the findings of this study revealed that hybrid learning through the effective use of technology would enhance students' learning. All participants from the 2nd year did not report their views and experiences in clinical simulation and grand rounds since no clinical simulation and grand rounds are conducted in the 1st and 2nd years, according to the Complementary Medicine Practice 1 (Pellow et al., 2021) and Complementary Medicine Practice 2 (Razlog, 2021). The researcher supports the absence of clinical simulation and grand rounds in the 1st and 2nd years of study; because these two approaches are more suitable for delivering clinical-related content knowledge (Black et al., 2017; Cook et al.,

2011). This view also concurs with Hu & Venketsamy (2022a), who state that the adoption of pedagogical approaches should take into consideration of specific CK, according to the TPCK model.

Interprofessional education

The findings of this study also supported the adoption of IPE in the acupuncture programme, as discussed in section 5.5.3.3. The researcher opines that integrating IPE into the clinical simulation and grand rounds will also strengthen the teaching and learning of the acupuncture programme, provided the integration is effective.

Work-integrated learning (clinical practice)

The findings of this study revealed that participants recognised the importance of clinical practice in the acupuncture programme, as discussed in sections 5.5.4.1 and 5.5.4.3. Participants in the 3rd and 4th years agreed that practice under supervision as a form of WIL significantly improved their competencies and confidence in clinical practice. P4-Y3 stated: "*I prefer memorising the theory and getting more patients with different cases for experience*." P6-Y3: wrote: "*For me would be by having more practicals (WIL) that helps not to forget what I did and also enjoy what I am doing*." P8-Y4 added: "*The advantage that I got from the practicals of acupuncture was that I got to see different patients, which sharpened my knowledge on those types of diseases*." P9-Y4 indicated: "*It makes retaining information much simpler as when you get corrected [from clinical practice]. I'm less likely to repeat the very same mistake."*

P10-Y4 wrote:

> *I was practising under supervision to increase my needling ability. Also, looking and repeating different techniques to make it under memory. With the practicals [clinical practice], I realised my improvement in confidence and needling. I would recommend attending the clinic at least twice a week.*

From the observations, the researcher noted that all participants experienced a quicker improvement in their clinical skills. They were less like to repeat the same mistake if it was corrected immediately.

Atkinson (2016) and Freudenberg et al. (2010) acknowledge the importance of WIL in medical training. They explain that WIL, such as clinical practice, allows students to acquire lived clinical experiences through authentic practise under supervision. According to the

Clinical Practice 1 Learning Guide (Gower & Hu, 2021), clinical practice as a form of WIL is compulsory in the programme. The researcher contends that clinical practice is significant in the acupuncture programme since it is real practice in a clinical setting. The effective use of WIL in acupuncture will significantly improve students' competencies in clinical practice. This view concurs with Atkinson (2016) and Govender and Wait (2017). They emphasise the importance of WIL as practice-based learning activities in the world of work. The researcher opines that debriefing through the Socratic method of questioning will also benefit students from clinical practice. Tolsgaard (2012) and Getie et al. (2021) place much emphasis on students' competencies in clinical practice to ensure that they (students) are competent, confident and capable of performing their clinical duties to promote public health, including children's health.

5.6 SUMMARY

In this chapter, the researcher presented a comprehensive analysis of the data of this study to answer the primary research question regarding students' experiences with the delivery of the acupuncture programme to improve children's health. The data were collected through an online text-based interview and triangulated with other resources, including participants' reflective journals, observation schedules, field notes and documentations. The researcher explained the themes and sub-themes that emerged from the data using the TPCK model. The researcher also discussed strategies to strengthen the ***teaching, learning, assessment, and practices*** of the acupuncture programme to improve children's health. In the next chapter, the researcher will further discuss the conclusion and recommendations of this study.

CHAPTER 6
INTERPRETATION OF RESEARCH FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

6.1 INTRODUCTION

In chapter 5, the researcher presented a comprehensive discussion on the analysis of data and research findings. The findings of this study were presented according to the themes and sub-themes that emerged from the data. The researcher consulted existing literature to support and validate the findings of this study. This study aimed to explore the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health. To improve children's health using acupuncture, the researcher agrees with He et al. (2013), Moeen (2016) and Saunders and Berry (2020) that it is of extreme importance that all students are competent, confident, and capable of practising acupuncture. Therefore, HEIs must ensure that acupuncture programmes are designed appropriately and incorporate effective teaching and learning strategies, quality assessment, and adequate clinical practice.

In this chapter, the researcher presents an interpretation of the research findings to achieve the research aim (see Chapter 1, section 1.4). The researcher draws conclusions from the findings to formulate and present recommendations on how this study can contribute to the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health. A summary of the study is provided to give an overview of the discussions in the previous chapters to facilitate the link between the value of the literature study with the research findings, conclusions, and recommendations.

6.2 SUMMARY OF THE STUDY

This section serves as a summary of the study. The researcher provides an orientation to the section in which the recommendations are made and discussed.

In Chapter 1, the introduction and background of this research study were presented. The research problem and the secondary research questions were identified and formulated to provide a framework for how the study focus was structured and how it would guide the research process. The researcher further explained the aims of the study and the research methodology for conducting the research. Furthermore, in chapter 1, the conceptual frameworks were suggested. Key concepts were well-defined to frame future use and

exposition of the concepts throughout the study. Chapter 1 also provided an overview of the chapter divisions of the research study.

Chapter 2 focused on existing literature on acupuncture as a therapeutic approach. This chapter also explored acupuncture programmes from a national and international perspective, including countries such as PRC, Australia, and SA. The researcher outlined the importance of teaching, learning, assessment, and practices of an acupuncture programme. Furthermore, the researcher provided a detailed discussion on the challenges of teaching, learning, assessment, and practices of the acupuncture programme in HEIs. To conclude this chapter, the researcher presented strategies to improve the teaching, learning, assessment, and practices of acupuncture programmes.

In Chapter 3, the researcher provided a detailed explanation of the conceptual framework, which unpinned this study. The conceptual framework, the TPCK model, which was developed from Shulman's (1986) PCK model and Mishra and Koehler's (2006) TPACK model, was used in this study as a lens to explain and enunciate the findings. The TPCK model placed much emphasis on CK, PCK, and TCK. The research questions of this study determined the decision to adopt the TPCK model. The TPCK model was applied to this study and was reflected in the data analysis.

Chapter 4 focused on the research methodology for the study. A qualitative research approach and interpretivist paradigm were discussed as an approach to make meaning of the participant's own experiences and contexts. Using a single descriptive case study was motivated to support a comprehensive exploration of the research problem. This was selected because it was useful in obtaining an in-depth understanding of the lived experiences and real-life context of participants' experiences with the teaching, learning, assessment, and practices of the acupuncture programme. Purposive sampling was used to recruit participants from the 2nd, 3rd and 4th year students in the BHScCM programme at a public HEI in SA. This chapter also described the data collection process and methods used: online text-based interviews, observation, participants' reflective journals, field notes, and documentation. The data analysis procedure was provided, and the issue of the trustworthiness of the findings was discussed to ensure credibility, confirmability, dependability, and transferability in the study. Ethical concerns were discussed, including the principles of anonymity, privacy, and confidentiality.

In Chapter 5, the findings and analysis of the qualitative data collected were presented. The profile of the participants was provided, and the data analysis methods were discussed. The results from the multiple data resources, as indicated in chapter 4, were detailed, and findings were organised into themes and sub-themes. Lastly, the researcher synthesised discussions and participants' responses on their experiences with the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health.

6.3 INTERPRETATION OF RESEARCH FINDINGS

The interpretation of research findings illuminates the links between the findings and the themes and sub-themes that were used for data analysis. It also reflects the value of how the conceptual framework connects to the findings. This study aimed to explore students' experiences of the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health. The interpretation of findings was also a crucial approach to verify or refute key statements in the existing literature as evidence for responding to research questions:

Primary research question:

- How do students experience the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health?

Secondary research question

- *Secondary question 1*: What are students' views and perceptions on the teaching, learning, assessment, and practices in the acupuncture programme?
- *Secondary question 2*: What strategies can be used to strengthen the quality of teaching, learning, assessment, and practices in the acupuncture programme?
- *Secondary question 3*: How can Shulman's (1986) PCK and Mishra and Koehler's (2006) TPACK model be used as a lens to facilitate the delivery of an acupuncture programme?

During the data analysis, the researcher found that some of the findings were linked to multiple research questions. This provided richness to the analysis across themes and sub-themes, thus allowing for natural linkages. Table 6-1 highlights the links between the themes, sub-themes, and research questions.

Themes	Sub-themes	Relevance to the research question
Knowledge and understanding of acupuncture	Views and attitudes toward the acupuncture programme Knowledge and attitudes toward acupuncture as a therapeutic approach	Main question Secondary question 1
Importance of CK for the delivery of the acupuncture programme	Importance of CK to teaching and learning Students' perceptions and experiences of assessment Students' perceptions of the importance of CK for practice	Main question Secondary question 1 Secondary question 2
Effects of the appropriate PCK and TCK in the delivery of the acupuncture programme	Students' views towards the teaching methodology Students' views and experiences towards the use of technology Students' challenges in the programme	Main question Secondary question 1 Secondary question 3
Strategies to improve the delivery of the acupuncture programme	Alternative approaches to teaching and learning Differentiated assessment techniques to improve learning outcomes Suggested approaches to enhance clinical practices	Secondary question 2 Secondary question 3

Table 6-1. Themes, sub-themes as identified in Chapter 5 and the relevance to research questions

Below is a summary of the findings aligned to the themes and sub-themes. These findings are the key drivers generating the recommendations in this study.

6.3.1 Knowledge and understanding of acupuncture

Participants in this study showed a good understanding of the acupuncture programme; however, students in the 3rd and 4th years of the study showed much deeper and profound knowledge and understanding of acupuncture and the acupuncture programme. They acknowledged the purpose and the outcomes of the acupuncture programme at the identified HEI. They agreed that the acupuncture programme was designed for the professional training of acupuncturists. Participants also expressed positive attitudes toward the acupuncture programme by highlighting their satisfaction with the depth and scope of the CK. They believed that the acupuncture programme prepared them to be competent and confident to practise acupuncture in the working world. Despite these positive attitudes, some participants highlighted challenges and barriers towards the study of acupuncture. They stated that there were too few lecturers and clinical instructors to support them during teaching and learning. They also indicated a need to ensure sufficient time in the acupuncture programme, particularly for the clinical practice (see section 5.5.1.1). From a therapeutic perspective, most participants shared a positive attitude toward acupuncture as a therapeutic approach to improving adults' and children's health. Compared to the 2nd year students, participants from the 3rd and 4th years acquired a much deeper understanding of acupuncture as a therapeutic approach. There was evidence that acupuncture CK and previous positive experiences contributed to participants' knowledge and understanding of acupuncture (see section 5.5.1.2).

