

Developing an interprofessional education programme for a health science faculty

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PREFACE

This PhD thesis is presented in an article format according to the North-West University 2016 guidelines. The PhD student, Ms F. Delawala, conducted the research and wrote the manuscript under the guidance and supervision of Dr Christmal Dela Christmals and the co-supervision of Dr Yolande Heymans. The student wrote and submitted four manuscripts which are under review for possible publication in four different journals. The thesis is presented in seven chapters, with an introduction and conclusion for each chapter.

Permission was obtained from Dr Christmals and Dr Heymans to submit the dissertation for examination purposes. Consequently, the thesis meets the requirements for the North-West University's Doctor of Philosophy in Health Sciences with Health Professions Education degree at the Potchefstroom campus.

DECLARATION

I hereby declare that this thesis is my work and that it has not been submitted earlier to any other institution or for any other qualification. I declare that the sources have been acknowledged and referenced according to the regulations in the bibliography. I declare that this research has been approved by the Ethics Committee of the North-West University (NWU-00430-20-A1) and that it complies with all the ethical standards issued by the institution.



Farhin Delawala
March 2022

DEDICATION

This dissertation is dedicated to my father Ghulam, who has always given me the guidance I needed to achieve it all. Your wisdom has been the source that fuelled my determination, I love you papa.

My husband Yasin, your support means the world to me, and with you this road has become worth it. Indeed, your love has been selfless, and you have shown this repeatedly that is why, my better half, the love and respect I have for you, has grown so much. Thank you for teaching me what selfless love is all about, I love you!

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SUMMARY

Despite the benefits of IPE, many healthcare professionals in institutions and countries continue to train them in traditional silos while expecting them to practice collaboratively across the health system. Several challenges with developing and implementing IPE programmes could be cited as contributing factors to the continuous training of health professionals in silos. The already demanding health professions curricula, curricula differences, time and scheduling problems; poor coordination and support; resource constraints; attitudes and stereotypes; student characteristics, and lack of teaching personnel are some barriers to developing and implementing IPE programmes. Also, educational (instructors' absence of skill, fixed and single curriculum use, and flaws in the present education), structural (monopolism, hierarchy of control, reduced learning basis, and lack of organisational support), and cultural (attitudes of executives, lecturers and students concerning IPE) add up to the challenges to the development and implementation of IPE.

Despite the universality of the challenges to IPE programme development and implementation, institutions in the developing world experience them to a greater extent than developed countries. Especially the lack of context-specific benchmarks and frameworks to guide its development. Not to be left behind, institutions on the continent are attempting to design and implement IPE programmes. This study sought to develop an IPE programme for a health science faculty in South Africa to support IPE efforts on the African continent.

This study employed a sequential multi-method research design carried out in five phases. In phase one, a scoping review was conducted to synthesise literature on the nature, development and implementation processes of IPE programmes globally. Phase two involved a qualitative document analysis in analysing the characteristics of IPE programmes globally. In the third phase, a qualitative descriptive exploratory design was used to gather the perspectives of international experts on the development and implementation of IPE programmes, including challenges faced. In the fourth phase of the study, the findings of phases 1-3 were synthesised in addition to the results of a context analysis to design a draft IPE programme for the faculty of health sciences. The final phase included an exploratory qualitative method using nominal group technique to review the draft IPE programme.

Due to the context of NWU, a three-year optional IPE programme was developed. The programme was designed in three-year levels, and each level in the content included common concepts, the modules that reflected those concepts, the outcomes and assessment criteria of each level, the proposed IPE activities and the resources needed to carry out those activities. The draft programme proposed how to implement the programme, i.e., who implements the programme, the policy and legislation to follow, promotion and administration of the programme, proposed hours required, suggested resources for the activities and reviewing of the programme. Aside from the programme developed, other useful outputs include a synthesised IPE programme development and implementation process and points to consider when planning IPE programmes.

It is recommended that institutions learn from the processes involved in this study to develop their programmes or adapt them for their context to increase the presence of IPE on the African continent. The advocacy of regional networks such as AfrIPEN on the continent needs to be intensified to stimulate the development and implementing of more IPE programmes. This will ensure a growing community of practice and sharing of expertise across the African context for the sustenance of the IPE programmes

Keywords: Interprofessional education, Interprofessional Collaborative Care; Health professions education programme, optimal healthcare, team-based care, undergraduate health professions students.

GLOSSARY OF TERMS

Several terms have been used throughout this thesis. This glossary aims to provide a better understanding of the terms used when reading the thesis.

- Confirmability** Confirmability focuses on the researcher's capacity to show or prove that the data was retrieved from the participants and is not the subjective opinions of the researcher (Korstjens & Moser, 2018).
- Credibility** Polit and Beck as cited in Cope, (2014) refer to credibility as the veracity of the information or views of the participants and the analysis and description of the participants by the investigator. Credibility is augmented by the investigator explaining the experiences and validating the research findings with those participating (Cope, 2014; Korstjens & Moser, 2018).
- Curriculum** Conditions for students to obtain a qualification or part of it through different aspects such as knowledge, skills, and/ or work experience (South African Qualifications Authority, 2015).
- Dependability** Dependability describes the reliability of the gathered information under parallel circumstances, when one more researcher coincides with the ruling at each point or when the study can be easily replicated to achieve similar results (Cope, 2014; Korstjens & Moser, 2018).
- Health Professional** An individual trained in studying, diagnosing, treating and/or preventing illness, injury or impairment. The individual advises and applies healthcare through health promotion and reaching the healthcare needs of the individual and community (World Health Organization, 2013).
- Implementability** Implementability refers to the applicability of the programme developed - how feasible the programme is within the institution it was developed for (Klaic et al., 2022).
- Interprofessional Education** Interprofessional Education (IPE) is a teaching and learning method in which associates or undergraduates of two or more health and/or social care professions participate in learning with, from and about each other to improve collaboration in the delivery of healthcare (Buring et al., 2009; Olenick et al., 2010; World Health Organization, 2010).

Interprofessional Education Programme	A set of interventions and experiences provided to health professions' students to learn from, with and about each other to function effectively in collaborative healthcare teams for improved healthcare outcomes (Darlow et al., 2015; Lê et al., 2008; World Health Organization, 2010).
Interprofessional Learning	Interprofessional Learning is the learning that occurs through the interaction of members or students of two or more professions through interprofessional education and collaborative practice (World Health Organization, 2010).
Nominal group technique	A method of retrieving important and new information to establish an order of shared opinions (Bitzer & Botha, 2011).
Primary Health Care	The method of addressing the optimal (mental, physical and social) health needs of a person throughout their lifetime. This essential care service is provided through, but not limited to, vaccination, screening, diagnosis, treatment, prevention and control. Through primary health care, individuals, their families and the community are empowered to hold the reigns of their own health (World Health Organization, 2021).
Purposive sampling	Purposive sampling may be defined as a technique that identifies and selects individuals or groups that have the knowledge or experience about a certain phenomenon of interest (Creswell & Plano Clark, 2011; Palinkas et al., 2013).
Qualitative exploratory descriptive studies	Qualitative exploratory, descriptive studies are conducted to examine a phenomenon from the participants' perspective (McCallum & Howes, 2018). It is conducted to determine the "who", "what", and "where" of an event (Kim et al., 2017).
Qualitative Document Analysis	Qualitative Document Analysis is defined as a systemic method for assessing or appraising documents through examining and decoding data to expand on its meaning and the development of empirical knowledge (Bowen, 2009).
Qualitative synthesis	Qualitative synthesis can be done by reviewing, interpreting, and drawing together data from various findings for rigour (Pearson et al., 2011).
Scoping Review	A scoping review is conducted to summarize the breadth and depth of evidence in a field of study. Scoping reviews are either pre-systematic review or standalone review that

seeks to map the evidence in an emerging field of study (Christmalls & Armstrong, 2019).

Social care A component or sector that is part of the health care system where the social aspects are seen as important in improving the quality of life and well-being of an individual (World Health Organization, 2011).

Thematic analysis A thematic analysis is used to investigate the opinions, views, experiences or values from qualitative data gathered through interviews, surveys or other relevant sources (Caulfield, 2019).

Transferability Transferability is achieved when the outcomes have significance to people who are not engaged in the study, and those who read can connect the outcomes with their individual encounters (Cope, 2014; Korstjens & Moser, 2018).

Triangulation Triangulation occurs by testing the validity of the data that was combined from the various sources consulted (Carter et al., 2014).

Trustworthiness Trustworthiness in qualitative data focuses on the credibility, transferability, confirmability and dependability of the findings (Creswell & Plano Clark, 2018).

ABBREVIATIONS AND ACRONYMS

Several abbreviations and terms are used throughout this thesis. The abbreviations and acronym list aims to provide guidance when reading the thesis.

ABBREVIATION	MEANING
AfrIPEN	Africa Interprofessional Education Network
AIHC	American Interprofessional Health Collaborative
AIPPEN	Australasian Interprofessional and Education Network
Au	Australia
CAIPE	Centre for Advancement of Interprofessional Education
CBL	Case-Based Learning
CDC	Center for Disease Control and Prevention
CEPH	Council on Education for Public Health
CHBQ	CAM Health Belief Questionnaire
CHE	Council for Higher Education
CHPE	Centre for Health Professions Education
CHSE	Centre for Health Science Education
CIHC	Canadian Interprofessional Health Collaborative
Covid-19	Coronavirus disease
FAIMER	Foundation for Advancement of International Medical Education and Research
FDP	Faculty Development Programme
GWU	George Washington University
HIC	High Income Countries
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HPCCPS	Health Professional Collaborative Competency Perception Scale
HPE	Health Professions Education
HPED	Health Professions Education Department
ICCAS	Interprofessional Collaborative Competency Survey

ICF	International Classification of Functioning, Diseases and Health
ICS	Interprofessional Collaborative Scale
IEPS	Interdisciplinary Education Perception Scale
IndIPEN	Indian Interprofessional Education Network
IPA	Interaction Process Analysis
IPAS	Interprofessional Attitudes Scale
IPCP	Interprofessional Education Collaborative Practice
IPE	Interprofessional Education
IPECP	Interprofessional Education and Collaborative Practice
IPEP	Interprofessional Education and Collaborative Practice (SU)
IPEP	Interprofessional Education Project (GWU)
IPEU	Interprofessional Education Unit
IPL	Interprofessional Learning
iRAT	Individual Readiness Assurance Test
ISVS	Interprofessional Socialisation and Valuing Scale
ITOSCE	Interprofessional Team Objective Structured Clinical Examination
IU	Indiana University
JIC	Journal of Interprofessional Care
KII	Key Informant Interviews
KCL	King's College London
KCN	Kamazuzu College of Nursing
LMIC	Low- and Middle-Income Countries
MUSC	Medical University of South Carolina
NEXUS	National Center for Interprofessional Practice and Education
NIPNET	Nordic Interprofessional Network
NGT	Nominal Group Technique
NWU	North-West University
NWU-HREC	North-West University Health Research Ethics Committee

NWU-RDGC	North-West University Research Data Gatekeeper Committee
PA	Physician Assistant
PACT-novice	Performance Assessment of Communication and Teamwork
PAR	Participatory Action Research
PBL	Problem-Based Learning
PCC	Population, Concept and Context
PHC	Primary Health Care
PL	Practice Learning
PT	Physical Therapy
QDA	Qualitative Document Analysis
REIP	Regional Network for Interprofessional Education in the Americas
RIPLS	Readiness for Interprofessional Learning Scale
SA	South Africa
SAMHSA	Substance Abuse and Mental Health Services Administration
SAQA	South African Qualifications Authority
SAW-IT	Structured Assessment Worksheet for Interprofessional Teamwork
SBIRT	Screening, Brief Intervention, and Referral to Treatment
SBL	Skill-Based Learning
SDL	Self-Directed Learning
SIPS	Student Interprofessional Society
SM	Supplementary Material
SU	Stellenbosch University
tRAT	Team Readiness Assurance Test
UFS	University of the Free State
UKZN	University of KwaZulu-Natal
USA	United States of America
UWC	University of the Western Cape

VPS	Virtual Patient Simulations
WHO	World Health Organisation
WISH	Winnipeg Interprofessional Student-run Clinic
WVGW 221	Know the World of Health

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CHAPTER 1: OVERVIEW AND INTRODUCTION

1.1 INTRODUCTION

The introduction, background, problem statement, purpose of the research, research question, sub-question and objectives, significance of the study and structure of the thesis were presented in this chapter. The chapter further outlined interprofessional Education (IPE), its values, design and programmes. The referencing style and intext-citation used in this chapter was the APA 7th edition, and the reference list was presented at the end of the chapter.

Interprofessional Education (IPE) is when students from two or more health and/or social care professions participate in learning with, from, and about each other to acquire knowledge and skills to improve collaboration in the delivery of healthcare (Buring et al., 2009; Olenick et al., 2010; World Health Organization, 2010). Bainbridge and Wood (2012) explain that IPE learning occurs in classroom and practice settings. Learning from each other can include active listening and reflecting, trusting and having confidence in the other person, transferring knowledge, and the willingness to work with the other. Learning with each other includes active engagement through interaction, reasoning, and discovery. Learning about each other entails watching, observing and shadowing the other in action (Bainbridge & Wood, 2012).

Some of the benefits of IPE include: developing personal relations, improved education, improved patient-care and improved job satisfaction (Carney et al., 2019). Kashner et al. (2016) and Teodorczuk et al. (2016) posited that there was growing scientific evidence to support interprofessional team care for favourable health outcomes. In terms of health education, improvement and transformation over the years can be seen to facilitate holistic patient-care in learning and for collaborations within the health systems. Furthermore, a shift from traditional siloed learning to patient-centred and team-based learning can facilitate a better understanding of different health disciplines (Birk, 2017). In an interprofessional team, members from different and specialised fields share expertise, skills and values (Buring et al., 2009). WHO stated that IPE was “an innovative plan that will play a noteworthy role in shrinking the health personnel crisis globally” (World Health Organization, 2010). Through IPE, students become prepared for

Interprofessional Collaborative Practice (IPCP), where health professionals from different health disciplines provide comprehensive services by working together and with the patients, their families, caregivers, and their communities to deliver the highest quality of care across settings (World Health Organization, 2010).

The South African health system was recognised for various challenges, for example, lengthy waiting time in health centres due to a lack of human resources; harmful incidents; lawsuits due to preventable errors; lack of maintenance of health records of patients; access to health services; social circumstances that affect health; shortage of health staff in rural areas; chronic health conditions (Benatar, 2013; Coovadia et al., 2009; Maphumulo & Bhengu, 2019). Furthermore, finances, delivery of services and risks to patients thereof are also challenges in the South African health system (Malakoane et al., 2020). Poor attitudes and perceptions of members of different health professions were other challenges (Lash et al., 2014). Lumague et al. (2006) mentioned scheduling, lack of motivation and resources as general challenges. IPCP may contribute to overcoming these challenges, as different health professionals are required to work together in a team to meet health outcomes, sharing responsibilities and expertise. For health professionals to work collaboratively, they must be trained to work together in teams. IPE may aid in promoting positive attitudes of health professionals among each other, positive behavioural changes and delivery of better care and overall well-being to patients (Reeves, 2016).

IPE in undergraduate health professions programmes can be beneficial for both students and the health care system in the long term. Although, according to Thistlethwaite (2015), training institutions may experience challenges in incorporating IPE into their curricula. Health Professions' students are currently faced with limited opportunities to work with one another due to curricula designed to focus solely on mono-disciplinary education despite graduates needing to work collaboratively in interprofessional teams (Ateah et al., 2011).

1.2 BACKGROUND

Health professions' students require effective training to familiarise themselves with the challenges as well as the demands of a healthcare system (van Gessel et al., 2018). Thus, educators have to train students so that they become competent in a collaborative healthcare team (Browne et al., 2021). Siloed learning in health professions education

means collaborative competencies are limited due to the constraints of siloed learning curricula (Ho et al., 2022). Furthermore, siloed learning negatively affects the safety of patients (World Health Organization, 2010). So, to streamline health professions' education to foster collaboration, the facilitation of IPE is needed (Anderson et al., 2016). Olenick et al. (2010) add that IPE is an existing subject of interest, dialogue and consideration. According to Frantz and Rhoda (2017), IPE is a "vehicle" for tackling health and social challenges through collaboration. IPE accommodates learning through real-life settings so that there is an understanding of health and social complexities, facilitation of constructive professional relationships, and professional obligations (Anderson et al., 2016). Additionally, IPE assists with the reduction and elimination of professional stereotypes, preparing health professions' students for collaborative practice through the integration of team-based learning (Chan et al., 2017). IPE can be incorporated into clinical, educational and community-based settings so student engagement can occur (Stubbs et al., 2017).

Prast et al. (2016) note that to benefit from collaboration, the components of IPE can be integrated into health curricula. IPE is a significant step for optimal healthcare generated through collaboration and health professionals respecting and realising the roles of others (Rajiah & Mari Kannan, 2016).

1.2.1 The value of Interprofessional Education

IPE aims to provide students with an environment where they learn how to work in an interprofessional team and convey information, skill and value in a potential work setting (Buring et al., 2009). This provides interprofessional patient-care through a collaborative health team with a focus on enhancing patient outcomes (Buring et al., 2009). IPE is beneficial in that it allows students to actively learn as a diverse health team by reducing the separation between health professions' students to optimise healthcare and patient safety (Gill et al., 2017). This form of learning is described as Interprofessional Learning (IPL). IPL can be termed as the interaction of members or students of two or more professions through IPE or IPCP (World Health Organization, 2010). A study conducted by Carney et al. (2019) addressed the benefits of IPL, which included: (1) the progress of individual relations, (2) enhanced education, (3) better quality patient-care, and (4) enhanced job satisfaction (Carney et al., 2019).

Improved attitudes develop from early exposure to IPE and may influence competence and collaboration in the future (Zechariah et al., 2019). Also, IPE may build other

competencies, including teamwork, leadership, agreement and the skill to recognise and attain joint patient-care objectives (Buring et al., 2009). Chen et al. (2017) describe 'communication' as another important skill developed through IPE. They state that IPE supports collaboration so that healthcare in individual patients and populations may be maintained (Chen et al., 2017). The Interprofessional Education Collaborative (IPEC) identified four core principles for learning: interprofessional communication practices; roles, and responsibilities for collaborative practice; collaborative practice values and ethics; and interprofessional teamwork and team-based practice, to move beyond isolated learning and involve the interaction between different health professions (Interprofessional Education Collaborative, 2016).

A member of an interprofessional team brings about discipline-specific knowledge and skills to allow a multi-dimensional approach to the varied health requirements of specific patients (Vanderwielen et al., 2014). Inuwa (2012) explains that once IPE has been introduced to the future health workforce, then collaborative practice can be encouraged in the workplace, resulting in attaining optimal health services and surely improving health outcomes. IPE can reinforce a healthcare professional's practice and their collaborative role since isolated health professions cannot effectively meet the complex health needs of patients (Inuwa, 2012). Inuwa (2012) also suggests that improvements in relationships, trust, attitudes and a decrease in stereotypes can be seen during undergraduate IPL, which can impact positively on future practices.

1.2.2 Interprofessional education programmes

The design and implementation of IPE programmes differ from university to university, both nationally and internationally. To be most effective, IPE should be introduced early in training so that students can understand their roles and appreciate the roles of other professions. In this section, a short overview of some of the IPE programmes that are currently being presented has been given. This is by no means full scope of programmes but provides an insight into the field of IPE.

1.2.2.1 IPE globally

The George Washington University (GWU) in the United States of America (USA) has defined IPE using the WHO definition and mentioned that for all accredited schools in public health, IPE is a requirement of the Council on Education for Public Health (CEPH). Additionally, IPE was endorsed by the National Academy of Medicine and

WHO (George Washington University, 2021). The GWU Interprofessional Education Project (IPEP) formed part of their research initiative. It was a pioneering model, investigating the use of simulation and mentoring as clinical teaching approaches so that IPE could be endorsed by health students. The IPEP aimed to advance management capability, encourage collaborative performance, improve self-expression and liberation, and instil considerate mindsets in members of interprofessional teams (George Washington University, 2020). The IPEC core competencies were found to have played a role in learning outcomes whilst students engaged in IPE activities. The following IPE learning outcomes were stated in accordance with the IPEC competencies (George Washington University, 2021):

- Work with other professions to sustain mutual values and respect. (Values/Ethics for Interprofessional Practice)
- Utilise the expertise of other professions and that of one's own to study and investigate a patient's health needs whilst promoting and advancing community health. (Roles/Responsibilities)
- Communicate with patients, families, communities and professionals in various fields whilst serving them through ethical means via teamwork so that health is encouraged and sustained as a disease is avoided. (Interprofessional Communication)
- The application of the elements of team dynamics (e.g., building relations) to ensure health services for individuals and the community may be carried out in a timeous, harmless, cost-effective, successful and fair manner. (Teams and Teamwork)

In the IPEP project, participants were selected from medical, nursing, Physician Assistant (PA), and Physical Therapy (PT) programmes as well as involving professionals from the Department of Clinical Research and Leadership and programmes in Health Care Quality. Students joined workshops and were coached in interdisciplinary teams. Primary research found that incorporating interprofessional students can improve team-based healthcare service, management capability and professional advancement at individual and group levels (George Washington University, 2020).

Western University of Health Sciences in the USA aims to produce healthcare professionals that exercise and foster collaborative patient-centred care (Western

University, 2020). IPE was planned by a committee, which included faculty, staff, and management. Discussions and meetings were held to brainstorm concepts, develop and implement IPE, and later on, an oversight committee was appointed too (Western University, 2020). A pilot programme was conducted to establish the best method of delivering case-based IPE and assess students' attitudes towards IPE (Western University, 2020). Western University of Health Sciences was the first institution to create a broad programme to help undergraduates from nine different health professions learn to work as a team (Western University, 2020). Similarly, the programme helped students to provide collaborative care through IPE. The outcomes included (Western University, 2020):

- Understanding the roles and responsibilities of others
- Understanding other professions, how they can improve healthcare security and value and can help to improve healthcare security and value
- Exercising and encouraging teamwork in healthcare.

Western University noted that as chronic conditions increased amongst the elderly, IPE became necessary in healthcare as the rise of contagious illnesses affected all health professions, meaning that timely treatment, reduction of costs, and maximising recovery would result due to IPE (Western University, 2020). Their programme was considered one of the largest in class size as well as participating health professions. The IPE programme focused on five competencies (Western University, 2020): communication, collaboration, teams and teamwork in healthcare, the scope of practice and one health. Their case-based IPE programme addressed five chronic health conditions such as (1) diabetes/obesity, (2) cardiopulmonary disease, (3) degenerative neurological disease with long-term rehabilitation needs, (4) developmental neurological disease, and (5) cancer. These conditions were identified as prevalent areas that require collaborative care, and the programme was aimed at providing the skills to promote patient-centred care and collaboration once the health professions' students graduate (Western University, 2020).

In England, the University of Southampton made use of the Centre for the Advancement of Interprofessional Education (CAIPE) definition of IPE, which states that IPE is when two or more professions learn with, from, and about each other with the objective of collaborative practice and improvement in quality-of-care (Chikwanha et al., 2009). Because the institution emphasized the importance of understanding various health roles,

collaborative learning and performance were central topics in the programmes of their healthcare qualifications (University of Southampton, 2020).

IPE was presented in their first, second, and third years of learning. In their first year of IPE, the focus was placed on understanding one's role and responsibilities and those of another profession, as well as understanding the term "professionalism". In their second year, the focus was placed on the benefits of teamwork and its influence on safe and efficient health service. In their third year, the objectives included further development of their knowledge and skills in IPE, improving their understanding of collaborations and their benefits, reflection on their individual and team roles, and lastly, preparing to enter the workforce as professionals (University of Southampton, 2020). Students were issued workbooks that included certain activities and reflections for students to complete as part of the learning process. Student workshops were also held where they could collaborate to share expertise, develop skills and discuss patient-care (Chikwanha et al., 2009).

The Medical University of South Carolina (MUSC) in the USA implemented an IPE programme in 2007, leading to the growth of a Faculty Development Programme (FDP). This programme was implemented to contribute to the interprofessional method for the university to thrive. It focused on IPE, teaching and learning, training, management and structural changes, and support of IPE, research and practice (Shrader et al., 2014). An evaluation was conducted of the FDP through qualitative and quantitative methods and the results obtained proved that participants recognised beneficial networking opportunities, involvement in interprofessional projects, and obtained training in managing and operating in interprofessional teams (Shrader et al., 2014). MUSC used frameworks such as the WHO framework, Interprofessional Collaborative Practice competencies, the National Center for Interprofessional Practice and Education (NEXUS), and the Institute for Healthcare Improvement (Medical University of South Carolina, 2021). MUSC made use of different IPE activities for student engagement that included an IPE competition around an interactive case study: 1500 students participating in an annual interprofessional day where they do different activities in smaller groups, and elective courses that focus on various topics, e.g., *caring for the community*; various pilot programmes through 2016-2021 were completed (Medical University of South Carolina, 2021). A fellowship was also offered by MUSC where students got an interprofessional engagement chance (Medical University of South Carolina, 2021). MUSC also established a Student Interprofessional Society (SIPS) to facilitate communication between disciplines in training (Medical University of South Carolina, 2021).

The University of Manitoba, in Canada, made use of the WHO definition of IPE (University of Manitoba, 2021). The institution established an interprofessional faculty development programme for the IPE initiative and created opportunities that resulted in generating Interprofessional Education and Collaborative Practice (IPECP) consciousness (Grymonpre, 2016). The initiative improved apparent interprofessional facilitation skills and stated that Interprofessional Collaboration (IPC) and IPE were interdependent (Grymonpre, 2016). The institution mentioned that collaborations improved the working environment, safety and quality of care (University of Manitoba, 2021). The institution further implemented a Winnipeg Interprofessional Student-run Health Clinic (WISH) so that the health and social needs of the community were met with the facilitation of an IPL environment for the students (University of Manitoba, 2021). Students took part in clinical learning and simulations, and clinical practice as part of collaborations (University of Manitoba, 2021). Post-evaluation results indicated that participants' attitudes were favourable toward IPE and the benefits thereof. Participants agreed that working together to achieve a more operative healthcare team, with patients ultimately benefiting from the teamwork efforts so that health outcomes may be improved, was definitely determined through IPE (Grymonpre, 2016).

Findings from a study conducted in the context in which IPE had been established and developed in Western Australian universities suggested that IPE had a positive impact on the health system. The participants indicated reasons such as: (1) quality and safety of care; (2) understanding and respect for other disciplines; (3) better working relations; (4) efficiency and cost-effectiveness; (5) commonality of skills and knowledge; and; (6) future health system's needs, i.e. team-based care due to chronic illnesses, as amongst the reasons for IPE development (Nicol et al., 2013). Curtin University, for example, used a combination of learning experiences, such as lectures, online learning and so on, for students to work together to solve real-life problems (Curtin University, 2021). Workshops were implemented to allow students to engage in case-based learning (Curtin University, 2021). Simulated learning offered students the opportunity to develop skills, such as decision-making, needed for practice (Curtin University, 2021). Students could learn in a safe and supportive environment, collaborate with other professions' students, and improve their confidence and communication skills. Curtin University focused on four aspects during IPE: collaborative practice, role clarification, conflict resolution, and team function (Curtin University, 2021). Students joined programmes such as Juniper Annesley, where they would go out in interprofessional teams to the elderly to provide

collaborative care. The programme received positive reviews from the patients (Curtin University, 2021).

1.2.2.2 IPE in Africa

In Uganda, at Makerere University, a community-based IPE programme was developed and implemented as part of a Master of Science in Reproductive Health qualification to prepare trainees with the required competencies to work in interprofessional teams (AfrIPEN, 2020). IPE was developed by a team that included faculty members from nursing, public health, medicine, gender studies, nutrition, and social sciences. To develop IPE, weekly meetings were held to brainstorm ideas, host discussions, and document these meetings. Stakeholders across the faculty recognized the importance of active participation during interprofessional training (AfrIPEN, 2020).

1.2.2.3 IPE in South Africa

Nationally, in South Africa (SA), many universities are at different stages in implementing IPE into their health sciences curricula. For example, the University of the Western Cape (UWC), the University of the Free State (UFS), the University of the Witwatersrand (Wits) and Stellenbosch University (SU) have implemented IPE programmes in their health education (Stellenbosch University, 2013; University of the Free State, 2020; University of the Western Cape, 2013; University of Witwatersrand, 2020).

UWC has an Interprofessional Education Unit (IPEU) to deliver IPE prospects and empowerment by creating appropriate core curricula, places of training for students, and providing services to populations (University of the Western Cape, 2013). The IPEU offers certain undergraduate modules, courses and programmes central to the interprofessional concept and health. UFS offers a Health Professions' Education (HPE) programme, which includes qualifications in PhD (HPE), Magister in Health Professions Education (MHPE) and a Postgraduate Diploma in HPE (University of the Free State, 2020) that specifically focuses on IPE. When compared, UWC and UFS both offer direct community-based IPE so that students may train and develop their skills (University of the Free State, 2020; University of the Western Cape, 2013).

The Centre for Health Science Education (CHSE) at Wits has a unit for interprofessional education and research that encourages new and vibrant health science curricula (University of Witwatersrand, 2020). Stellenbosch University also has a CHPE in the Faculty of Medicine and Health Sciences, where the focus is placed on developing a

culture and competencies in working mutually to enhance patient outcomes and strengthen the health system whilst institutionalising Interprofessional Education and Collaborative Practice (IPEP) (Stellenbosch University, 2013). The focus of the SU IPEP lies in: (1) Creating core competencies for IPCP; (2) Presenting an interprofessional care and collaboration framework based on the International Classification of Functioning, Disability, and Health (ICF) as a mutual dialect between professions; and (3) Building confidence and capacity between faculty and service benefactors to model IPCP (Stellenbosch University, 2013). Using these focus areas, SU aimed to transform learning and interdependence education. The focus areas of SU also allow for social accountability through the IPEP strategy. In short, one can find IPE in (1) formal IPECP units, e.g., at UWC; (2) postgraduate qualifications in IPE (HPE with a specialised focus on IPECP), e.g., at UWC, SU, and UFS; and (3) research, e.g., Wits.

Likewise, results from an investigation conducted on the IPE programme at a university in SA by Van Wyk and De Beer (2017), using a sample of undergraduate students, indicated a noticeable improvement in patient-care. Other benefits to both the patient and team members (i.e. professional, social, and personal learning experiences) were experiencing teamwork, contribution and support of members, effective communication, and a respectful and non-judgemental IPE environment (Van Wyk & De Beer, 2017).

IPE is also promoted on other platforms and not only as part of higher education's formal curricula. The University of KwaZulu-Natal (UKZN), for example, hosted a symposium at their institution in 2014 with health professionals and experts, led by the School of Health Sciences, and advocated for IPECP to reach health equality within the country (University of KwaZulu-Natal, 2017).

1.2.2.4 IPE networks and organisations

Professional associations provide a valuable platform for the promotion of IPE and IPCP. An example is the Africa Interprofessional Education Network (AfrIPEN) and the Interprofessional.Global that adds value to the motive of IPECP (Interprofessional.Global, 2020). AfrIPEN, a member of the IPE World Coordinating Committee, founded in 2015, allies with institutions and individuals with the concept of establishing an IPECP in training health workers and in the effective operation of health systems in Sub-Saharan Africa. Interprofessional.Global enables support and exchange between IPECP networks, creates associations with similar organisations and embraces and encourages new networks, that share the same objectives and principles (Interprofessional.Global, 2020).