6.3.2 Importance of CK for the delivery of the acupuncture programme

Participants agreed that CK was crucial for the teaching, learning, assessment, and practices of the acupuncture programme. They believed that appropriate CK provided them with the KSVA to become competent acupuncturists. This study found that CK is necessary for both educators (lecturers and clinical instructors) and students as this strengthens their (students) abilities and confidence in clinical practice (see section 5.5.2.1). Furthermore, participants acknowledged the value of assessment in the acupuncture programme. They enjoyed the continuous assessment, which aided in strengthening their knowledge. The findings of this study disagree with Earl (2006), who argues that increased time in assessment would not improve students' performance. This study revealed that more frequent assessments in various forms should be implemented to facilitate students' learning (see section 5.5.2.2). Participants also recognised the significance of adequate CK for their competence in real-

world situations. There is a need for competent lecturers and clinical instructors with appropriate pedagogical approaches. This study also reveals a need for adequate clinical practice to ensure the quality of the acupuncture programme in preparing students' competencies in improving children's health (see sections 5.5.1.1 and 5.5.2.3).

6.3.3 Effects of the appropriate PCK and TCK in the delivery of the acupuncture programme

Participants agreed that hybrid learning was an effective approach in the acupuncture programme. Participants further suggested some pedagogical approaches that could be implemented in the acupuncture programme to strengthen the teaching, learning, assessment, and practices (see sections 5.5.3.1, 5.5.4.1, 5.5.4.2 and 5.5.4.3). Participants recognised the importance of technologies in education, particularly during the COVID-19 pandemic. They were open to adopting technologies in the acupuncture programme since technologies significantly facilitated their studies. However, they suggested that PK and TK should be considered with specific contexts to achieve the best outcomes of the acupuncture programme. They believed some CK should be delivered in contact classes because it was not appropriate to be delivered online (see section 5.5.3.2). The reason was that the experiences from online learning for these CK were not the same as in the real-life world (see section 5.5.3.2). Furthermore, participants reported some challenges in their study in the acupuncture programme. These challenges included the limited number of competent lecturers/clinical instructors, the lack of clinical practice, and social-cultural factors (see section 5.5.3.3).

6.3.4 Strategies to improve the delivery of the acupuncture programme

This study proposed various approaches that could be adopted in the acupuncture programme to strengthen the teaching, learning, assessment, and practices. Participants suggested the employment of hybrid learning and IPE in the acupuncture programme. Participants believed that a variety of different pedagogical approaches would promote their learning. They further suggested various pedagogical approaches to strengthen their study, such as peer learning, PowerPoints, videos, flipcharts, formal lectures, group discussions, simulation, analogy, reading, and learning by doing (Benazira et al., 2021). They felt that these pedagogical approaches would improve their learning. The reason was that these approaches effectively promote students' learning from multiple perspectives, according to Gardner's multiple intelligences theory (see sections 2.6.1.4 and 5.5.4.1). Participants also

agreed that various assessment techniques should be adopted in the acupuncture programme. These techniques included quizzes, tutorials, formative assessment, formative use of summative assessment, self-reflection, portfolio assessment, and debriefing through the Socratic questioning (see section 5.5.4.2). They further highlighted the need for OSCEs in the acupuncture programme. This study revealed various approaches to promote students' competencies in practice, such as clinical observation, integration of clinical simulation and grand rounds, IPE, and WIL (see section 5.5.4.3).

6.4 NEW INSIGHTS: VALUE OF THE LITERATURE REVIEW, CONCEPTUAL FRAMEWORK AND RESEARCH APPROACH AND FINDINGS FROM THE EMPIRICAL STUDY

In this section, the researcher discusses the value of the literature review, conceptual framework and research approach, and findings from the empirical study.

6.4.1 Value of the literature review

The researcher consulted national and international literature to acquire a deeper understanding of the research phenomenon and to justify selecting the research approach and data collection processes. The literature review provided broad insights regarding the importance of teaching, learning, assessment, and practices in educational programmes. The literature revealed the global challenge in children's health, particularly in Africa. It also confirmed the critical role of acupuncture in promoting children's health. Furthermore, the literature also provided possible strategies to strengthen the teaching, learning, assessment, and practices of an educational programme. It was also evident from the South African literature that there was a limited number of acupuncturists practising in SA compared to the PRC and Australia. This further affirmed the value and significance of this study to improve the capacity building for quality acupuncturists by ensuring the teaching, learning, assessment, and practices of the acupuncture programme. The literature also identified what literature was in place to support the findings and recommendations of this study for the strengthening of teaching, learning, assessment, and practices of the acupuncture programme to improve children's health.

6.4.2 Value of the conceptual framework

Cohen et al. (2018) state that applying a conceptual framework in research will benefit the study from multiple perspectives, such as guiding the approach to the identified phenomenon

and clarifying core concepts. Maree (2020) concurs with Cohen et al. (2018) that the conceptual framework selected for research should bridge the problem, purpose, significance, and research questions of a study.

In this study, the researcher explored students' experiences on the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health. This aim was achieved by developing strategies and guidelines to strengthen the delivery of acupuncture higher education in the South African context. The importance of content and pedagogical knowledge cannot be over-emphasised. Mishra and Koehler (2006) and Shulman (1986) concur that appropriate adequate CK and PCK are necessary to improve quality education. In recent decades, technologies have played an important role in education, resulting in significant global impacts amongst HEIs (Elas et al., 2019). The use of technologies was of particular significance during COVID-19 pandemic since it allowed for remote learning while ensuring the safety of students. Consequently, the researcher believes that CK, PCK, and TCK were pertinent in ensuring the success of delivering the acupuncture programme to students.

The researcher believes that the integration of technologies is a basic requirement for the acupuncture programme in the 21st century. The TPCK model was a useful tool for promoting effective learning and teaching of the acupuncture programme. The adoption of the TPCK model in this study provided a theoretical lens for the researcher to explore the teaching, learning, assessment, and practices of the acupuncture programme from various perspectives. This model also allowed the researcher to be explicit and analyse the complex relationship among different components in teaching and learning, such as CK, PCK, and TCK. The in-depth understanding of this relation further aided the researcher in developing strategies and guidelines to promote and strengthen the acupuncture programme's teaching, learning, assessment, and practices. During the data collection, the researcher focused on probing students' experiences and views on the teaching, learning, assessment, and practices of the acupuncture programme, with a special focus on CK, PCK, and TCK of the programme. The application of the TPCK model also benefited this study in strengthening the findings of this study using anchoring discussions and recommendations in a well-designed conceptual framework. This further improved the generalisation of the findings of this study (Cohen et al., 2018; Yin, 2018).

6.4.3 Value of the research approach and theoretical paradigm

In this study, the researcher aimed to explore students' experiences of the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health. For this reason, the researcher adopted a qualitative case study design in this study. The selection of a single case study design was suitable for this study since the identified case was critical, unusual, common, and revelatory (see section 4.3.1). A qualitative approach is suitable for the purpose of investigating participants' experiences, understandings, and characteristics (Creswell, 2014; Maree, 2020). The interpretivism paradigm allowed the researcher to interpret the data of this study, which were the lived experiences with the phenomenon (participants). The value of this research approach also allowed the researcher to employ multiple data collection methods, enabling data triangulation. The value of this research approach was within the authenticity of the data collection processes, which allowed for the voices of the participants to be recognised as equal partners in this research, with the researcher and participants each occupying their respective roles. The findings, based on the empirical data, reflected the voices of the participants and how their stories shaped the recommendations of this research study. The research approach also indicated the willingness of participants to participate in this study and, truthfully, where they felt they were respected as equal contributors, with the researcher and participants each understanding their respective roles in the research. Therefore, it was important for the researcher, as indicated in chapter 5, to hear the voices of the participants. It also confirmed the validity and authenticity of the research question in search of a solution to promote the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health.

6.5 VERIFICATION OF THE RESULTS (LITERATURE CONTROL)

In this section, the insights obtained throughout this research were verified against key literature references. This is done using the key themes and sub-themes as indicated in chapter five and summarised under sections 6.3.1 to 6.3.4. of this chapter. Through interpretative comments, the researcher will indicate how the findings from the empirical data are supported by these key literature references or how it contradicts some of the key literature. The verification process will then be used to craft the recommendations, tools, and tips for designing and delivering the acupuncture programme.

Table 6-2. Verification of the findings against the themes, sub-themes, insights gained and key literature resources

Main themes and sub-themes	Interpretative comment from the research	Insights	Key literature sources	
			Agreement on the findings and insights	Refute the findings and insights
Knowledge and understanding of acupuncture **Views and attitudes toward the acupuncture programme** **Knowledge and attitudes toward acupuncture as a therapeutic approach**	Students expressed positive views towards the acupuncture programme. They indicated that the programme prepared their competencies in the world of work.	HEIs should provide quality educational programmes to ensure graduates are competent through effective teaching, learning, assessment, and practices.	Hénard & Roseveare, 2012; UJ, 2021	
	Students had a clear and accurate understanding of the purpose and learning outcomes of the acupuncture programme.	The identified acupuncture programme is designed to provide professional training to be acupuncturists.	UJ, 2021	
	The findings of this study revealed that there was insufficient time in the	This finding agrees with other literature from international countries that the identified	FJTCM, 2018	

	acupuncture programme, particularly in clinical practice.	programme has limited clinical hours. There is a need to standardise the requirement for sufficient clinical hours in this programme.	Regulations in terms of the Allied Health Professions Act, 1982 (2011); WHO, 2020c	
	Students in the 3rd and 4th years of study shared a better understanding of acupuncture as a therapeutic approach (treatment) than students in the 2nd year.	The longer students are immense in the programme, the better understanding they will acquire. The reason is that students acquire more comprehensive content knowledge. Therefore, it is of profound significance to ensure HEIs provide quality programmes with adequate content knowledge to strengthen students' KSVA.	Koehler et al., 2013; Rice & Kitchel, 2016	
	Students had an in-depth understanding of acupuncture treatment.	This study highlights that content knowledge strengthens students' understanding and attitudes towards acupuncture treatment. This finding concurred with the	Flesch, 2013; Lim et al., 2015	

		literature that knowledge positively affects students' attitudes.		
	Students shared positive attitudes toward acupuncture as a therapeutic approach. They indicated that acupuncture was effective in various conditions.	The findings of this study agree with the literature that acupuncture is an effective treatment for various diseases. It is widely used for a variety of medical conditions.	He et al., 2013; Moeen, 2016; Saunders & Beery, 2020; WHO, 2019	
	Students' previous experiences of acupuncture treatment influenced their views toward acupuncture as a therapeutic approach.	The findings of this study concur with the literature that previous experiences significantly affect student attitudes towards acupuncture treatment. Therefore, HEIs must ensure students are competent.	Shumer et al., 2016; WHO, 2019	
Importance of CK for the delivery of the	Students recognised the significance of acquiring	The findings of this study reveal that students' adequate content	Bhukuvhani, 2018;	

acupuncture programme **Importance of CK to teaching and learning** **Students' perceptions and experiences of assessment**	adequate and appropriate acupuncture content knowledge in learning. They believed that adequate acupuncture content knowledge promoted their competencies for future work.	knowledge benefits their in-depth understanding of acupuncture in teaching and learning. Therefore, it is of importance to ensure that the acupuncture programme provides adequate content knowledge in teaching.	Hénard & Roseveare, 2012; Koehler et al., 2013; Ludigo et al., 2019; Wang, 2019	
Students' perceptions of the importance of CK for practice	The data reflected that lecturers' adequate content knowledge and pedagogical content knowledge were of significance to ensuring the quality of teaching.	The findings of this study agree with the literature that lecturers' content knowledge is of profound importance to ensure effective teaching. There is a need to strengthen lecturer effectiveness to ensure the quality of teaching and learning.	DHET, 2011; Hénard & Roseveare, 2012; Killion & Hirsh, 2011; Lumpkin, 2020; Rice & Kitchel, 2016; Shulman, 1986	

	Participants recognised the importance of assessment in promoting their learning.	This study agrees with the literature that assessment promotes students' learning. It is of pertinent importance to use assessment effectively in the acupuncture programme to enhance students' learning.	Flórez & Sammons, 2013; Khan, 2012; Umar, 2018; Yambi, 2018	
	Participants acknowledged that assessment was crucial to evaluate learning outcomes and their competencies.	The findings of this study agree that assessment is an effective approach to evaluating learning outcomes in an educational programme. Therefore, it is crucial to ensure the assessment is valid and reliable.	Barari et al., 2020; CHE, 2011; Liljedahl, 2010; Stăncescu & Drăghicescu, 2017; Yambi, 2018	
	The data indicated various assessment techniques should be adopted for different purposes. They believed that various assessment techniques would strengthen their	This finding agrees with the literature that assessment should meet different purposes and requirements, according to the revised Bloom's Taxonomy. It is important to select appropriate assessments in the acupuncture	Barari et al., 2020; Cakmak, 2013; Chandio et al., 2016; Esomonu & Eleje, 2020; Goh, 2013;	

	learning from different perspectives.	programme to enhance students learning.	Jang & Wagner, 2013; Payne, 2014	
	Participants indicated that increased time in assessment would promote their learning and improve their learning outcomes.	Contrary to the literature that increased time in assessment does not benefit students' learning, the findings of this study reveal that increased time in assessment will benefit students' learning. Therefore, it is important to allocate appropriate assessment time		Earl, 2006
	Participants agreed that adequate content knowledge in acupuncture ensured them to practise better and improved their confidence in practice.	This finding agrees with the literature that content knowledge was the foundation of clinical practice. It is of profound significance to ensure students acquire adequate content knowledge in the acupuncture programme.	Jamshidi et al., 2016; Kane et al., 2021; Nabolsi et al., 2012; Roberts et al., 2019	

Effects of the appropriate PCK and TCK in the delivery of the acupuncture programme **Students' views towards the teaching methodology** **Students' views and experiences towards the use of technology**	The data indicated that hybrid learning was beneficial in the acupuncture programme. Participants indicated that hybrid learning was an effective approach because it provided much convenience and flexibility in learning.	This finding agrees with the literature that hybrid learning is an effective teaching mode in 21st-century education. Hybrid learning promotes students' learning in the acupuncture programme. This is of particular significance in the acupuncture programme since acupuncture is a profession that requires practical skills. Integrating online and contact classes allows the effective delivery of theoretical knowledge and practical skills.	Al-Zumor et al., 2013; Hu & Venketsamy, 2022a; Koehler & Mishra, 2009; Lalima & Dangwal, 2017; Mpungose, 2020	
Students' challenges in the acupuncture programme	Students concurred that various pedagogical approaches should be adopted in the acupuncture programme.	These findings agree with the literature that it is important to apply various pedagogical methods in educational programmes to achieve the different needs of students. According to Gardner's multiple intelligences theory, the different pedagogical methods in the	Davis et al., 2011; Benazira et al., 2021; Gardner, 1999; Calik & Birgili, 2013; Yavich & Rotnitsky, 2020	

		programme allow students to gain the most out of the teaching.		
	Although participants supported online teaching and learning, they also reported some challenges in using technologies in teaching and learning during the COVID-19 pandemic.	The findings of this study agree with the literature that the ERE through technologies places additional pressure on HEIs, particularly in African countries. There is a need to provide sufficient support for the implementation of ERE among South African HEIs.	Aigbavboa & Thawala, 2016; Davis et al., 2011; Jensen & Calvert, 2014; Paideya, 2020; Scott, 2020	
	The findings of this study revealed that poverty and poor infrastructure negatively affected students learning in the acupuncture programme during the COVID-19 pandemic.	These findings agree with the literature that many African HEIs experience barriers in ERE. It is important for policymakers to consider improving the poverty and infrastructure to support ERE in African HEIs.	Aristovnik et al., 2020; Hu, 2022b; Salmi, 2020; Thaba-Nkadimene, 2020;	

			Venketsamy & Wilson, 2020	
	Participants in this study highlighted the benefits of using technology in the acupuncture programme. They believed that studying through technology, such as online teaching, provided them with many conveniences in their learning.	The findings of this study disagree with the literature that students are reluctant to adopt technologies in their learning.		Aristovnik et al., 2020; Marinoni et al., 2020
	The findings of this study revealed that the use of technology might increase stress and anxiety among students.	This study agrees with the literature that using technology may increase students' stress. It is of significance to ensure the appropriate implementation of technologies in the acupuncture programme. This is further assured by taking content knowledge into	Aristovnik et al., 2020; Bhukuvhani, 2018; Hu, 2022b; Hu & Venketsamy, 2022a; Koehler et al., 2013;	

		consideration when designing a lesson.	Paideya, 2020	
	To improve teaching and learning, participants reported a need to consider content knowledge when employing specific technologies in the acupuncture programme.	This finding agrees with the literature, emphasising the importance of PCK and TCK in teaching and learning. The findings of this study highlight the significance of using technologies in the acupuncture programme. However, appropriate technologies should be selected for specific CK.	Hu & Venketsamy, 2022a; Koehler et al., 2013; Paideya, 2020	
	Participants indicated that LCA was an effective approach in the acupuncture programme. Furthermore, they believed that the integration of LCA and SCA effective promoted students' learning. They agreed on	The findings agree with the literature that both LCA and SCA are effective approaches to teaching and learning. The integration of LCA and SCA effective promotes students' learning.	Emaliana, 2017; Hackathorn et al., 2011; Kitiashvili, 2020; Murphy et al., 2021; Zeki & Güneyli, 2014	

	the importance of participatory teaching and learning.			
	The findings revealed that there was a limited number of competent lecturers/clinical instructors. Participants believed that the limited number of competent lecturers in the acupuncture programme negatively influenced their study.	This finding agrees with the literature that there was a limited number of qualified acupuncturists in SA. It is crucial to ensure lecturers in the programme are competent in teaching. To achieve the best outcomes of the educational programme, such as the acupuncture programme, there is a need for HEIs to support lecturers' personal development in teaching.	Cakmak, 2013; Goh, 2013; Kasim & Abdurajak, 2018; Lumpkin, 2020; AHPCSA, 2022b; 2022c	
	The findings of this study highlighted the need for IPE. Participants believed that IPE would promote	The findings of this study concur with the literature that interprofessional education would benefit students' competencies in the world of working.	Hu et al., 2022; Kitto et al., 2013; Ratka et al., 2017	

	their competencies in the world of work.			
	Participants revealed a limited clinical practice in the acupuncture programme, which negatively affected their competence in acupuncture.	The study concurs with the literature that there was a need to ensure sufficient time is allocated for clinical practice in the acupuncture programme to promote students' competencies.	CHE, 2011; Jamshidi et al., 2016; Kane et al., 2021; Nabolsi et al., 2012; Roberts et al., 2019	
	Participants agreed that a supported learning environment would promote their learning. They believed that cultural-social factors might affect their study.	The findings of this study agree that cultural-social factors influence students learning. There is a need for HEIs to provide a supported learning environment to students.	Burhanuddin et al., 2021; Hassad, 2011	
Strategies to improve the delivery of the acupuncture programme	The findings of this study revealed that hybrid learning and IPE were effective pedagogical methods to improve	These findings agree with the literature that it is of profound significance to employ hybrid learning and IPE in the acupuncture programme.	Al-Zumor et al., 2013; Hu et al., 2022; Hu & Venketsamy, 2022a;	

Alternative approaches to teaching and learning **Differentiated assessment techniques to improve learning outcomes**	student's learning outcomes.		Kitto et al., 2013; Koehler & Mishra, 2009; Lalima & Dangwal, 2017; Mpungose, 2020; Ratka et al., 2017	
Suggested approaches to enhance clinical practices	The findings of this study indicated that various pedagogical approaches might improve the teaching and learning of the acupuncture programme.	The findings support the literature that various pedagogical approaches should be adopted in teaching since they benefit students' learning. These approaches include the use of PowerPoints, videos, flipcharts, formal lectures, group discussions, simulation, analogy, reading, and learning by doing. The adoption of different pedagogical approaches in the acupuncture programme also promotes teaching and	Benazira et al., 2021; Calik & Birgili, 2013; Davis et al., 2011; Sener & Cokcaliskan, 2018; Wilson, 2018; Yavich & Rotnitsky, 2020	

		learning, according to Gardner's multiple intelligences theory.		
	The findings of this study revealed that peer learning was an effective technique to strengthen students' learning.	The findings of this study agree with the literature that peer learning is an effective approach in education which promotes students' learning.	Bhukuvhani, 2018; Carvalho & Santos, 2021; Hu & Venketsamy, 2022a; Keerthirathne, 2020; Kodabux & Hoolash, 2015	
	The findings of this study indicated that the use of various assessment techniques would promote students' learning	These findings agree with the literature that the adoption of various assessment techniques in the programme will strengthen students' learning. Therefore, there is a need to ensure various appropriate assessment is utilised in the acupuncture programme to promote students' learning outcomes.	Amua-Sekyi, 2016; Chandio et al., 2016; CHE, 2011; Flórez & Sammons, 2013; Khan, 2012; Stăncescu & Drăghicescu, 2017	

	Participants in this study reported that mock OSCEs strengthened their learning by identifying their weaknesses in clinical practice. They believed that OSCEs could effectively reflect their skills and competencies in clinical practice.	The findings of this study agree with the literature that OSCEs are effective assessments in medical fields that evaluate students' competencies in clinical practice. There is a need to provide sufficient opportunity for students to use mock OSCEs to identify their deficiencies in clinical practice.	Ten Cate et al., 2010; Khan et al., 2013	
	Participants highlighted that clinical observation was an effective technique to promote students' competence in clinical practice.	This finding agrees with the literature that clinical observation is crucial in improving students' competencies in clinical practice. To enhance students' competence in clinical practice, it is important to ensure students acquire sufficient hours for clinical observations. HEIs are advised to adopt virtual clinical observation in the acupuncture programme to relieve	Chen et al., 2008; Hu & Venketsamy, 2022a; Pierce et al., 2013	

		the burden of the capacity for physical clinical observation.		
	Participants stated that both clinical simulation and grand rounds were beneficial to their learning in clinical practice	The findings expand on the literature that clinical simulation and grand rounds are effective approaches to promoting students' competencies in clinical practice. It is crucial to offer opportunities for students to attend clinical simulation and ground rounds. Integrating clinical simulation and grand rounds is also an effective approach to be implemented in the acupuncture programme to strengthen teaching and learning in clinical practice.	Black et al., 2017; Cook et al., 2011; Kapucu, 2017; Persico, 2018; So et al., 2019; Stanyon & Khan, 2015; WHO, 2013	
	The findings of this study revealed the importance of WIL in improving students' skills in clinical practice.	The findings of this study agree with the literature that WIL allows students to gain authentic clinical experiences. Therefore, it is crucial for HEIs to ensure sufficient time is allocated to clinical practice	Atkinson, 2016; Freudenberg et al., 2010; Getie et al., 2021;	

		allowing students are competent in the world of work.	Govender & Wait, 2017; Tolsgaard, 2012	

6.6 ANSWERING THE RESEARCH QUESTIONS

In this section, the researcher presents answers to the research questions of this study. The online text-based interview consisting of open-ended questions was developed according to the guidance of research questions (see Annexure D). While answering the primary research question, consideration is given first to answering the secondary research questions.