Other bodies affiliated with Interprofessional.Global include Australasian Interprofessional Practice and Education Network (AIPPEN), Canadian Interprofessional Health Collaborative (CIHC), Indian Interprofessional Education Network (IndIPEN), Nordic Interprofessional Network (NIPNET), Regional Network for Interprofessional Education in the Americas (REIP), Centre for the Advancement of Interprofessional Education (CAIPE) and American Interprofessional Health Collaborative (AIHC) (Interprofessional.Global, 2020).

1.2.3 Designing an IPE programme

To establish IPE at North-West University (NWU), a programme or curriculum required development and implementation. In this study, the definition of an IPE programme was drawn from a few definitions and presented as a set of interventions and experiences provided to health professions students to learn from, with and about each other to function effectively in collaborative healthcare teams for improved healthcare outcomes (Darlow et al., 2015; Lê et al., 2008; Western University, 2020; World Health Organization, 2010). 'Curriculum' can be defined as conditions for students to obtain a qualification or part of it through different aspects such as knowledge, skills, and/or work experience (South African Qualifications Authority, 2015). Bitzer and Botha (2011) mentioned 'curriculum' in simple terms as something that should be learned, or that is worthy of being known. Through definition alone, one can gather that a programme encompasses a wider setting and allows IPE a better reach in undergraduate health education. Thus, in this case, a *programme* was a more holistic and inclusive approach in terms of IPE at the Faculty of Health Sciences (FHS) for NWU.

As explained by Olenick et al. (2010), certain aspects that determine the presence of IPE (p,77): active participation of two or more healthcare professionals in patient evaluation and/or administration; a socialization and an experiential learning method; a method where healthcare professionals from different disciplines participate in learning with, from, and about each other, within and throughout different health schools, through experience; encounters that are non-hierarchical and decentralized; a value and knowledge-sharing practice; and joint, patient-centred care aiming for optimal health outcomes.

To develop an IPE programme for NWU, several publications on IPE frameworks were perused to find guidelines on what could be included in such a programme. Bridges et al. (2011) compared three best practice models of interprofessional education, explaining how a didactic programme, a community-based programme and an interprofessional-

simulation experience were implemented at three different universities. The recommendations for best practices published in this article were useful to include in an IPE programme. However, they only provided a small section of what an IPE programme should look like. On the other hand, Hugh Barr, an internationally acknowledged IPECP expert, focussed on the theories related to a framework for IPE (Barr, 2013). He stressed the importance of grounding IPE initiatives in theory, referring to education, psychology, and sociology theories. Barr included concepts such as adult learning, practice theory and situated learning that would influence the learning process during IPE. Barr (2013) mentioned on pages 5-6 that this might guide the design of an IPE programme. D'Amour and Oandasan (2005) provided a frame of reference for interprofessional education that established linkages between different determinants and processes of collaboration at several levels (defined as stakeholders). They referred to the micro level (learners, educators, and professionals), the meso level (organisational links between teaching and health organisations) and the macro level (links between political, socio-economic, and cultural systems). D'Amour and Oandasan (2005) highlighted the importance of collaboration between these stakeholders in advancing interprofessionalism in IPE.

On a more practical level, El-Awaisi et al. (2016) listed certain steps to follow when developing, implementing, and commencing IPE in higher education. For this research, the steps listed by El-Awaisi et al. (2016) were used as a basic framework to inform the development of an IPE programme and were extended and elaborated on based on the guidelines provided by researchers such as Barr (2013), Bridges et al. (2011), D'Amour and Oandasan (2005) as discussed above. Each of the steps listed by El-Awaisi et al. (2016) has been described or clarified in terms of developing an IPE programme below.

1.2.3.1 Getting started by bringing together the main stakeholders

Bringing together the main stakeholders, such as the representatives from the different health schools of the FHS, would allow them to compare their perceptions of IPE and consider ways in which IPE could be incorporated into the health curriculum, as mentioned by El-Awaisi et al. (2016). Once it has been modified, the stakeholders then look for evidence to support IPE. Other stakeholders might be discovered in the empirical research (e.g., the community, management, and so on).

1.2.3.2 Implementing a definition, values and standards

The WHO and CAIPE definitions of IPE guided different institutions with their IPE programmes. For this research, the definition of IPE was adapted to accommodate a wide range of components and guide the IPE programme for NWU through consolidation of the definitions from both the WHO and CAIPE:

“IPE is a teaching and learning method in which associates or undergraduates of two or more health and/or social care professions participate in learning with, from and about each other in order to improve collaboration in the delivery of healthcare” (Buring et al., 2009; Journal of Interprofessional Care, 2020; Olenick et al., 2010).

1.2.3.3 Formulating outcomes

EI-Awaisi et al. (2016) added that decisions on learning outcomes must be taken prior to the IPE experience, and the outcomes must be realistic and reviewable. A pre-existing skill- or capacity-based collaborative framework can be used as a foundation to explain the IPE learning outcomes. The outcomes must be matched to the activities in a way that each profession can contribute.

1.2.3.4 Participation and selection of students and faculty

Students and facilitators of at least two or more health professions should be kept in mind when planning activity, as stressed by EI-Awaisi et al. (2016). The environment of NWU’s FHS and the different health professions that are studying at NWU need to be considered, then experienced individuals should be recruited to form the point of contact with the students and “patients” who can be considered as co-teachers during the activities. Diversity should be encouraged, and students might be involved in the planning process.

1.2.3.5 Selecting themes

EI-Awaisi et al. (2016) added that theme selection could be based on professional and interprofessional outcomes and overlapping of curricula should be considered for IPE. Themes are incorporated so that students can have a focus area and collaborate to come up with health solutions. EI-Awaisi et al. (2016) identified four example themes: (1) Chronic disease management, (2) Primary Health Care (PHC), (3) Mental Health and (4) Elderly care.

1.2.3.6 Collaborating in case and activity design and mixing up learning methods

Furthermore, El-Awaisi et al. (2016) mentioned that after logistical arrangements, the content and sessions should be developed. Activity planning needs to be done in advance so that meetings with the different stakeholders can occur and the activity can be developed satisfactorily. Learning methods, e.g., simulated learning, from the different health professions may be altered and implemented to fit interaction, reflection and patient-centeredness. The learning methods need to complement the outcomes of the session so that students can develop IPE competencies and come up with health solutions.

1.2.3.7 Determine levels and stages

Learning may be divided into three phases: exposure, immersion and mastery (Halupa, 2015). In the exposure stage, students are initially introduced to working with other health professions, and the activities follow a parallel approach. With immersion, health professions' students commence with interactions and collaborations that are mostly conducted in a clinical setting. Activities in this stage may be concentrated on interactions and collaborations. Mastery focuses on the incorporation of collaboration into the daily life of a health graduate or practitioner, for instance, through working in a team-based setting within a community facing complex conditions such as Human Immunodeficiency Virus (HIV) or Acquired Immunodeficiency Syndrome (AIDS) in SA. A noteworthy part is determining how IPE will be immersed in a health curriculum, for instance, if it will be throughout undergraduate learning or be introduced in certain semesters.

1.2.3.8 Facilitating the learning

Facilitators may help the students improve mutual gratitude, awareness, and collaboration, as supported by El-Awaisi et al. (2016). Facilitators must be aware of their attitudes and perceptions and can invite a critical individual to observe and discuss the facilitators' roles in working with the students. Facilitators are to be given a guidance and training in their role during IPE activities. The facilitators should only guide the process and allow student-centric learning.

1.2.3.9 Raise expectations and experiences of students

Handbooks can also be issued to the students for preparation before the IPE sessions. Students should be introduced to each other when possible so that they may enjoy

learning together. Self-quizzes on the sessions or connecting students with colleagues to spark communication and build relationships may be encouraged to capture the principles of IPE.

1.2.3.10 Assess and utilise feedback

Certain tools may be used to obtain feedback from students, and formative assessment (e.g., questions leading to discussions) followed by summative assessment (e.g., an examination) may be conducted. The feedback could be used to improve teaching and IPE results. Other forms of feedback can include surveys or programme evaluations (Mubuuke 2018).

1.2.3.11 Evaluate the intervention

El-Awaisi et al. (2016) added that the impact of IPE may be analysed and revised for quality and can be evaluated for certification of meeting the standards. Reflections, as well as reviews, may also assist with the evaluation of the IPE programme. Furthermore, the community in which IPE programmes take place can be evaluated too. The community can reflect on or respond to questions about their experiences with IPE and IPE students interacting with patients and providing healthcare.

1.2.3.12 Share experiences

IPE experiences may be shared through events that include or promote IPE, and planning that addresses the logistics should be done months in advance (El-Awaisi et al., 2016). Posters and presentations may be issued at conferences or websites so that IPE experiences can be shared to maximise scholarly output.

At NWU, FHS, health professions' students are not exposed to IPE except in their second year with the *Know the World of Health* (WVGW 221) module, in which they learn and work with different health professions in teams. The limited experience of IPE in their second year does not provide a 'long-enough' period for students to fully grasp and make use of the benefits of learning and working in an interprofessional setting with other health students.

1.2.4 IPE programme implementation

To institutionalise an IPE programme, certain processes for implementation need to be followed. According to Buring et al. (2009), the environment in which a programme will be implemented must be considered. Buring et al. (2009) further state that the IPE

activities, their components, community needs, faculty resources, technical resources, administrative support and challenges of IPE implementation must be accounted for. Van Diggele et al. (2020) support Buring et al. (2009) regarding the challenges and mention that poor communication among different professional cultures, hierarchies and professional uncertainties are among the most common challenges. The IPEC core need is to be integrated into the IPE activities and assessments (van Diggele et al., 2020). Additionally, the IPE programme needs to be facilitated by representatives from different disciplines so that IPL can occur effectively (van Diggele et al., 2020).

Since NWU has three campuses in different locations, the mode of implementation needs to be innovative in nature so that students from the three campuses can collaborate effectively. Activities that allow for student collaboration between campuses or alternatively, smaller activities encourage collaboration, for each campus, need to be developed and implemented.

1.2.5 IPE programme evaluation

WHO mentions that evaluation of the impact of IPE is rare, but is required to measure benefits and improvements (World Health Organization, 2010). In order to evaluate the IPE programme on progress made regarding the outcomes of IPE, assessment and feedback need to be conducted (van Diggele et al., 2020). Reeves and Barr (2016) were explicit in the evaluation of IPE and suggested twelve steps for evaluations, as discussed below.

1.2.5.1 Developing evaluation questions

Questions should be based on whether the outcomes have been achieved and whether the concerns relating to IPE have been addressed. Questions can be formulated around the delivery of IPE and the experience thereof, whether collaborative knowledge and skills improved and if there were changes in service delivery after IPE.

1.2.5.2 Supporting the evaluation method

The evaluation method should be based on the questions and can be in either form of formative, summative, progression-focused or product-focused assessment or can be combined to address evaluation.

1.2.5.3 Using the evaluation frameworks

The Biggs (3P: Presage, Process and Product) model or Pawson and Tilley's realistic evaluation can serve as supportive frameworks. *Presage* addresses the aspects that affect IPE design and delivery, *process* addresses aspects regarding the delivery of IPE and *product* addresses IPE outcomes.

1.2.5.4 Using evaluation expertise

Colleagues experienced in evaluating education should be contacted for guidance, and a team of relevant experts could be created to assist in the design, integration and distribution of the evaluation. IPE is competency-based; therefore, the evaluation method must reflect its nature (Kiguli et al., 2014).

1.2.5.5 Reviewing the literature

Consulting existing evidence is important to determine what is known, improve understanding of what has been previously used, add to new knowledge and compare findings to one's own for guidance.

1.2.5.6 Decide on the method and design

Post-course evaluations, before and after studies, controlled before and after studies, randomised control trials, longitudinal studies, mixed-methods studies, and action research studies are the different designs that can be used.

1.2.5.7 Acquiring ethical approval

With the inclusion of 'living' subjects, ethical clearance will be required to ensure that participation is voluntary, that data collection occurs anonymously, and the data collected is securely stored.

1.2.5.8 Retrieving the data

Data gatekeepers will play a role in the retrieval of data from staff and students and therefore, an appeal or application will follow.

1.2.5.9 Tackling fieldwork problems

One's own influence needs to be acknowledged as internal evaluators may have trouble in interpreting the data neutrally. Lack of time and resources and the pressure to deliver IPE as opposed to evaluating it may be issues for consideration. Having stated the

challenges with internal evaluators, external ones would make a better fit to ensure neutrality, have time and resources and be honest in data interpretation.

1.2.5.10 *Applying evaluation tools*

Depending on the questions, different tools can be used for evaluation. The tools that can be used include the Interdisciplinary Education Perception Scale (IEPS), the Interprofessional Attitudes Scale (IPAS), the Interprofessional Collaboration Scale (ICS), the Team Climate Inventory, Interaction Process Analysis (IPA) instrument and the Interprofessional Education Collaborative (IPEC) Assessment Tool.

1.2.5.11 *Accounting for the resources*

Funding needs to be considered for evaluation and the previously stated steps, even more so for long-term and large-scale evaluations.

1.2.5.12 *Distribution options*

The purpose of distributing findings is so that important information on the effectiveness of IPE can be issued and details on the quality of the process can be expressed. Distribution can occur through social media, conferences and publications.

There is no formal IPE programme in the Faculty of Health Sciences of the North-West University; it is, therefore, essential to explore the development and implementation of an IPE programme in the institution.

1.3 PROBLEM STATEMENT

Despite the benefits of IPE, many healthcare professionals in institutions and countries continue to train health professionals in traditional silos, while expecting them to practice collaboratively across the health system (Anderson et al., 2016). Several challenges with the development and implementation of IPE programmes could be cited as contributing factors to the continuous training of health professionals in silos (Delawala, 2020; Reitsma et al., 2019; Sulistyowati & Walker, 2019). Reitsma et al. (2019) found already demanding professional curricula as a barrier to participation in IPE programmes. Also, Sunguya et al. (2014) mentioned curricula differences, time and scheduling problems; poor coordination and support; resource constraints; attitudes and stereotypes; student characteristics, IPE model, design/concept used, and lack of teaching personnel as some of the barriers experienced (Sunguya et al., 2014). Additionally, Ahmady et al. (2020)

cited educational (instructors' absence of skill, fixed and single curriculum use, and flaws in the present education), structural (monopolism, hierarchy of control, reduced learning basis, and lack of organisational support), and cultural (attitudes of executives, lecturers and students concerning IPE) challenges to the development and implementation of IPE. Further, Delawala (2020) added *stress* amongst team members as a barrier to interprofessional education and collaboration.

The drive and advocacy for developing and implementing IPE programmes by organisations such as the Africa Interprofessional Education Network (AfrIPEN) (Botma & Snyman, 2019) have received global and regional responses. Many institutions (George Washington University, 2020; Grymonpre, 2016; Nicol et al., 2013; Shrader et al., 2014; University of Southampton, 2020; Western University, 2020) in South Africa and worldwide have attempted to design and implement IPE programmes. However, the design and implementation processes of IPE programmes differ from institution to institution. The differences could be observed in the programmes' aim, focus, and development process, but the central theme is training students for IPCP.

As the need for IPE grows internationally (Gilbert et al., 2010), learning institutions such as NWU, which offer specialised health programmes, require a revision of their current approach to HPE to provide an environment for students where training in holistic patient-care is encouraged. Internationally, HPE curricula are transitioning towards IPE, and nationally (in SA), certain universities are at various stages of transforming their health professions' curricula through IPE. HPE at NWU is constantly reviewed and improved in order to pursue appropriate knowledge and innovation in health sciences, in addition to promoting and enhancing the health of the people of SA, Africa and the world through education, investigation, services and community participation (North-West University, 2020a). However, HPE is still isolated in terms of the typical silo-based approach to teaching and learning. IPE is not formally part of any of the health science curricula presented at NWU. Based on the requirements of both the Council for Higher Education (CHE) and the different professional bodies, health science curricula are already extremely full. Due to restricted space in their already full schedules, e.g., classes, practical sessions, and formal assessments, there is little room left for students from the different health schools to learn and collaborate with each other at an undergraduate level. There are eight fields of study implemented in the FHS at NWU, these include human movement sciences, psychosocial health with psychology and social work,

nursing sciences, pharmacy, physiology, consumer sciences, occupational hygiene, and dietetics.

The emphasis of student training in these programmes is on the individual profession, limiting interaction with students from other professions. Health students at NWU are exposed to IPE in a single twelve-credit module at the second-year level. The outcomes of the module are:

- Thorough knowledge and a strong sense of philosophical influence underlying South African healthcare development;
- Awareness of social justice and multiplicity underlying South African healthcare development;
- Understanding of ethics and social responsiveness to communities and the setting;
- Demonstrating a profound influence on society through understanding and critical thinking in different socioeconomic and cultural settings, and
- Communicate, collaborate and engage ethically within the interprofessional team, through neutral, fair, rational, and reasonable.

This exposure is theory-based and limited to in-class interaction during team-based-learning activities once every two weeks. These interactions are not sufficient to develop the skills needed for IPCP. Learning in professional silos limits students from gaining knowledge from working with other health professions, and this can affect holistic patient-care. Therefore, it becomes necessary to develop and introduce a prescribed and context-specific IPE programme in conjunction with the existing twelve-credit module. Training students in IPE will help them to develop the IPCP skills necessary for collaborative practice in the workplace, which in turn leads to optimal health services, improved health outcomes, and patient satisfaction. Consequently, it is critical to include an IPE programme in NWU's health professions education curricula to prepare students for the IPCP in the health system.

1.4 THE PURPOSE OF THE RESEARCH

The purpose of this study was to develop an IPE programme that could be integrated into the health professions' curricula at NWU.

1.5 RESEARCH QUESTION, SUB-QUESTIONS AND OBJECTIVES

The main research question posed was:

What will the most appropriate IPE programme for undergraduate HPE at the NWU's FHS entail?

1.5.1 Research sub-questions

To answer the main research question, a few sub-questions were formulated:

Question 1: What is the nature, development and implementation processes of IPE programmes globally?

Question 2: What are the characteristics of IPE programmes implemented globally?

Question 3: What are the perspectives of international experts on the development and implementation of IPE programmes, including challenges faced?

Question 4: What does a developed IPE programme for NWU's FHS comprise?

Question 5: What are the opinions of academics in the FHS regarding the appropriateness and implementability of the developed IPE programme for FHS NWU?

1.5.2 Research objectives

To answer the research question and sub-questions, the following objectives for this research were stated:

Objective 1: To synthesise the nature, development and implementation processes of IPE programmes globally.

Objective 2: To analyse the characteristics of IPE programmes implemented globally.

Objective 3: To explore the perspectives of international experts on the development and implementation of IPE programmes, including challenges faced.

Objective 4: To design an IPE programme for the NWU's FHS.

Objective 5: To review the developed IPE programme in terms of the appropriateness and implementability for the FHS NWU.

1.6 SIGNIFICANCE OF THE STUDY

In "The path to longer and healthier lives for all Africans by 2030: The Lancet Commission on the future of health in sub-Saharan Africa" (Agyepong et al., 2017), the Lancet Commission recommended seeking home-grown strategies that revolve around the core of the contextual African realities to chart the course of sustainable, quality and people-

centred health care. This includes investments in higher education toward producing a skilled health workforce to meet the health needs of the continent (Agyepong et al., 2017). Although there are existing IPE programmes, as cited in the background and Chapter 2 of this study, it was necessary to develop an NWU content-specific IPE programme that takes the contextual nuances and peculiarities of the NWU into account. Lessons from already developed and implemented programmes to guide the development of the tailor-made programme for the NWU were considered essential in this study.

For the FHS at NWU, an IPE programme was developed with the aid of experts in IPE and Health Professions Education. Should the IPE programme be implemented in the FHS at NWU, the graduate attributes of the health professions' students will increase as the FHS will be able to deliver practice-ready health workers who may use holistic team-based collaboration and healthcare to overcome many complex health challenges that the South African community faces. The programme may also be effective in promoting better health conditions in poor communities that lack effective health services, as the FHS at NWU students may be granted the opportunity to practice IPECP skills and competencies in underprivileged societies to collaborate for holistic health treatment and patient-care.

For the knowledge field, the developed IPE programme will inform HPE and provide a basis for future learning in health education at higher learning institutions such as NWU. Institutions interested in implementing a similar programme in their health faculties may be inspired by the advantages of this IPE programme. For future students who participate in the developed IPE programme, working in a health team with diverse professions will teach various skills needed to support holistic health treatment. Students will appreciate the benefits of IPE in general and may implement their knowledge and the knowledge gained during collaborations to inform their own learning and field of interest. They will then graduate as champions of IPECP and adopt the principles that are entailed in this area in their practice.

The study will provide new information in health education and IPE in the South African context. Health education may be revamped and improved at NWU through the findings of this research on IPE programmes. NWU may integrate the IPE programme as an essential and crucial aspect of health education and training during HPE. The potential IPE programme may be used to allow students to learn and work together effectively to overcome health challenges. The IPE programme will help develop the necessary

knowledge and skills required for IPC in health services. Through this, healthcare and positive patient outcomes may be enhanced. Also, health and diagnostic errors may be reduced once IPECP takes place.

1.7 STRUCTURE OF THE THESIS

This thesis is submitted in an article format in agreement with the submission guidelines of the North-West University. Chapters 3, 4, 5 and 6 are separate studies addressing specific objectives of phases 1, 2, 3, and 5. The chapters were written up in article formats according to author guidelines of specific and selected journals based on their scope, appropriateness and readership. Articles 1, 2, 3 and 4 have been submitted to different journals and are under review. The reference styles, tables, figures and article formats were based on the author guidelines of the selected journals.

Chapter 1: Overview and Introduction: The introduction, background, problem statement, purpose of the research, research question, sub-question and objectives, significance of the study and structure of the thesis were presented. The chapter outlined IPE, its values and IPE programmes and further included the designing of an IPE programme. The referencing style and intext-citation used in this chapter was the APA 7th edition, and the reference list was presented at the end of the chapter.

Chapter 2: Methodology: The introduction, research paradigm, research design and methodology of each phase, quality and rigour of the research, ethical considerations and references are presented. The referencing style and intext-citation used in this chapter is the APA 7th edition.

Chapter 3: Article 1: Nature, development and implementation of Interprofessional Education programmes: A Scoping Review. This article was submitted to the [Journal of Interprofessional Education & Practice](#) with an impact factor 0.99. The article addressed the objective of phase 1 of this study and was formatted to according to the author [guidelines of the journal](#). The references are presented at the end of the chapter.

Chapter 4: Article 2: Conceptualisation, development and implementation of Interprofessional Education Programmes: Points to Consider. This article was submitted to the [Journal of Taibah University Medical Sciences](#) (impact factor 1.203) and is under review. It addressed the objective of phase 2 of this study and was formatted to according to the author guidelines of the journal. The references are presented at the end of the chapter.

Chapter 5: Article 3: Development and implementation of Interprofessional Education: Global perspectives. This article was submitted to the [Medical Education](#) Journal (impact factor 7.647) and is under review. It addressed the objective of phase 3 of this study and was formatted according to the author guidelines of the journal. The references are presented at the end of the chapter.

Chapter 6: Article 4: Developing an Interprofessional Education programme for a Health Science Faculty in South Africa: A multi-method study. This article was submitted to the [Journal of Interprofessional Care](#) with an impact factor 2.338. It addressed the objective of phase 5 of this study and was formatted according to the author guidelines of the journal. The references are presented at the end of the chapter.

Chapter 7: Summary, conclusions, limitations and recommendations: The final chapter of the research study includes the summary and conclusion of the previous chapters. It further addresses the limitations and recommendations for further research. The chapter is presented in the APA 7th edition intext-citation and referencing style with the reference at the end of the chapter.

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CHAPTER 2: RESEARCH DESIGN AND METHODOLOGY

2.1 INTRODUCTION

Although the papers in Chapters 3, 4, 5, and 6 have their methodologies presented, they were not presented in detail due to the limited space provided by the author guidelines of the respective journals in which they were submitted. Hence, the reader is provided with the details in this Chapter. The research paradigm, research design, the individual methodologies of each of the five phases, the quality and rigour of the research and ethical consideration and references are presented in this Chapter.

2.2 RESEARCH PARADIGM

This study was situated within the pragmatic paradigm (Kaushik et al., 2019). In pragmatism, truth and reality are simply what works and stand the test of time. The paradigm accepts that meaning cannot be divorced from individual experiences, contexts and needs. The philosophical foundation of pragmatism is built on the plurality of methods of enquiry. Pragmatism is founded on the social construction of beliefs and habits, which allows for a more flexible and instinctive approach to research design. Pragmatism is positioned toward resolving practical challenges in the present world and is used by practical-minded researchers. Pragmatists believe that the best method is the one that helps in producing the best outcomes from an enquiry. This study aimed to develop an applicable Interprofessional Education (IPE) programme, which could be inculcated into the North-West University (NWU) Health Sciences curricula. This was accomplished by employing multiple methods as pragmatism is not limited to the mixed methods approach and can employ multiple or mixed research methods, thus the paradigm (Kaushik et al., 2019).

The study was underlined by the pragmatic paradigm provides the 'epistemological guiding framework' for this study (Kaushik & Walsh, 2019; Kelly & Cordeiro, 2020). The pragmatic paradigm prescribed the use of practical inquiry processes, which were the focus of this study. The research purpose, questions and specific objectives were guided by the pragmatic research epistemological framework. This was also used by Kelly & Cordeiro (2020) Christmals (2018), (Anim-Boamah, 2021) and (Salifu et al., 2022) to guide their PhD study.

2.3 RESEARCH DESIGN

A sequential multi-method research design was employed in this study (Mafuba & Gates, 2012). The sequential method allowed the researcher to inform the next phase of the research by using the results obtained from the previous phase. Each phase of the research used a different method to gather data; thus, it delivered effective control as all phases were handled individually (Mafuba & Gates, 2012). Christmals and Armstrong (2020) employed a multi-method design in seven phases to develop and evaluate an Advanced Practice Nursing curriculum framework for sub-Saharan Africa. Multimethod designs are pragmatic and provide flexible processes through which a researcher can embed other research methods to meet the objectives of the study (Christmals, 2018; Christmals & Armstrong, 2020).

Each phase of this research is presented as an individual study in a chapter. Chapter 3 (phase 1), Chapter 4 (phase 2) and Chapter 5 (phase 3) informed the development of the draft IPE programme (phase 4). The draft IPE programme was presented to staff in a nominal group session in Chapter 6 (phase 5). A summary of the methods is presented in Table 1.

Table 1: Research strategy of inquiry: summary of methods

Phase	Objective	Research Method	Sample	Data Collection	Data Analysis	Output
1.	To synthesise the nature, development and implementation processes of IPE programmes globally.	Scoping review.	Papers included from selected databases.	Key findings and recommendations were extracted from the relevant documents obtained through the database searches Data was extracted onto an excel sheet.	Qualitative Synthesis of findings (Pearson et al., 2011).	Journal: Journal of Interprofessional Education and Practice Title: Nature, development and implementation of Interprofessional Education programmes: A Scoping Review Status: Under review
2.	To analyse IPE programmes globally to guide institutions seeking to conceptualise, develop, implement and review their IPE programmes.	Qualitative Document Analysis.	Documents, policies and empirical evidence related to IPE implementation in South Africa.	Relevant content of documents, policies and empirical evidence relating to IPE implementation were extracted onto an Excel sheet.	Document analysis using thematic content analysis (Nowell et al., 2017).	Journal: Journal of Taibah University Medical Sciences Title: Conceptualisation, development and implementation of Interprofessional Education Programmes: Points to Consider Status: Under review
3.	To explore the perspectives of international experts on the development and implementation of IPE programmes, including challenges faced.	Qualitative exploratory, descriptive design.	Key informants: A minimum of 15 experts in IPE within South Africa and internationally.	Individual interviews using semi-structured interview schedule	Thematic analysis (Deductive coding according to El-Awaisi et al. (2016) framework (Nowell et al., 2017).	Journal: Medical Education – Wiley online library Title: Development and implementation of Interprofessional Education: Global perspectives Status: Under review
4.	To design an IPE programme for the NWU's FHS.	The researcher used the results from phases 1, 2 and 3 to design an IPE programme for NWU's FHS, guided by the 12 steps for introducing IPE in Health Professions' Education (HPE) by El-Awaisi et al. (2016).				
5.	To review the designed IPE programme in terms of appropriateness and implementation for the FHS at NWU.	Exploratory qualitative research method using nominal group technique.	Purposively selected experts from the schools of the FHS at the NWU 1) Human Movement Sciences, (2) Social Work (3) Nursing Sciences, (4) Pharmacy, (5) Physiology, (6) Occupational Hygiene and (7) Dietetics) and two representatives from the Centre for Health Professions Education (CHPE).	Nominal group discussions using one expert from each health school and one from the CHPE. Individuals were used to collecting data. Consensus feedback from the participants was gathered in field notes.	Feedback from the participants was used to finalise the IPE programme for NWU.	Journal: Journal of Interprofessional Care Title: Developing an Interprofessional Education programme for a Health Science Faculty in South Africa: A multi-method study Status: Under review

2.4 PHASE 1: SCOPING LITERATURE REVIEW

The aim of phase 1 was to synthesise the nature, development and implementation processes of IPE programmes globally. A scoping review was conducted to synthesize the breadth and depth of evidence in a field of study (Levac et al., 2010). Scoping reviews are either pre-systematic reviews or standalone reviews that seek to map the evidence in an emerging field of study (Christmalls & Armstrong, 2019). IPE is an emerging field of study; hence, a scoping review was the choice of methodology. Among other uses, scoping reviews are conducted to synthesize and communicate research findings in an area or to identify a gap in the existing literature (Levac et al., 2010). This scoping review, guided by the enhanced Arksey and O'Malley (2005) framework scoping review framework (Nyoni, Van Dyk & Botma 2021; Peters et al., 2015) was to conducted to synthesize literature available on the nature, development and implementation of IPE to guide the development of IPE programme in this study. The framework conceptualise scoping review in six phases; 'Define and Align the Objective/s and the Question/s; Develop and Align the Inclusion Criteria; Developing and aligning the inclusion criteria with the objective/s and question/s; Describing the planned approach to evidence searching, selection, data extraction, and presentation of the evidence; Searching for the evidence; Selecting the evidence; Extracting the evidence; Analysis of the evidence; Presentation of the results; and Summarizing the evidence in relation to the purpose of the review, making conclusions and noting any implications of the findings'.

2.4.1 Define and Align the Objective/s and the Question/s

The objective should agree with the title and what the phase aims to achieve. The research question directed the inclusion criteria for this review and was guided by the Population (P), Concept (C) and Context (C) mnemonic of scoping reviews, thus "What is the nature of interprofessional education programmes implemented in faculties of health sciences internationally and nationally?" The concept is the "nature of interprofessional education programmes". The context is 'internationally' and "nationally", and the population comprises faculties of health sciences nationally and internationally (Box 1).

Box 1: Population (P), Concept (C) and Context (C) mnemonic

Concept: Nature of interprofessional education programmes

Context: Internationally and nationally

Population: Faculties of Health Sciences nationally and internationally

2.4.2 Develop and Align the Inclusion Criteria with the Objective/s and the Question/s

The inclusion criteria must provide clear details on the PCC elements whilst addressing which sources of information will be considered and consulted. The inclusion criteria were guided by the aim and objective of this phase.

2.4.3 Describe the Planned Approach to Evidence Searching, Selection, Data Extraction and Presentation of the Evidence

For the search strategy of this phase, time, language and resource constraints, as well as the availability of literature, whether grey or primary literature, were considered together with the input of the NWU librarian. Inclusions and limitations were justified according to the requirements of the study. Appropriate database searches using key words were followed by an analysis of the texts of titles and abstracts. Following that, the reference lists of the selected literature were reviewed for additional inclusions.

2.4.4 Search for Evidence

The EBSCOhost (MEDLINE, CINAHL with full text, Academic search complete, Health Source: Nursing/Academic Edition, SocINDEX with Full-Text, MasterFILE Premier, and Health-Source Consumer Edition) databases, as well as Scopus and PubMed, were searched for relevant studies.

2.4.5 Select the Evidence

Different Boolean combinations of various derivatives of the keywords: interprofessional education, interprofessional collaboration, programme, and undergraduate students were used to search for relevant studies from the databases. Limits were set based on the key terms found in the title, language, availability of full-text, date of publication and relevance of the study. Only published journal articles and relevant theses were included.

The inclusion criteria for the literature search comprised:

- Articles limited to the key terms: at least one of the key terms needed to be present in the title.
- Date limits: no specific time limit was used, as we wanted the review to be as inclusive as possible. However, since we found with the initial search that the number of articles was extreme, a date limitation had to be applied, e.g., articles between January 2016 and March 2022 were included.
- Language: only articles available in English were included as the literacy component needed to be considered in terms of reading and understanding the data.

Studies were independently evaluated for inclusion by the researcher and the co-promoter. The promoter of the study served as the adjudicator in cases where the researcher and the co-promoter disagreed on the inclusion of a particular study.

2.4.6 Extracting the Evidence

Relevant findings from the studies were extracted into a data matrix for easy visualization and synthesis. By extracting the evidence in this manner, the results could be aligned with the summary of the findings.

Evidence was extracted with the following used as a guide (Peters et al., 2015):

- a. Author(s)
- b. Date/year of publication
- c. Country of origin
- d. Aims/purpose
- e. Population or sample size (if any)
- f. Methodology
- g. Intervention type, comparator and details of these (if any)
- h. Length of the intervention (if any)
- i. Outcomes and details of these (if any)
- j. Key results that relate to the scoping review question/s.

2.4.7 Analysis of the Evidence

The data was sorted and examined for similarities and differences, and the findings were then summarised in another data matrix table. A qualitative synthesis of the

findings was used (Pearson et al., 2011). This was accomplished by reviewing, interpreting, and combining data from various findings for rigour.

2.4.8 Presentation of the Results

For this study, the results were represented and categorised in a table, and the PCC inclusion criteria guided how the results were represented.

2.4.9 Summarising the Evidence in Relation to the Purpose of the Review, Making Conclusions and any Implications of the Findings

Clear and concise conclusions were summarised, and the answers to the question and objective were provided, followed by the implications for research and practice.

2.5 PHASE 2: QUALITATIVE DOCUMENT ANALYSIS

The aim of Phase 2 was to analyse IPE programmes globally to guide institutions seeking to conceptualise, develop, implement and review their IPE programmes. This was conducted to gather lessons learnt from other institutions regarding the development, implementation and evaluation processes of IPE programmes. A Qualitative Document Analysis (QDA) method was employed in this phase. QDA is defined as a systemic method for assessing or appraising documents through examining and decoding the data to expand on their meaning, understanding and development of empirical knowledge (Bowen, 2009). This institutional document analysis was conducted using a document analysis guide that was described by Wach et al. (2013). The steps for the QDA, according to Wach et al. (2013), were: setting the inclusion criteria, document search, articulating the focus of document analysis, coding and analysis of documents, verification, and data analysis. The steps for the QDA for this study are presented below:

2.5.1 Identify Additional Institutional Documents

An initial document search was conducted using websites of different institutions. Additional documentation or information from their webpages that provided more details on the IPE programmes were used to inform this phase of the study.

2.5.2 Inclusion Criteria

Institutional documents such as policies, IPE programmes and curricula-related notes associated with IPE programme implementation were used. The focus was placed on High-Income Countries (HIC), such as the United States, United Kingdom and Australia, as well as Low and Middle-Income Countries (LMIC), such as India, South Africa and other African countries such as Malawi. Documents were not limited to publication dates as each institution had a different date for implementing their IPE programme; therefore, date restrictions were not imposed. The reason for including both HIC and LMIC was to make sure that all possible contexts were studied to provide relevant and rich data. Realistically, not all universities could be included; therefore, three HICs were chosen, and three LMICs were chosen (based on their involvement with IPE) for the purpose of consolidating and contextualising the data.

2.5.3 Articulating Focus of Document Analysis

Documents were analysed on the basis of the key areas listed by El-Awaisi et al. (2016):

- How were the main stakeholders brought together, and who were they?
- How did they define and implement the definition, values, and standards of IPE?
- What outcomes were formulated?
- How was the participation and selection of students and faculty done?
- Which themes were selected?
- How was collaboration in case and activity design encouraged and how was mixing up the learning methods done?
- What levels and stages were determined?
- How was the learning facilitated?
- How were the expectations and experiences of students raised?
- How was the feedback assessed and utilised?
- How was the intervention evaluated?
- How were the experiences shared?

The possibility of other, more explicit themes emerging during document analysis was considered for inclusion in the key areas of analysis.

2.5.4 Coding and Analysis of Documents

Documents were included based on the key areas of analysis, and coding was done by theming the key areas. The criteria list of El-Awaisi et al. (2016) was used as a pre-determined list of key areas to be themed. Deductive analysis was used where the documents were scrutinised using earlier or existing knowledge (S Elo & Kyngas, 2008), meaning that existing information was tested with new information in a new context. Therefore, the coding list was created before commencing with the analysis as predetermined concepts. The deductive approach also assisted with the reliability of the coded list.

2.5.5 Verification and Analysis

The documents were verified and coded using the criteria list of El-Awaisi et al. (2016) by an independent co-coder and the promoter for consistency and reliability. Themes were analysed and compared for similarities and differences.

2.6 PHASE 3: INDIVIDUAL INTERVIEWS

The aim of Phase 3 was to explore the perspectives of international experts on the development and implementation of IPE programmes, including the challenges faced. This phase was conducted to gather expert experiences on the development; implementation, and review of IPE programmes globally to guide the development of the IPE programme for the health Science faculty in this study. A qualitative exploratory research design guided this phase. Qualitative exploratory studies are conducted to examine a phenomenon from a participant's perspective (McCallum & Howes, 2018; Nyoni & Botma, 2017). The research design is conducted to determine the "who", "what", and "where" of an event (Kim et al., 2017).

2.6.1 Population and Sample

Purposive criterion sampling, a form of non-probability sampling, was used for this phase. Purposive sampling is defined as a technique that identifies and selects individuals or groups that have the knowledge or experience of a certain phenomenon of interest (Creswell & Plano Clark, 2011; Palinkas et al., 2013). According to Crossman (2020), this type of sampling is critical, selective or subjective and is done based on the characteristics of a population and the objectives of the research.

Criterion sampling is used to recount the individual's role in a research study and thus, only those individuals that meet the same criteria are included (Palinkas et al., 2013). Key informants included a minimum of 15 experts (Mason, 2010) who had played a critical role in the implementation of IPE globally. These experts were contacted directly by the researcher to conduct individual interviews using a semi-structured interview schedule relating to IPE programmes. The experts were identified based on their contribution to IPE and included individuals from learning institutions and those that took part in conferences related to IPE, both nationally and internationally.

The inclusion criteria for selecting the experts were:

- Experts identified from IPE-related conferences, such as keynote speakers, presenters and those who have published data related to IPE.
- Individuals who played a role in implementing IPE within their institutions.
- Individuals who were part of IPE programmes and who played direct roles in the IPE programmes at higher learning institutions.

The exclusion criteria for excluding experts were:

- Individuals who did not sign the informed consent form.
- Individuals who did not have the proper facilities for the online interviews.
- Individuals who did not have a qualification in a health-related field.
- Individuals who did not have any knowledge of IPE and who were unfamiliar with its context in higher education.
- Individuals who did not have a publication record on IPE or on IPE-related information.

2.6.2 Recruitment and Obtaining Informed Consent

The potential participants identified through purposive criterion sampling were contacted by the researcher through their e-mails that were available online on their university websites or on conference websites. The participants were informed of the aim of the research and their role in this phase in an information document attached to the email (Addendum C). They were asked to confirm receiving the email and indicate if they were interested in participating in the research. A follow-up email was sent to the potential participants if no response was received within seven days to inquire if they had indeed received the invitation that was sent.

Once potential participants agreed to take part in individual interviews, using a semi-structured interview schedule (Addendum D), a consent form (Addendum F) was emailed for signature by an independent person. In the email, the detailed process for gaining informed consent via the online platform was explained. The researcher obtained informed consent from the participants for this phase of the research, as she had no relation to any of the potential participants that could influence a participant (such as a power relation or possible coercion), and she was in the best position to explain the research and answer the questions. The approach included an independent individual who oversaw the signing of the informed consent forms.

A specific date and time were scheduled during which the researcher met with the potential participant via an online platform, using a video link, so that the process was visible to all involved. The participant was asked to sign the informed consent form timeously and have it sent back to the independent person via e-mail. The participant and the researcher were each required to have another person present to co-sign and witness the signing process. The presence of witnesses on both sides ensured that informed consent was obtained in a fair and safe manner (Greeff, 2020).

The independent person collected all the signed informed consent documents by saving them as e-copies and mailing them to the researcher. These e-copies were saved in a single folder and kept on the researcher's computer. A specific date for the semi-structured interviews was scheduled by the researcher after consulting the availability dates and times with individual participants.

2.6.3 Instrument: Semi-Structured Interview

The instrument used was a semi-structured interview schedule (Addendum D), which was developed by the researcher whilst keeping in mind the key areas mentioned by El-Awaisi et al. (2016). The interview schedule was reviewed by experts from the CHPE of NWU. In addition to the major topics, the schedule included additional questions that were added once data from phases 1 and 2 were gathered.

2.6.4 Data Collection

Individual interviews were conducted with the key informants using the semi-structured interview schedule (Addendum D). To conduct the individual interviews, the researcher made use of Zoom, an online platform, whilst considering all the ethical

obligations. The interviews lasted between 20 and 60 minutes. The interviews were audio recorded for later use during data analysis and were referred to if the researcher “missed out” on some of the information. The key informants were informed of the audio recording, and consent was obtained for it. The key informants were not required to connect with video; instead, they were only asked to connect with audio (ethical issues discussed later in this Chapter). The recorded interviews were transcribed by the researcher. An independent person then read the transcriptions while listening to the recordings to verify that the interviews were transcribed correctly.

2.6.5 Data Analysis

Thematic analysis is used when one is working in a research team to identify, analyse, organise, describe and report themes within large sets of qualitative data (Nowell et al., 2017). In thematic analysis, large amounts of texts, e.g., in interviews, are condensed or cleaned (unnecessary or personal information is removed), coded and categorised in order to develop themes from the data (Erlingsson & Brysiewicz, 2017). For this phase, data were analysed through deductive analysis (S Elo & Kyngas, 2008). The key areas mentioned by El-Awaisi et al. (2016) were used as prior codes to which the data obtained from the informants during the interviews were compared. The purpose of using deductive analysis was to work according to the same framework used for the scoping review and the document analysis and to allow for all the information to be combined for the final programme. However, due to the exploratory nature of the study, inductive coding was applied in the second round of coding to see if any new themes emerged. The responses from the interviews were coded by the researcher and a co-coder. Both the researcher and a co-coder compared the codes to reach a consensus. The researcher then completed the coding by making use of the codes that were agreed upon. The coded findings were used to search for themes, which was followed by reviewing the themes and then defining and naming the themes (Nowell et al., 2017). The themes were used to inform the development of the IPE programme.

2.7 PHASE 4: DESIGNING THE IPE PROGRAMME FOR THE NWU’S FHS

The objective of this phase was to design an IPE programme for NWU’s FHS. This was done by the researcher, under the guidance of the promoters’ team, using the

results from Phases 1, 2 and 3. The design of the draft IPE programme was guided by the 12 steps for introducing IPE in HPE by El-Awaisi et al. (2016) and other, more explicit themes that emerged during document analysis. The identified themes were incorporated into designing the IPE programme for the context of NWU. The findings were combined from the scoping review, document analysis, and semi-structured interviews to design an IPE programme for the context of NWU. This was a theoretical process of designing the programme. Once the IPE programme had been designed, it was sent to the key informants from phase 3 for their views before it was presented in phase 5 of the research.

2.7.1 Synthesis of results from the IPE scoping review, qualitative document analysis and qualitative exploratory, descriptive design

In qualitative research, data is synthesized to test the validity of the union of the data from various sources consulted (Carter et al., 2014). This technique is employed to verify results and obtain thorough data, improved validity and awareness of the occurrence, situation or experience (Bekhet & Zauszniewski, 2012). Data obtained through triangulation is more extensive and in-depth, thus, confirming the findings (Wilson, 2014).

There are four kinds of triangulation, method triangulation, investigator triangulation, theory triangulation and data source triangulation (Carter et al., 2014). According to Bekhet and Zauszniewski (2012), methodological triangulation involves the execution of more than one method to analyse an occurrence, situation or experience. Investigator triangulation is when two or more investigators work on the same study so several interpretations and inferences are given (Carter et al., 2014). In theory triangulation, various theories are used to examine and give meaning to the data (Carter et al., 2014). Data source triangulation comprises data gathering from people, groups, families and communities for distinct perceptions (Carter et al., 2014).

Triangulation can be used in IPE research to understand and interpret qualitative data (Silva et al., 2015). In Filies (2017), which aimed to develop an IPE model, triangulation was conducted to provide credibility and confirmability of the research. In Peeters et al. (2017), where a team-based IPE course was described, triangulation of the assessment methods was done to determine course effectiveness. Pauzé and Reeves (2010) used triangulation to rate the quality of evidence on the effects of IPE on mental

healthcare providers. Johnson and Howell (2017) focused on collaboration and learning amongst different health professions students, and data from written documents, interviews, focus groups and observations was included and then triangulated. Using multiple methods of triangulating findings is known as method triangulation.

Data in this phase was triangulated from three different sources, i.e., scoping review, QDA and qualitative descriptive exploratory design using Key Informant Interviews (KII). In the scoping review, 34 articles were selected to explore the nature of the IPE programmes globally. In the QDA, webpages of institutions were analysed to determine criteria associated with effective IPE programmes and the challenges encountered with the implementation of IPE programmes. For the KII, 15 IPE experts from around the globe were interviewed with the same objective as the QDA.

2.7.2 Synthesis of findings

Triangulation of the findings from the three phases, the scoping literature review, the QDA and the KII, were presented. Synthesis is a process in which findings from various sources are consolidated, ensuring that biases that are fundamental to each of the methods, researchers, data sources or research methods are checked (Popay et al., 2006; Snilstveit et al., 2012). Also, to ensure a comprehensive study of a complex phenomenon, such as interprofessional education, it is necessary to triangulate results from various sources for completeness (Heale & Forbes, 2013). The synthesis done in this phase was based on both motivations above.

2.8 PHASE 5: REVIEW OF THE IPE PROGRAMME

The objective of this phase was to review the designed IPE programme in terms of appropriateness and implementation for the FHS at NWU. A qualitative exploratory research design supported by nominal group discussion was used. Qualitative exploratory studies are done to investigate a phenomenon from the contributor's viewpoint (McCallum & Howes, 2018). The method was chosen to permit the staff access to the draft programme for review and interaction before the group discussion so that they can make valuable inputs into the programme. Varying views regarding the programme were also discussed, and consensus was reached during the nominal

group discussion; this ensured that every department or entities' voices were included in the study.

2.8.1 Population and Sample

Purposive criterion sampling was used to select participants from the FHS at NWU, and of the eight fields, experts from the following schools agreed to participate: (1) Human Movement Sciences, (2) Social Work, (3) Nursing Sciences, (4) Pharmacy, (5) Physiology, (6) Occupational Hygiene, and (7) Dietetics/Nutrition. A representative from CHPE and an assistant were included. The inclusion criteria that were used to select the participants were as follows:

- A certification in a health-related field.
- Involvement in the academic aspects of that field, e.g., nursing.
- A minimum of 2 years of experience in working with students is required.
- Involvement in theory or practice in an educational context.
- Willingness to attend the nominal group session.
- Indicating previous interest or involvement in IPE or future involvement in the implementation of the IPE programme.

2.8.2 Recruitment and Obtaining Informed Consent

The previous director of the CHPE, who was also the chairperson of the Interprofessional Teaching Committee, suggested names based on staff members' previous involvement in IPE research in the faculty. The researcher then contacted the directors of the different health schools in the FHS via email to inform them about the Nominal Group Technique (NGT) and ask for recommendations for academics from their schools who adhered to the inclusion criteria. The directors suggested contacting one or two individuals who could be contacted and who might show an interest in participating. The purposively selected participants were invited (Addendum G) through e-mail to participate in a nominal group activity by the researcher, in which the designed IPE programme was reviewed for the FHS at NWU.

The independent person, once again, was tasked with issuing consent forms (Addendum H) via email to the potential participants for signature before the researcher could commence this phase of the research. The participants had three days to read and think about participating, after which the independent person

contacted them again via a follow-up email. Once the signed forms were received by the independent person, the independent person signed them before sending the forms to the researcher for signing. Those participants who agreed to participate were invited to confirm their available dates where most or all participants were present. The time and date were then confirmed via e-mail, and the participants were invited to an online session (during COVID-19).

2.8.3 Data Collection

The NGT was used for data collection and reaching consensus in this phase (Bitzer & Botha, 2011; McMillan et al., 2016). This technique was used to gather solutions and decide on the appropriateness of the designed IPE programme for NWU's context (Norris et al., 2014). The benefit of using this method was that it was less time-consuming and, due to its being a direct process, the results were more tangible. The experts, however, needed to be present and personally attend the nominal group session on the online platform (McMillan et al., 2016). A coordinator was required to be present during the NGT for control and to ascertain that the process was not influenced by the researcher (Bitzer & Botha, 2011). The NGT allowed for problem-solving, the generation of ideas, and the determination of priorities (McMillan et al., 2016). To do this, the researcher presented the aim of the nominal group discussion and the draft IPE programme to the experts from the different health professions at NWU a week earlier for review.

During the online NGT, the researcher allowed the experts a few minutes to reflect on their thoughts and asked them to type their ideas or suggestions (**privately** to the researcher in the 'chat section') on the appropriateness of the designed IPE programme for undergraduate HPE at NWU's FHS. The researcher asked one participant at a time to present their ideas in the chat function. The participants supported the researcher in grouping and clarifying the ideas through screen sharing. Inclusions and exclusions of ideas happened during this step of grouping and clarifying ideas or suggestions, and the consensus was reached on the best ideas or suggestions. When consensus was reached on the first part, the researcher asked the participants to review the final IPE programme for its implementation in the FHS at NWU's health professions curricula. The steps from proposing ideas or suggestions to reaching a consensus on the best ideas or suggestions were repeated (McMillan et

al., 2016). Feedback from this NGT was gathered by the researcher in field notes (Bitzer & Botha, 2011; McMillan et al., 2016). The researcher noted down comments from the experts, which were used for referrals and as forms of recordings. The most appropriate ideas were penned down by the researcher for further analysis. The NGT was a longer process than individual or focus group techniques and took 2 hours and 10 minutes.

2.8.4 Data Analysis

Feedback from the participants was analysed using an inductive approach (Elo et al., 2014) and used to finalise the developed IPE programme for NWU. The purpose of using inductive qualitative data analysis was to explore the recommendations and opinions of the experts about the developed IPE programme for the FHS at NWU. Open coding was used in order to create groupings of the data (Satu Elo et al., 2014). Open coding can be referred to as the classification, definition and development of ideas created on their properties. Findings were defined by the content of the groupings explaining the development of the IPE programme and its appropriateness and implementation thereof.

2.9 QUALITY AND RIGOR OF THE RESEARCH

2.9.1 Qualitative Research

Trustworthiness was determined for every qualitative phase of the research. In qualitative data, trustworthiness is focused on the credibility, transferability, confirmability and dependability of the findings (Creswell & Plano Clark, 2018; Elo et al., 2014). In summary, trustworthiness can be explained as follows:

- Polit and Beck, as cited in Cope (2014), referred to credibility as the veracity of the information or the views of the participants and the analysis and description of the participants by the investigator. The investigator added credibility by explaining the experiences and validating the research findings with people who took part (Cope, 2014; Korstjens & Moser, 2018).
- Transferability was achieved when the outcomes had significance to people who were not engaged in the study and those who read and partnered the

outcomes with their individual encounters (Cope, 2014; Korstjens & Moser, 2018).

- Confirmability focuses on the researcher's capacity to show or prove that the data was retrieved from the participants and was not the subjective opinions of the researcher (Cope, 2014; Korstjens & Moser, 2018).
- Dependability describes the reliability of the gathered information under parallel circumstances, when one more researcher coincided with the ruling at each point or when the study was easily replicated to achieve similar results (Cope, 2014; Korstjens & Moser, 2018). For this research, dependability was transparent in the sense that the study could be replicated with the same participants, coders and context. For evidence of rigour and replication, as well as to guarantee that the researcher's observations or biased opinions did not impact the data, an audit trail of all data collecting and analysis methods were created.

2.9.1.1 Phase 1: Scoping review

To ensure trustworthiness for phase 1 of this research, the scoping review was aligned with the stages mentioned by Peters et al. (2015). Appropriate databases (suggested by the faculty librarian) with the keywords (consulted with the co-promoter) and inclusion criteria of the documents were followed. For rigour, the literature was individually reviewed, and interpreted, and the data was drawn together from the different findings. The promoter and co-promoter reviewed this process to confirm the trustworthiness of this phase.

2.9.1.2 Phase 2: Document analysis

In phase 2 of this research, the Wach et al. (2013) document analysis guide was used to analyse institutional documents. The key areas mentioned by El-Awaisi et al. (2016) were used to analyse the documents, and more themes that emerged were considered for inclusion. Data was charted onto a data matrix table to provide for analysis.

2.9.1.3 Phase 3: Individual interviews

In phase 3, key informants with knowledge and experience of IPE and IPE programmes were identified for transferability through purposive sampling. A semi-

structured interview schedule (Addendum D) and checklist (Addendum E) were used and were based on the key areas mentioned by El-Awaisi et al. (2016), as well as the emerging themes identified during phases 1 and 2. The audio recordings were transcribed by the researcher and checked for correctness by an independent person to ensure the rigour and credibility of the data. Deductive analysis was followed so that it was aligned with the scoping review and document analysis. Inductive analysis was also applied to ensure that all possible themes were extracted. Co-coder reliability was used, and the researcher and co-coder came to an agreement on coding.

2.9.1.4 Phase 4: Designing the IPE programme

In phase 4 of this research, a supervisory team guided the design of the IPE programme for NWU through the findings from the previous phases. The supervisory team included the promoter and co-promotor of this research. A draft programme was then sent to the experts from phase 3 and to the experts from NWU for review.

2.9.1.5 Phase 5: Nominal Group Technique

In phase 5 of this research, purposive sampling for transferability comprised participants from the different health profession fields and one from the CHPE. This was followed by an inclusion criterion to include a total of eight participants during the NGT for transferability. Tangible results and credibility were provided through the NGT, and the session included a coordinator for control and confirmability, which was also achieved through recordings in the form of documentation. The process of NGT, as described by Bitzer and Botha (2011), was used to ensure rigour. Similar ideas were grouped once the participants presented them and inclusions and exclusions of ideas occurred through voting. This process was then repeated for the next step, and feedback from the NGT was collected in the form of filed notes. An inductive analysis followed in this phase to explore the recommendations and opinions of the experts. Thus, an audit trail was possible. Open coding was employed to group the data, and the findings were defined accordingly.

2.10 ETHICAL CONSIDERATIONS

The researcher adhered to fundamental ethical standards such as the distribution of justice and respect for persons, maximization of benefit and minimization of harm,

honesty, non-malevolence, veracity, and the protection of rights and data. This included relevance and value of the research to the needs of South Africa, scientific integrity with reliable and valid data, role player engagement to improve research quality and rigour, and a fair selection of participants without discrimination, e.g., race or gender. In addition, a fair balance of risks and benefits was struck where the benefit of participating in the research outweighed the risk, and informed consent with voluntary participation was applied. Ongoing respect for participants throughout the process, including privacy and confidentiality, with researcher competence and expertise (one who is technically competent and qualified), was upheld. Furthermore, the promoter monitored and ensured the safety and well-being of the participants and took responsibility for the correct dissemination of the results. The researchers involved in this study included a PhD student (who completed a master's degree in IPE), a promoter and a co-promoter. All the researchers involved in IPE and the student researcher, as well as the promoter, were key members of AfrIPEN. Therefore, their knowledge of the scientific process and the ethics pertaining to this field of study was sufficient to uphold the necessary precautions and ethical standards. Furthermore, the NWU-HREC inspected the records pertaining to this research for regulatory reasons.

The research continued once ethical clearance was given by NWU's Health Research Ethics Committee (NWU-HREC) (Addendum A) as well as the Research Data Gatekeeper Committee (RDGC) (Addendum B) and with the promoter's permission.

2.10.1 Phase 1: Scoping Review

No human participants were involved in this phase. Database searches used the recommended databases from the faculty librarian, thereby avoiding bias selection by the researcher. The researcher avoided bias when extracting data from the relevant documents obtained from database searches by following the pre-specified methodology for conducting a scoping review. All data were treated objectively during extraction from the relevant sources.

2.10.2 Phase 2: Document Analysis

The researcher avoided bias when gathering data from documents, policies and empirical evidence related to IPE implementation globally through document analysis using thematic content analysis.

2.10.3 Phase 3: Individual Interviews

During the recruitment process, the researcher invited (Addendum C) those that were identified through the inclusion criteria. Participation was voluntary; informed consent was sought by an independent person, and non-participation did not negatively affect those who chose not to participate. Participants had the opportunity to terminate their involvement in this phase of the research. Personal data of the participants were not shared with anyone during the study. Once the potential participants agreed to take part in the individual interviews, using a semi-structured interview schedule (Addendum D), a consent form (Addendum F) was emailed for signing by an independent person. The key informants were made aware of an audio recording to capture their responses. The researcher sought re-consent from the participants before each interview. The online platform was safeguarded by using the setting of keeping participants in a virtual waiting room and only allowing access after confirmation of identity. Identities of the informants were hidden, and only an audio recording was used to avoid recognition. The researcher upheld neutrality during the interviews. For **privacy and confidentiality** reasons, the data collected from the informants was protected and safeguarded in the care of the researcher. All participants received a code name so that no personal names or institutions could be identified. The co-coder also upheld all ethical considerations when coding the data from the interviews. Data was only made available to the promoter and co-coder to identify the consistency of coding and the documents. Duplicate copies were kept in the care of the researcher so that data could be reproduced if lost.

2.10.4 Phase 4: Designing the IPE Programme

This phase was guided by a supervisory team, which consisted of the co-promotor and promoter, to avoid bias from the researcher.

2.10.5 Phase 5: Nominal Group Technique

Experts from NWU FHS were invited to participate (Addendum G). Informed consent was obtained by an independent person (Addendum H), participation was on a voluntary basis, and termination of involvement was granted without any consequences to the experts. During the NGT, there was partial confidentiality as individuals were involved as a group. No personal names were included in any of the written data created during the NGT. To maintain the right to **privacy** of the experts and maintain the duty of **confidentiality**, the researcher secured the data collected from the experts on a password-protected computer. The researcher was the only individual who had access to this password-protected computer.

2.10.6 Risks, Precautions and Benefits

The risk level for this study was not more than minimal due to the possible identification of the individual institutions and the recordings of the interviews. Only the identities of the institutions and their contributing directors or lecturers were present. However, individuals were provided with codes to use instead as a form of identity. Also, any inconvenience to the directors or lecturers was kept to a minimum. Participating in this research did not cause any harm to the individuals involved. Participating in the research did not directly benefit the participants nor lead to any incentives, but this research could contribute to the overall quality of health education at the FHS of the NWU and the benefits outweighed the risks involved (See Table 2).

Table 2: An explanation of the possible risks and precautions

Phases	Risks	Precautions
Phases 1, 2 & 4	No risks as no human participants were involved.	
Phase 3	Privacy and fear of loss of anonymity.	Confidentiality and anonymity were maintained in this phase. The gathered data was not distributed. Names of participants and universities were coded. No personal information was asked.
	Audio recording: Participants may not want to have audio recordings done and kept for later use.	Participants were informed about the audio recordings before signing the informed consent forms. Re-consent was obtained before audio recordings commenced. Participants who did not want to be recorded declined further participation without any negative consequences for them.

Phases	Risks	Precautions
	Technology problems for online interviews.	Making use of another device for a backup or rescheduling the interview. Making sure that the participants had access to stable Wi-Fi or enough data to participate in the online interview processes.
	Time constraints.	The researcher kept track of time and scheduled another session with the participant, when required, to conduct the remainder of the interview. The researcher had scheduled the interviews at a time suitable for the participants. The researcher did not waste unnecessary time and conducted the interviews in the planned manner.
Phase 5	Privacy and fear of loss of anonymity.	Partial confidentiality was assured, and consent was taken. Gathered data was not made available to others.
	Exposure to other lecturers in the same online platform.	Participants were not required to connect with video, only audio. Participants were not required to share personal information.
	Recordings of the session.	Participants were informed about the audio recordings before signing the informed consent forms. Re-consent was obtained before audio recordings commenced.
	Influencing each other regarding the topic discussed.	During the NGT, a member from CHPE was present for control.
	Time constraints.	The researcher planned the session before hand, and a CHPE representative kept track of the time.

2.10.7 Data Management

The researcher took extra precautionary measures by keeping the data locked in storage. It was not shared with other individuals or used in an unethical manner. Data was only shared with the promoters, co-coder and the independent person who checked the transcribed interviews for accuracy in order to promote scientific enquiry and argument, increase clarity and reliability, and decrease the cost of replicating data collection (North-West University, 2020b). Data was backed-up to limit data loss and to save the researcher from having to reproduce the results.

During the research, all the data collected was kept by the researcher on a password-protected computer and hard copies in a locked cabinet. All recordings were deleted

as soon as they were transcribed and verified for accuracy. A back-up of the data was made and was stored on the promoter's password-protected computer. Only the promoter and co-promoter, under whom the researcher was guided, had access to the data collected on request. The promoters requested the data should there be any uncertainty, or ambiguity, or for confirmation (as part of the monitoring process).

Once the study was completed, all data, i.e., hard copy and soft copy, were to be kept in the care of the promoter for a minimum of 5 years (locked away in a cabinet in the promoter's office and backed-up on an external drive and kept locked away). After five years, the data was to be destroyed by deleting soft copies and shredding the hard copies in the presence of the promoter and a representative of IT. The researcher was to make sure that all the data was removed from her computer and that all hard copy data was sent to the promoter's office for safekeeping.

2.10.8 Monitoring of the Data

Data was monitored by the promoter, who was responsible for determining the consistency of findings as well as the rigour of the research process. The co-promoter was part of this process to ensure that there was reliability and rigour. The promoter evaluated the progression of the study, reported on any problems or potential problems that the study may have encountered and appraised the ethical considerations of those involved. Regular discussions between research team members occurred, and the protocol was rigorously followed. At the promoter's request, annual monitoring and progress reports were completed.

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CHAPTER 3:

ARTICLE 1: NATURE, DEVELOPMENT AND IMPLEMENTATION OF INTERPROFESSIONAL EDUCATION PROGRAMMES: A SCOPING REVIEW

This article was submitted to the [*Journal of Interprofessional Education & Practice*](#) with impact factor 0.99. The article addresses the objective of phase 1 of this study and was formatted to according to the author [guidelines of the journal](#). The line spacing and margins used in this thesis are, however, done according to the North-West University prescription. The references are presented at the end of the chapter.

Link to author guidelines: <https://www.elsevier.com/journals/journal-of-interprofessional-education-and-practice/2405-4526/guide-for-authors>

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Keywords: IPE programme, development, implementation, process, scoping review.