6.6.1 Secondary research question 1

What are students' views and perceptions on the teaching, learning, assessment, and practices in the acupuncture programme?

The researcher asked secondary research question 1 to explore students' views and perceptions of the acupuncture programme focused on teaching, learning, assessment, and practices. All the participants agreed on the importance of quality teaching, learning, assessment, and practices in the acupuncture programme. They believed that with quality education, they would become competent and confident practitioners. The participants also agreed that the programme presented at the HEI could definitely be improved in some areas, such as the depth and scope of the content knowledge, the pedagogical approach to presenting the content, and the amount of time they spent in the clinics for WIL. The researcher is of the view that teaching, learning, assessment, and practices are of profound importance to ensure the quality of the acupuncture programme at the identified HEI to improve children's health. This view concurs with Govender and Wait (2018) and Pournara et al. (2015). They emphasise the significance of quality delivery of educational programmes to prepare students' competencies in the world of work (see sections 2.4.1; 2.4.2; 2.4.3 and 2.4.4). The researcher believes that through quality teaching, learning, assessment, and practices, students will become competent in using acupuncture to improve children's health in the world of work.

The emerging themes established the understanding of students' views and perceptions of the delivery of the acupuncture programme. Students' views and perceptions of the teaching, learning, assessment, and practices of the acupuncture programme were explained in themes 1, theme 2, and theme 3 (see sections 5.5.1.1; 5.5.2.2; 5.5.2.3; 5.5.3.1; 5.5.3.2 and 5.5.3.3). Participants acknowledged the importance of teaching in the acupuncture programme. Even though students were satisfied with the current teaching, they did indicate that they experienced challenges in the teaching of the acupuncture programme. The findings highlighted a lack of diverse pedagogical approaches in the acupuncture programme (see

section 5.5.3.1). The absence of IPE also negatively influenced their competencies in the world of work (see section 5.5.3.3). The findings revealed that adopting hybrid learning in the acupuncture programme was beneficial. However, students indicated that some CK in the acupuncture programme was not appropriate to be delivered online. Therefore, it was necessary for lecturers to select the appropriate pedagogical approaches to teaching (see sections 5.5.3.2).

Participants in this study agreed on the significance of assessment in the acupuncture programme. They believed that assessment evaluated their learning outcomes and also promoted their understanding of acupuncture content. However, they indicated that the lack of frequent assessment negatively affected their performance (see sections 5.5.2.2 and 5.5.3.3). Participants believed that there was a need to implement various assessment techniques to facilitate their learning (see sections 5.5.3.3 and 5.5.4.2).

The findings of this study indicated that students acknowledged the importance of practices in preparing them to be competent in the world of work. They highlighted that the inadequate time for clinical practice in the acupuncture programme negatively influenced their practical skills in performing acupuncture treatment (see sections 5.5.1.1 and 5.5.3.3). Participants also agreed that their competency in clinical practise was negatively affected by the limited number of competent lecturers and clinical instructors in the acupuncture programme (see section 5.5.3.3).

Secondary research question 1 links the research questions by identifying students' views and perceptions on the gaps in the delivery of the acupuncture programme. By answering this research question, the researcher can further explore strategies to improve the quality of teaching, learning, assessment, and practices in the acupuncture programme.

6.6.2 Secondary research question 2

What strategies can be used to strengthen the quality of teaching, learning, assessment and practices in the acupuncture programme?

The researcher aimed to explore students' views and perceptions of the delivery of the acupuncture programme at the identified HEI in secondary research question 1. The reason is that the researcher believes that identifying the gaps in the teaching, learning, assessment, and practices of the acupuncture programme will assist in exploring strategies to strengthen

the delivery of the programme. Therefore, secondary research question 2 explored strategies to promote the quality delivery of the acupuncture programme.

Participants in this study indicated approaches that could improve the teaching and learning in the acupuncture programme. These approaches included participatory teaching and learning, lecturer-centred teaching and student-centred approaches, hybrid learning, peer learning, and IPE (see sections 5.5.3.1; 5.5.3.2; 5.5.4.1 and 5.5.4.3). Participants agreed that both lecturer-centred and student-centred approaches should be utilised in the teaching and learning of the acupuncture programme. They believed that integrating the lecturer-centred and student-centred approaches effectively promoted learning (see section 5.5.3.2). Furthermore, they agreed that participatory teaching and learning would strengthen their learning (see sections 5.5.4.1 and 5.5.4.3). The findings revealed that students believed implementing hybrid learning, peer learning, and IPE in the acupuncture programme would improve their learning outcomes.

The findings of this study revealed that students agreed that diverse assessment techniques would facilitate their learning. Participants believed that various forms of assessment should be adopted in the acupuncture programme. These assessments included quizzes, tutorials, formative assessment, formative use of summative assessment, self-reflection, portfolio assessment, debriefing through Socratic questioning, and OSCEs (see sections 5.5.4.2). This study identified that clinical observation, clinical simulation, grand rounds, and WIL are effective approaches to strengthen students' learning in clinical practice (see section 5.5.4.3).

Through secondary research question 1, the researcher identified the gaps in the teaching, learning, assessment, and practices in the acupuncture programme to ensure students are competent in the world of work. In secondary research question 2, the researcher explored strategies to strengthen the delivery of the acupuncture programme. The researcher believes that quality delivery of the acupuncture programme will further enhance students' competencies in using acupuncture to improve children's health. The conceptual framework in this study is the TPCK model, which places much emphasis on CK, PCK, and TCK.

6.6.3 Secondary research question 3

How can Shulman's (1986) PCK and Mishra and Koehler's (2006) TPACK model be used as a lens to facilitate the delivery of an acupuncture programme?

In this study, the researcher focused on exploring students' experiences on the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health. For this reason, the researcher argues for the importance of CK, PCK, and TCK in education (see sections 3.2; 3.3; 3.6 and 3.8). Therefore, the researcher adapted Shulman's (1986) PCK and Mishra and Koehler's (2006) TPACK model to suit this study. He focused on TPCK as the fundamental model in this study which investigated the CK, PCK, and TCK. These various elements of the model by both Shulman's (1986) PCK and Mishra and Koehler's (2006) TPACK model was an appropriate model for this study. Pompea and Walker (2017) concur with Shulman (1987) on the importance of CK and PCK. Mishra and Koehler (2006) emphasise technology integration in 21st-century education. The TPCK model provides an opportunity to explore students' experiences in the teaching, learning, assessment, and practices in the acupuncture programme from three crucial elements in education: CK, PCK and TCK (see section 3.3 and Annexure I).

6.6.4 Primary research question

How do students experience the teaching, learning, assessment, and practices of an acupuncture programme to improve children's health?

In this study, the researcher found that most students shared ambivalent experiences of the teaching, learning, assessment, and practices of the acupuncture programme. There were moments of highlights and challenges experienced by students. Collectively, there was a degree of satisfaction among the students regarding the teaching, learning, assessment, and practice of the acupuncture programme at the HEI. The experiences of the participants were discussed in Chapter 5 through various themes that highlighted their views and attitudes toward acupuncture treatment and the acupuncture programme.

The researcher is of the view that children's health can be significantly improved using acupuncture treatment (He et al., 2013; Moeen, 2016; Saunders & Berry, 2020). For this reason, it is crucial for HEIs to ensure their students are competent and confident through quality teaching, learning, assessment, and practices in the acupuncture programme. Participants in this study acknowledged that the acupuncture programme at the identified HEI is designed for professional acupuncture training (see section 5.5.1.1). Successful graduates will be eligible to be registered as acupuncturists in SA. They believed it was of profound importance for them to acquire the appropriate KSVA for acupuncture during the teaching,

learning, assessment, and practices in the programme. Only then students will be competent to improve children's health using acupuncture.

The findings of this study indicated that appropriate and adequate CK in the acupuncture programme is the premise of quality teaching, learning, assessment, and practices in the acupuncture programme. Participants expressed positive views and perceptions of the teaching and learning in the acupuncture programme. They agreed that they developed positive KSVA through the teaching and learning in the acupuncture programme. However, participants in this study also highlighted challenges in teaching and learning. This study revealed that diverse pedagogical approaches should be implemented in the acupuncture programme because it was beneficial to students' learning (see sections 5.5.2.1; 5.5.3.1 and 5.5.4.1). Calik and Birgili (2013), Benazira et al. (2021), and Sener and Cokcaliskan (2018) explain the need for diverse pedagogical approaches in education. The reason being is that different approaches will strengthen students' learning from various learning styles, according to Gardner's multiple intelligences theory (see sections 2.6.1.4 and 5.5.3.1).

Although participants agreed on the importance of technologies in education, particularly during the COVID-19 pandemic, they indicated that technology is not suitable for all CK in the acupuncture programme (see section 5.5.3.2). They believed that practical skills could not be taught effectively through the internet. Participants further highlighted their support for participatory teaching and learning, such as integrating lecturer-centred and student-centred approaches, hybrid learning, peer learning, clinical observation, clinical simulation, grand rounds, and WIL (see sections 5.5.3.2; 5.5.4.1 and 5.5.4.3).

Participants in this study concurred with the importance of assessment in the acupuncture programme. They recognised that assessment not only evaluates students' learning outcomes but also promotes their learning. The findings of this study revealed that there is a need to employ various assessment techniques to facilitate students learning. This view concurs with Barari et al. (2020) and Chandio et al. (2016). They explained that diverse assessments should meet the different purposes of the assessment, according to the revised Bloom's Taxonomy (see sections 5.5.2.2 and 5.5.4.2). This study further revealed that diagnostic assessment in the form of various classroom assessments, formative use of summative assessments, and OSCEs are effective techniques to be utilised in the acupuncture programme to promote students' learning (see section 5.5.4.2).

Participants acknowledged the importance of practice in the acupuncture programme. They expressed positive attitudes towards IPE, clinical observation, clinical simulation, grand rounds, and WIL in the acupuncture programme. They believed these are effective approaches to improving their clinical skills. The findings of this study highlighted the limited clinical training in the acupuncture programme negatively influenced students' competence in practising acupuncture in the world of work. They believed that HEIs should ensure there is sufficient time allocated for clinical practice so that they can be competent and confident when practising acupuncture in clinics (see sections 5.5.1.1; 5.5.2.3; 5.5.3.3 and 5.5.4.3).

The findings of this study identified gaps in the teaching, learning, assessment, and practices in the acupuncture programme at the identified HEI (see section 6.6.1). To strengthen the delivery of the acupuncture programme, the researcher further discussed strategies to improve teaching, learning, assessment, and practices (see section 6.6.2). The conclusions and recommendations of this study are explained in section 6.7.

6.7 RESEARCH CONCLUSIONS AND RECOMMENDATIONS

In this section, the research conclusions are based on the findings from the data and the insights gained through the verification of the findings with the key literature resources. The researcher then explicates the recommendations emanating from the conclusions and broadly advocates for the adoption of strategies to strengthen the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health. The recommendations continue within the themes and sub-themes, highlighting the key drivers for a quality acupuncture programme and delivery of the programme.

6.7.1 Knowledge and understanding of acupuncture

The acupuncture programme at the identified HEI was designed to train professional acupuncturists. The data indicated that there is insufficient time in the acupuncture programme compared to the international designs of the programme. The limited time in the programme negatively affected students' competencies in clinical practice in the world of work. It is concluded from the findings that acupuncture CK and previous experiences contribute to students' in-depth understanding and attitudes of acupuncture as a therapeutic approach. Students concurred that acupuncture played a crucial role in improving children's health. Students in the 3rd and 4th years shared a more comprehensive understanding of acupuncture treatment. Based on the above conclusions:

- It is further recommended that sufficient time should be allocated to the acupuncture programme at the HEI, particularly in clinical practice. It is recommended that the HEI and policymakers consider standardising the requirements for clinical practice in the form of internships for graduates before their full registration as acupuncturists (Brosnan et al., 2016; FJTCM, 2018; Yang, 2021).
- It is recommended that the design of the acupuncture programme should be in alignment with international standards. A proposed model for future acupuncture programmes to be presented at HEIs is illustrated in Annexure G.

6.7.2 Importance of content knowledge for the delivery of the acupuncture programme

It is concluded that CK is of significant importance in the teaching, learning, assessment, and practices of the acupuncture programme. Effective teaching, learning, assessment, and practices are crucial in ensuring students' competencies. This study revealed that there was a limited number of competent lectures and clinical instructors in the acupuncture programme. Some lecturers and clinical instructors lacked adequate CK in teaching the acupuncture programme. This may negatively influence students' learning outcomes. This study concurred that assessments would promote students' learning and measure students' knowledge. However, there is a lack of various assessment techniques in the acupuncture programme to meet different aims of the evaluation (Chandio et al., 2016; Jang & Wagner, 2013). There is also a lack of IPE and clinical practice in the acupuncture programme. Based on the above conclusions:

- It is recommended that detailed lesson plans should be in place before each class, specifying the purpose, aims, and procedure of actual classes (Hénard & Roseveare, 2012; Lumpkin, 2020).
- Due to the lack of appropriate training and inadequate CK among some lecturers/clinical instructors, it is recommended to develop a handbook for acupuncture clinical supervision with detailed guidelines as support for them, which will ensure the proper CK is delivered in each section and the learning outcomes are met (Hu & Venketsamy, 2022a). Socratic questioning method is recommended in clinical supervision (Boghossian, 2012).
- It is further recommended that IPE be adopted in the acupuncture programme, which will positively improve students' competencies in the world of work.

- It is recommended that various forms of assessment techniques should be applied frequently to the acupuncture programme. These techniques include classroom assessment, quizzes, formative use of summative assessment, portfolio assessment, and OSCEs (Flórez & Sammons, 2013; Jang & Wagner, 2013; Khan et al., 2013; McDonald, 2012). Annexure J presents a proposed example of an OSCE.
- It is recommended that HEIs should increase their capacity to provide professional training for acupuncturists. This will be achieved by ensuring the quality of acupuncture programmes at HEIs through effective teaching, learning, assessment and practices.

6.7.3 Effects of the appropriate PCK and TCK in the delivery of the acupuncture programme

It is concluded that there is a lack of various pedagogical approaches in the acupuncture programme. According to Gardner's multiple intelligences, adopting various pedagogical approaches will promote students' learning (Davis et al., 2011; Yavich & Rotnitsky, 2020). It is further concluded that technologies play an important role in acupuncture teaching and learning, particularly during the COVID-19 pandemic. This study concluded that hybrid learning was an effective approach for some acupuncture CK. However, there are some challenges in adopting technologies to deliver some acupuncture CK. Poor computer skills, poor infrastructure, and poverty are still barriers to the delivery of the acupuncture programme in SA. It was further concluded that social and cultural factors influenced the teaching and learning in the acupuncture programme. Based on the above conclusions:

- It is recommended that the acupuncture programme should provide an adequate cultural background of acupuncture and sufficient CK in the acupuncture programme to assist students in gaining positive attitudes towards acupuncture.
- It is recommended that hybrid learning should be employed in the acupuncture programme since it is an effective approach in the delivery of acupuncture CK.
- It is further recommended that participatory teaching with various pedagogical approaches should be adopted in the acupuncture programme, such as visual approach, auditory approach, linguistic approach, logical approach, intrapersonal approach, interpersonal approach, and kinaesthetic approach (see section 2.6.1.4).
- It is recommended that appropriate technologies should be applied to the teaching and learning of the acupuncture programme, taking into consideration specific CK. For instance, virtual simulation is adopted in some HEIs; it is recommended to be used as

a supplementary approach to teaching which should only contribute to a limited portion of clinical simulation (Hu & Venketsamy, 2022a). Programmes such as acupuncture require physical practice and cannot be replaced by technologies completely. In this respect, it can be used to prepare a blended learning curriculum.

- It is further recommended that government and policymakers ensure the appropriate infrastructure in the country to successfully deliver HEI through emergency remote education and online learning in a post-COVID-19 era. HEIs should ensure students acquire adequate computer skills and access to digital devices.

6.7.4 Strategies to improve the delivery of the acupuncture programme

It is concluded that there are various pedagogical approaches that can be employed in the acupuncture programme to strengthen students' learning outcomes. Peer learning is an effective way to promote students' learning. It is further concluded that frequent assessments will strengthen students' learning and OSCEs are an effective approach to assessing students' clinical skills. Clinical observation, clinical simulation, grand rounds, interprofessional education, and work-integrated learning are effective approaches to promoting students' competencies in clinical practice. A detailed recommendation on the mode of delivery for an acupuncture programme at an entry level is presented in Annexure H.

- It is recommended that various pedagogical approaches should be adopted in the acupuncture programme to meet different needs. These approaches include PowerPoints, videos, flipcharts, formal lectures, group discussions, simulation, analogy, reading, and learning by doing (Benazira et al., 2021; Sener & Cokcaliskan, 2018). It is recommended that participatory learning and peer learning be adopted in the acupuncture programme to enhance students' learning.
- It is recommended that clinical observation, clinical simulation, grand rounds, IPE, and WIL should be implemented in the acupuncture programme since they are effective in promoting students' clinical skills. These teaching and learning strategies should be included and standardised in the acupuncture curriculum (Munroe et al., 2016). It is further recommended that HEIs should make use of technologies to improve the effectiveness of these strategies, such as virtual clinical observation, virtual clinical simulation, and virtual grand rounds.

6.8 RESEARCH LIMITATIONS

This study aimed to explore students' experiences of the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health. The intention was to explore strategies to promote, enhance, and contextualise the teaching, learning, assessment, and practices of the acupuncture programme at the HEI in SA. The researcher believed students' competencies in improving children's health could be ensured through quality curriculum design and quality teaching, learning, assessment, and practices of the acupuncture programme. Even though this study successfully achieved its aims and objectives, there were some limitations of this study. This view concurred with Creswell (2014) that any research has limitations.

- This study was limited to exploring students' experiences with the delivery of the acupuncture programme at one HEI in Gauteng Province in SA; therefore, the results limited comparisons. The reason is that there is currently only one HEI in SA offering an acupuncture programme. This study did not separate students into groups according to their intelligence preferences. Consequently, this study could not identify which pedagogical approaches are more effective for specific CK for particular student groups in the acupuncture programme within the African context.
- Another limiting factor was the small sample size in this case study design. The researcher believes that since the sample size was small, the findings may yield different results from a large sample, and the findings might not be generalised to other contexts. However, the researcher concurred with Yin (2018) that whether or not the findings can be generalised to other contexts relies on the readers' own judgements. The responsibility of the researcher in a qualitative case study was to provide detailed and authentic descriptions of the study and data.
- Although this study adopted a qualitative approach, the researcher contends that this is not the only way of exploring the teaching, learning, assessment, and practices of the acupuncture programme. Through this study, the researcher does, however, hope this study will raise greater awareness of the importance of effective teaching, learning, assessment, and practices in all educational programmes. Despite that the researcher followed rigorous strategies to strengthen the trustworthiness of this study, the subjective interpretation in the interpretivism paradigm was also seen as a limitation.

6.9 RECOMMENDATION FOR FUTURE RESEARCH

This study was the first attempt to explore higher education in the field of complementary medicine, particularly acupuncture, within the South African context. The findings of this study *Exploring teaching, learning, assessment and practices of the acupuncture programme to improve children's health* opens the field for studies and practices on the curriculum design and effective strategies to improve complementary medicine higher education in the African context. The findings and methodology of this study can be taken forward through studies focusing on the following:

- comparison of the delivery of acupuncture programmes at HEIs globally to strengthen their teaching, learning, assessment, and practices;
- exploration of lecturers' views and experiences of the delivery of acupuncture programmes at HEIs focusing on CK, PCK, and TCK;
- exploration of teaching, learning, assessment, and practices of other complementary medicine professions, such as Homeopathy and Phytotherapy; and
- development of complementary medicine higher education within the African context.

6.10 CONCLUDING REMARKS

This chapter concludes the study. The aims and objectives of the study were met, and the research questions were addressed through exploring different literature sources, the conceptual framework, and the rich narratives and conversations with the participants. This study revealed that acupuncture plays a crucial role in children's health. There is a need to promote the capacity of training professional acupuncturists in SA through quality programme design. The study also presented strategies to improve the teaching, learning, assessment, and practices of the acupuncture programme to improve children's health.

In this final chapter, the researcher presented recommendations to improve the curriculum design and teaching, learning, assessment, and practices of the acupuncture programme within the South African context. The recommendations draw on the data, which indicated that students had a positive view of acupuncture. There was a need for HEIs to ensure adequate time in the acupuncture programme. The proposed strategies in teaching, learning, assessment, and practices also can be utilised to strengthen other educational programmes. The research methodology could be further utilised to explore the delivery of other complementary medicine professions worldwide.