ABSTRACT

There have been many calls for Interprofessional Education (IPE) in the last decade, which has been scientifically proved to promote interprofessional collaborative practice in health facilities. Many authors have attempted the production of guidelines, steps and processes for developing IPE programmes in health professions' education. This scoping review sought to synthesise the nature, development and implementation processes of interprofessional education programmes for higher education institutions.

Thirty-four papers out of 1338 initially identified were included and synthesised in this review. We found that IPE programmes were mainly implemented to get students to learn 'from', 'about' and 'with' each other to improve interprofessional knowledge and skills that students can transfer to the future workplace. We also discovered that the nature of the IPE programmes developed was influenced by the purpose, target audience and mode of assessment. We synthesised the development processes presented into a ten-phased process for the development of IPE programmes: buy-in from the institution; form an IPE team; conduct stakeholder engagements regarding the IPE; learn from other institutions; articulate common IPE content of the various curricula; design the IPE programme/curriculum grounded in framework, theory and ethical principles; share programme for stakeholder inputs; finalise and seek accreditation/approval for the programme; implements programme; continually engage stakeholder involvement in evaluation and improvement. IPE is essential for the health workforce. We recommend faculties and colleges of health sciences develop and implement IPE programmes, using the phases scientifically synthesised for better collaboration in the workplace, to improve the healthcare outcomes of patients.

Keywords: IPE programme, development, implementation, process, scoping review.

3.1 INTRODUCTION

When two or more health professionals from different professions practice in an organised team with the purpose of providing safe, holistic, and effective care for their clients, it is termed interprofessional collaborative practice (IPCP). IPCP is an outcome of interprofessional education (IPE), which is defined as two or more health professions' students learning from, with and about each other. IPE encompasses learning about other professionals' roles, skill sets, weaknesses and legal boundaries.

Although IPE has over 50 years history¹, the global call for its development and implementation has only intensified in the last decade^{2,3}. Interprofessional Education (IPE) is to equip health professions' students for collaborative practice so that holistic and comprehensive health services are offered, with the assistance and support of the patients/clients, their relatives, caregivers or their communities². Additionally, introducing undergraduate health professions' students to IPE inculcates shared teamwork and collaborative practice value for future practice⁴. Thus, presenting IPE early in undergraduate training allows students to understand their roles and value the roles of other health professionals that contribute synergistically to a healthcare team and the care of patients⁵.

Despite the benefits of IPE, many healthcare professionals in institutions and countries continue to train health professionals in traditional silos while expecting them to practice collaboratively across the health system⁶. Several challenges with the development and implementation of IPE programmes could be cited as contributing factors to the continuous training of health professionals in silos⁷⁻¹⁰. Reitsma et al.⁸ found already demanding professional curricula as a barrier to participation in IPE programmes. Also, Sunguya et al.¹¹ mentioned curricula differences, time and scheduling problems; poor coordination and support; resource constraints; attitudes and stereotypes; student characteristics, IPE model, design/concept used, and lack of teaching personnel as some of the barriers experienced¹¹. Additionally, Ahmady et al.¹² cited educational (instructors' absence of skill, fixed and single curriculum use, and flaws in the present education), structural (monopolism, hierarchy of control, reduced learning basis, and lack of organisational support), and cultural (attitudes of executives, lecturers and students concerning IPE) challenges to the development and

implementation of IPE. Further, Delawala⁷ added *stress* amongst team members as a barrier to interprofessional education and collaboration.

The drive and advocacy for developing and implementing IPE programmes by organisations such as the Africa Interprofessional Education Network (AfrIPEN)¹³ have received global and regional responses. Many institutions in^{14–19} South Africa and worldwide^{14–19 20,21} have attempted to design and implement IPE programmes. However, the design and implementation processes of IPE programmes differ from institution to institution. The differences could be observed in the programmes' aim, focus, and development process, but the central theme is training students for IPCP. The IPE programmes that have been evaluated were found to have a positive impact on learning and the overall health system^{22–24}, including quality and safety in healthcare^{25,26}, consideration and esteem for other disciplines^{23,27–31}, improved interprofessional relations^{31,32}, productivity and reduced expenditure; accord in skills and knowledge^{22,23,33}; and meeting future health systems' needs¹⁷.

In South Africa (SA), the University of the Western Cape (UWC), the University of the Free State (UFS), the University of Witwatersrand (Wits) and Stellenbosch University (SU) have inculcated IPE programmes into their health science curricula^{20,34–36}. An Interprofessional Education Unit (IPEU) is present at UWC to deliver IPE with central curricula and venues to train students³⁶. The Centre for Health Professions Education (CHPE) at SU encourages a culture and competencies to boost patient outcomes and solidify the health system through Interprofessional Education and Collaborative Practice (IPEP).

The development and implementation processes within institutions in South Africa also vary. In their bid to streamline IPE programme development and implementation processes, many authors^{37–40} have attempted to produce guidelines, steps and processes for developing interprofessional education in the health professions. It is not known which processes are the most effective in the development and implementation of IPE programmes. This review sought to synthesise the nature, development and implementation processes of interprofessional education programmes globally.

3.2 METHOD

3.2.1 Design

This scoping review was guided by the enhanced Arksey and O'Malley⁴¹ framework presented in Peters et al.⁴². A scoping review is conducted to summarise the breadth and depth of evidence in a field of study⁴³. It could be preceding a planned systematic review or a standalone review that seeks to map the evidence in an emerging field of study⁴⁴. Interprofessional education is an emerging field of study; hence, a scoping review is the choice of methodology.

The scoping review framework comprises the following steps: synchronising the research question and the objectives; setting the inclusion criteria; literature search; inclusion and exclusion of evidence; data charting, synthesising and reporting of results.

3.2.2 Synchronising the research question and objectives

The review question was guided by the PCC (Population Concept and Context) mnemonic developed by Joanna Briggs Institute; thus, "what constitutes the nature, development and implementation processes of an interprofessional education programme in health professions education"? The population (P) being explored is undergraduate health professions' students, the concept (C) is the nature, development and implementation of Interprofessional education programmes, and the context (C) is global.

3.2.3 The inclusion and exclusion criteria

3.2.3.1 *Inclusion*

Primary research papers published from January 2016 – March 2022 in English that met the study's objectives were included.

3.2.3.2 *Exclusion*

Studies that did not focus on undergraduate students were excluded as the emphasis was IPE for undergraduate health professions' students. Studies that reviewed or evaluated IPE programmes without the development and implementation process

were excluded. Also, studies providing outcomes of opinions, attitudes and perceptions of students, staff and professionals on IPE programmes without development and implementation process were excluded. Lastly, studies that provided the IPE programme development and implementation process but included only one profession were also excluded.

3.2.4 Literature search

EBSCOhost (MEDLINE, CINAHL, Academic search complete, Health Source: Nursing/Academic Edition, SocINDEX, MasterFILE Premier and Health-Source Consumer Edition), Scopus and PubMed databases were searched for relevant studies using Boolean combinations of the keywords: Interprofessional education, curriculum, development. All the identified papers were retrieved into a Mendeley reference manager, where duplicates were identified and merged. The titles of the studies were scanned for appropriateness; titles that were found irrelevant to the review were excluded. Abstracts of the remaining articles were read for appropriateness of the studies to the review. Another set of papers was also excluded based on their abstract. After this, the reference lists of the selected literature were examined for further inclusions. The search was conducted in September 2020 and updated in April 2022.

3.2.5 Studies included

A total of 1338 records were identified and imported into the Mendeley referencing manager. After that, 407 duplicates were identified and merged, leaving 931 studies. Of the remaining 931 studies, 834 were excluded after screening the titles and abstracts for appropriateness, leaving 97 studies. Sixty-three (63) of the 97 full-text articles were excluded after assessing the full texts for eligibility. Thirty-four (34) relevant full-text articles were extracted on a data matrix (Table 1) for easy visualisation and synthesis. Extracting the evidence in this way allowed the results to be aligned with the summary of the findings. Evidence was extracted using adapted data extraction steps proposed by Peters et al.⁴².

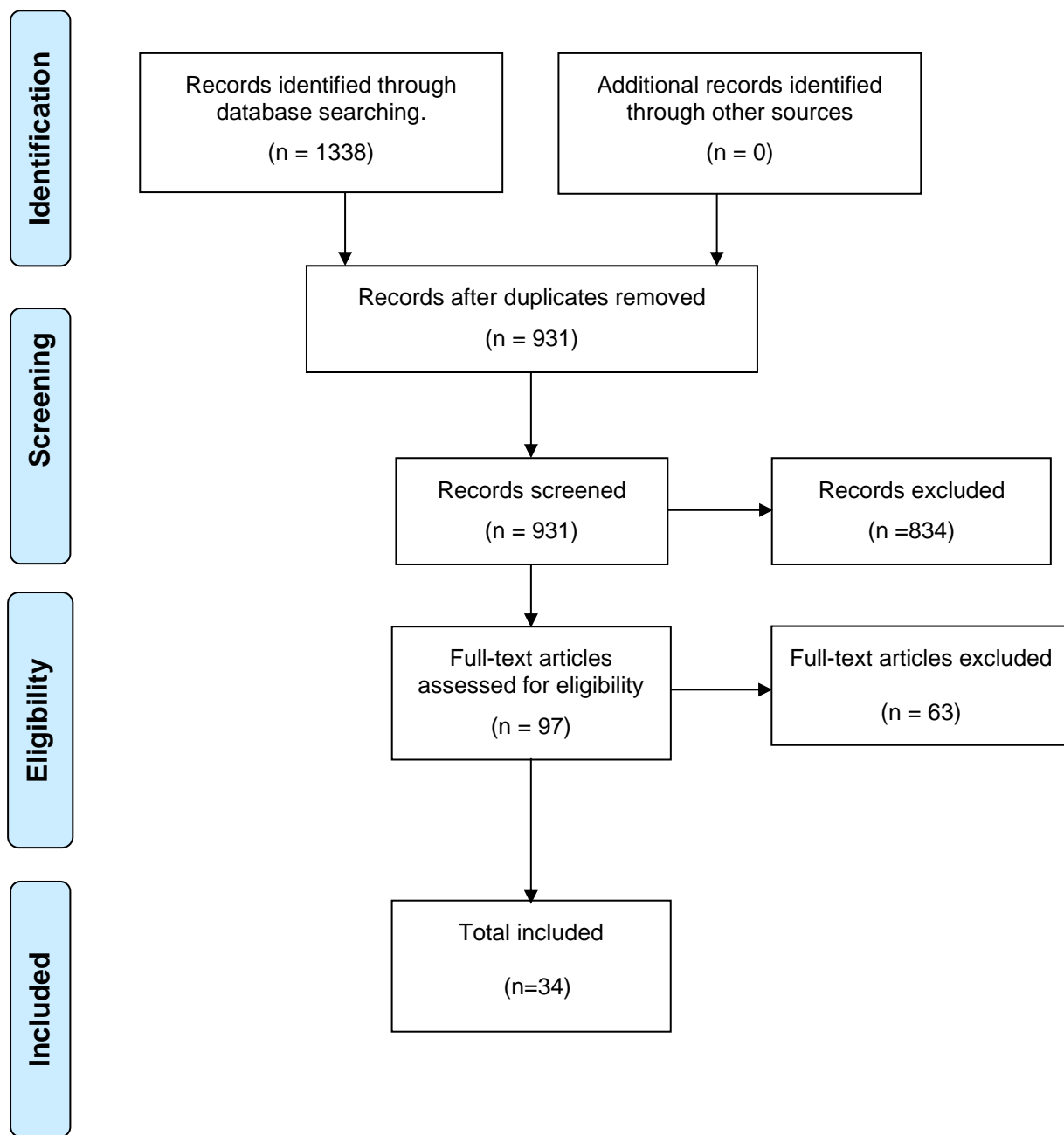


Figure 1: Search and inclusion process

3.2.6 Data charting

Author and date, purpose, target population; programme; programme development process; and relevant findings were extracted from the studies and included in a data matrix (Table 1). The extraction was done by the first author and cross-checked by the other two.

3.3 ANALYSIS AND PRESENTATION OF THE EVIDENCE

A qualitative synthesis of data charted onto the data matrix (Table 1) from the studies included in this study was conducted⁴⁵. This was done through individual reviewing and interpreting and drawing together the data from various findings. Similar findings were pooled together to allow for a flow in discussing the evidence and understanding of the nature, development and implementation of IPE programmes.

3.3.1 Distribution of studies included

Of the 34 papers included, 18 were published in the United States of America (USA), followed by four in the United Kingdom (UK), two in the Peoples' Republic of China, two in Germany and one each in Australia, Canada, Iran, Malaysia, Qatar, South Africa (SA), Sweden and Switzerland (Figure 2).

Regarding the yearly distribution of studies included, Figure 3 shows a downward trend with the highest number (7) of studies published in 2019 and the lowest (4) in 2021. 2022 was not considered as the search was conducted up to March 2022.

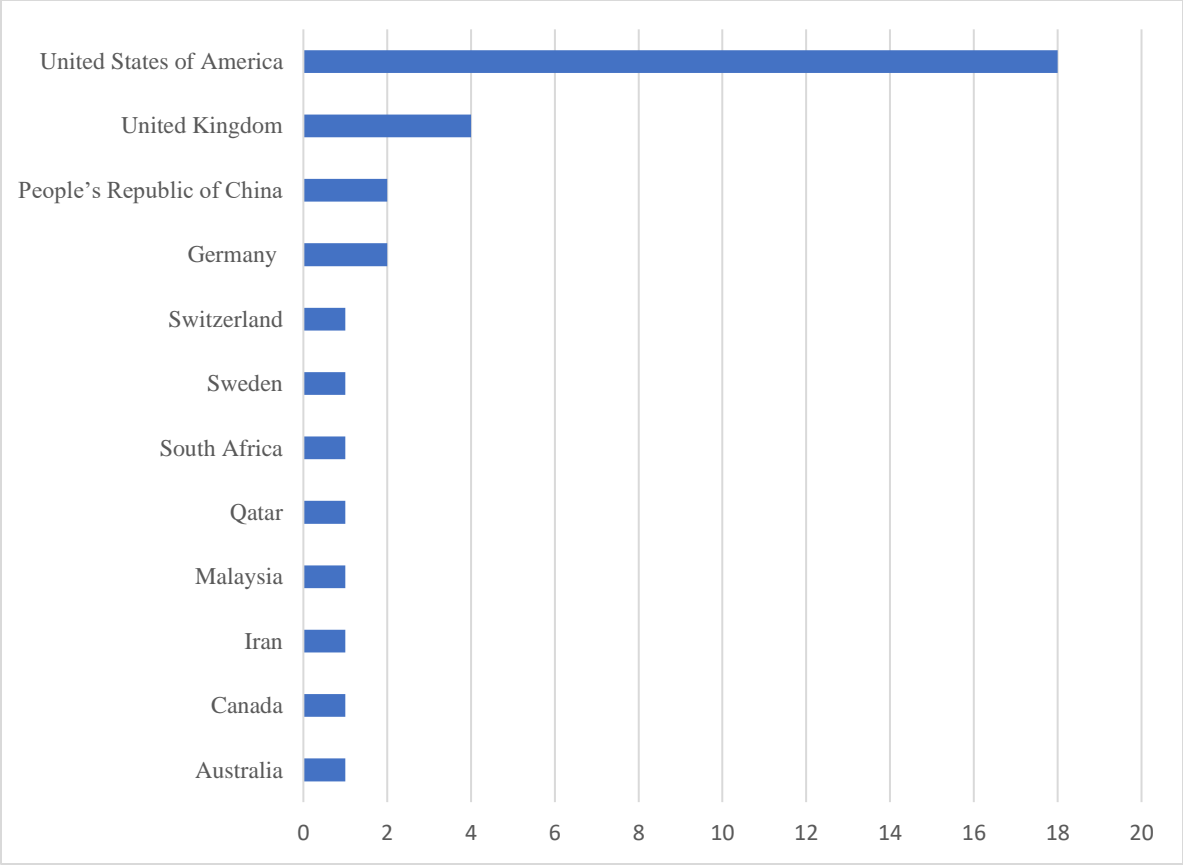


Figure 2: Country distribution of studies included

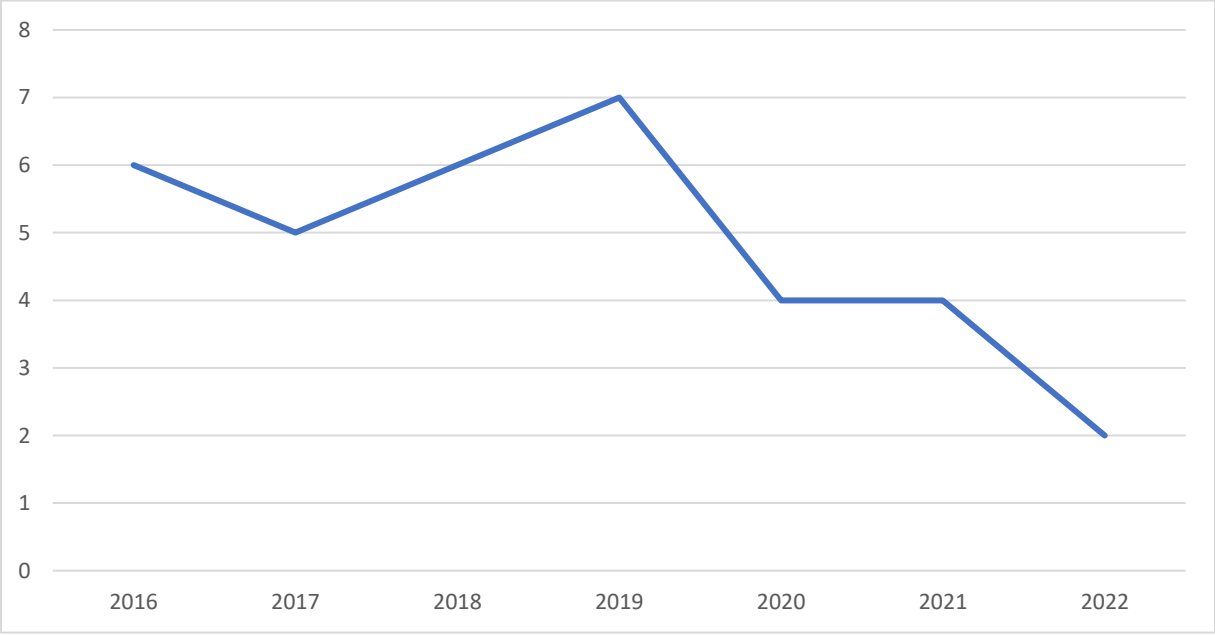


Figure 3: Yearly distribution of studies included (January 2016-March 2022)

3.3.2 Nature of IPE programme

Interprofessional education programmes could be described in terms of their: a) purpose/outcomes, b) target audience and c) mode of assessment.

3.3.2.1 Purpose/ outcomes

The aims of IPE programmes determine how they were designed and implemented and their target audience.

All IPE programmes included sought to enhance interprofessional collaborative practice. Some were specific to clinical^{4,27} and community cases, whereas others focused on general IPE competencies. For example, IPE programmes in Branch-Mays et al.⁴ and Bares et al.²⁷ sought to teach skills and attitudes for clinical practice^{4,27} so that students can excel in the Interprofessional Education and Collaborative (IPEC) competencies⁴. Chan et al.³¹ mentioned the importance of authentic experiences through simulated learning, giving students the intentional opportunity to develop specific skills. In Chan et al.²⁸, students were given the platform to develop personal skills, and intra-team relationships and identify the need for collaboration for patient-centred care. Patient safety²⁵, community wellness³³ and collaborative operations^{6,22,24,29,30} were identified as possible outcomes in various included studies. In Kutt et al.²³, students identified conflict resolution, collaborative problem-solving and time management as part of the skills needed in IPE.

3.3.2.2 Target audience

The target audience influences the nature of IPE programmes. The target audience for the assessed IPE programmes included students from all undergraduate health programmes¹ and other disciplines such as theology²⁴ and Chinese medicine³¹. Certain

¹ social work, pharmacy, healthcare, dentistry, medical, physician assistant, physical therapy, radiography, medicine, nursing, nutrition, occupational therapy, dietetics, exercise science, psychology, natural medicine, veterinary medicine, public health, dental hygiene, dental therapy, dental medicine, osteopathic medicine, anaesthesiology assistant, healthcare administration, medical laboratory science, speech and hearing science, speech, language and hearing, speech-language pathology, midwives, biomedical science, physiotherapy and medical radiology technologists

studies included students from undergraduate and graduate levels^{6,22,29,46}, whereas two^{25,47} included graduate levels. For El-Awaisi et al.³⁹ and Safabaksh et al.³², no target audience was selected as these studies spoke about introducing³⁹, designing and developing³² IPE.

Most clinical IPE programmes focus on clinical practice professions' students; the community-based programmes include broader professions, including theology and traditional medicine practitioners. For example, the target audience for community-based programmes presented in Acquavita et al.²² and Stubbs et al.²⁴ are broader than clinic-based IPE programmes presented by Bares et al.²⁷, Forstater et al.²⁵ and Kutt et al.²³. Some programmes are holistic, comprising acute care and community-based follow-up care components^{47,48}. Some specialised community-based programmes, however, included fewer professionals^{33,49}. It was observed that social work professionals cut across clinical and community-based programmes^{22,24,29,31,33,49}.

3.3.2.3 Mode of assessment

Given the nature of different IPE programmes, it became clear that more than one mode of assessment was used in many studies. In certain contexts, students were required to commence with pre-tests and readiness tests before being exposed to the programme. In some programmes, students completed assessments after each activity in the IPE programme, whilst in others, students had to complete post-tests, teamwork tests, tests on IPE competencies and programme evaluations. Thus, assessments were issued before, during, and after the IPE programme. Assessments were conducted through reflections^{6,23,24,30,33,47-49}, discussions^{23,47,49,50}, report writing^{24,33,49}, completing portfolios⁵¹, questionnaires⁵¹, focus groups and interviews⁵¹, open-ended and, multi-choice questions²⁷ and simulations to measure content knowledge²².

Tools such as the Structured Assessment Worksheet for Interprofessional Teamwork (SAW-IT)²⁷, the Interprofessional Collaborative Competency Attainment Survey (ICCAS)⁴, pre and post-tests^{23,29,33}, the Individual Readiness Assurance Test (iRAT) and Team Readiness Assurance Test (tRAT)^{30,31,52-54}, the Readiness for Interprofessional

Learning Scale (RIPLS)²³, the Performance Assessment of Communication and Teamwork (PACT-novice)²⁵ tool and completing rubrics and surveys⁴⁹ were used. Other modes included the Rapid cycle assessment⁵⁵, the Interprofessional Education Scale (IEPS)²³, the Health Professional Collaborative Competency Perception Scale (HPCCP)²³, the CAM Health Belief Questionnaire (CHBQ)²³ and the Interprofessional Socialisation and Valuing Scale (ISVS)²⁴.

3.3.3 Development of IPE programmes

3.3.3.1 *Models, frameworks and theories used in the development of IPE programmes*

Five IPE programmes^{22,25,48,51,56} were developed using already existing models for developing IPE programmes: Substance Abuse and Mental Health Services Administration (SAMHSA) model²², Three Strand Model of Interprofessional Learning (IPL)⁵¹, flipped classroom model²⁵, the Boyer's model of scholarship⁵⁶; and Interprofessional Collaborative Practice Domains model⁴⁸.

Branch-Mays et al.⁴ aligned their objectives with the core competencies of the IPCP, and the learning activity focused on small group sessions and course facilitators. Similarly, in Cahn et al.⁴⁷ the IPEC competencies were fundamental to student learning so that they could collaborate. The Kirkpatrick framework, used for analysing and evaluating educational and training programmes' results, was used to map the IPEC core competencies for developing an IPE framework in Danielson and Willgerodt⁵⁷. The Kirkpatrick framework focuses on gauging responses, attitudes, and insights of specific IPE activities and behavioural and structural alteration. Also, Anderson et al.⁵¹ used the Kirkpatrick levels with other theories from cognitive constructivists to assess the impact that IPE had in the three-strand model.

Kolbs⁵⁸ experiential learning theory was employed by some programmes^{6,22,23,25-27}. It consists of four aspects: concrete experience, reflective observation, abstract conceptualisation, and active experiment. Each aspect of the cycle was exclusive to a goal for students to complete the learning outcomes of IPE. Students' reflections and

observations were based on concrete experiences, followed by the absorption of abstract concepts for implementation and lastly, tested in active trials.

3.3.3.2 Phases of IPE programme development

Generally, IPE programmes were developed in a phased manner^{39,49,57}. The labour demands and the time investment needed to develop IPE programmes make it very taxing, although it is worth the investment as the benefits outweigh the challenges^{6,30,39}. Experts in the field believe that IPE programmes develop over time and must be piloted before large-scale implementation⁵⁹. While many studies^{4,6,23,39,48,49,57} have outlined, to various extents, the stages or steps used to develop the IPE programmes, others^{24,29,33,46,47,50,51,56,60} did not provide details of the programme development process. However, they were explicit about the programmes' implementation and evaluation. Figure 4 summarises the IPE programme development processes reported in the included studies.

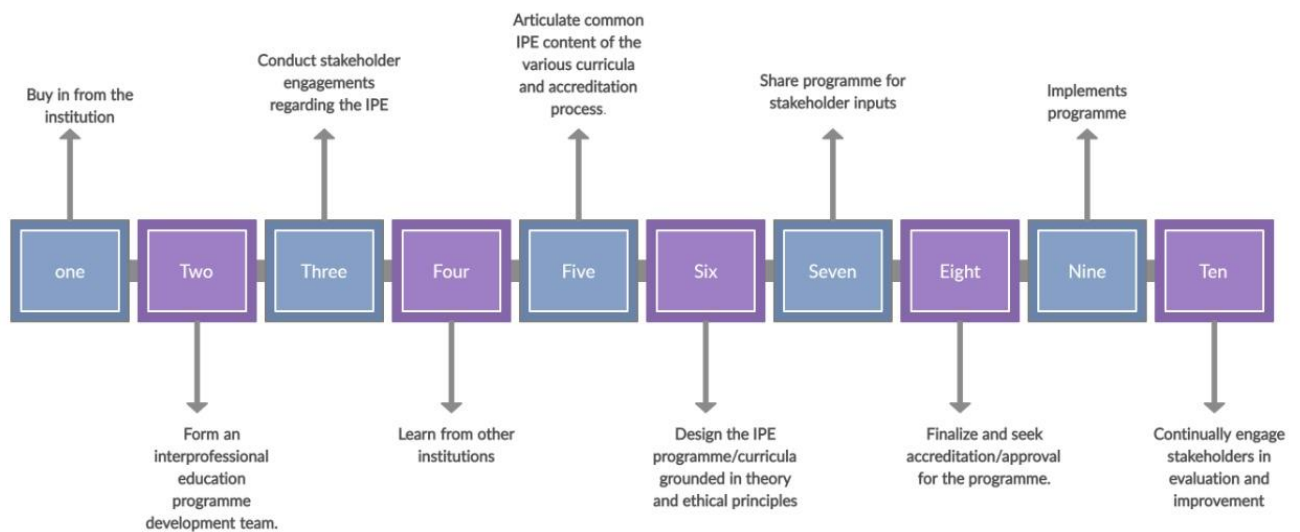


Figure 4: Interprofessional Education Programme Development Process

Buy-in from the institution

Buy-in from the institution was important in IPE programme development^{26,39,47,60}. Cahn et al.⁴⁷ emphasised the importance of initial support from leadership for IPE programme development. Leadership must realise the need for the IPE programme to support its development³⁹.

Form an IPE team

Generally, an IPE team is formed by nominating staff from each programme⁴⁷. It is called an IPE advisory team in Teodorczuk et al.⁶⁰ and an IPE committee or task force in Herrera et al.⁴⁹ and Prast et al.⁴⁸. Additionally, Branch-Mays et al.⁴ formed an IPE steering committee that formulated objectives, establishing a core interprofessional team. Anderson et al.⁵¹, Danielson and Willgerodt⁵⁷ and Kutt et al.²³ agreed on forming a local group to develop IPE strategies, a core faculty curriculum group and a working group in their respective studies. El-Awaisi et al.³⁹ cited commencing with forming a learning group of colleagues who could compare their perceptions of IPL and Interprofessional Practice (IPP).

Conduct stakeholder engagements regarding the IPE

Identifying and engaging with stakeholders is necessary after formulating the IPE team⁶. Targeting diverse stakeholders, especially students³⁹, to form a critical mass for IPE and IPP was also stated by Frantz and Rhoda⁵⁶. Branch-Mays et al.⁴ noted that their core interprofessional team engaged and collaborated with stakeholders. In Kutt et al.²³, working groups invited leaders from specific health professions' education units to engage with the IPE development phase. Anderson et al.⁵¹ emphasised clinical facilities as crucial stakeholders in IPE programme development.

Learn from other institutions

Many institutions have adopted IPE into their curricula²⁴. El-Awaisi et al.³⁹ mentioned that IPE programme integration differs from one institution to another; however, they were encouraged to embrace current skill or ability-based collaborative frameworks and other factors, e.g., the number of professions involved in one activity. Herrera et al.⁴⁹ stated

that two institutions collaborated to develop and implement the IPE programme. Whereas Stubbs et al.²⁴ mentioned the involvement of five institutions for inter-institutional IPE.

The content of institutions that have established IPE programmes can be studied and adapted to develop new programmes. Experts from those universities were consulted on how they developed and implemented their IPE programmes³². Furthermore, published data may prove valuable in guiding one's process³². Safabaksh et al.³² outlines a systemic method of learning from other experts, institutions and studies and look at various components of IPE, e.g., objectives, content and strategies, leading to the development of their IPE model.

Articulate common IPE content of the various curricula

One of the difficult phases of IPE programme development is articulating the common content of the target health professions^{4,60}. IPEC competencies can be used as guidelines to assist with creating such content^{47,57}. In addition to the IPEC competencies, Cahn et al.⁴⁷ stated accreditation, design and assessment in IPE programme development. Collaborative structures need to be established⁶ for collaborative planning⁵⁶ and collaborative formulation of learning outcomes⁶⁰. Danielson and Willgerodt⁵⁷ reported that a core faculty curriculum group identified and articulated common curricula content and determined the level of students from each programme for the common content⁵⁷. El-Awaisi et al.³⁹ and Herrera et al.⁴⁹ also emphasised the articulation of common IPE themes from the curricula content of the target professions.

Design the IPE programme/curricula grounded in framework, theory and ethical principles

Frantz and Rhoda⁵⁶ mention the need for a theoretical framework to be integrated into the IPE programme development process. The IPE committee in Prast et al.⁴⁸ used the IPCP domains to guide the development of the IPE programme. Acquavita et al.²², Danielson and Willgerodt⁵⁷ and Anderson et al.⁶ supported the theoretical grounding of the development of an IPE programme. Activity designs related to clinical practices were identified for design⁶⁰. In Branch-Mays et al.⁴, the core interprofessional team developed a draft IPE programme.

Similarly, in Danielson and Willgerodt⁵⁷, the core faculty curriculum group developed the IPCP curriculum framework by mapping the IPE core competencies on Kirkpatrick's evaluation domains. Danielson and Willgerodt⁵⁷ also held bi-weekly meetings to review the map and classify competencies according to the Interprofessional education model developed by the Universities of Alberta and British Columbia⁶¹, constituting the IPE curriculum framework. The curriculum framework then guided the development of their IPE curriculum. El-Awaisi et al.³⁹ stated the following to be included in this stage: collaboratively designing the IPE programme and determining at what level in the professional category the IPE programme fits. Herrera et al.⁴⁹ added that their programme was formulated and then nested into the existing curricula. Inputs from the TeamSTEPPS®, too, were used to develop IPE, as found in Forstater et al.²⁵, Madigosky et al.³⁰ and Mcquown et al.⁶².

Share programme for stakeholder inputs

In this phase, the programme plan is shared⁶ with stakeholders for their inputs⁴. The draft programme can be circulated to all the stakeholders for comments. For example, Danielson and Willgerodt⁵⁷ circulated the IPE programme with internal stakeholders for vetting, followed by other interprofessional groups, including clinical practice stakeholders and international experts, for sequential reviewing.

Finalise and seek accreditation/approval for the programme

Anderson et al.⁶ mentioned seeking support once the programme has been shared for input. Before seeking approval, finalising the programme must be done by considering all the inputs and comments from the stakeholders.

Implements programme

A common philosophy of Danielson and Willgerodt⁵⁷ was including an implementation plan. The programme can be uploaded onto a learning management system⁴⁷. The programme must be implemented^{23,49}; once implementation occurs, students must be motivated to buy into and engage in the IPE programme. Otherwise, the programme may fail at what it seeks to achieve³⁹. In the studies included, IPE programmes were implemented using various teaching, learning, assessment and evaluation methods and

activities. The most frequently used methods and activities of implementation included patient scenarios^{6,25,26,29,47,48,60,63}, and students made use of documents such as keeping records, writings (notes), journals and guidebooks^{4,6,23,27,30,46,50}, practicing in a community/rural environment^{24,33,46,47,50,51}, case studies^{22,25,27,30,50}, online platform/materials^{22,25,47,60} and clinical experience^{23,27,60}.

Experiential learning was reported throughout the studies was included as a key to reaching the objectives of IPE²⁵. First, having students do community diagnosis, report, and discuss issues offered students “lived experiences”, which help develop competencies^{24,33}. Rajiah and Mari Kannan⁵⁰ used community-based learning to help students gain attitudinal and cultural competencies in healthcare. Second, simulations with simulated patients in active and experiential learning allowed different roles and responsibilities to be identified^{26,48}. Prast et al.⁴⁸ conducted simulations in which roles were given to team members to play. Third, a clinical practice that provided students with real-life patient-care experiences was essential in building IPE competencies in students^{26,29,46,60}. Konrad et al.²⁹ utilised relational and Practice Learning (PL) to promote relations for future collaborations among practitioners. Further, Stubbs et al.²⁴ explained that students could apply their time to service-learning (client engagement and problem solving) so that teamwork and comfort in learning with others may improve.

Other types of activities used in implementing IPE programmes include Team-Based Learning (TBL), Case-Based Learning (CBL), Skill-Based Learning (SBL) and online learning. Three studies^{29–31} reported that TBL was used to implement IPE activities^{52,54}. TBL created an active student who experiences learning in a team setting³⁰. In-class and online learning was supported³¹, together with TBL in the clinical area. Frantz and Rhoda⁵⁶ made use of the biopsychosocial approach for the representation of different health professions. This approach was helpful in driving IPE and IPP as stakeholders in the faculty shared the same vision and goals. Also, some programmes used CBL, which formed part of experiential learning, where students could work on scenarios, do case analysis and assessments, and provide diverse input whilst working with other health professionals^{23,29,63,64}. Additionally, SBL, a form of collaborative learning, was cited by

Rajiah and Mari Kannan⁵⁰ where students shared information and communicated their roles to other health professionals.

Continually engage stakeholders in evaluation and improvement

The programme needs to be evaluated for improvements^{6,51}. Assessing student learning through student reflections and faculty debriefing can take place as evaluations^{51,65}. Danielson and Willgerodt⁵⁷ support the idea of faculty debriefing. Concluding assessments^{39,49}, programme evaluations^{23,39,49} and student assessments^{22,23} are seen as different ways of evaluating the programme. Evaluation tools or data collection instruments such as the Interprofessional Attitudes Scale (IPAS) and the IPEC Assessment Tool can be used to assess students⁶⁶. Branch-Mays et al.⁴ suggested conducting yearly reviews through student and staff feedback, and El-Awaisi et al.³⁹ suggested sharing the IPE experience academically.

Therefore, conducting evaluations are important in IPE programmes and can be done through reflections^{24,30,47,48}, discussions^{47,49,50}, structured observations^{47,49}, surveys⁴⁹, completing portfolios⁵¹ and debates⁵⁰. Other evaluation tools used included the IEPS²³, HPCCPS²³, CHBQ²³, ISVS²⁴, pre and post-tests^{25,29,30,62}, SAW-IT²⁷, rapid-cycle programme assessment²⁹, Kirkpatrick model⁵⁷, RIPLS^{23,30} iRAT³¹, tRAT³¹ and ICCAS⁴.

3.3.3.3 Contributions of IPE programmes included in this study

The key findings from the different literature included: skills development, such as time management and conflict resolution²³, improved content knowledge and attitudes^{22,23,33,52–54,63}, the importance of patient-centred learning²⁶, team-based problem-solving^{23,32,52,67}, forming clinical teams and gaining the support of institutes^{6,50} and resolving barriers to learning⁵¹. Furthermore, the findings comprise improved identity^{30,62}, improved knowledge on the roles of other professions and respect and appreciation for them^{23,27,29–31,33,53,65,68}, better communication, teamwork, values/ethics^{4,31,63,68–70} creating interprofessional networks⁴⁷, collaboration^{31,32,64,69} and use of theory and pedagogy^{57,67}. Forstater et al.²⁵ reported that patient safety improved and medical errors diminished through IPE and IPCP.

3.4 DISCUSSION

This review sought to describe the nature, development and implementation processes of interprofessional education programmes globally. 1338 studies were identified, out of which 34 were included and synthesised.

We found that most of the studies were published in the USA and the UK. Only one study was included from Africa⁵⁶, which is not surprising as the developed world lead in a research capacity, funding and outputs reported in many studies^{71,72}. Erfanmanesh, Tahira and Abrizah⁷¹ analysed Scopus index papers from 102 countries and found that the USA and the UK contributed more than half of the publications globally. The previous statement can be confirmed by a more recent study analysing the research deficit of countries across the globe and reported the highest amount of publications from the USA and UK⁷². South Africa, in particular, although growing in nature, is very limited in IPE. While IPE in the South African context is an emerging concept, it is not as popular when compared to the likes of the USA or UK.

Also, various developed programmes were guided by existing theories, allowing for programmes to be adapted to specific contexts. Kolb's theory was mainly applied due to the core IPE competencies that are best acquired through 'doing' - which forms the foundation of Kolb's experiential learning theory⁷³. Experiential learning, TBL, CBL, PL and community-based learning were among the more widely used theoretical frameworks in developing IPE programmes.

Additionally, the modes of IPE were not singular, as several studies used combined methods of carrying IPE to students, suggesting that various learning methods can be incorporated into IPE. Thus, an IPE programme could also help health professions' students from different health schools familiarise themselves with multiple modes of teaching and learning. The most prevalent methods were 'patient/scenario/mock-ups' and 'documents (records, notes, journals, writings, and guidebooks).' The possible reason for patient/scenarios/mock-ups showing up as the most used method could be the essential nature of the clinical component of health professions curricula, and 'clinical mock-ups' are essential for students to engage with each other effectively in experiential learning

activities. Poore et al.⁷⁴ reiterated the use of lived experiences to develop collaborative and clinical skills. Additionally, students could easily implement what was learned and develop knowledge and skills in an interprofessional team. Hence, scenarios/mock-up are central to IPE and student training. The importance of evaluative measures with the correct evaluation tools is necessary for feedback.

The evaluation measures employed to obtain better feedback were qualitative, quantitative, or mixed. Surveys such as the iRAT and tRAT were the most mentioned tools for quantitative evaluations. Student orientations, reflections and discussions were dominant in qualitative evaluations. In their study, Reeves et al.⁷⁵ highlighted a selection of three evaluation designs: qualitative, quantitative and mixed methods, as was determined and acknowledged in this study.

The option and period of conveying the programme to students differed too. Some programmes were introduced as credit-bearing components of health science curricula, whilst others were introduced as non-credit-bearing and optional short programmes. The World Health Organization's *Framework for Action on Interprofessional Education & Collaborative Practice* recommends that IPE programmes be compulsory to overcome logistics challenges and promote effective collaboration².

Regarding when it was introduced, some programmes were introduced much later into a health curriculum, possibly due to curricula load or the prerequisites needed for activities such as patient diagnosis. In other learning institutes, IPE was introduced from the first and ran through to the final year. IPE in higher learning institutes should be introduced early in their training so that students are adapted to providing health services in an interprofessional and holistic manner once they graduate. Requiring students to join a programme much later in their undergraduate, graduate or postgraduate training could limit the impact and objectives that IPE aims to achieve⁷⁶.

Lastly, we found that most of the programmes developed were grounded in theory, signifying the essence of education theory in health professions education. We synthesised the development process into ten comprehensive phases to guide institutions and academics in developing, implementing and reviewing IPE programmes. The

underlying characteristics of these phases were the emphasis on institutional buy-in and stakeholder involvement and collaboration. IPE programmes are complex due to the varying target audience and stakeholders involved. Implementing a programme is facilitated by involving all stakeholders from the conceptualisation phase. Also, feedback from both the students and facilitators is essential in improving a programme. Therefore, continuous evaluation of a programme is necessary for an enhanced IPE programme.

3.5 CONCLUSION

This scoping review looked at the nature, development and implementation of Interprofessional Education Programmes globally. It is important to contextualise that we found that most articles published were from the USA, suggesting the thriving nature of IPE in that country as compared to other countries. The nature of IPE programmes included their purpose/outcomes, target audience and mode of assessment. The development of a programme included models, frameworks and theories used and phased development of IPE programmes. Developing and implementing IPE in higher education was supported in the included studies. In setting an IPE programme in motion, substantial support is needed, especially in developing countries such as South Africa. Institutional buy-in is the most crucial step, followed by bringing together stakeholders and individuals with a common IPE philosophy to assist in developing a programme. This study established and contributed ten steps for the development process of an IPE programme.

One of the challenges identified with IPE implementation included lack of buy-in and that health profession students have already packed schedules. However, the benefit of implementing IPE even for a short period was proven to facilitate the development of various knowledge and skills parallel to optimal healthcare. Collaborating in interprofessional teams improved health outcomes, and students appreciated learning with, from and about each other.

There is no doubt that, especially in the South African context, IPE needs establishment in health professions curricula so that students can work with other professions and will be equipped with the necessary knowledge and skills once they graduate. IPE

programmes need to be contextualised so that students can work with other professions and accommodate the country's health needs. Furthermore, IPE programmes need to be evaluated to facilitate any changes and suggestions for improvements.

Interprofessional collaboration practices have improved patient outcomes whenever implemented. The core and additional competencies of interprofessional collaborative practise are acquired through interprofessional education, which is labour intensive and time-consuming to develop and implement.

IPE also demands expert knowledge in development and implementation. To contribute to the development of IPE programmes globally, we synthesised an evidence-based IPE programme development process that has the potential to guide institutions and academics to seamlessly design and implement IPE programmes. We recommend academics and institutions contextualise and apply this development process in developing their IPE programmes to help health sciences students learn from, with and about each other.

Table 1: Data matrix

No.	Author, date <i>setting</i>	Purpose/ Outcomes	Target Audience	Programme development	Programme Developed	Key results that relate to the scoping review question/s
1.	Acquavita et al. ²² 2019 <i>United States of America</i>	Assessed results of a semester-long IPE course on Screening, Brief Intervention, and Referral to Treatment (SBIRT).	200 students from: -Undergraduate, senior/masters social work, -medicine, -Graduate pharmacy and -Undergraduate or graduate nursing	The SBIRT, based on a public health model detecting risky substance use, governs an IP course using a hybrid-model to instruct and train students to offer SBIRT. It follows Kolb's experiential learning theory with his cyclical model of four components for synthesizing learning: (a) concrete experience, (b) reflective observation, (c) abstract conceptualization, and (d) active experiment. Firstly, the asynchronous material was completed and SBIRT was introduced online and with virtual simulations. The online material included Microsoft PowerPoint slides, videos, readings, and branching scenarios together with interactive case studies allowing students to reflect, report and receive feedback on situations. Synchronous components followed the use of a standardized patient and two clinical	SBIRT Interprofessional Course (Week 1-14 and 30-day follow-up)	The course was positive in skills development for evidence-based practice in health professions' students. Online modules were used to provide content knowledge, and foundation skills practice resolved some of the scheduling difficulties native to IPE efforts. VPSs and standardized patients are permitted additional skills practice before using SBIRT in clinical and community settings. Working in IP pairs permitted students to advance their skills for collaborative practice. Students' content knowledge and attitudes towards patients improved.

No.	Author, date <i>setting</i>	Purpose/ Outcomes	Target Audience	Programme development	Programme Developed	Key results that relate to the scoping review question/s
				<p>SBIRT experiences. Students became active participants and learners who also learned from the SBIRT experiences, then obtained feedback and reflected on their own experiences. Each week focused on specific lessons and topics followed by evaluation measures. The SBIRT was managed in IP clinical experiences in various healthcare and civic intervention environments, i.e., a food bank, homeless shelter, a federally qualified health center or the campus hospital. Students also completed pre- and post-tests for the course evaluation and used screening tools during the course. Assessments were done based on content knowledge through virtual patient simulations (VPSs).</p>		
2.	<p>Anderson et al.⁶ 2016 <i>United Kingdom</i></p>	<p>Offer students the opportunity to participate and reflect on interprofessional learning How working with a diverse interprofessional</p>	<p>Undergraduate and postgraduate students</p>	<p>Constructivist learning theory was used in design and assessment. The Leicester Model integrated Kolb's theory Participating hospital or community received students. A pre-briefing of the students followed. Students then</p>	<p>Leicester model (Short practice-based IPE) Total of four IPE days.</p>	<p>There is value of a theoretical approach to learning. The backing and warrantee of patient-centred learning. The importance of clinical teams required for student support.</p>

No.	Author, date <i>setting</i>	Purpose/ Outcomes	Target Audience	Programme development	Programme Developed	Key results that relate to the scoping review question/s
		health and social care teams feels.		<p>worked with in-patients with complex needs and followed learning outcomes. Students accessed patients' notes and records; reflective learning followed the assessing of notes and records. Students conducted presentations and gave their recommendations occurred.</p> <p>Educating the educator and facilitator so that knowledge and skills are sustained, and the educator and practitioner are brought together so that pressure is reduced during patient-care, was part of development. A holistic health and social care assessment was completed by students by making use of each other's profession-specific knowledge and skills and gathering information from the practice team. Students also completed holistic assessments of their patients. Thus, each afternoon included either assessments, reflections, discussions or report writing.</p>		The article further made mention of an organizational structure which highlights the role of higher learning institutes, and health and social care organizations, together with administrative support and student evaluations, as the vital sources for educating students leading to patient-care.

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3.	Anderson et al. ⁵¹ 2016 <i>United Kingdom</i>	Highlighted the significance of longitudinal IPE through complete curriculum assessment for contrasts and to improve understanding of applicability and the reasons thereof.	Undergraduate health and social care programmes of over 10 professions	A framework was developed using the Biggs 3P Model, the application of Kirkpatrick typology of education outcomes and theories from cognitive constructivists. This framework was divided into three strands, each with its own aims. Strand one focused on classroom learning while the other two concentrated on practice-based learning. Strand one followed sociological and psychological concepts; strand two followed the formation of communities of practice, entailing theories of social learning; strand three used the Kolbs learning cycle student reflections. Students were required to complete and submit Interprofessional Personal Portfolios after each IPL event. In addition to this, evaluation was done with questionnaires, focus groups, interviews and student recommendations.	"Three strand Model" of IPL (Four days of IPL)	The assessment centred on cyclical issues related to students' experiences, facilitators skills and focused on the barriers of learning in training. The difficulties and barriers were resolved with theory application to refine understanding.
4.	Bares et al. ²⁷ 2018	1) Didactics for a basis in the theory and rudiments	Second-year advanced practice nursing students,	Theory and practice was integrated into an HIV clinic to allow for students to change their attitudes, gain knowledge,	Foundations of Interprofessional Communication	Curriculum fixated on experiential learning.

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	<i>United States of America</i>	<p>of IPE 2) Clinical practice for experiential education.</p> <p>Objectives: 1) Students' reflections and descriptions on viewpoints and attitudes about interprofessional care for those with HIV, 2) Gaining information on initial IPE theory with didactic learning and appraisal of online resources. 3) Developing skills for interprofessional care for those with HIV. 4) Experience in evaluating performance of interprofessional care teams.</p>	second and third-year medical students, and fourth-year pharmacy students rotating through the HIV clinic.	<p>skills and experiences in relation to IPE. The curriculum was sectioned into two different parts: Didactics (Interprofessional education days, online and didactic content) and Clinical (patient-care, cross training, team rounds, shared note-writing, case studies) followed by assessments and evaluations. This curriculum mainly focused on experiential learning. Assessments were done with open-ended and multiple-choice questions and informal debriefings occurred. Student assessment with SAW-IT were used to evaluate the purpose of the interprofessional teams.</p>	and Collaboration (FIPCC) (Clinical: 49.5 hours, didactic: 3.6 hours)	Students appreciated other professions in the care of persons with HIV. End-of-rotation student assessments indicated that rotations were successful in meeting the objectives. Self-reported information associated with the interprofessional team purpose was enhanced due to the programme. All participants registered an intent to follow IPCP after completing the programme. The outcomes indicated that the clinic is ideal to include an IPE-focused curriculum so students can witness, train, and assess: 1) the progress of collaborative care plans, 2) the sharing of views and skill, and 3) operative interaction. The programme highlighted impacting students' knowledge of other professions and the aim of reaching IPCP post-completion of their studies.
5.	Bhattacharya et al. ⁵² 2021	<p>Enable workplace preparation.</p> <p>Prepare students to work together and recognise</p>	Students from Family Medicine residency programmes; undergraduate	<p>The goal of the programme was to centralise geriatric care. The IPE activities focused on TBL.</p> <p>In the first year, the programme and curriculum were built. This was followed</p>	Geriatrics Champions Programme	<ul style="list-style-type: none"> Students or individuals performed better in teams.

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	<i>United States of America</i>	<p>and treat common conditions in geriatrics.</p> <p>Provide an opportunity for engagement in geriatrics for students.</p> <p>An opportunity for team collaboration to imitate the workforce.</p>	<p>medical clerkships in Family Medicine; Nurse Practitioner tracks for Adult Gerontology and Family Nurse Practitioner programmes;</p> <p>Master's programmes in Social Welfare, Occupational Therapy and Psychology; undergraduate Dietetics programme; and doctorate programmes in Physical Therapy and Pharmacy.</p>	<p>by a 24-month curriculum. Faculty met monthly to ensure the standard of the curriculum was kept. Core faculty also recruited individuals to form part of the faculty and assist in the curriculum. Pre-work was given to the students, and when they arrived at sessions, they completed the iRAT followed by the tRAT.</p>	<p>24-month programme repeated twice.</p> <p>Four 2 and a half hour sessions were held yearly.</p>	<ul style="list-style-type: none"> • Positive association between team size and team performance. • Improved knowledge. • Students developed interprofessional geriatric competencies.
6.	Branch-Mays et al. ⁴	1) Roles and Responsibilities: Created awareness of the variety	First year students: dental hygiene, dental	The course is mandatory for first year students. The learning objectives of this course were aligned with the core	Foundations of Interprofessional Communication	Included six topics:

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	2018 <i>United States of America</i>	<p>of expertise that reinforce actual IPC teams.</p> <p>2) Interprofessional Communication: Gained experience in exchanges and communication with patients, families, communities, and other health professions and created gratitude for their influence.</p> <p>3) Teams and Teamwork: Started elementary ideas of real teamwork through professions, considering the influence of communication.</p> <p>4) Values/Ethics for Interprofessional Practice: Discovered the evolving notion of interprofessional integrities and</p>	therapy, dentistry, dietetics, healthcare administration, medical lab science, medicine, nursing, nutrition, occupational therapy, pharmacy, physical therapy, psychology, social work, speech-language-hearing, and veterinary medicine.	competencies of IPCP, and the activities focused on small group sessions and course facilitators, followed by an assessment using the ICCAS and student and facilitator course evaluations. This course required a facilitator and student guidebook.	and Collaboration (FIPCC) course (six two-hour sessions)	<p>1) Roles and responsibilities of Healthcare Professionals</p> <p>2) Health Systems and Interactions</p> <p>3) Interprofessional Teams and Teamwork</p> <p>4) Wellbeing and resilience for healthcare professionals</p> <p>5) Ethics and professionalism</p> <p>6) Leadership</p> <p>FIPCC represents Phase I of a three-phase curriculum. After the orientation to IPE in Phase I, the students move to Phase II where they learn certain skills required to be effective in Phase III with interprofessional experiential or clinical activities.</p>

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		professionalism as a foundation of IPCP.				
7.	Browne et al. ⁶⁴ 2019 <i>United States of America</i>	Compared longitudinal effects of delivering IPE in two different methods. Compared student attitudes toward interprofessional teamwork across time and across groups with opposing amounts of IPE.	For the IPE symposium - graduate students from Health Service Administration (HAS), nursing, OT, and clinical psychology (i.e., Psy.D.), as well as undergraduate students from nursing and social work For the IPE course - graduate students from HSA, nursing, OT, counselling, clinical psychology	IPE was presented as a symposium and as a semester long course. Group one participated in the symposium and group two participated in both. Due to the nature of the methods, it was certain that the OT and HAS students participated in both methods. The symposium focused on CBL. Students were given a case before the symposium and needed to come up with a treatment and intervention for the patient in the case. The symposium was five hours and focused on persons with dementia. The IPE course was a semester long, online course, compulsory for HAS and OT students and optional for the rest focusing on CBL with simulated experiences. For the symposium, a pre-test, post-test and follow up was done.	IPE course and IPE symposium.	<ul style="list-style-type: none"> • Participating in both methods improved attitudes for collaboration in IPE. • Increasing IPE did not influence student attitudes. • Students preferred face-to-face sessions as opposed to online or blended sessions.

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			(i.e., Psy.D.), and special education.	The Attitudes toward Health Care Teams Scale (ATHCTS) was used to gather data.		
8.	Cahn et al. ⁴⁷ 2018 <i>United States of America</i>	To describe an institute's framework to assimilate varied parts of interprofessional and IPL actions into one unit.	Graduate students from: Nursing, occupational therapy, physical therapy, physician assistant studies, and speech- language pathology students	Students practiced IPEC competencies in different settings. The model had been divided into five parts, namely, classroom, simulation, clinical, community and team. In the classroom aspect, students were introduced to the competencies that were central to IPEC and were then divided into teams with facilitators in the first semester. Moving into the next semester, students were introduced to simulation scenarios so that they participated and practiced with simulated patients. For the clinical aspect, an interprofessional dedicated education unit (IPDEU) was set up in a hospital for students to work in an interprofessional way to observe and reflect on collaborative care. For the community aspect, students were given a book where the main character of the book suffered from a disease and thus, during student orientation, a discussion	IMPACT Practice (Classroom: four times per term; two simulation scenarios; Clinical: two half day sessions)	A list of IPE practices was created, both needed and elective, didactic and pragmatic, allowing students to shape their own intellect of being interprofessional collaborators, also ensuring that IPE doings relate directly to a variety of practice settings so that students make applicable networks.

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				<p>happened on the book and how an interprofessional team worked around the disease. For the team aspect, the model brought different health centres together so students could practice IPL and interprofessional care.</p> <p>Faculty members in all academic programs plotted their curricula to find and present tasks that may be used for evaluating capabilities for collaborative practice. Members recognised main outcome measures in each semester relating to amplified interprofessional skill.</p>		
9.	Chan et al. ³¹ 2017 <i>People's Republic of China</i>	Described the progress and application of IPTBL for medical education in Hong Kong. Discovered the appropriateness of TBL for a vast number of students from a varied range of health and social	801 students from HKU, six undergraduate-entry health and social care programmes participated: biomedical sciences, Chinese medicine, medicine, nursing,	The quantitative design (a pre-test-post-test) was used to assess students' gains on their readiness to engage in IPE. Three instructional units (IUs) focused on TBL and were executed around a clinical area that could involve students from partnering health and social care disciplines. The programme was divided into Pre-class study, iRAT, tRAT, Team appeals, Feedback, Team application	interprofessional team-based learning programme (IPTBL) – (three four-hour IUs)	Certain challenges were encountered: <ol style="list-style-type: none"> 1) Difficulty in linking up students from different programmes 2) The amount of time dedicated towards developing the programme 3) Scoring of the programme and making it part of assessment 4) Customising the learning management system

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		<p>care undergraduate-entry programmes.</p> <p>Offered the outcomes of an assessment on the efficiency of the programme.</p> <p>Students were expected to:</p> <ol style="list-style-type: none"> 1. Solve problems by working together. 2. Collate roles, responsibilities, and professional restrictions. 3. Share views, facilitate active listening and show respect. 4. Critically assess personal skills to improve team relations. 	<p>pharmacy, and social work.</p> <p>From PolyU, another six undergraduate-entry health and social care programmes took part: medical laboratory sciences, nursing, occupational therapy, physiotherapy, radiography, and social work</p>	<p>exercises (in class), and Team application exercises (online) for Learning. An online platform was established and was gradually presented in the three IUs. Students were required to study some materials before the face-to-face sessions. Students were asked to specify their readiness for IPE on the RIPLS.</p>		<p>5) Determining a venue</p> <p>Even after certain challenges in developing and executing the IPTBL programme, TBL was a feasible pedagogy IPE involving hundreds of students. The noteworthy enhancement in all four subscales of RIPLS exhibited the effects of the IPTBL programme in preparing students for collaborative practice.</p>

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		<p>5. Identify collaborative need for better patient-care.</p> <p>6. Identify views of oneself and of other professionals, and</p> <p>7. identify the importance of the opinions of others.</p>				
10.	Danielson and Willgerodt ⁵⁷ 2018 <i>United States of America</i>	Described the course for evolving a hypothetical framework to establish and direct curriculum design.	Pharmacy, social work, dentistry, physician assistant, nurse practitioners, nursing students	<p>Possessing a common philosophy for IPL, categorizing IPEC competencies in the Kirkpatrick Model and vetting the framework to stakeholders were the initial steps. Successive steps were discussed for student growth leading to patient-care outcomes and population health outcomes e.g., contact, focus, integration and training.</p> <p>Step 1: Built a mutual philosophy for how and why IPL happens in students. A group of central faculties, with knowledge in curricular development, met to link curricula and inspect accreditation standards for IPE across</p>	University of Washington Health Sciences Curricular Framework for IPE (three small group discussions in the second year [total: six hours], shadowing [four hours] and three immersion experiences in	Used theory and pedagogy as an underpinning to educate that IPE is important in making sound, meaningful, and effective curricula to ensure students are “collaborative-practice ready” in health care delivery.

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				<p>many health sciences schools and programmes.</p> <p>Step 2: Determined mutual content parts across the health sciences curricula and made learning events that addressed these content parts led to the development of a common philosophy.</p> <p>Step 3: Worked to shape a tangible framework study with the philosophy by plotting the Core Competencies for Interprofessional Collaborative Practice (IPEC sub-competencies) on to the Kirkpatrick evaluation domains (adapted from the Kirkpatrick programme evaluation model).</p> <p>Step 4: Used an iterative course with bi-weekly assemblies to solve inconsistencies that permitted reflection on “how” and “why” competencies were charted in Kirkpatrick levels.</p> <p>Step 5: Inspected the framework carefully with internal stakeholders.</p>	the third year [total: 12 hours]	
11.	El-Awaisi et al. ³⁹	Highlighted facilitation as the main point to	N/A	Step 1: Commencement	N/A	The auxiliary evidence from the documents showed that interprofessional

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	2016 <i>Qatar</i>	interprofessional teaching and learning, with inferences for the groundwork of faculty and students.		<p>Step 2: approve a definition, values and principles</p> <p>Step 3: create outcomes</p> <p>Step 4: determine participation and choose the students and faculty</p> <p>Step 5: choose themes</p> <p>Step 6: work together in case and activity plan and change learning methods</p> <p>Step 7: make learning appropriate for that stage</p> <p>Step 8: guide the learning</p> <p>Step 9: attempt towards a positive learning experience and increase expectations</p> <p>Step 10: evaluate and apply feedback</p> <p>Step 11: assess the intervention</p> <p>Step 12: disseminate the experience.</p>	(12 steps to integrate IPE into the curricula)	<p>student assessment and programme appraisal played important roles in the fruitful running of IPE courses.</p> <p>12 steps for introducing IPE into the curriculum were stated to improve teaching of students and practitioners as they attempt to become capable collaborators.</p>
12.	Fiske et al. 2021	For healthcare professionals to provide	Graduate social work and undergraduate Nursing, and	The Adverse childhood experiences (ACEs) were used to guide the development of the IPE course.	IPE for trauma-informed care	Students gained valuable experiences that would allow them to work in an interprofessional team.

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	<i>United States of America</i>	trauma informed care and receive trauma exposure	public health students	<p>Resilience as a dynamic process was tackled.</p> <p>A faculty team from different health schools created the IPE course. The structure of the course used a backward design approach grounded in the instructional design.</p> <p>Process where the outcomes and the assessments are determined before creating the activities.</p> <p>The course was a three-credit hour presented in the late afternoon once a week for 15 weeks.</p> <p>The course addressed: self-care; roles, regulations, and ethical guidelines for the three disciplines; assessments of ACEs and trauma; inhibition and care of trauma. Students wrote reflections and completed a group project.</p>	(Semester-long course)	<p>Students had the opportunity to practice resilience techniques.</p> <p>The course contributed to students' knowledge and skills.</p>
13.	Friedrich et al. ⁶⁵ 2021 <i>Germany</i>	The programme aimed to allow students to:	Paediatric nursing trainees and medical students	<p>Peer teaching method was used to develop a 30-minute activity in context of a training ward.</p> <p>Two students from each profession took part in four sessions. The team chose a</p>	Speed InterprofESSional Peer Teaching PaediAtric (SIESTA)	<p>The following was identified:</p> <ul style="list-style-type: none"> • Students noted a rise in the understanding of roles and responsibilities

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		<ul style="list-style-type: none"> • Understand roles of other professions • Convey their opinions and work together to with other professions. • Identify and select contents relevant to patient-care. 		<p>topic on a clinical problem and then prepared a learning activity together whilst focusing on their profession-specific components.</p> <p>A mixed method approach used to gather data. Questionnaires and semi-structured interviews were used.</p>		<ul style="list-style-type: none"> • The programme enhanced interprofessional competencies.
14.	Forstater et al. ²⁵ 2019 <i>United States of America</i>	Students would be able to: 1. Explain critical mechanisms of person-centred care and patient safety. 2. Identify occasions to use TeamSTEPPS® approaches and tools in patient-care.	554 students from medicine, nursing, occupational therapy, pharmacy, physician assistant and radiologic sciences completed this programme	The Team SAFE curriculum, adapted from the TeamSTEPPS® worked with the 'flipped classroom model' and experiential learning approach to train learners in IPE and experiential learning to aid interprofessional students. Students started with data and attainment of team-based skills through collaborative online pre-work, then recounted these skills in the care of simulated patients through the course of three cases, and lastly, participated in a	Team SAFE (Simulation and Fearlessness Education) – (four simulation cases)	Teamwork skills were learnt that have the possibility to improve student leadership skills and enhance patient safety. This led to essential skill-building, patient safety, teamwork and reduced medical errors.