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ANNEXURES

ANNEXURE A
Invitation poster

RESEARCH INVITATION

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Education
Fakulteit Opvoedkunde
Lefapha la Thuto

Call for Complementary Medicine students

to

participate in research on

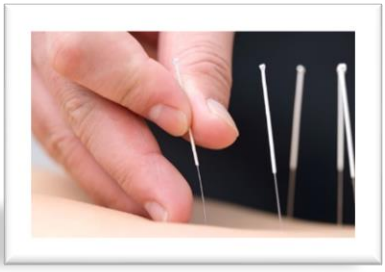
Exploring teaching, learning, assessment and practices of the acupuncture programme to improve children's health

The purpose of this study is to explore complementary medicine students' experiences of the teaching, learning, assessment and practices of the acupuncture programme to improve children's health, to strengthen the acupuncture education and students' competencies in South Africa. Should you wish to participate in this research, please contact the researcher at nicholaswoo3@gmail.com for more information.

Inclusion criteria:

- Students who are registered in the acupuncture programme towards the BHScCM degree
- Students have to be in the 2nd, 3rd or 4th year of study in the BHScCM programme

Valid from 01 December 2021 until 28 February 2022



ANNEXURE B

Research permission letter (Head of the Department)

TITLE: Exploring teaching, learning, assessment and practices of the acupuncture programme to improve children's health

Dear Dr R Razlog,

I am Zijing Hu, a PhD student at the University of Pretoria. The title of my study is "***Exploring teaching, learning, assessment and practices of the acupuncture programme to improve children's health".*** The aim of the study is to explore teaching, learning, assessment and practices of the acupuncture programme to improve children's health at the University of Johannesburg (UJ).

I am working under the supervision of Dr Roy Venketsamy from the Department of Early Childhood Education at the University of Pretoria and Dr Janice Pellow from the Department of Complementary Medicine at UJ.

I would like to kindly request your permission to invite the 2nd, 3rd and 4th years students who are studying acupuncture at the Department of Complementary Medicine at UJ to participate in this study. There are three parts to this study, an online text-based interview (using Google Forms), practical observation in the acupuncture clinic and students keeping a reflective journal. The online text-based interview will be available from Google Forms for two months. Students may answer the questionnaire at their most convenient time during the two months period from March to April 2022. The online text-based interview should take approximately 25 minutes to answer all the open-ended questions.

The practical observation will take place during the compulsory practical training sessions; this is to avoid disruption of academic time. The aim of this data collection method is to observe the students' performance and skills of acupuncture. An observation schedule will be used during the observation. All participant information will be kept confidentially and anonymously. The researcher will be a non-participant observer during the study.

Participants will need to keep a reflective journal for a period of two months from March to April. The purpose of the reflective journal is to keep records of their experiences of the programme, with regards to the teaching, learning, assessment and practices in acupuncture.

Students' participation in this study is voluntary and confidential. They have the right to withdraw at any point during the research study without any consequences or explanations. They can be assured that their decision will be respected. Confidentiality and anonymity will be guaranteed at all times. Pseudonyms will be used during the reporting phase of the study to avoid any identification of students or the institution. **No participants' names and institutional information will be reported in this study.**

All information will be password protected and visible only to the supervisors and researcher. All data collected will only be used for academic purposes. At the end of the study, all the data will be securely stored in the archives at the University of Pretoria.

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

In order to avoid the spread of the virus due to COVID-19 pandemic and achieve anonymity, the interviews will be conducted as an online text-based interview. For the observations, all COVID protocols will be adhered to in line with the national guideline and the University of Johannesburg guideline.

Since I am a lecturer in the Department of Complementary Medicine UJ, my personal information will be omitted in the consent form to avoid bias and prejudice in the data. This is also to avoid coercion.

It would be appreciated if you would approve my request to collect data from the acupuncture students.

Kind regards

Signature of student

E-mail address: nicholaswoo3@gmail.com

Contact number: 0748262190

Supervisor: Dr Roy Venketsamy

E-mail address: roy.venketsamy@up.ac.za

Co-supervisor: Dr Janice Pellow

E-mail address: jpellow@uj.ac.za

PERMISSION FOR RESEARCH
I, _____, hereby give permission to Zijing Hu to conduct his research on ***Exploring teaching, learning, assessment and practices of the acupuncture programme to improve children's health*** at the Department of Complementary Medicine, University of Johannesburg. Signature: _____ Date:_____

ANNEXURE C

Research information and informed consent letter (For participants)

TITLE: Exploring teaching, learning, assessment and practices of the acupuncture programme to improve children's health

Dear students

This is a PhD study at the University of Pretoria focussing on ***Exploring Teaching, Learning, Assessment, and Practices of complementary medicine to improve children's health".*** The aim of the study is to explore teaching, learning, assessment and practices of the acupuncture programme to improve children's health at the University of Johannesburg.

The researcher is working under the supervision of Dr Roy Venketsamy from the Department of Early Childhood Education at the University of Pretoria and Dr Janice Pellow from the Department of Complementary Medicine at the University of Johannesburg.

As one of the participants, the researcher kindly requests you to participate in this study. There are three parts to this research, an online text-based interview (using Google Forms), practical observation and reflective journals. The online text-based interview will be available from Google Forms for two months, and you may answer the questionnaire at the most convenient time to you. The online text-based interview should take approximately 25 minutes to answer all the questions.

The practical observation will be during your practical training at the university acupuncture clinic. The aim of the observation is to observe students' performance and skills of acupuncture knowledge and practice. Students will be active participants in the observation. All participant information will be kept confidentially and anonymously. The researcher will be a non-participant observer during the study.

You will need to keep a reflective journal for a period of two months, from March to April 2022. The purpose of the reflective journal is to keep records of your experiences on the programme, with regards to the teaching, learning, assessment and practices in acupuncture.

Your participation in this study is voluntary and confidential. You have the right to withdraw at any point during the research study without any consequences or explanations. You can be assured that your decision will be respected. To ensure and protect the participants, pseudonyms will be used during the reporting phase of the study. There will be no link to any person or institution. **No participants' names or personal information will be reported in my findings.**

All information will be password protected and visible only to the supervisors and researcher. All data collected will only be used for academic purposes. At the end of the study, all the data will be securely stored in the archives at the University of Pretoria.

You may ask questions before or during the time of your participation. If you have any concerns regarding the data collection procedures, please notify me or my supervisors.

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

In order to avoid the spread of the virus due to COVID-19 pandemic and achieve anonymity, the interviews will be conducted as an online text-based interview. For the observations, all COVID protocols will be adhered to in line with the national guideline and the University of Johannesburg guideline.

Should you agree to be a participant in this study, please select **Yes** and click **Next** to gain access to the next page.

Kind regards

Signature of student

E-mail address: nicholaswoo3@gmail.com

Contact number: 0748262190

Supervisor: Dr Roy Venketsamy

E-mail address: roy.venketsamy@up.ac.za

Co-supervisor: Dr Janice Pellow

E-mail address: jpellow@uj.ac.za

ANNEXURE D

Online text-based interview

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Education
Fakulteit Opvoedkunde
Lefapha la Thuto

INSTRUCTIONS:

The purpose of this questionnaire is to explicit your views and experiences of the acupuncture programme. This instrument will take you about 30 minutes to complete.

- Please complete this questionnaire in detail.
- If you need more space, you can add more lines.
- There are no right or wrong answers to these questions.
- Please submit your answers before **30 April 2022**.

Thank you for your time in participating in this study.

Section A: GENERAL QUESTIONS

1. Explain briefly your understanding of the acupuncture programme.

_____

_____

_____

_____

_____

_____

2. Explain why you choose to study the acupuncture programme.

_____

_____

_____

_____

_____

_____

3. Indicate which year of study you are in. For example, year 2, year 3 or year 4.

_____

4. Briefly describe your experiences of the acupuncture programme?

Section B: TEACHING, LEARNING, ASSESSMENT AND PRACTICES

Section B1: TEACHING

1. Describe your experiences of the teaching of the acupuncture programme.

2. Describe how the teaching of the acupuncture programme has improved your understanding of the acupuncture programme.

3. Explain ways in which you would like the acupuncture programme to be taught.

4. Describe your views on the list of modules in the acupuncture programme. (The outline of the BHsCM programme will be provided.)

5. Describe your experience of the use of technologies for the teaching of the acupuncture programme.

Section B2: LEARNING

1. Explain your experiences in the learning of the acupuncture programme.

2. Describe how the learning of the acupuncture programme has prepared you for the practical skills.

3. How would you prefer to develop your knowledge and skills of the acupuncture programme?

4. Describe how technologies have helped you to learn the content of acupuncture programme during COVID-19.

5. Explain ways in which you can be supported to develop a positive attitude towards the acupuncture programme

Section B3: ASSESSMENT

1. Describe your experiences in the assessment of the acupuncture programme.

2. Explain how the assessment has helped you to strengthen your knowledge in the acupuncture programme.

3. Explain how you would prefer to be assessed in the acupuncture programme.

4. Describe how technologies have helped to assess your knowledge in the acupuncture

programme.

Section B4: PRACTICES

1. Explain your experiences (advantages and disadvantage of practicals) in the acupuncture programme.

2. Describe how the teaching, learning and assessment have prepared you for practicals (focus on the acupuncture skills).

3. Explain how you can be supported to improve your acupuncture practical skills.

4. Explain how the use of technologies have benefited or not benefited your practical skills.

Other comments:

THANK YOU FOR PARTICIPATING IN THIS STUDY.

ANNEXURE E

Observation schedule

Introduction: The purpose of the observation is to evaluate students' content knowledge and practical skills.