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		3. Use the ideologies crucial for teamwork in simulated scenarios.		<p>faculty-facilitated debriefing of each case.</p> <p>Students completed eight-item quantitative pre-post appraisals run done online for pre-work and on paper succeeding the course. The PACT-novice tool was modified, and data was gathered about students' perceptions of their teamwork skills, as well as their skill to work proficiently in and donate valued insight to teams, assist in connecting with team members, arrange and take responsibility for tasks, resolve conflicts among people, take a lead role on a team and integrate information and proposals into a strategy.</p> <p>ANOVA tests were conducted to examine fluctuations among professions at pre and post levels. The post-evaluation included five quantitative and three qualitative questions surrounding the worth of the course. Quantitative questions were on content, appropriateness and the clinical</p>		

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				experience. Qualitative questions requested student inputs.		
15.	Frantz and Rhoda ⁵⁶ 2017 <i>South Africa</i>	Addressed the concerns associated with IPE and IPP in under-resourced places such as South Africa and mainly in the Faculty of Community and Health Sciences at the University of the Western Cape (UWC)	Physiotherapy, occupational therapy, social work, dietetics, exercise science, nursing, psychology, natural medicine, and public health	<p>1. Requirement for a common IPE framework at the UWC: Boyer's model of scholarship (1997) and the essence of the biopsychosocial approach was used to drive IPECP. Boyer's model stresses discovery, integration, application, and teaching.</p> <p>2. From the idea to the execution: working together, using different ways of learning and espousing various professions in one faculty through a biopsychosocial technique.</p> <p>3. Formation of a critical mass: show the value and skills of IPE through joint teaching, examination, and practice.</p> <p>In the first year, the basic ideas of IPE were imbedded in modules and activities such as world cafés. The second year allowed for the development of IPE knowledge and presented IPP. The third year allowed</p>	IPE AND IPP (Year one, two and three)	<p>The biopsychosocial method characterised across professions in the faculty turned to drive IPE and IPP as all sponsors represented similar ideas and objectives.</p> <p>The faculty addressed the barriers by a scaffolding design through the six competencies of IPE and IPP i.e., ethics, values, effective communication, role understanding, teamwork, responsibilities, interprofessional conflict, and interprofessional leadership.</p> <p>The faculty implemented valuable workshops for academics, clinical teachers and service workers to assist in overcoming barriers.</p>

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				for the intensifying of IPP knowledge and presented research.		
16.	Guilding et al. ⁶³ 2020 <i>United Kingdom</i>	<p>The aim was to plan and assess an IPE conference so that future developments of interprofessional antimicrobial teaching activities could be informed.</p> <p>The study aimed to explore:</p> <ul style="list-style-type: none"> • the use of contact theory in designing IPE activities. • the attainment of knowledge and skills from the workshops. • the facilitators and barriers to learning in each workshop and explored the suggestions for change. 	Undergraduate pharmacy and medical students	<p>The conference was managed by faculty from medicine and pharmacy.</p> <p>Contact theory was used in designing three small group workshops on three broad themes.</p> <p>Interprofessional tasks were designed in such a way that would incorporate knowledge and cooperation from both professions. An explicit and implicit approach was used where the explicit approach focused on IPE and the implicit approach focused on a clinical case centred around IPE competencies.</p> <p>Facilitators also underwent training to prioritise a safe and collaborative space.</p> <p>The educational approach focused on:</p> <ul style="list-style-type: none"> • Two hours of CBL where students worked in groups. 	IPE conference	<p>Students gained knowledge and skills related to infection management, problem-solving and critical evaluation skills. Understanding of the different roles improved.</p> <p>Students understood the need for communication which impacted patient safety and confidence in working in teams.</p> <p>Students noted the value of working in a collaborative team.</p>

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		<ul style="list-style-type: none"> the conference in encouraging the worth of collaborative practice. 		<ul style="list-style-type: none"> One hour of video reflections and significant event analysis in groups. One hour of high-fidelity virtual simulation with TBL. <p>Frameworks such as the Biggs 3P model, contact theory and the Kirkpatrick educational outcome's model were used.</p>		

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17.	Heath et al. ³³ 2019 <i>United States of America</i>	<p>Described the products of this creative engagement experience to aid in connecting IPE to clinical practice in poor societies with an academic-clinical engagement with various health professions colleges.</p> <p>Produced, incorporated, and assessed educational results from an inventive clinical service-learning experience to aid in improving the oral health and wellness teaching of elementary school children, though creating skills for collaborative practice.</p>	113 students from dentistry, nursing, pharmacy, social work and communications and information.	<p>A pilot programme was developed to promote oral health and wellness. Students had clinical experiences by exploring health resources during community visits and reflected on their experiences. Reporting of IP communication during orientations followed discussions and reflections on their experience. Pre- and post- surveys were done to determine improvements on IPEC competencies. Initially, students were divided into teams and went on to different communities with their team-topic and economic related issues. Community assessments were done followed by a “pizza and present” session where teams presented what they had found in their communities and discussed the findings.</p>	<p>hCATS (Health Colleges Advancing Team Skills) to Appalachia (Two-and-a-half-day experience)</p>	<p>Students specified enhancements in the mindfulness of their personal collaborative skills and knowledge of communal individualities.</p> <p>Interprofessional competencies improved through the rural health clinic course.</p> <p>Rural communities offered a rich learning setting for reliable clinical and collaborative practice.</p> <p>The importance of interprofessional communication in teamwork for quality and wholeness of care was noted. The importance of views was recognised together with the roles and responsibilities of each team member and furthermore, the course founded respect and appreciation for the expertise of others. The experience increased their understanding of community needs, understanding of other health professions and their influence on patient-care</p>

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18.	Herrera et al. ⁴⁹ 2019 <i>United States of America</i>	Encouraged IPL constructed on the IPEC competencies and offered further recognition for the students that contributed to the programme.	First and second year osteopathic medical, second year pharmacy and first year nursing students.	<p>The programme was designed for the promotion of IPL with competencies for IPP. An interinstitutional task force was developed to form the implementation of IPE activities into their own curricula. Themes were noted that would allow for student engagement to take place, which then led to the development of the IPE certificate programme. The programme included early clinical experiences (ECEs), taking part in IPE engagement activities, volunteering with other health professions, and a reflection piece re-counting the interprofessional team experience.</p> <p>The Programme was established by integrating new curricular components with prevailing requirements to decrease the load on scholars, administrators and faculty. The programme was conveyed over three years by means of collaborative, volunteer, clinical and insightful experiences. Every institution established a distinct IPE group to</p>	IPE Certificate Program (offered over three years with eight volunteer hours).	<p>Positive attitudes towards the interprofessional area were determined.</p> <p>This model supported community-based health profession institutes wanting to integrate IPE.</p>

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				integrate the interinstitutional IPE activities. Evaluations were founded on both involvement and rubrics created on the learning aims. The students' knowledge and attitudes were measured by an adapted survey and the programme in general was assessed with concluding evaluation.		
19.	Ho et al. ⁵³ 2022 <i>People's Republic of China</i>	Undergraduate students formed teams to experience collaborative problem-solving. Assessed the experiences of undergraduate nursing and physiotherapy students after being exposed to interprofessional activities.	Undergraduate nursing and physiotherapy students	A qualitative research approach was adopted. Students were given study material a week before the IPTBL. Students were then assigned to teams and completed the iRAT and tRAT following the presentation of a clinical experience. Students were interviewed and the data from the interviews was transcribed. Themes and sub-themes were identified. Three themes were identified: (a) The process of IPL (participation and involvement in the discussion, mutual respect, peer learning and support)	Interprofessional Team-Based Learning (IPTBL) course	Students enjoyed the interprofessional experience. Students were able to build relations and participate actively. Three main themes appeared: (1) the process of IPL (2) profession-specific outcomes of IPL (3) patient-related outcomes of IPL Interprofessional TBL activities improved learning through interaction with other students. The interprofessional relationships allowed for the development of confidence in sharing knowledge and collaborating while providing optimal patient-care.

No.	Author, date <i>setting</i>	Purpose/ Outcomes	Target Audience	Programme development	Programme Developed	Key results that relate to the scoping review question/s
				<p>(b) Profession-specific outcomes (knowing others, knowing of self)</p> <p>(c) Patient-related outcomes (an expanded perspective on holistic care, exploring care options).</p>		
20.	Ivarson et al. ⁷⁰ 2020 <i>Sweden</i>	Discovered how the Call the On-Call activity created IPL.	Undergraduate medicine, nursing, physiotherapy, and occupational therapy students	<p>Students participated in the training wards together.</p> <p>The study was conducted through ethnography. Students were placed for two weeks in teams. Every two weeks, three student teams rotated in the wards. A nursing student would call the medical student related to a medical situation for consultation. The on-call medical student would return to team on the IPTW for a reflective seminar. The activity could be done via telephone for interpersonal communication and where the call surgeon was shadowed.</p> <p>Observations and semi-structured interviews were held.</p>	Call the On-Call through the Interprofessional Training Ward (IPTW)	<p>New aspects of professional roles were made clear to the students.</p> <p>Students appreciated clear and open communication.</p> <p>Understanding of the difficulties of talking on the phone.</p> <p>Understanding structured communication role.</p>

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21.	Konrad et al. ²⁹ 2017 <i>United States of America</i>	<p>Heightened students' understanding of the different roles and duties, used teamwork principles, improved communication skills for contextualized person-centred practice, and used information for a joint venture.</p> <p>Offered a model for observing and refining the value and applicability of campus-based, pre-clinical IPE knowledge actions to student and faculty comment.</p>	<p>Intended for pre-clinical undergraduate and graduate-level scholars registered in health professions training programmes, with osteopathic medicine, physical therapy, dental hygiene, occupational therapy, social work, dental medicine, nursing, pharmacy, and physician assistant.</p>	<p>The programme plan employed CBL and certain PL models with constructivist and relational learning concepts. Instructional set-ups comprised a team-building exercise, case-based learning, and mock-up. Pre- and post-session assessment evaluated students' attitudinal and behavioural variations. Rapid cycle programme assessment used student responses to continuously progress in the value of the experience. There were five sessions (orientation, planning, simulation 1, simulation 2, poster session) and each session was divided into (a) purpose and product, (b) learning activity and, (c) facilitator role.</p> <p>There were five successive small group collaborative learning experiences concluding with simulation assemblies with standardized patients, facilitated debriefing and presentations.</p> <p>IPTI faculty interviewed, selected and coached affiliates of the local community to attend as actors for a</p>	interprofessional team immersion (IPTI) – (five sessions)	<p>The programme increased student knowledge of other professions, shaped confidence in team skills and allowed for operating collaboratively in the workplace. Programme assessment response strengthened the effectiveness of small group, collaborative learning and faculty engagement in IPE learning activities. The programme provided common content, forms of instruction and evaluation plans for transformative TBL experiences.</p>

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				<p>scenario. IPTI faculty members were allocated as facilitators to the team and had explicit roles in every meeting.</p> <p>Data was gathered twice to determine learning outcomes for students. The initial survey was handled 2 weeks earlier to commencing with the IPTI. The post-survey was issued on the final day.</p>		
22.	Krampe et al. ⁶⁷ 2022 <i>Germany</i>	Evaluated the implementability of Interpret2Improve and evaluated its impact from the students' perspectives.	Second- and third-year nursing and final year medical students	<p>The course was developed with the Programme to Enhance Relational and Communication Skills (PERCS) as a didactic framework. Simulated patients were used in the roles of the patient and family members.</p> <p>The intervention was a three-hour seminar with a teaching team consisting of a paediatrician and medical psychologist.</p> <p>Students first had a theoretical introduction followed by groupwork and discussions. This was followed by a practical exercise/simulation and finally, debriefing and feedback. During the</p>	Interpret2Improve Three-hour course	<p>The intervention was implementable and valued. Understanding of the importance of interprofessional collaboration increased after the course.</p> <p>Skills in addressing language barriers improved.</p> <p>Students worked effectively with interpreters and were open to working with them.</p>

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				<p>simulation, the patient conversed in a foreign language.</p> <p>Evaluations were done using the Freiburg Questionnaire for Interprofessional Learning Evaluation ("FILE") and PERCS.</p>		
23.	Kutt et al. ²³ 2019 <i>Canada</i>	Determined if learning goals for IPE and complementary therapies could be achieved in the same course by assessing the effect of the CAM-stream IntD410 course attitudes and education.	329 undergraduate students enrolled in the programme	<p>More than 1000 students synchronised by the central Health Sciences Education and Research Commons. The course was established and presented by merging IPE and corresponding treatments learning aims.</p> <p>The course included didactic lectures, facilitated small groups, CBL, experiential learning, field trips, discussing complex cases and writing reflections. The course was assessed using pre and post questionnaires together with qualitative evaluations. The amended RIPLS measures students' outlooks on learning with other professions.</p> <p>The IPE initiatives were assessed by the IEPS.</p>	IntD410 CAM "Interprofessional Health Team Development" Complementary and Alternate Medicine (30-hour, 10-week course)	<p>Qualitative findings: Knowledge on matching therapies improved, and students remained stimulated to study further, respected the collaborative and communicative need, anticipated to be more patient-centred and included ideas linked to IPE and therapies.</p> <p>Students found teamwork beneficial for patient-centred care and mentioned the need for team skills that included the following:</p> <ul style="list-style-type: none"> • conflict resolution, • team-based problem solving • managing time.

No.	Author, date <i>setting</i>	Purpose/ Outcomes	Target Audience	Programme development	Programme Developed	Key results that relate to the scoping review question/s
				<p>The HPCCPS, founded on CanMEDs, to manage the pre and post intervention.</p> <p>The CHBQ assessed views related to balancing therapies.</p>		<p>The importance of collaboration, communication, and role clarity were noted.</p>
24.	<p>Madigosky et al.³⁰</p> <p>2019</p> <p><i>United States of America</i></p>	<p>Student outcomes included:</p> <ol style="list-style-type: none"> 1. Showing knowledge, skills and behaviours of teamwork, values/integrity, and quality/security as an IP associate. 2. Showing teamwork, team skills and behaviours. 3. Spotting the exclusive roles and duties of each healthcare professional. 	<p>First year students from anaesthesiology assistant, dentistry, medicine, nursing baccalaureate, pharmacy, physical therapy, physician assistant and public health programmes.</p>	<p>Developed the course, with input from ethics, TeamSTEPPS®, and the Institute for Health Improvement (IHI) open school. 16 sessions of 2-hours, together with the iRAT and tRAT tests for evaluation, were used. Facilitators were trained with guides beforehand; orientation and debriefing were done after each session. Pre-work got distributed before and students completed the evaluations and before the sessions too. Then students participated in application exercises, acting on ethical matters surrounding a case, and ending with a review and reflection. TBL was used to make operative individuals and collaborative learning practices.</p>	<p>Interprofessional Education and Development (IPED) – (15 TBL sessions of pre-work and 16 two-hour IPED sessions).</p>	<p>It was found that interprofessional care, team skills, recognising different roles and duties, and improving identity were enhanced. The programme proved that large-scale IPE is achievable in TBL, developing fundamental knowledge and for interprofessional practice skills.</p>

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		4. Displaying a common, IP identity as a health care professional.				

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25.	Mastel-Smith et al. ⁵⁴ 2020 <i>United States of America</i>	<p>Examined how the programme influenced the students' knowledge, attitudes, confidence, empathy and understanding of people with dementia.</p> <p>Promoted knowledge, attitudes, empathy and confidence through reflection, social developing, explicit learning experiences.</p>	Occupational therapy assistant, psychiatric mental health nursing, psychology and pharmacy students	<p>Social Cognitive Theory (SCT) was used. The Dementia Care Bootcamp was offered at the college of pharmacy.</p> <p>Hypotheses and research questions were formulated followed by the recruitment of students.</p> <p>Before the start of each session, the iRAT and tRAT were completed.</p> <p>Role plays and case studies were done in teams.</p> <p>Quantitative measures such as: the Dementia Knowledge Assessment Tool Version 2 (DKAT2), the Confidence in Dementia Scale (CODE), the Interpersonal Reactivity Index (IRI) and the Dementia Attitudes Scale (DAS) were used.</p> <p>For the qualitative measure, a focus group was used.</p> <p>Students participated in TBL through theory and practice.</p>	Dementia care boot-camp (16-hour team-based learning)	<p>Programme improved attitudes, confidence and knowledge on dementia.</p> <p>Four themes emerged in qualitative findings: empathy, attitudes toward dementia and knowledge and confidence for dementia care.</p> <p>Dementia care competencies were accomplished.</p>

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26.	Mcquown et al. ⁶² 2020 <i>United States of America</i>	Develop an IPE curriculum to train undergraduate, graduate, and specialized health service providers with a focus on geriatric fall prevention Evaluate the kind and number of students that the programme accommodated, and record the alterations after the Plan-Do-Study-Act model.	Undergraduate nursing, nurse practitioner graduate program, pharmacy, medicine, social work, physical therapy, nutrition, and pastoral care	The design of the IPE session used the Plan-Do-Study-Act (PDSA) model. TeamSTEPPS® was used as a teamwork curriculum. Students attended the educational and Fall Risk Reduction Clinic (FRRRC) session. The clinic was a half day (one to two times per week) session. Patients were presented to a full IP team that created a fall prevention plan which comprised of medication suggestions, home adjustments, outpatient recommendations, and community resources. A follow-up would be done with the patient. Open discussion and anonymous open answer paper surveys were used for evaluations. A pre and post survey was done with the ISVS.	Geriatric IPE session and FRRRC	Students understood the value of caring for older adults. Students learnt from practitioners and benefitted from seeing other students present their patients. Facilitators learnt of each other's strengths and unique approaches too. Thus, students were able to see this benefit in working in a diverse team.
27.	Prast et al. ⁴⁸ 2016	Documented the university's experience in reaching the objective of	Occupational therapy, nursing, social work, athletic training,	The IPEC domains model was used as a guide and integrated into different health education curricula. Certain simulation experiences and activities	Case conference and IPE simulations.	The most important for IPC patient-care are: sharing values and ethics with each other, consideration of roles and duties, evolving operative interprofessional

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	<i>United States of America</i>	<p>delivering IPE in a health professions college.</p> <p>Improved students' understanding of the different roles in many patient-care scenarios, expanded communication and encouraged interprofessional teamwork skills.</p>	<p>exercise science, and medical laboratory science</p>	<p>were drawn up with the intent of improving knowledge on different roles, communication and teamwork skills.</p> <p>The case conference activity centralized around a hypothetical patient so that IPC core competencies were promoted. Students were expected to develop a care plan for the patient. Simulations were developed where team members were given roles to play and assessment to follow. Once completed, a debriefing session was held to discuss and reflect on the simulations.</p> <p>One activity was a case conference discussing the various stages of care for the patient.</p> <p>Managing the classroom and laboratory as well as resources, associates of the faculty created many interprofessional simulations for students to improve on their expertise to effectively work as a team.</p>		<p>communication, and gaining skill in teamwork. IPE events may also focus on community and population.</p> <p>Evaluation of the IPE events and simulations indicated that the IPC practices reinforced the evolution of the competencies and students were able to develop those competencies.</p>

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28.	Rajiah and Mari Kannan ⁵⁰ 2016 <i>Malaysia</i>	<p>Part 1: Students expressed and listed roles and clarified the positions of the professions. They had to be able to express the need for basic communication skills.</p> <p>Part 2: Students worked as members of a team, showed advanced communication skills, explained the different roles and controlled data from several resources through IT skills.</p> <p>Part 3: Students determined and examined problems in scenarios, assessed and use the ideologies of communication and developed outlines and plans while operating in a team.</p>	Undergraduate medicine, pharmacy, nursing and dentistry students	<p>The activities for IPL included:</p> <p>SBL for healthier communication and understanding.</p> <p>PBL to encourage collaboration.</p> <p>Simulation (audio-visual and facilitator guide) resource.</p> <p>Workshops depicting the importance of interprofessional relationships.</p> <p>IPAL for a controlled learning experience for different health students.</p> <p>Community based education for team building, service education, consolidated patient-care, familiarity with the different professions, interprofessional clinical mechanisms and how culture affects the delivery of healthcare.</p> <p>Action plan Part 1: IPL workshop and practice. Student interactions, understanding the roles and duties of others, and staff giving positive criticism. Part 2: Collaborative activities like: simulations, case studies, PBL and</p>	Framework for IPL in India	Staff members needed to work towards IPE and communicated with health providers through debates that addressed the collaborative practice to integrate IPCP in health sciences programmes. Academic staff, institutional support, and the right environment was crucial in developing and sustaining IPE programmes for different health curricula.

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				<p>debates. Positive criticism could follow.</p> <p>Part 3: Visits to the community could be done and different health professions students may be involved and accompanied by staff members.</p>		
29.	Reed et al. ⁶⁸ 2021 <i>Australia</i>	Promoted collaborative care approaches to enhance cross-discipline communications, improve knowledge and clarity of roles and improve patient-care and outcomes.	Medicine, nursing, paramedicine, radiography, physiotherapy and occupational therapy	<p>Rural interprofessional learning was incorporated. Activities took place in rural settings such as hospitals, community and general practice settings. Students experienced high-and low-insight events through a time-lapsed order through the journey of a patient. Facilitators created the cases and after students had been exposed, they met for discussions. In the simulations, the actors were from the community.</p> <p>After each simulation, a 15-minute semi-structured debrief session was held using the SHARP debrief model.</p> <p>A mixed-method evaluation was done for every experience. Pre and post measures as well as semi-structured</p>	Rural Interprofessional Learning (RIPL)	Four themes emerged: <ul style="list-style-type: none"> • Role clarity and understanding of other professional roles, • enhanced understanding of collaborative care team's role in enhancing patient outcomes, • the significance of efficient communication between professions, • significance of engaging the patient and their caretakers in conversation and decisions.

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				<p>focus group sessions were used. Feedback from facilitators was done through post surveys.</p>		
30.	<p>Safabakhsh et al.³² 2018 <i>Iran</i></p>	<p>Designed an IP continuing education model.</p>	<p>N/A</p>	<p>Designing an interprofessional continuing education model for another institute required three stages, namely - stage 1: systemic review, stage 2: interviewing specialists and stage 3: designing the model by using the results from the previous two stages. Several models and the themes that included the subject of IPE, the objective of IPE, the content that the programme entailed, the learning strategies to be used and the evaluation strategies for the programme were designed. Based on these, the model designed was divided into three components: scheming, applying and assessing the interprofessional program.</p> <p>Systematic review of literature and search of databases was done to find the mutual models and extract information. Cross-examination was</p>	<p>Interprofessional education post-registration model</p>	<p>Experts mentioned IPC, requirements of community and learners, attention to patient by means of collaborative teaching approaches, and response as the main points around the themes. This model supported the use of IPE not only in education but also in the clinical environment.</p>

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				done and then a model was designed from the results of the first two steps.		
31.	Schuller et al. ⁴⁶ 2017 <i>United States of America</i>	Improved the understanding of the experiences of students in an under-resourced location that could add to the progress of IPE and the staffing and preservation of healthcare workers in under-resourced societies.	Students from medical, psychology, dental, social work, nurse practitioner, and physician assistant professions with residents	Students practiced in rural settings and learnt about interprofessional service delivery in rural communities. 181 participant journals were analysed, following the directed content analysis for the extraction of themes. After coding, three themes were discovered: information of healthcare matters in rural and underserved parts, information on interprofessional teams and mindfulness on the rural and underserved populations.	Health professions students and residents Experiences and Rotations in Community Health (SEARCH) – (four weeks)	Value was placed on collaborative work. Students could report problems on the rural areas in terms of healthcare needs and had a better understanding thereof. Students became knowledgeable about the different problems and shortages that rural communities faced and reported on the level of participation providers had in patient-care.
32.	Stubbs et al. ²⁴ 2017 <i>United States of America</i>	Generated a programme for students to participate in teamwork and mutual problem-solving and report the needs of the patient and community. Regulated the viability of adding IPE into a modern situation and measured the influence that a	30 students from dentistry, dietetics, divinity, medicine, nursing, occupational therapy, pharmacy, public health, social work, and speech	The programme followed didactic, preparatory and service learning. Six interprofessional teams of students were formed and matched with the community organisation. For the preparatory phase, students took part in training and team building activities for 11-14 hours. The service learning followed, which went on for 20-24 hours and included client engagement and shared problem solving through focus	Community-based IPE programme – (didactic, preparatory and service learning)	Community-based IPE initiatives could create constructive variations in teamwork and team-centred skills. This programme improved students' views on teamwork, ease in team-based roles, and the skill to take part in solving problems and making decisions together. The need to train students in rural communities, by allowing them to experience interprofessional

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		community-based programme had on students': (1) aptitude to contribute to communal problem-solving and decision-making, (2) ease with team-based roles, and (3) value in teamwork, with gratitude for patient participation and operating with other professionals.	and hearing sciences.	groups, interviews and discussions. The service-learning phase had reflections and debriefings and time for the development of tools and resources that targeted the needs that were not met. Students worked with the staff to create a tool linked with a patient's needs that were yet to be met and the tool and resources were handed over after completion. The ISVS was used to assess variations in student's perceptions on collective problem-solving, comfortability in team-based roles, and teamwork.		learning when delivering healthcare services, was stressed.
33.	Teodorczuk et al. ⁶⁰ 2016 <i>United Kingdom</i>	Using Griffith' s three-phase IP curriculum as a specimen, the authors suggested an applied guide to the application and the basis for IPE.	Students from nursing, clinical psychology, medicine and social work. 3 rd year medical students worked with students from other health professions, including	A framework was developed consisting of three phase (three phase pedagogy). Phase one included theory and an understanding of other health professional roles. Phase two involved workshops and simulations through CLEIMS (clinical learning through extended immersion in multimethod simulation). In phase 3, the IPE ideologies were used practically in realistic settings centralised around	Griffith University framework of interprofessional education (IPE) activity	Guide to support creating an IPE curriculum through eight pragmatic steps. Application on developing an IPE curriculum 1. Create an interprofessional collaborative navigation or advisory team in the faculty. 2. Implement a programmatic method using activities in the different professions' curricula.

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			pharmacy, occupational therapy, exercise physiology, speech pathology and dietetics.	patient-care. The framework separated into two boxes, where box one focused on CLEIMS and box two provided a guide on developing an IPE curriculum.		<p>3. Create and come to terms on learning outcomes that should be met by all health professional students.</p> <p>4. Plan IPE activities together that are 'real' and related to the clinical setting.</p> <p>5. Pair the activities with mock-ups and online learning.</p> <p>6. Train the instructors in IPE facilitation.</p> <p>7. Measure IPE through different angles, including learning, ability, and action.</p> <p>8. Assess, analysis and revise the curriculum frequently.</p>
34.	Van Gessel et al. ²⁶ 2018 <i>Switzerland</i>	<p>Integrated a training programme in joint practice, with simulation.</p> <p>The key goals of this 3-module programme were to:</p> <ul style="list-style-type: none"> • provide students information on joint practice in diverse settings of care 	1400–1500 students (nutritionists, physiotherapists, midwives, nurses, technologists in medical radiology, physicians)	<p>With simulation as a tool, a 3-model IPE training programme, focusing on collaboration, was developed by two institutes.</p> <p>The programme had three sequential modules and made up of 300 hours.</p> <p>Module 1: the healthcare system and collaborative tools to provide students with the necessary information on collaborative practice in healthcare.</p>	The actual 3 module-8 European Credit Transfer System (ECTS) Interprofessional programme. Module 1: full week	Reflections on how to train interprofessional skills from undergraduate to continuing education, emphasising the idea of “patient as a partner” whilst making decisions.

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		<ul style="list-style-type: none"> • permit the attainment of collective tools and support in putting students into practice • connect the IP skills developed to students' influence on care and outcomes. 		<p>Module 2: Through active learning, students gained experience of tools that allow them to be used during professional practice. Roles and duties of the diverse health professionals, fundamental tools attainment in team working (condition observing, joint support, communication) were also experienced.</p> <p>Module 3: quality and safety of care in diverse contexts and circumstances provided students with the opportunity to link interprofessional competences to patient-care and the influence that they have on it through 10 scenarios in simulation workshops.</p>	<p>Module 2: takes place over two semesters</p> <p>Module 3: Over one week</p>	

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CHAPTER 4:
ARTICLE 2: CONCEPTUALISATION, DEVELOPMENT AND
IMPLEMENTATION OF INTERPROFESSIONAL EDUCATION
PROGRAMMES: POINTS TO CONSIDER

This article was submitted to the [*Journal of Taibah University Medical Sciences*](#) with an impact factor of 1.203 and is under review. It addressed the objective of phase 2 of this study and was formatted according to the author guidelines of the journal. The line spacing and margins used in this thesis are, however, done according to the North-West University prescription. The references are presented at the end of the chapter

Link to Author Guidelines: <https://www.elsevier.com/journals/journal-of-taibah-university-medical-sciences/1658-3612/guide-for-authors>

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ABSTRACT

Interprofessional Education (IPE) occurs when two or more health professionals learn with, from and about each other to improve collaboration within a healthcare team, which is a step toward the realisation of Interprofessional Collaborative Practice (IPCP) which, in turn, enhances the healthcare outcomes of patients. Many institutions are taking on the challenge of developing IPE programmes, and it is essential to provide evidence-based information to guide these institutions in their journey. We analysed the IPE programmes of six institutions from High-Income Countries (HIC) and Low and Middle-Income Countries (LMIC) according to the 12 steps of IPE programme introduction into health professions education. This paper provides a step-by-step and to-do list to guide educators in conceptualising, developing, implementing and reviewing their IPE programmes. We recommend that institutions review and contextualise these findings and implement them in their IPE programme from idea to a final review.

Keywords: Document analysis; Interprofessional Collaborative Practice; Interprofessional Education; IPE Programme development.

4.1 INTRODUCTION

Interprofessional Education (IPE) occurs when two or more health professionals learn with, from and about each other to improve collaboration within a healthcare team, which is a step toward the realisation of Interprofessional Collaborative Practice (IPCP) which, in turn, enhances the healthcare outcomes of patients¹. As discussed by van Diggle², IPE has been highlighted by various health organisations as necessary to reach several health outcomes. The need to collaborate is well recorded by Buring³ and Reeves⁴, especially when a healthcare system is increasingly complex. Roberts and Kumar⁵ expressed urgency for students and graduates to experience IPE before graduation or professional registration. In their study, Jorm⁶ stated that higher learning institutes had been confronted with providing opportunities for all health professions' students to collaborate in IPE activities.

Several studies have designed IPE programmes or models implemented in learning institutes⁷⁻¹². In South Africa (SA), health professions' education historically has been done in professional silos, where there are limited opportunities for students from various professions to work with each other¹³, and there is a definite need to implement IPE in higher education¹⁴. Currently, there are four universities in SA that have implemented IPE, i.e., the University of the Western Cape (UWC), the University of the Free State (UFS), the University of Witwatersrand (Wits) and the Stellenbosch University (SU)¹⁵⁻¹⁸. At North-West University (NWU), there is only one semester in which undergraduate students experience IPE through the second-semester module: *Know the world of Health* (WVGW 221). This experience is not enough for students to be adequately equipped with the required competencies to practice IPCP as professionals and meet optimal healthcare needs.

It is recommended that institutions developing IPE programmes learn from those that have implemented them successfully¹⁹. Areas of learning include content, development process, facilitators, and challenges to developing and implementing IPE programmes^{19,20}. Institutes of higher education have included different IPE activities so that students are well equipped with the knowledge and skills to improve healthcare systems^{2,3}. There are various ways in which students can learn with, from and about each other. For example, it can be done through large classes, small groups,

simulations, and clinical settings². Frameworks published on IPE can guide the development of learning outcomes required to gear IPE activities². Generally, IPE frameworks resort to common themes that govern the development of IPE activities. For example, the Interprofessional Education Collaborative's (IPEC) core competencies: interprofessional teamwork, roles and responsibilities, values and ethics, and communication are, in many cases, used as themes or as guidelines to develop themes²¹.

It was imperative for the programmes developed and implemented to be reviewed to provide a foundation for the development of other IPE programmes. Hence, this study sought to analyse IPE programmes globally to guide institutions seeking to conceptualise, develop, implement and review their IPE programmes.

4.2 METHODOLOGY

A Qualitative Document Analysis (QDA) research method was used in this study. A QDA is a systemic method to assess, evaluate and synthesise relevant information in selected documents²². The researcher interprets the meaning of the data and the data is coded for analysis²².

This study sought to analyse IPE programmes globally, using the QDA method, to guide institutions to conceptualise, develop, implement and review their IPE programmes. The institutional document analysis was performed by employing a document analysis manual described by Wach et al.²³. The steps for the QDA according to Wach et al.²³ include: setting the inclusion criteria; document search; articulating focus of document analysis; coding and analysis of document; verification; and data analysis. According to O'Leary²⁴, evidence can fall into one of the three major categories where analysis can be conducted: public records, personal documents and physical evidence.

4.2.1 Setting the inclusion criteria

The researcher used institutions that are affiliated to Interprofessional.Global, a global confederation backing engagement between organisations advocating for IPE and IPCP²⁵ globally. The reason is to ensure the content is scientifically sound and internationally acceptable. Institutions from High-Income Countries (HIC), such as the

United States of America (USA), United Kingdom (UK) and Australia (Au), as well as Low and Middle-Income Countries (LMIC), such as India, SA and Malawi, were selected. Müller and Couper¹⁴ mention that SA is an upper-middle-income country with a record number of inequalities. Thus, comparing and matching healthcare training in institutes from other countries ranking higher and lower would provide better insight into the context of SA. Including HIC and LMIC ensured that all possible contexts were studied for relevant and rich data findings. The institutions that do not have their programmes on their web pages were excluded. All the programmes included had data openly available.

4.2.2 Document Search

The research commenced by conducting a primary search on Interprofessional.Global network institutional websites for information on their IPE programme development, content and implementation. The web pages and documents uploaded on the IPE programmes from the selected institutions were retrieved for evaluation and synthesis. Date restrictions were not imposed as the institutions may have adopted IPE into their health curricula at different times.

4.2.3 Articulating focus of document analysis

The data and evidence relating to IPE implementation were then extracted onto a data matrix for easy visualisation, comparison and synthesis (Table 1). The information extracted was in line with the 12 Steps of introducing IPE into Health Professions Education²⁶.

Table 1: Data matrix - Rational for selection

	Indiana University - USA	King’s College London – United Kingdom	Monash University - Australia	University of the Western Cape – South Africa	University of Malawi - Malawi	Manipal Academy of Higher Education - India
How were the main stakeholders brought together and who were they?	Assembled from different health schools.	One person from each health school.	The Faculty of Medicine, Nursing and Health Sciences (FMNHS).	Director, deputy dean, lecturer, field coordinator who were part of the IPEU.	Consultation with faculty members who were experts in biosciences, statistics, reproductive health, public health and gender followed by setting up an interprofessional team to develop the curriculum.	Partnering with FAIMER and stakeholders from the higher education e.g., professors, chancellors, vice-presidents, presidents and directors.
How did they define and implement a definition, values and standards of IPE?	WHO definition and IPEC competencies.	CAIPE definition.	Own definition with IPEC competencies.	WHO definition.	WHO definition.	WHO definition, IPEC competencies and emphasis on the development of leadership competencies for interprofessional practice (IPP).
What outcomes were formulated?	Collaborate with others to facilitate common respect and values.	Work collaboratively in teams for patient-centred care. Understand the roles and responsibilities of	Learning outcomes based on person-centred care, role understanding, interprofessional communication and	Explain the expertise to other professions. Identify limitations in relation to role,	Show knowledge on different components and respect for human rights; create new promotion plans for reproductive healthcare; show	Improve faculty understanding of interprofessional education and practice.

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	<p>Use own expertise and those of other professions to facilitate the healthcare needs of a patient and promote health.</p> <p>Communicate with patients, families, communities, and professionals in health and other fields in a responsive and responsible manner that supports a team approach to promoting and maintaining health and preventing and treating disease.</p> <p>Apply relationship-building standards of</p>	<p>other professions and how they contribute to the overall care of individuals, families and communities.</p> <p>Produce expert care and treatment in an holistic context, including human factors.</p> <p>Improve patient safety through improved communication and collaboration between professions who are responsible for a common patient.</p>	<p>collaboration within and across teams.</p>	<p>responsibilities and competence.</p> <p>Identify and respect the competencies and roles of other professions.</p> <p>Collaborate for change and provide conflict resolutions to provide care and treatment.</p> <p>Work with others to assess, plan, provide and analyse care. Collaborate to examine, strategise, offer and analyse patient-care.</p> <p>Mitigate differences, misunderstandings and shortfalls in other professions.</p> <p>Indulge in case conferences, meetings and so on.</p>	<p>knowledge and understanding of various management issues impacting the delivery of healthcare; advocate for the health of individuals, families and groups through activities on community development through support, commission, education and guidance; perform research to advance reproductive healthcare.</p>	<p>Implement collaborative projects in IPE relevant to the health needs of the community.</p> <p>Develop faculty who lead in the practice of IPE.</p>

	Indiana University - USA	King's College London – United Kingdom	Monash University - Australia	University of the Western Cape – South Africa	University of Malawi - Malawi	Manipal Academy of Higher Education - India
	team dynamics to act productively in teams to strategise, offer, and examine patient-care and health programmes and regulations that are safe, timely, of quality and value, and are fair.			Embark on interdependent relations with other professions.		
How was the participation and selection of students and faculty done?	Curriculum part of the studies.	Part of health curriculum.	The health professions represented in the faculty were medicine, midwifery, nursing, nutrition and dietetics, occupational therapy, paramedicine, pharmacy, physiotherapy, psychology, radiography, radiation therapy, ultrasound and social work. Thus, the course required the participation of these professions.	Health schools in undergraduate level. Part of health curriculum.	Students and faculty who were part of the reproductive health programme participated.	The selection criteria were as follows: Be associated with a higher education institution. Have a graduate or professional degree (e.g., medicine, dentistry, alternative medicine, physiotherapy, occupational therapy, nursing, nutrition, veterinary sciences,

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						<p>agricultural sciences, engineering, humanities, law, social sciences, or management).</p> <p>Have at least five years' work experience as a faculty member after completing formal academic training.</p> <p>Have institutional endorsement.</p>
Which themes were selected?	<p>IPEC competencies: Roles and responsibilities; values and ethics; communication; and teams and teamwork through the phases of exposure, immersion and entry-to-practice.</p>	<p>Year 1: promoting patient safety, patient-centred communication within a team approach. Year 2: Interprofessional pain education. Year 3: Interprofessional learning in practice. Year 4: clinical simulation and keeping patients safe from medication errors.</p>	<p>Person-centred care; Role understanding; interprofessional communication; collaboration within and across teams. Real world problems, e.g., safe use of medicine.</p>	<p>Primary healthcare; interdisciplinary health promotion; shared research module; interprofessional world café; interprofessional supervision.</p>	<p>Theoretical, clinical and research model. biosciences (advanced physiology/pharmacology), conceptual and theoretical frameworks/models, leadership and management, bioethics, education for health professionals, research methods and statistics, maternal and neonatal</p>	<p>Emphasizes development of leadership competencies for interprofessional practice (IPP). It provides opportunities for interaction with recognized leaders in IPP, collaboration with peers, and implementation of</p>

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					care, men's and women's reproductive health, and integrated reproductive health practicum.	interprofessional projects.
How was collaborating in case and activity design encouraged and how was mixing up the learning methods done?	The Exposure phase focused on the IPEC competencies in an online setting lasting between 90-120 minutes. In the immersion phase, focus was placed on application of expertise with the use of simulated or real patients. The entry-to-practice phase put students in professional settings so that they had direct experiences.	Work collaboratively; devise a pain management plan; identify roles and responsibilities of different professions; teamwork in simulations; learn medicine management in a team through digital resources and workshops; case study with virtual characters.	Facilitator guide; small group learning; discussion and collaboration; active learning tasks; facilitated reflections. Simulated patient; bag of medicines; quizzes; case studies.	Students engaged with each other and stakeholders to deliver interprofessional services in rural and urban communities as well as at primary, secondary, and tertiary clinical sites.	Theoretical component: Each profession conducted a profession-specific seminar so students could evaluate philosophical approaches of knowledge development and care in their disciplines. Clinical component: students allocated to reproductive health units/wards in teams, other clinical experiences related to care of patients with STI. Research component: students worked individually by choosing a problem on a particular area but attended research	Guidance was through the involvement of FAIMER, Philadelphia together with the support of the MAHE leadership and team.

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					seminars together for the purpose of sharing topics and approaches to research projects.	
What levels and stages were determined?	Throughout their learning.	Undergraduate and graduate level.	Novice (First year of an undergraduate degree) Intermediate (Second or Third year of an undergraduate degree, or First year of a graduate entry) Entry to practice (Final year).	First year to final year.	MSc coursework and dissertation (2 years).	The fellowship includes two annual one-week residential sessions and two 11-month online learning sessions following the residential sessions.
How was the learning facilitated?	Facilitators to guide the students.	Facilitators to guide the students.	Facilitators to guide the students.	Facilitators and student supervisors.	Faculty teaching and guest lecturers during theoretical component. Clinical components included multidisciplinary ward teaching rounds.	The MAHE-FAIMER fellows were provided one-to-one mentorship and their role was to facilitate, guide, supervise and role-model. They were responsible for

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						monitoring the progress and completion.
How were the expectations and experiences of students raised?	<p>Prepare individually. Learning objectives aligned to competencies. Active learning with team-building experiences.</p> <p>Assessments and evaluations followed by reflections and debriefings.</p>	<p>Appreciation in learning with a multi-disciplinary team with the understanding that it could improve patient-care. Each student was individually responsible and for the team. Knowing the importance of working with other health professionals and how beneficial a multi-disciplinary team could be to enhancing patient-care. Inquiry-based learning promoted collaboration, directed learning and offered reflection on learning.</p>	<p>Challenging and interactive learning. Brainstorming solutions to complex issues, that required the engagement of multiple disciplines.</p>	<p>Shaped the education and training of students for a strong, flexible and collaborative health workforce, that was able to confront the highly complex health challenges of today.</p>	No mention.	<p>They learned sequentially and progressively which facilitated skills. Self-directed learning was established together with collaborative learning.</p>

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How was the feedback assessed and utilised?	Formative assessment, competency-based evaluation. Reflection, debriefing.	Year 1: presentation; Year 2: online questionnaire, feedback posted on website; Year 3: concept map; Year 4: presentation.	Evaluation survey and reflections. Student and staff evaluation. Share evaluation feedback with the education team and make necessary curriculum changes.	Reflections.	Theoretical components; Assessment through examinations, seminar presentations and projects. The clinical component was assessed through clinical portfolios. The students provided care to patients with various reproductive health conditions and wrote up according to guidelines. The students were graded based on written and oral presentations.	A modified form of OSCE – interprofessional team objective structured clinical examination (ITOSCE), reflections, clinical exams, questionnaires.
How was the intervention evaluated?	No community evaluation.	No community evaluation.	No mention.	No mention.	No mention.	No community evaluation.
How were the experiences shared?	Publication, conferences and networks.	Conferences and networks.	Workshops and presentation to broader group.	Networks, conferences, universities.	Dissertation and presentation.	Conferences and organisations or networks.

	Indiana University - USA	King's College London – United Kingdom	Monash University - Australia	University of the Western Cape – South Africa	University of Malawi - Malawi	Manipal Academy of Higher Education - India
Challenges	Preparing students to fulfil requirements. Creating meaningful online experiences for students. Implementation due to Covid-19.	Disagreements and conflicts.	Logistics (time, timetable and space), staff learning material.	Staff, misunderstandings, shortcoming of professions and tolerating differences.	Some faculty members expressed concern that the college was departing from its core mandate of training nurses and midwives by initiating an IPE programme that would include other cadres such as doctors and clinical officers.	Logistic, developing curricula for all levels, faculty training, suitable assessment, buy-in, accreditation.

4.2.4 Analysis of document

Best fit framework analysis²⁷ was applied using the 12 steps of IPE programme introduction into health professions education outlined by El-Awaisi et al.²⁶ as the analytical framework. A predetermined set of themes was drawn from the analytical framework in best-fit synthesis. The analytical process also allowed for additional themes that emerged outside the framework to be reported²⁷. The data matrix was printed and read through several times to familiarise the researcher with the content, trends, similarities and differences in the programmes extracted. The findings were presented iteratively under the various steps in the analytical framework²⁶. This study presented challenges during the development and implementation of IPE programmes, which were not part of the 12 steps in the prior framework.

4.2.5 Verification and data analysis

The first author conducted the search and did the extraction. The second and third authors reviewed the search and extracted documents. The analysis and writing of the scripts were done collaboratively. The results were examined and evaluated for relationships and variations.

4.3 RESULTS

4.3.1 How were the main stakeholders brought together and who were they?

We found that the main stakeholders were brought from different health schools/departments of the Health Sciences faculties. This was augmented by experts invited through their conference inputs. These experts contributed their expertise and institutional knowledge to the programme's development. Furthermore, frameworks that have been published on IPE programme development were consulted.

Specifically, Indiana University (IU) (USA) mentioned the president gathering deans from different health schools to partner up for the IPE²⁸. King's College London (KCL) (UK) noted that one person from each health school was invited to come on board with the programme²⁹. At Monash University (Au), the Faculty of Medicine, Nursing and Health Sciences (FMNHS) agreed on the curriculum and consulted the "*collaborative learning outcomes 2016 accreditation document*" as an opening point³⁰. Monash

University also sourced current IPE curricula such as the *Canadian Interprofessional Health Collaborative Competency Framework* and the *Curtin University Framework*. In addition to those frameworks, Monash university used the Lee et al.³¹ four-dimensional curriculum framework.

UWC (SA) developed a programme through the inputs of the director, deputy dean, lecturer and coordinator of the present Interprofessional Education Unit (IPEU)¹⁷. A consultation with faculty members took place for the Kamuzu College of Nursing (KCN) at the University of Malawi, followed by the creation of an interprofessional team to develop the IPE case study in their programme³². The faculty from the University of Malawi included experts from biosciences, statistics, reproductive health, public health and gender. Manipal Academy of Higher Education (MAHE) in India opted to partner with organisations such as Foundation for Advancement of International Medical Education and Research (FAIMER) and stakeholders from the higher education sphere that included the likes of professors, chancellors, vices, presidents and directors³³.

4.3.2 Benefits of IPE

We learned that IPE was beneficial because it gave students the platform to work together to provide optimal healthcare to patients^{17,28-30}. It improved patient safety through collaboration and communication with other health professionals, and students could identify the roles and responsibilities of different professions and how they contribute to the overall well-being of a patient^{17,28,29}. IPE fostered positive working attitudes in teamwork and collaborative care whilst incorporating the delivery of safe, in-expensive, and unified healthcare^{17,28-30,32}. Moreover, the evidence supported that IPE strengthened the healthcare system, and students were encouraged to find innovative ways to meet health goals³⁰. IPE promoted health, the well-being of the patient, their families and the communities, enhanced health outcomes, delivered effective healthcare services, teamwork and the understanding and appreciation of professional expertise^{17,28-30,32,33}.

4.3.3 How did they define and implement a definition, values and standards of IPE?

Although the IPE definitions were harnessed from different organisations by the institutions included, they were fundamentally analogous in nature. Of the six universities included in this study, four^{17,28,32,33} used the World Health Organization (WHO) definition of IPE¹. WHO defined IPE as when students from two or more professions learn from, with and about each other for effective collaboration and enhanced health outcomes¹. One university²⁹ followed the definition of the Centre for the Advancement of Interprofessional Education (CAIPE). CAIPE defined IPE as occurring through occasions when two or more professions learn from, with and about each other for improvements in collaboration and quality treatment³⁴. Another³⁰ drew from the standard IPE definition and formulated their own. In terms of the values and standards, it was identified that IPEC competencies were profoundly used as overarching principles and to guide the development of IPE programmes.

4.3.4 What outcomes were formulated?

Outcomes for faculty in terms of development and implementation, together with outcomes for students during IPE, are presented:

IU required the students to: collaborate with others to facilitate common respect and values; use their expertise and those of other professions to facilitate the healthcare needs of a patient and promote health; communicate with patients, families, communities, and professionals in health and other fields responsively and responsibly to support teamwork in promoting and maintaining health and preventing and treating disease; apply relationship-building standards of team dynamics to act productively in teams to strategise, offer, and examine patient-care and health programmes; and regulations that are safe, timely, of quality and value, and are fair.

KCL required students to: work collaboratively in teams for patient-centred care; understand the roles and responsibilities of other professions and how they contribute to the overall care of individuals, families and communities; produce expert care and treatment in a holistic context, including human factors; improve patient safety through enhanced communication and collaboration between professions who are responsible for a common patient.

Monash University determined the learning outcomes in four primary categories, i.e., person-centred care, role understanding, interprofessional communication and collaboration within and across teams. The outcome of *person-centred care* required students to seek out, integrate and value, as a partner, the input and engagement of the person/family/community. For *role understanding*, students had to understand their roles and the roles of others. Under *interprofessional communication*, students from different professions were required to communicate in a collaborative, receptive and considerate manner. For *collaboration within and across teams*, students were required to understand and apply team dynamics and group processes standards.

The UWC required students to explain their expertise to other professions; identify limitations with roles, responsibilities and competence; identify and respect other professions' competencies and functions, collaborate for change, and provide conflict resolutions to provide care and treatment; work with others to assess, plan, and provide; collaborate to examine, strategise, offer and analyse patient-care; mitigate differences, misunderstandings and shortfalls in other professions; indulge in case conferences, meetings and so on.

The University of Malawi required the students to show knowledge of different components and respect for human rights; create new promotion plans for reproductive healthcare; show knowledge and understanding of various management issues impacting the delivery of healthcare; advocate for the health of individuals, families and groups through activities on community development using support, commission, education and guidance; perform research to advance reproductive healthcare.

Apart from the student outcomes, both Monash University and MAHE indicated outcomes that were in place for faculty. The faculty at Monash University was required to determine a predominant education framework for outcomes and practice the three levels, i.e., novice, intermediate and entry-to-practice; back interprofessional learning in the profession-specific curriculum; back educational research in the strategy, distribution and valuation of the Collaborative Care Curriculum and direct the development of resources for the outcomes. MAHE required the faculty to improve knowledge of Interprofessional Education and Practice (IPEP); serve in joint ventures

when it comes to the health requirements of the community; create faculty that will champion IPE.

The analysis of the outcomes from each university was done and a consolidated outcomes list was formed (Table 2).

Table 2: A consolidation of the outcomes from the universities

No.	Consolidated outcomes from the QDA
a.	Work together in interprofessional teams for optimal patient-centred care
b.	Awareness of the diverse roles and responsibilities of the different health professions and respecting professional expertise
c.	Adopt the IPEC competencies in healthcare whilst following ethical principles
d.	Identify barriers to interprofessional collaboration and how to overcome them so that treatment and care can be provided
e.	Overcome arising disagreements and conflicts through a team management plan
f.	Create interprofessional healthcare plans that are patient-specific and innovative in approach
g.	Support and employ interprofessional collaborative care at the individual and community level

4.3.5 How was the participation and selection of students and faculty done?

With stakeholder involvement, the stakeholders from the different universities were gathered from other health schools or were invited to partner in the venture. Monash University, for instance, included academic and clinical staff from nursing, pharmacy and medicine to design and deliver the programme. Having IPE become part of the health curriculum was another way to include staff and students.

4.3.6 Which themes were selected?

Although the underlining themes are interprofessional collaboration, communication, patient safety, and teamwork, each institution was peculiar in its content and mode of delivery of the IPE programme. This study identified and consolidated themes from the six institutions, which included: lived experiences - clinical simulations, case studies of patients with complex needs; patient safety, medical errors; interprofessional communication and IPEC competencies; primary healthcare - diagnosis, treatment and support; and interprofessional health promotion and advocacy.

4.3.7 How was collaborating in case and activity design encouraged and how was mixing up the learning methods done?

In IU, developmental sessions were offered where faculty were initially trained in design delivery and evaluation of IPE and to develop and enhance their skills. The sessions were focused on different collaborative topics to foster practice around patient-centred care. At KCL, faculty got together to answer questions on the programme by paying close attention to the teaching, the type of activities and how they impact knowledge and skills, and the assessment thereof. KCL was more explicit in the interprofessional activities and learning methods. It required students to develop a pain management plan, use digital resources, have workshops and be issued with virtual case studies. At Monash University, a 45-minute module was designed to assist staff in designing and delivering interfaculty activities. Furthermore, Monash University used facilitator guides and provided an atmosphere for students to have small group learning. In addition to this, simulated patients were made available, quizzes, case studies and innovative activities existed too. At the UWC, academic staff, currently, part of the IPEU, were involved in developing, implementing, and coordinating the IPE curriculum and convened for its ongoing development.

At KCN, the faculty dean was in charge of academic matters. IPE literature was reviewed, and consultation took place with staff involved in reproductive health and interviewing students. Two faculty members from midwifery then developed the Interprofessional Master of Sciences (MSc) in Reproductive Health programme. Three components, i.e., theoretical, clinical and research, were then established. In the theoretical component, the health professions steered profession-specific seminars so the rest of the professions could evaluate philosophical aspects. The philosophies were then scrutinised for similarities and variations and how they could be utilised for quality care. For the clinical component, students were assigned to reproductive health wards or given patients with STIs; this was done in teams of three or four. For the research component, students worked individually by choosing a problem related to a specific topic and then attended research seminars to share their findings and views. MAHE designed the programme through the partnership, leadership, expertise and support of the Foundation for Advancement of International Medical Education and Research (FAIMER). The faculty in charge were drawn from different disciplines and

championed innovative education. MAHE stressed the advancement of leadership competencies for Interprofessional Practice (IPP), offering prospects for collaboration with recognised leaders in IPP, collaboration with associates, and interprofessional project implementation.

4.3.8 What levels and stages were determined?

Most universities offered IPE in their first to final years. Only two universities^{32,33} from the LMIC were found to have IPE in their postgraduate levels.

4.3.9 How was the learning facilitated?

Learning was facilitated by facilitators/lecturers, guest lecturers and student supervisors. Facilitators were commonly seen as enablers rather than directly influencing the learning and allowing the students to take over. For one of the universities that offered IPE at a postgraduate level, mentorship was provided to guide, supervise, model, and monitor progress.

4.3.10 How were the expectations and experiences of students raised?

At IU, the IPE curriculum was presented throughout the students learning and provided students with the opportunity to participate actively and collaborate effectively²⁸. Similarly, at UWC, their IPEU was developed to offer opportunities for IPECP¹⁷. At Monash University, on the other hand, their curriculum was structured on a continuum basis so that the learning needs of programmes were targeted and students were prepared to meet patients' collaborative needs³⁰. Students were given opportunities to interact with other professions on health-related issues to come up with solutions collaboratively²⁸⁻³⁰. Students had to take responsibility as individuals and for what the team achieved, which followed reflections on the learning whilst understanding the benefits of a collaborative approach to patient care^{28,29}. Challenging students was one technique to keep them motivated as students needed to brainstorm solutions by accounting for complex matters collaboratively^{17,30}.

4.3.11 How was the feedback assessed and utilised?

Students were graded with examinations, clinical examinations, reflections and oral presentations. At IU, students were assessed through formative assessment, competency-based evaluations, reflections and debriefing²⁸. KCL used three different forms in the different year levels. In year 1, students had to do presentations; in year 2, students completed online questionnaires and feedback was posted on the website; in year 3, a concept map was completed and in year 4, a presentation was done²⁹. Monash University used surveys and reflections by evaluating students and staff and sharing the feedback with the education team to make necessary changes to the curriculum³⁰. UWC mentioned reflections as part of assessments¹⁷, whereas the University of Malawi incorporated different assessment tools and methods depending on the component they wished to evaluate. Thus, for the theoretical components, assessment was done through examinations, seminar presentations and projects; for the clinical component, assessment was done through clinical portfolios, and students provided care to patients with various reproductive health conditions and write up according to guidelines³². The students were then graded based on written and oral presentations³². MAHE used the Interprofessional Team Objective Structured Clinical Examination (ITOSCE) with reflections, clinical exams and questionnaires³³.

4.3.12 How was the intervention evaluated?

Overall, none of the universities analysed mentioned evaluating the effect of the IPE intervention on the community. Therefore, no data could be gathered for the intervention and how it was evaluated.

4.3.13 How were the experiences shared?

Experiences were shared on many different platforms and in many ways. Most commonly experiences were shared at conferences^{17,28,29,33}, with networks^{17,28,29,33} and organisations^{17,33}. The mediums included dissertations³², publications²⁸, workshops³⁰ and presentations^{30,32}.

4.3.14 Challenges encountered

The challenges were not present as part of the steps that El-Awaisi et al.²⁶ penned. However, 'challenges' were another theme identified whilst conducting the analysis. Logistic challenges such as lack of time, timetabling issues and limited space to carry out IPE were evident. Staff challenges were stated as it became difficult as they did not want to come on board or agree to IPE benefits in health curricula. Having appropriate learning material where aspects of all health schools were merged was a challenge. IU found that implementing IPE during the Coronavirus disease (Covid-19) was a challenge. Other challenges include disagreements and conflicts amongst team members, misunderstandings, professional shortcomings, and tolerating differences. The University of Malawi identified faculty members expressing apprehension as accommodating IPE meant that there had to be a shift from their school's core mandate. Buy-in from the included institutes was crucial so that there was support in developing and implementing IPE. Another challenge was that developing curricula to be implemented for all year levels was a problem and this was factored around logistical challenges. Training the faculty was a challenge too, as facilitators needed to be guided through the process of IPE. Suitable assessments were required to measure the programme, and accreditation of the programme was necessary so that there was another reason to support participation in IPE.

4.4 DISCUSSION

Interprofessional education programmes are evolving across the world and especially in Africa. The Africa Interprofessional Education Network (AfrIPEN) is advocating and building the capacity of health science educators on the continent to develop and implement IPE programmes. This paper provides a step-by-step and to-do list to guide educators in the process of conceptualising, developing, implementing and reviewing their IPE programmes. We analysed the IPE programmes of six institutions from HIC and LMIC according to the 12 steps of IPE programme introduction into health professions education outlined by El-Awaisi et al.²⁶.

We found that, although getting the stakeholders together to participate in the primary development of the programme varies from institution to institution, the underlining principle was that it should be done in a way that all stakeholders felt involved and

contributed their expertise to the programme. Branch-Mays et al.³⁵, Teodorczuk et al.³⁵, Herrera et al.⁹ and Prast et al.³⁶ resonated with the involvement of all stakeholders who needed to accept and contribute to the development and implementation of the IPE programme. Key stakeholders were the university's leadership, whose buy-in was necessary for the programme's initiation, as reported in many studies^{26,36,38,39}.

We found that the benefits reported in the evaluated programmes had many commonalities and peculiarities, depending on the programme's nature, level, and scope. The WHO¹ *Framework for Action on Interprofessional Education & Collaborative Practice* emphasised that health systems' needs greatly influenced the nature of the IPE programme; hence IPE programmes in different contexts must differ. The common benefits reported included improved collaboration, improved attitudes towards other healthcare team members and reduced medical errors, which also fell within the core competencies of the IPE reported in the WHO¹ *Framework*. Furthermore, IPE also challenged students to think critically and engage in high-level problem-solving⁴⁰.

This study found that the WHO definition for IPE was the most used, and the IPEC competencies were fundamental in guiding the development of the programmes. It could be deduced that the institutions included sought to make their programmes internationally accepted. Furthermore, the common themes we identified from the programmes could be classified into theory, practice and research. Frantz and Rhoda⁴¹ supported the implementation of the three categories.

In terms of case and activity design, bringing together stakeholders and facilitators to work on the programme was an important step. Innovative learning strategies were necessary to stimulate students' thinking and support collaborative practice. When comparing the different IPE programmes, it was quite evident that the overarching aim of facilitating an environment that harboured IPE for health professions' students was necessary so that the collaborative healthcare needs of patients and populations were met. Additionally, importance was placed on enhancing the IPE programmes regularly. Differences amongst the universities were found in terms of the learning methods used and how students were trained for the world of work. Furthermore, intervention in terms of community evaluations was a scarcity, whereas student and staff evaluations were given preference.

4.5 CONCLUSION

Interprofessional education is instrumental in making health professions' students competent IPCP practitioners of the future. Many institutions are taking on the challenge of developing IPE programmes, and it is essential to provide evidence-based information to guide these institutions in their journey. This paper provides a step-by-step and to-do list to guide educators in the process of conceptualising, developing, implementing and reviewing their IPE programmes. We recommend institutions review, contextualise these findings and implement them in their IPE programme conceptualisation, development, implementation and review.

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Conflict of Interest

The authors have no conflict of interest to declare.

Ethical Approval

This study has received ethical approval from the North-West University Human Research Ethics Committee (NWU-00430-20-A1).

Consent

This study did not involve any human participants and therefore, seeking consent was not applicable.

Author Contributions

All authors have contributed significantly and agree with the manuscript content. Therefore, the authorship requirement, according to the author guide of this journal, was met, and the authors agree to the veracity of the work.

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CHAPTER 5:
ARTICLE 3: DEVELOPMENT AND IMPLEMENTATION OF
INTERPROFESSIONAL EDUCATION: GLOBAL PERSPECTIVES

This article was submitted to the [Medical Education](#) Journal with an impact factor of 7.647 and is under review. It addressed the objective of phase 3 of this study and was formatted according to the author guidelines of the journal. The line spacing and margins used in this thesis are, however, done according to the North-West University prescription. The references are presented at the end of the chapter

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ABSTRACT

Introduction: Few theoretical guidelines and evaluations are available to guide the development and implementation of Interprofessional Education (IPE) programmes. However, it is expedient to learn from the practical experiences of experts involved in the development and implementation of IPE programmes to aid in the development and implementation of new programmes. This study explored the perspectives of international experts on the development and implementation of IPE programmes, including the challenges faced.

Methodology: A qualitative exploratory, descriptive design was used in this study. Fifteen international experts in the development and implementation of IPE were purposively sampled and interviewed.

Results: Four themes were identified and described: IPE structure in higher education institutions, faculty and student involvement, challenges and opportunities, and evaluation and quality improvements in IPE programmes.

Conclusion: Interprofessional education programmes are gaining ground internationally. Each continent presents special contextual issues regarding the development and implementation of IPE programmes; nevertheless, the challenges and opportunities that confront the development of the programmes are universal, although to different extents. Institutional culture, resource limitations, already packed curricula, professional hierarchies and rivalry were challenges identified. Comprehensive stakeholder engagements are very important in overcoming challenges and sustaining IPE programmes. Despite the push for making IPE compulsory in undergraduate health professions' education, with some accreditation bodies requiring IPE as a component of the curricula for accreditation, it is important to consider the context when making such decisions.

Keywords: *IPE programme; individual interviews; qualitative exploratory descriptive; development; implementation; challenges.*

5.1 INTRODUCTION

According to the World Health Organization (WHO)¹, Interprofessional Education (IPE) is when two or more health professions' students participate in learning with, from, and about each other to optimise healthcare and improve health outcomes. In the global space, IPE is known for improving health education, quality of healthcare, and healthcare outcomes and is flourishing in developed countries but not in developing ones²⁻⁴. Despite the important role of IPE in improving health professions' education and healthcare outcomes, many institutions still implement isolated health professions curricula. Limited exposure to IPE can lead to little competency in meeting complex healthcare needs. Thus, exposing patients to ineffective healthcare and concomitant poor healthcare outcomes. Some hindrances to the development and implementation of IPE programmes include non-flexible curricula, professional hierarchy, limited resources, lack of experience and poor institutional buy-in⁵⁻⁷. These challenges are global in nature but more profound in the developing world⁴.