Date of Observation: _____ Site: _____

Times of Observation: _____ Duration of Observation: _____

Please evaluate the performance of the student in the following competencies using the indicators described below: Meets Expectations: Capable, at expected performance for level Below Expectations: Demonstrates initial growth; opportunity for improvement Unacceptable: Needs Attention			
	Meets Expectations	**Below Expectations**	**Unacceptable: Needs Attention**
Patient Care: Students are expected to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.			
History of the patient taken	Always takes fully history of patients.	Takes part of the patient's history.	Does not take part of the patient's history.
Performs physical exam	Demonstrates correct technique always.	Demonstrate correct technique sometimes.	Does not demonstrate correct technique.
Generates differential diagnosis	Consistently generates a complete differential diagnosis.	Sometimes generates a differential diagnosis.	Unable to generate a differential diagnosis.
Generates and manages treatment plan	Successfully contributes to the treatment plan and management of patients.	Partially contributes to the treatment plan and management of patients.	Unable to contributes to the treatment plan and management of patients.
Comments:			
Content Knowledge: Students are expected to demonstrate knowledge of established and evolving biomedical, clinical and social sciences.			
Exhibits knowledge of diseases and pathophysiology	Exhibits good knowledge of diseases and pathophysiology.	Exhibits satisfactory knowledge of diseases and pathophysiology.	Exhibits poor knowledge of diseases and pathophysiology.
Comments:			

Practice-Based Learning and Improvement: Students are expected to investigate and evaluate their patient care practices by appraisal and assimilation of scientific evidence.			
Demonstrates skills in evidence- based medicine	Confidently demonstrate skills in evidence-based medicine.	Shows satisfactory confidence in demonstrating skills in evidence-based medicine.	Shows no confidence in demonstrating skills in evidence-based medicine.
Comments:			
Interpersonal & Communication Skills: Students are expected to effectively communicate and collaborate with patients, their families and health professionals.			
Interpersonal and communication skills with patients and families	Good interpersonal and communication skills with patients and families.	Satisfactory interpersonal and communication skills with patients and families.	Poor interpersonal and communication skills with patients and families.
Record keeping of patients' profile	All written records are kept.	Most written records are kept.	Some written records are kept.
Explanation to patients about their conditions	Good explanation to patients about their conditions.	Satisfactory explanation to patients about their conditions.	Poor explanation to patients about their conditions.
Comments:			
Please rate the student's performance in each subject below by choosing a box with the most accurate descriptor. Try to think of specific witnessed events and behaviors when rating each subject.			
Professionalism: Students are expected to demonstrate a commitment to carrying out professional responsibilities, and to be responsive, compassionate, and honest.			
	Meets Expectations	**Below Expectations**	**Unacceptable: Needs Attention**
Respect and compassion: Consider how the student shows respect and compassion for others and tolerates differences.	Always shows respect and compassion to patients.	Sometimes shows respect and compassion to patients.	Never shows respect and compassion to patients.
Response to feedback from clinicians:	Always accepts feedback positively.	Sometimes accepts feedback.	Does not accept feedback.
Accountability: Consider whether the student is prepared, can be relied upon to take responsibility for assigned tasks and is punctual.	Always accountable and accept responsibilities willingly for the task assigned.	Sometimes accountable and accept responsibilities willingly for the task assigned.	Does not accept accountability and responsibilities willingly for the task assigned.
Comments:			

ANNEXURE F

Participants' reflective journal template

INSTRUCTIONS:

The purpose of reflective journals is to explicit your views and experiences of the acupuncture programme.

- Please complete this reflective journal in detail.
- If you need more space, you can add more lines.
- There are no right or wrong answers to these questions.
- Please submit your reflection every week on Friday **between 01 March 2022 to 30 April 2022.**

Thank you for your time in participating in this study.

TEACHING

Describe your experiences of the teaching of the acupuncture programme.

LEARNING

Explain your experiences in the learning of the acupuncture programme.

ASSESSMENT

Explain your experiences in the assessment of the acupuncture programme.

PRACTICES

Explain your experiences (advantages and disadvantages of practicals) in the acupuncture programme.

What are your views of the acupuncture programme?

List recommendations you think would help to improve and strengthen the acupuncture programme under the following headings

	Recommendations
Teaching	
Learning	
Assessment	
Practice	

THANK YOU FOR YOUR TIME.

ANNEXURE G

Proposed model for future acupuncture programmes to be presented at any HEI.

Year of study	Content	Learning outcomes	Hours
First year	The History of Chinese Medicine	Upon completion, students will be able to • Discuss and explain the comprehensive Chinese Medicine history.	15
	The Basic Theory of Chinese Medicine	Upon completion, students will be able to explain and criticize various concepts in Chinese Medicine, including • concepts of Yin/Yang and the Five Elements; • physiological functions of the Organ system and their interrelationships; • individual function and interactive relationship of Qi, Blood, Essence and Fluid; and • aetiology and pathology of traditional Chinese medicine.	85
	The Diagnostics of Chinese Medicine	Upon completion, students will be able to demonstrate and assess the following techniques: • basic four methods of diagnosis, including inspection, auscultation and olfaction, enquiry, pulse-taking and palpation; • syndrome differentiation according to the theory of Eight principles, the theory of Qi, Blood, Essence and Fluid, the theory of Organ system, and the theory of meridians and collaterals.	85
	General Introduction to Chinese Materia Medica	Upon completion, students will be able to explain the • general characteristics of Chinese materia medica; • general principles of application, including compatibility, dosage and administration; and • classification, performance, indications and clinical application of commonly used Chinese materia medica;	10
Second year	General Introduction to Chinese Medicinal Formulas	Upon completion, students will be able to illustrate • the fundamental structure and dosage form of formulae in traditional Chinese medicine; • the classification, composition, performance, indications and clinical application of commonly used formulae.	10
	Acupoints and Meridians (including needling techniques)	Upon completion, students will be able to discuss and demonstrate • the distribution, functions and relative disorders of the 14 meridians, the eight extraordinary meridians and the 15 collaterals;	165

		• names, codes, locations and classifications of selected acupoints for basic training, including the direction and depth of needle insertion, actions and indications; • basic needling and assisting manipulations; • precautions and contraindications of acupuncture treatment; and • incident management during acupuncture treatment.	
	Therapeutics of Acupuncture and Moxibustion I	Upon completion, students will be able to • discuss and assess common clinical conditions in the fields of gynaecology, paediatrics, dermatology and internal medicine; and • simulate and role-play various clinical conditions.	50
Third year	Therapeutics of Acupuncture and Moxibustion II		200
	Guideline for sterilization and disinfection	Upon completion, students will be able to • discuss and demonstrate knowledge and skills of infection prevention and control during acupuncture treatment;	2
	General Introduction to Chinese Medicine Food Therapy	Upon completion, students will be able to explain • general characteristics of common food; and • general principles and application of these food in clinical practice	5
	The Legal Framework of Acupuncture in South Africa and Code of Ethics	Upon completion, students will be able to explain and criticise • the legal framework and code of ethics of acupuncture in South Africa.	10
Fourth year	Clinical Practice	Upon completion, students will be able to • explain the aetiology and development of some clinical conditions; and • assess and solve some clinical conditions using acupuncture	400
	Qigong exercises	Upon completion, students will be able to • demonstrate basic Qigong exercises, including Taiji Quan and Ba Duan Jin.	20
Internship		Upon completion, students will be able to • explain the aetiology and development of various clinical conditions; and • assess and solve various clinical conditions using acupuncture	400
Total hours			1457

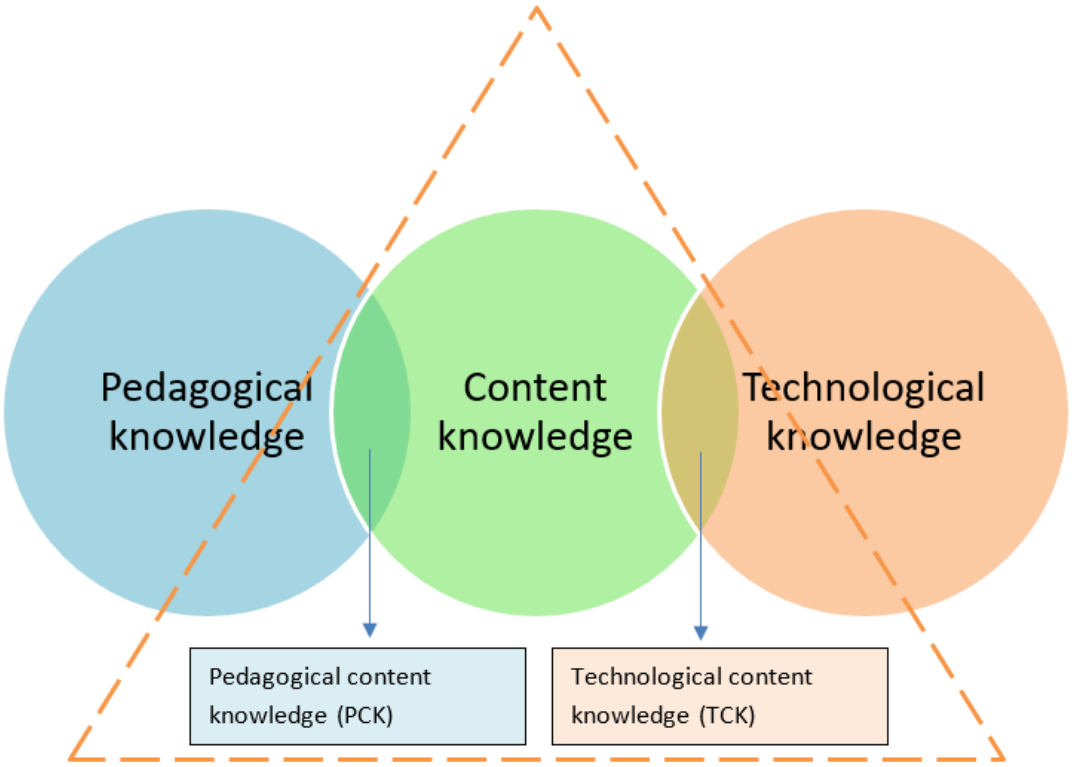
ANNEXURE H

Proposed modes of delivery of quality teaching, learning, assessment and practices

	Modes of delivery	First-year	Second-year	Third-year	Fourth-year	Internship
Teaching & learning	Participatory teaching	X	X	X	X	X
	Hybrid learning	X	X	X	X	
	Peer learning	X	X	X	X	X
	Lecturer-centred learning	X				
	Student-centred learning	X	X	X	X	X
	Interprofessional education			X	X	X
Assessment	Classroom assessment (Quizzes, student interviews, etc.)	X	X	X		
	Tutorial	X	X	X	X	
	Formative use of summative assessment	X	X	X		
	Summative assessment	X	X	X	X	
	Self-reflection	X	X	X	X	X
	Objective structured clinical examination			X	X	X
	Portfolio assessment			X	X	X
Practice	Clinical observation (contact/virtual)	X	X	X		
	Clinical simulation			X	X	X
	Grand rounds (contact/virtual)			X	X	X
	Work-integrated learning				X	X

ANNEXURE I

Proposed model for future studies focusing on CK, PCK and TCK: the Technological Pedagogical Content Knowledge (TPCK) model.



- **Explanation of the TPCK model**

Elements	Descriptions
Content knowledge	Knowledge of the subject matter to be learned or taught includes concepts, theories, and other required knowledge essential for establishing the subject matter.
Pedagogical content knowledge (PCK)	Knowledge of pedagogy that is appropriate for specific content.
Technological content knowledge (TCK)	Knowledge of the connection between technology and content that is related to each other.

ANNEXURE J

Proposed example for an Objective Structured Clinical Examination in the acupuncture programme

Instruction

1. Students should wait quietly outside the assessment venues. Students should then **only** proceed to their station 5-10 minutes before the starting time of their session. You may be asked to leave the facility if you are disturbing patients or staff.
2. You are requested to enter/exit the venue **quickly** without discussion with other students. Change of students in a session should be completed quickly to avoid any penalties.
3. When entering your station room, have all your necessary items ready. The session will start and end at the times indicated with minimal exception.
4. Students exiting assessments should do so promptly and leave the assessment premises.

Assessment timetable

Examiners	Examiner 1	Examiner 2	Examiner 3	Examiner 4
Venue	Room 1	Room 2	Room 3	Room 4
09h00-09h10	Student 1	Student 4	Student 3	Student 2
09h10-09h15				
09h15-09h25	Student 2	Student 1	Student 4	Student 3
09h25-09h30				
09h30-09h40	Student 3	Student 2	Student 1	Student 4
09h40-09h45				
09h45-09h55	Student 4	Student 3	Student 2	Student 1

Note: There are four stations that have been designed in this section which aim to evaluate students' clinical skills and competencies. Each station consists of 10 minutes.

Stations	Time allocated	Aims
Station 1 – Diagnostic techniques	10 mins	This station focuses on students' critical thinking and skills in a clinical setting, the skill of inquiry in particular.
Station 2 – Acupoints and meridians	10 mins	This station intends to evaluate students' knowledge and skills on Acupoints and Meridians for clinical application.
Station 3 – Needling techniques	10 mins	This station focuses on students' needling techniques in a clinical setting.
Station 4 – Comprehensive clinical application	10 mins	This station aims to measure students' comprehensive application of critical thinking in a clinical setting.

Questions and memorandum

Station 1 – Diagnostic techniques (10mins)

Note to the examiner: Please ensure appropriate progress through the required questions. Do not allow for too much delay during the question.

Narration: A 55-year-old male complains of a dry cough and fatigue.

Question	Answer	Alloc.	Mark
Do a thorough inquiry and history on the patient to explore possible causes of his complaint. **Please use your discretion in marking this question!** Marks can also be given for other relevant questions etc.	Duration: 2 months, worse for 4 days The onset of symptoms: No obvious causes Characteristics of disease: Character: Dry cough, less phlegm, sticky white, sometimes blood, hoarse sound Aggravating factors: None Relieving factors: None Timing: Comes and goes Setting: None Associated symptoms: Dry mouth, dry throat, red cheeks, losing weight, constipation Tongue: Red, less coating Pulse: Thin and rapid Disease development: Cough started 2 months ago, was mild, comes and goes. 5 days ago, the cough aggravated without obvious causes Treatment history: None for this condition, only on chronic HBP meds General condition: Stool: Constipation Sleep: No problems Appetite: Good	10	
What is your diagnosis (Including the syndrome/subtype)?	Diagnosis: Cough Subtype: Lung yin deficiency	4	
What advice would you give this patient?	Advice: Avoid spicy/warming food; avoid cold Food/ herbal medicine to tonify lung yin Exercise, stop smoking and drinking alcohol	1	
Total		15	

Station 2 – Acupoints and meridians (10 mins)

Note to the examiner: Please ensure appropriate progress through the required questions. Do not allow for too much delay during the question.

Questions	Memo	Alloc.	Mark
Please describe the superficial pathway of the gallbladder meridian of the foot shaoyang.	1. Originates at the outer canthus (GB1) 2. Ascends to the corner of the forehead (GB4) and then curves downward to the retro auricular region. 3. It then runs upwards again to (GB14) above the eyebrow. 4. From here it travels posterior to (GB20) and down to (DU14) where it enters the supraclavicular fossa. 5. It branches here and the straight portion of the channel runs downward from the supraclavicular fossa and passes in front of the axilla. 6. It travels along the lateral aspect of the chest and through the free ends of the floating ribs. 7. It continues descending to the hip region where it meets the other branch. 8. Then it descends along the lateral aspect of the thigh to the lateral side of the knee. 9. It continues descending along the anterior aspect of the fibula, all the way to its lower end (GB39). 10. It then reaches the anterior aspect of the lateral malleolus. Where it then follows the dorsum of the foot to the lateral side of the tip of the 4th toe (GB44).	10	
Please describe the location, needling technique and indication for the following acupoints.	**LU5 (Chize)** <u>Location:</u> • On the cubital crease of the elbow • In the depression on the radial side of the tendon of the biceps brachii <u>Indications:</u> 1. Cough, tachypnoea, haemoptysis, sore throat, lung heat syndromes 2. Elbow pain 3. Acute vomiting and diarrhoea, sunstroke and infantile convulsions <u>Needling:</u> Perpendicular insertion 0,8 – 1,2 cun or prick to bleed	3	

	ST25 (Tianshu) Location: • On the abdomen • 2 cun lateral to the centre of the umbilicus Indications: 1. Acute or chronic enteritis or gastritis, bacillary dysentery, paralytic ileus, abdominal pain and or distension, diarrhoea, constipation 2. Dysmenorrhoea and irregular menstruation Needling: Perpendicular insertion 1 – 1,5 cun	3	
	GB30 (Huantiao) Location: • On the postero-lateral aspect of the hip • "Lie on the side, bend the patient's hip joint" this point is at the junction of the lateral third and the medial two thirds of the distance between the greater trochanter and the sacro-coccygeal hiatus Indications: 1. Lumbo-sacral pain, numbness and pain of the lateral aspects of the lower extremities, hemiplegia 2. Rash Needling: Perpendicular insertion 2 – 3 cun	3	
	SP4 (Gongsun) Location: • In the depression distal and inferior to the base of the first metatarsal bone • At the junction of the red and white skin Indications: 1. Abdominal distension, epigastric pain, vomiting, diarrhoea, dysentery, borborygmus 2. Insomnia, irritation, mental disorders and qi rebellion Needling: Perpendicular insertion 0,5 – 1 cun	3	
	BL40 (Weizhong) Location: • At the midpoint of the popliteal crease • In the depression between the tendons of the biceps femoris and semitendinosus	3	

	Indications: 1. Lower back pain, motor impairment of the hip joint, muscular atrophy, pain, numbness and motor impairment of the lower extremities, hemiplegia 2. Abdominal pain, vomiting, diarrhoea (prick to bleed) 3. Dysuria, enuresis 4. Erysipelas Needling: Perpendicular insertion 1 – 1,5 cun or prick to cause bleeding		
Please state the five shu points of the large intestine meridian.	Jing-well: LI1 (Shangyang) Xing-spring: LI2 (Erjian) Shu-stream: LI3 (Sanjian) Jing-river: LI5 (Yangxi) He-sea: LI11 (Quchi)	5	
Please state the xi-cleft point of lung.	LU6 (Kongzui)	1	
Please state the front mu (alarm) points of the liver, gallbladder and spleen.	Liver: LV14 (Qimen) Gallbladder: GB24 (Riyue) Spleen: LV13 (Zhangmen)	3	
Total		34	

Station 3 – Needling techniques (10 mins)

Note to the examiner:

1. Please ensure appropriate progress through the required questions. Do not allow for too much delay during the question.
2. In this station, students will need to demonstrate various needling techniques. A patient is needed for this station.

Question	Answer	Alloc.	Mark
Please explain the different types of moxibustion techniques.	Moxibustion: **Moxa Cones** The herb Artemisia Vulgaris is shaped into a cone Direct moxibustion • Moxa is placed directly on skin • Scarring and non-scarring Indirect moxibustion	6	

	• Moxa is placed on a material • Ginger, garlic, salt or monkshood cake insulation **Moxa Sticks** A preformed and packaged cylinder (Stick) of Artemisia Vulgaris • Mild-warm moxibustion • "Sparrow-pecking" moxibustion **Warming Needle** A needle is inserted into the patient and then moxa is place onto the end of the needle		
Please describe the management of fainting during the acupuncture treatment with filiform needles and stuck needle.	• Stop treatment immediately and remove all needles • Give patient warm water and something sweet • Move patient to a lying position and allow to rest until improvement • Keep the patient warm **In severe cases without improvement** <u>Press (preferably) or needle the following points:</u> DU26 (Renzhong),DU25 (Suiliao), PC6 (Neiguan) and ST36 (Zusanli) <u>Moxibustion on:</u> RN6 (Qihai), RN4 (Guanyuan) and DU20 (Baihui) • If condition worsens or patient is unresponsive call emergency services and begin first aid treatment	4	
Please demonstrate the needling technique forLU5 (Chize) and ST4 (Dicang).	**LU5 (Chize)** Correct location (wrong location means zero marks) <u>Needle size:</u> 1,5 cun needle selected <u>Antiseptic technique shown</u> <u>Insertion:</u> Perpendicular insertion 0,8 – 1,2 cun showing fingernail pressing technique to protect bicep tendon. <u>Precautions:</u> Avoid the bicep tendon **ST4 (Dicang)** Correct location (wrong location means zero marks) <u>Needle size:</u> 1,5 - 2 cun needle selected <u>Antiseptic technique shown</u> <u>Insertion:</u> Horizontal insertion 1 – 2 cun <u>Precautions:</u> Perpendicular insertions are contra-indicated	5 5	
Please demonstrate the retention cupping	1. Prepare the cups which will be used (inspect and disinfect) 2. Soak the cotton ball in 95% alcohol 3. Ignite the cotton ball	5	

technique on the back of a patient. *Marks should be awarded for proficiency of technique and correctly explaining the process*	4. Hold the forceps in one hand and the cup in the other hand 5. Place the cotton ball inside the cup and then quickly place cup on the skin 6. Cup should create suction on the skin 7. Then leave the cups on the selected areas for 10 – 15 minutes (Oral explanation only) 8. Remove by placing a finger on the skin near the cups and pressing the skin to release the suction		
Total		25	

Station 4 – Comprehensive Clinical Application (10 mins)

Note to the examiner: Please ensure quick progress through the required questions. Do not allow for too much delay during the question.

Narration: Mr Pay, 58 years old, with a large physique and a medical history of hypertension. 13 months ago, while exercising he suddenly fell down and lost consciousness. He was taken to the emergency room and monitored for a few days. Currently, he is experiencing numbness on the right side and difficulty in speaking. Upon further questioning, the patient also suffers from shortness of breath, lack of strength, spontaneous sweating and loose stools. Upon examination, the patient has a pale complexion, swollen hands and feet on the right extremity, a dark tongue with a white greasy coating and a thready, wiry pulse.

Question	Answer	Alloc.	Mark
What are your diagnosis and treatment principles?	Diagnosis: Stroke sequala Syndrome: Deficiency of qi and blood stasis, accompanied with phlegm Treatment principles: • Supplement qi • Activate blood circulation • Eliminate pathogens (phlegm)	5	
What medical examinations should you request/perform for this patient, if this patient comes to you on the first day of onset?	• Computerized tomography scan (CT) • Magnetic resonance imaging (MRI) • Blood pressure • Blood sugar	3	
What other conditions can have a similar presentation	Muscular atrophy Bi pain syndrome	6	

to this condition? (Differential diagnosis)	Stroke due to yang deficiency		
What treatment will you use in this situation?	Acupuncture PC6 (Neiguan); DU26 (Shuigou); SP6 (Sanyinjiao); HT1 (Jiquan); LU5 (Chize); LI4 (Hegu); BL40 (Weizhong); GB34 (Yanglingquan) <u>Moxibustion is applied to these points</u> RN8 (Shenque); RN6 (Qihai) (indirect with salt); RN4 (Guanyuan) Needling technique: Du 26: Bird-pecking technique Treatment can be applied once or twice a day	6 6	
Total		26	