The WHO *Framework for Action on Interprofessional Education and Collaborative Practice*¹ and other stakeholders⁸⁻¹⁰ of health professions education have strongly advocated for the implementation of IPE programmes to better equip health professions' students with the necessary competencies that enhance their readiness for the workplace as members of an interprofessional collaborative care team^{11,12}. The WHO advocacy is centred on many reports on the dwindling quality of healthcare linked to the poor quality of health professions education and the inability of newly trained health professionals to collaboratively solve patient problems. Key among these issues are an increasing number of medical errors and poor healthcare outcomes, especially in the developing world¹³⁻¹⁵.

A few authors have published theoretical guidelines and evaluations of their IPE programmes' development and implementation¹⁶⁻²⁰. However, it is expedient to learn from the practical experiences of experts who were involved in the development and implementation of IPE programmes^{4,21,22}. This helps institutions navigate the challenges other institutions experience and better utilise the existing opportunities in their institutions. This study explored the perspectives of international experts on the development and implementation of IPE programmes, including the challenges faced.

5.2 METHODOLOGY

5.2.1 Research Design

A qualitative exploratory descriptive design²³ was used in this study. Qualitative studies are conducted to explore or describe a phenomenon from the perspective of those who have experienced or observed it²⁴. In this study, we sought to describe experts' experiences in the development and implementation of IPE programmes, hence the choice of design.

5.2.2 Sampling

Fifteen (15) experts who had published or presented at international conferences on IPE programme development and implementation and those cited in IPE programmes as having played critical roles in IPE programme development and implementation were purposively invited to participate in this study. Crossman²⁵ added that purposive sampling is built on the attributes of a population and the intentions of the study. The researcher contacted participants through their emails on their papers, university websites and conference websites.

5.2.3 Data collection

The researcher developed a semi-structured interview guide using the key areas of IPE programme development and implementation outlined by El-Awaisi et al.¹⁹. The instrument was reviewed by seven (7) Health Professions Education (HPE) researchers and pre-tested with two educators before the interviews. Interviews were recorded with the consent of the experts. Due to participants' diversity and worldwide distribution, the interviews were conducted via Zoom, an online platform, between June and August 2021. Each interview lasted between 16-60 minutes.

5.2.4 Data Analysis

Thematic analysis was used in this study²⁶. Audio recordings of the interviews were transcribed using the transcription function in Zoom. The transcript was checked by a professional transcriber, correcting the areas where the automatic Zoom transcription was missed. The researchers read through the transcripts several times to familiarise

themselves with the content. The first author then uploaded the transcripts into ATLAS.ti™ qualitative analysis software and coded them inductively. A co-coder was used to code the transcripts independently. A meeting was then organised between the research team and the co-coder to compare the two codes, and a consensus was reached on the coding system. The first author then recoded all the scripts using the agreed coding system. Similar codes were clustered into sub-themes and described, after which related sub-themes were pulled together into four themes. All descriptions were supported with verbatim quotes from the participants.

5.2.5 Ethical Considerations

Ethical approval was obtained from the North-West University Human Research Ethics committee (NWU-00430-20-A1). For this study, all ethical principles were observed, including seeking and signing consent forms, signing confidentiality forms by the researchers, co-coder and independent person, voluntary participation without negative consequences, maintaining privacy and confidentiality by coding the names of participants, and consent for audio recordings. The independent person obtained informed consent to avoid coercion.

5.3 RESULTS

5.3.1 Participant information

This study included 15 experts from Africa, Asia, Australasia, Europe and North America. Table 1 presents the demographical information of the experts.

Table 1: Demographical information of the experts

Participants	Gender	Highest qualification	Expertise	Country
D1	M	Master's Degree	Academic innovation; online learning; Interprofessional education; IPE publications	United States of America
D2	M	PhD	Faculty development, competency-based education and sustaining curricular innovations; interprofessional education; IPE publication	South Africa
D3	M	PhD	Curriculum development; co-ordination; interprofessional education; IPE publications	South Africa

Participants	Gender	Highest qualification	Expertise	Country
D4	F	Master's Degree	Interprofessional collaboration, education and learning	South Africa
D6	F	PhD	Teaching and learning; curriculum development; interprofessional education: IPE publications	South Africa
D7	M	PhD	Curriculum review and implementation; interprofessional education and collaboration: IPE publications	India
D8	F	PhD	Interprofessional working and learning: IPE publications	United Kingdom
D9	F	PhD	Blended learning; collaborative learning; curriculum development; interprofessional education	South Africa
D10	M	Master's Degree	Interprofessional education	United States of America
D11	F	Master's Degree	Interprofessional education; IPE publications	South Africa
D12	F	PhD	Development and evaluation of interprofessional curriculum; IPE publications	Australia
D13	F	Master's Degree	Interprofessional education; blended learning	United Kingdom
D14	F	Master's Degree	Interprofessional education; IPE publications	United States of America
D15	F	PhD	Interprofessional education and collaboration; IPE publications	United States of America

5.3.2 Themes and sub-themes

Four themes were identified and described: IPE structure in higher education institutions; faculty and student involvement; challenges and opportunities; evaluation and quality improvements in IPE programmes (Table 2). In general, IPE programmes are an essential component of HPE; therefore, efforts to overcome the challenges encountered during the development and implementation must be made.

Table 2: A representation of the themes and sub-themes

IPE Programme Development	IPE structure in higher education institutions	Definition of IPE
		Motivation for IPE
		Objective of the IPE programme
		Stakeholder involvement
		Components of IPE
	Faculty and student involvement	Student involvement
		Facilitator/faculty involvement
	Challenges and opportunities	Challenges
		Opportunities
	Evaluation and quality improvement in IPE programmes	Suggestions for improvements
		Dissemination of findings
		Evaluation

5.3.2.1 IPE structure in Higher Education Institutions

IPE development and implementation vary from one institution to another, but the essential components remain the same. Sub-themes described under this theme include how IPE was defined by various institutions, what was the motivation for developing IPE programmes, stakeholder involvement, and components of the IPE programmes.

5.3.2.1.1 Definition of IPE

The WHO definition was the most commonly used IPE definition; seven experts (D2; D5; D6; D7; D11; D14; D15) reported using it in their programmes. The Interprofessional Education Collaborative (IPEC) competency domains and Centre for the Advancement of Interprofessional Education (CAIPE) guided the IPE definition of some institutions whereas others generated their own. An expert (D4) highlighted that IPE was defined through community engagement at their institution.

"So the definition that we use is based on the World Health Organization's definition, which is in 2010...which speaks to the fact that the IPE...allows two or more health professions

to learn with, from and about each other, to improve collaboration and patient health outcomes.” [D6:10]

“We acknowledge the CAIPE definition over into a more profession zone from, within and about one another to develop patient-care” [D12:3]

“We use the IPEC competencies that’s the tool that binds us together as we, we have those four big domains and all those sub-competencies as a reference point that we can use at the micro, meso and macro levels of creating different types of IPE experiences for our students” [D1:53]

5.3.2.1.2 Motivation for IPE

According to the participants, patient-care and the need for a collaborative approach in Primary Healthcare (PHC) motivated the IPE programmes. They stated that IPE addressed many problems in healthcare services and the delivery of those services. Re-orienting HPE to facilitate practice-ready graduates and preparing students for the world of work after graduation was also a key motivation for the IPE programmes. For two institutions (D10; D12), IPE was a requirement for their accreditation bodies to approve their undergraduate programmes.

“...within Primary Health Care, it calls for a collaborative approach or response to health care, and so our institution took this quite seriously and decided to start an IPE unit to develop IPE and to look at possibilities within our faculty” [D3:42]

“...schools, in fact, have accreditation standards, which require them to have interprofessional education as part of their training” [D10:37]

“We have accreditation requirements...that demand that we demonstrate how we've taught interprofessional skills and provided interprofessional opportunities” [D12:38]

5.3.2.1.3 Objectives of the IPE programme

Four participants (D1; D10; D14; D15) were explicit in using IPEC competencies to formulate the aims and objectives of their programmes. Other participants stated that the expected outcomes of their programmes included knowledge construction, patient safety, problem-solving skills, understanding of professional roles, mutual respect, ethical practice and teamwork. Emphasis was placed on collaboration and centralising patient-centred care. Conflict management skills were favoured for successful

collaboration. There was a suggestion for IPE outcomes to be short-term for students to fulfil in training and long-term outcomes upon graduation.

“To create a good...experience for the students...and we want to use the core competencies that are derived from the IPEC...competencies...in order to give them that best experience” [D14:4]

“teams and teamwork, where we have a number of activities that, you know, collectively built around relationship-building values and principles of team dynamics” [D7:42]

“When it comes to treating patients or clients, community members and the projects that they are involved in, in communities and to be able to handle conflict” [D3:7]

5.3.2.1.4 Stakeholder Involvement

Participants indicated that the individual stakeholders were either seconded, joined as observers or were invited through direct communication. Health schools that saw the need to transform their curriculum got involved, and others joined later. Specific programmes were required to have IPE for accreditation; for others, it was an undergraduate health curricula requirement. The leadership of the institutions played vital roles in recruiting faculty members and compiling programmes. In some programmes “IPE champions” were selected from different departments to encourage participation from such departments. The inputs of regulatory authorities and other stakeholders were gathered through seminars and national consultations hosted by the institutions.

“Those are assigned by deans of their colleges, some other faculty are sometimes voluntary, for specific events or to help us develop programming on a voluntary basis” [D10:8]

“every year, we have a national consultation with most of the important stakeholders involved, and that would also involve the regulatory authorities...also involves local administration, because most of the projects that are carried out are under the local administration” [D7:13]

we have...IPE champions in each department...so part of my role is to engage with all departments, you know, faculty and even outside of our faculty, and to identify IPE champions and, and those are the people that I then liaise with...almost on a weekly basis...so every year, I had different IPE champions in each department” [D3:4]

5.3.2.1.5 IPE Activities

Institutions made use of various activities: dedicating a day for IPE, shifting online for international student collaboration, creating care plans, participating in debriefing sessions and using standardised case vignettes. Other activities included roleplaying by students and participating in workshops and simulation experiences. Disciplines collaborated to construct case studies and simulation experiences. World cafes encouraged students to sit at small tables to explore an issue through discussions in different rounds. In contrast, the amazing race was fun to expose students to IPE by completing interprofessional tasks through various instructions, clues, and stops. One expert (D11) mentioned placing students in a hospital setting to participate in a case study.

" we would have a case study around nutrition, which is...from the diets...you would have a case study around disability, occupational therapy and physiotherapy would come...with that chronic diseases, nursing department would be the lead on that." [D6:23]

"a traditional World Cafe method, we use simulated patients, ethics is our, I know we've got an ethics World Cafe, and then we've got the Amazing Race" [D6:59]

"...the first day, we expose them to disaster management as a method of working in a team and then from that, we do role clarification exercises...the students have to triage the patients into different settings and then from there our roleplay case studies is taken" [D11:28]

Participants also stated that students identified a community, conducted a needs analysis, and reported back to the community so idea sharing, collaboration and community engagement could occur. Students also gave health talks on health promotion. One expert (D2) mentioned that students would go out into communities to create digital stories.

" they would now have to go and again identify community for a health promotion talk" [D4:50]

"before the pandemic, we were going out, and doing home visits with older adults and having didactics and a like a debriefing kind of session" [D15:4]

Asynchronous learning material was uploaded online with which students could familiarise themselves. Student workbooks and facilitator guides were used for learning and collaboration. Visual and auditory materials were methods and tools used to make learning fun and intriguing. The activities were conducted at varying intensities and time periods. The exposure ranged from a few hours to days, to weeks, a month or a year.

"We do have some introductory asynchronous online learning materials built into a leadership and management course" [D1:85]

" ranging from videos to podcasts to the lecturer teaching them...or via Zoom so there's different range of things, PowerPoints" [D6:52]

5.3.2.2 Faculty and Student Involvement

Faculty and student involvement addressed the exposure, approach and engagement of faculty and students in IPE programmes. The sub-themes were student involvement and facilitator/faculty involvement.

5.3.2.2.1 Student Involvement

Both undergraduate and graduate programmes inculcated IPE into their curricula. In some cases, IPE was present in the first and second years and in others, throughout the undergraduate and graduate years. Although all the experts stated that their IPE programmes were compulsory and students needed to participate, an expert (D1) stated that theirs carried no academic credits. Another expert (D15) said that IPE was a governing body requirement and became necessary for accreditation and training. An expert (D3) from South Africa stated that their students participated in the first and second year compulsorily, whilst departments selected students in the third and fourth year to participate in the optional components.

"We have two courses, each of which is a semester-long, and all students are required to be in that " [D10:22]

"I engage with our IPE champions, and I say, in a few weeks' time, we are having our World Cafe, which is one of our activities. Can you please identify students that would participate...some departments want to send four students, others want to send 50 students" [D3:12]

Drawing students' interest and engagement with IPE was not difficult for many institutions as students were motivated to participate in IPE activities and engage with other health professionals. Not much time investment was needed, which intrigued and motivated participation. IPE activities were student-centred, making the process fun for students. Detailing expectations, sharing previous students' experiences, publishing students' work on websites and emailing them increased interest. Additionally, community engagement projects excited students. Team management, where students held each other accountable, thereby reducing conflicts, also kept students interested. Students enjoyed working with other professions and creating bonds and friendships with those they may not have met before.

"I think one of the reasons that they are motivated is maybe the time commitment for a lot of these IPE activities is not burdensome. It's a few hours of prep work, and a few hours of collaboration with other people and they find it a joy"
[D1:71]

According to 10 experts (67%), students attended and participated according to their professional roles and applied what they learnt. They engaged in various IPE activities such as working with standardised patients, participating in simulations, discussing case studies, working online and face-to-face to produce a poster or presentation, and community engagements. During the discussions, students had to sit together and contribute their knowledge and experiences to solving the problems presented in the case studies. Students played active roles in the IPE programmes. They were given a topic to determine collaborative work with the intension of assessing their communicative skills, critical thinking and teamwork abilities.

"They are there to be well you know, an MD, a nurse, a public health professional in training...it's a chance to take everything that they've learned, that they've learnt everything they know, everything they're able to do so far in that discipline, and put it to work" [D1:69]

"You do have to put in sessions on team working, and the different scopes and what the different team members do"
[D13:11]

"They will carry out some online activities initially alone, and then as part of a group and produce either posters or presentations or group work, which they then post on to some of the virtual learning environments" [D8:44]

5.3.2.2 Facilitator/Faculty involvement

Facilitator involvement in IPE was mostly voluntary, and those with specific expertise were invited. Facilitators engaged weekly, bi-weekly, or monthly to discuss the programmes' planning, evaluation, implementation, and monitoring by receiving inputs from the disciplines involved. Facilitators were trained through orientations and workshops to handle interprofessional teams, negotiate learning outcomes, oversee the tenets of IPE, and certify the development of expertise. Facilitators had to create learning materials, train the standardised patients and supervise students.

“So we basically had task team meetings. So we had, for example, monthly meetings where we actually got together, and we developed the programme before then” [D6:26]

5.3.2.3 Challenges and opportunities

Challenges and opportunities influenced the development and implementation of IPE programmes. Several challenges were identified that hindered the development and implementation of IPE. Once the challenges were overcome, various opportunities were found to drive, maintain and cultivate IPE.

5.3.2.3.1 Challenges

Participants mentioned that siloed working culture and professional rivalries in the faculties of health sciences created resistance to the development and implementation of IPE programmes. Participants added that resources and logistic challenges included insufficient funds, difficulties moving online, physical space for IPE, staff and knowledge limitations, training standardised patients, activity planning, scheduling, managing large groups and transportation to sites. Primarily, the participants stated that the challenges with IPE were buy-in, accreditation, implementation, lack of interest or will and understanding. Giving up credits to accommodate IPE was challenging when its value was not understood. Implementation meant curriculum rework. Influencing individuals to get out of their comfort zone was a challenge. One expert (D2) mentioned that evaluation challenges arose with testing practical knowledge sustainability and transferability.

“professional rivalries, well known so, there was quite a bit to overcome those hardcore professional identities” [D7:15]

"The participation of especially the faculty members is on a very voluntary basis, and that sometimes becomes very frustrating because the people in the department don't necessarily realise how time-intensive it is to plan this, and how much effort the staff members put in" [D11:14]

" how sustainable is that knowledge? And how transferable is that knowledge to a practical context? " [D2:30]

5.3.2.3.2 IPE Opportunities

The participants stated that designing and developing an IPE programme made way for a blank canvas hence, different communities could be engaged. Participants then added that innovation for ways to deliver IPE had to occur due to the pandemic, and health schools collaborated to share resources and learning. IPE was generated by contributing towards scholarship and capacity building, networking, research and publications. An expert (D3) mentioned that applying to organisations to secure grants or funding was a great opportunity, and collaborations assisted in attracting funding, especially around research.

"Now that more staff across the different courses linked in really, we know each other, we share work, and that means less duplication" [D12:18]

"networking, in the global spaces, there's a lot of other universities globally, that's involved with IPE now" [D6:37]

" I've now seen many grant calls; they want to see how people work across institutions. They also wanted to see how people work collaboratively, so they won't accept the funding proposal if you can't show how you are working across departments, across faculties and across institutions." [D3:31]

5.3.2.4 Evaluation and quality improvements in IPE programmes

Evaluation and quality improvements addressed assessments and measures to facilitate progress with IPE programmes and comprised suggestions for improvements, evaluations and dissemination of findings.

5.3.2.4.1 Suggestions for improvements

The participants added that IPE programmes improved by interviewing experts who assisted with rigour and shared their experiences. When making decisions, involving patients in different professions for optimal input was encouraged by the participants.

Sharing data collected from communities or patients with them to inform them on what occurred since data was collected, what is currently underway and what is still required, together with the achievements since the interventions, was mentioned by one expert (D2).

"a strong representation from each health profession has to be around the deciding table, and patients have to be around the deciding table, and some student reps have to be there."
[D12:35]

"We always negate the process of going back to where we collected the data, where we did the interventions and bring people in a town hall and actually share this is what has happened, this is what we're doing, and this is what we still need and these are the successes" [D2:50]

An expert (D1) mentioned that psychological variables, tangible skills and training also had to be evaluated. One expert (D7) added that the IPE programme needed to be designed in a way that elevated attention, curiosity, and concentration and boosted student engagement. Giving students ownership of learning through professional relevance and allowing them to be active role players was supported by the expert (D7).

"I don't see a lot of measuring of psychological variables, [uhm] or factors and dimensions" [D1:71]

"a student must have the ownership of learning, and ownership of learning happens if they find that it is relevant to their profession" [D7:33]

5.3.2.4.2 Evaluation

Depending on the activity, experts mentioned that different types of assessments were used. Some experts developed their questions and used the IPEC competencies, whilst others employed pre and post-measures, group discussions, reflective reports, peer and facilitator evaluations, online surveys and competency tools. In terms of evaluation dissemination, one expert (D1) mentioned that it was important that faculty be motivated to publish beyond journals.

"We also rely a lot on student reflective writing to have them address the questions that we want them thinking about"
[D1:73]

“don't have the time as faculty to go back over that data and utilise it to continuously improve our programmes, and probably the only time we do that is when we're motivated to do some sort of publication on the activities that we've been engaging in together” [D1:90]

5.3.2.4.3 Dissemination of findings

Disseminating findings in IPE was considered critical not just to support scientific research but also to distribute new, relevant and innovative data in an emerging field. The experts mentioned that findings were disseminated through publications, conferences and presentations. During Covid-19, a trend toward virtual conferences was noted by one expert (D1). Experts added that workshops, poster presentations and keynote addresses were also hosted. One expert (D3) mentioned that students also presented their work to stakeholders.

“we've published in Medical Teacher, I think, we've published in the Journal of Interprofessional Care. We've published extensively in the African Journal of Health Professions Education” [D6:58]

“We are presenting a workshop for colleagues...I also have a presentation at SAAHE on our findings in this research; this is also presented at the ISOTL conference and AIMEE as well” [D5:134]

“my CV has popped up quite a bit...during COVID...because of all the virtual conferences, but we've been disseminating all over the place at conferences” [D1:91]

5.4 DISCUSSION

This study explored the perspectives of international experts on the development and implementation of IPE programmes, including the challenges faced. Fifteen experts across the globe were interviewed to provide their experiences in developing and implementing their IPE programmes. Data were analysed using thematic analysis aided by ATLAS.ti qualitative analysis software.

We found that in some countries, undergraduate programmes needed to have IPE components to be accredited. This then meant that IPE was compulsory for students because it was part of their curriculum. Thus, it became compulsory for staff to be involved, meaning the leadership of those institutions were required and expected to support the IPE programmes. This finding is in line with the WHO *Framework for Action*

*on Interprofessional Education and Collaborative Practice*¹, which states that IPE should be made compulsory as a curriculum mechanism.

Deans of different health schools played significant roles in embedding IPE and recruiting faculty. These faculty members then became IPE champions who collaborated and regularly engaged for continuous IPE programme development and management. Apart from these noteworthy stakeholders, regulatory authorities and local administration supported IPE programmes. WHO¹ supports the involvement of directors in engaging across the faculty with key stakeholders and organisations. Ho et al.²⁷ resonated that in an organisational structure, the IPE programme should start with champions that include deans, associates and directors.

Due to the varying nature of IPE programmes, IPE activities must accommodate innovative approaches so that IPEC competencies are incorporated into learning. Case studies and simulation experiences are fundamental in providing health professions' students with the opportunity to practice those competencies. South African experts highlighted the importance of community-based IPE activities, whereas the experts from other countries did not focus on such activities but rather gave importance to classroom-based activities. Joubert et al.²⁸ mentions the transformative role that rural collaborative learning played in competency development and student awareness. Müller and Couper²⁹ added that healthcare was shifted to communities, so healthcare institutions had taken the liberty to adapt their curricula to include community-based exposure in undergraduate training. Khalili³⁰ addressed that institutions were required to find innovative approaches to deliver IPE, such as shifting to online platforms. In our study, we found that institutions had transformed HPE by creating and accommodating IPE activities in virtual and online spaces due to the pandemic.

The development and implementation of IPE programmes are not immune to challenges which are bound to occur. Our findings categorically suggested that human, fiscal and logistical challenges are the most evident in IPE programme development and implementation. Treadwell and Havenga³¹ mentioned logistics challenges, whereas Ahmady et al.⁵ added that cultural and structural challenges burden the education system, echoing what we found. Additionally, they⁵ stated that hierarchy, siloed learning, poor attitudes, and support hindered the success of IPE,

which further supports the veracity of our findings. While many institutions have implemented IPE in different forms, it is not effectively present in all health professions learning, especially for undergraduate students.

We found that IPE programmes created opportunities for engagement, international faculty and student collaboration, and the sharing of common resources and learning, which in turn, reduced staff workload. Research in the field of IPE is booming due to its innovative approach to teaching and learning. Experts mentioned the increased participation in conferences and publications. Journals specifically dedicated to Interprofessional Education and Collaborative Practice (IPECP) are operational and accessible for publishing new and relevant data. Similarly, networks relating to IPECP have also been the common recipients and producers of IPE developments and publications. Interprofessional.Global³² is one such federation that works with IPECP networks and bodies to enable engagement and support.

In our study, we found that feedback from students, facilitators, and the community is vital to improving the quality of IPE programmes. Assessing feedback assists with understanding the challenges experienced, and utilising feedback enhance learning and identifies areas for improvement. We found that most, if not all, institutions negated conducting an impact study on communities. The reason could be that there were no current projects taking place in communities, or if there were any, the faculty did not consider them relevant to conduct a study. Reeves et al.³³ identified the limitations of evaluations that take place in communities. We must emphasise the importance of tracking students' activities in communities, including communities in conducting impact studies, and also disseminating findings where the data was originally gathered. We note that it is important to keep communities abreast of the data findings and the way forward.

5.5 CONCLUSION

Interprofessional education programmes are gaining ground internationally. Each continent presents special contextual issues regarding the development and implementation of IPE programmes; nevertheless, the challenges and opportunities that confront the development of the programmes are universal, although to different extents. Institutional culture, resource limitations, already packed curricula,

professional hierarchies and rivalry were challenges identified. Comprehensive stakeholder engagements are very important in overcoming challenges and sustaining the IPE programme. Despite the push for making IPE compulsory in undergraduate health professions education, with some accreditation bodies requiring IPE as a component of the curricula for accreditation, it is important to consider the context when making such decisions. Consideration should be given to innovative IPE activities such as community-based projects.

5.6 REFERENCES

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CHAPTER 6:
**ARTICLE 4: DEVELOPING AN INTERPROFESSIONAL EDUCATION
PROGRAMME FOR A HEALTH SCIENCE FACULTY IN SOUTH
AFRICA: A MULTI-METHOD STUDY**

This article was submitted to the [*Journal of Interprofessional Care*](#) with an impact factor of 2.338. It addressed the objective of phase 5 of this study and was formatted to according to the author guidelines of the journal. The line spacing and margins used in this thesis are, however, done according to the North-West University prescription. The references are presented at the end of the chapter

Link to author guidelines:

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ABSTRACT

Training health professions' students in their professional siloes limit the opportunity for students to develop the required Interprofessional Collaborative Practice (IPCP) competencies for optimum patient-care. Interprofessional Education (IPE), an innovative health professions education method, was invented to provide opportunities for health professions' students to develop the needed IPCP competencies.

This study employed a sequential multi-method design to develop an IPE programme for a health science faculty in South Africa. A scoping review was conducted to synthesise the structure, development and implementation processes of IPE programmes globally. Followed by an analysis of IPE programmes from institutions in five continents. Subsequently, the perspectives of international experts on the development and implementation of IPE programmes were explored in a qualitative study. This was followed by a university context analysis, and the development of a draft IPE programme was designed based on the data synthesized from all preliminary studies. The programme was presented to faculty to evaluate and make inputs using a nominal group technique.

An optional three-year IPE programme was developed to serve as a precursor for full credit integration of IPE into the faculty of health science curricula during future rearticulation of the health science curricula.

Keywords: Multi-method; IPE programme design; IPE programme implementation; challenges; nominal group; review

6.1 INTRODUCTION AND BACKGROUND

Hitherto, most health professions' education institutions train students in isolation, providing profession-specific knowledge and skills necessary for their professional practice¹. Nevertheless, having isolated professional knowledge and skills alone does not offer the opportunity for interprofessional collaborative practice, which is essential for the best healthcare outcomes^{2,3}. The motive for introducing Interprofessional Education (IPE) into health professions' curricula is not only to strengthen collaboration amongst health professionals but also to improve healthcare outcomes⁴. IPE assists in diminishing medical errors known to occur when there is a breakdown in communication and collaboration amongst healthcare professionals⁵. It has been argued that IPE is an innovative approach to preparing health professions' students to deal with healthcare problems collaboratively^{4,6}.

Although there are many views about what IPE is, what it entails and what it aims to achieve, the overarching conceptual definition of IPE, as stated in the *framework for action on interprofessional education and collaborative practice*, entails two or more health professions' students learning from, with and about each other with the intent of improving interprofessional collaborative practice and health outcomes of patients⁷. In this study, an IPE programme is defined as a set of interventions and experiences provided to health professions' students to learn from, with and about each other to effectively function in collaborative healthcare teams for improved healthcare outcomes. Healthcare outcomes include delivering the highest quality of care to patients, families and communities, strengthened health systems, enhanced patient safety and satisfaction, better access to health, enhanced workplace practices and production, enhanced communication channels and a reduction in the duration of treatment and costs⁷.

IPE programmes have been implemented at undergraduate and postgraduate levels^{8,9}. At undergraduate levels, IPE emphasises the integration of the Interprofessional Education and Collaborative (IPEC) core competencies and other components such as professional ethics, team management and research⁸. At postgraduate levels, IPE focuses on specific health conditions and enhancing

knowledge and skills⁸. Undergraduate and postgraduate IPE intended to develop interprofessional competencies through interprofessional expertise and values⁸.

Designing an IPE programme is somewhat complex in that various stakeholders need to be satisfied and institutional nuances navigated with a lack of context-specific frameworks to guide the process. According to Reeves et al.¹⁰, most studies on the implementation of IPE emanate from developed countries. Lapkin et al.¹¹ confirmed the assertions of Reeves et al.¹⁰, stating that data in developing countries are limited in publication and availability. Barr¹² added that certain developing countries had implemented IPE; however, IPE is not present in its entirety. Also, research has indicated that IPE programmes, although comprising core competencies, do not share similar frameworks or content⁸. Globally, IPE programmes have been shaped by the context (institution and community) in which they are developed and implemented. That is, IPE programmes are developed to respond to the specific healthcare needs of a community and the targeted student group. Also, advocacy from regional IPE networks such as Africa Interprofessional Education Network (AfrIPEN) has yielded some responses from institutions^{13,14}.

To achieve work-ready graduates equipped with the necessary knowledge, skills and attitudes, critical changes need to be made in the health professions' curricula^{7,15}. At the North-West University (NWU), health professions' programmes are implemented on three campuses: Potchefstroom, Vanderbijlpark, and Mafikeng. The Potchefstroom campus hosts most of the health professions programmes^{16,17}. NWU supports groundbreaking teaching and learning and has a desire to become a world-renowned institute in Africa through engaged scholarship, social sensitivity, and moral action¹⁸. The demand to transform teaching and learning at NWU to be nationally relevant and internationally recognised through innovation inspired the development of this IPE programme.

6.1.1 Theoretical foundations of the programme

Teaching and learning programmes are developed within a theoretical framework as there are different theories that underline our belief of being (axiology), the nature of knowledge (epistemology) and values (axiology)¹⁹. The philosophical underpinnings of an education programme drive how the programme is structured, how teaching and

learning is organized and how learning is assessed¹⁹. The IPE programme developed in this study sought to provide health sciences, students, with the opportunity to learn from, with and about each other. Although there are many components of the study that will cut across different philosophical orientations, the underlining theory on which this programme was developed is 'contact theory'.

Contact theory, first proposed by Allport²⁰ and applied by several interprofessional education scientists²¹⁻²³, postulated the contact hypothesis that gathering individuals in a group to function or learn together is not a guarantee that the purpose for the group will be met unless some conditions regarding the group are met. These conditions include:

- Each group must have 'equal status.'
- Experience a cooperative atmosphere
- Group works on common goals
- Group receives support from the institutional leadership
- Members were educated on the group similarities and differences
- Expect that members from different categories will receive each other as members of the group.

Meeting these conditions is not a given in any group/team work situation and therefore requires careful planning and execution of strategies to enable learning and change of attitudes that are expected in an interprofessional education recipient^{22,23}. As such, the interprofessional education programme developed for the health science faculty was crafted to ensure the above conditions were met.

First the programme sought buy-in from the University authorities, which is essential for the success of the programme. Without buy-in, it will be difficult for the institution to implement and maintain the programme²¹. Second, the programme was developed to ensure professional hierarchies are controlled for, sharing leadership roles in the group across all professions. Third, groups are expected to work on a common activity or project to provide a common/group outcome; hence each member of the team will contribute their skills and knowledge from a specific field to support the group. In this case, the group members will learn and appreciate the essence and the roles of every professional group. The interprofessional groups needed to learn about each professional's roles and unique contributions to the healthcare team, thereby

understanding their similarities and differences as well as accepting each member as a positive contributor to the group outcomes. This will then lead to a cooperative environment in the group ^{22,23}.

There are three levels of programme planning; macro, meso and micro^{24,25}. This programme cuts across all levels to an extent, although it is not a degree programme. At the macro-level, the policy decisions around the need for the programme, the resources allocation, and the structure of the programme were explored and described in the programme. It was also recommended that other institutions within and without South Africa where IPE is lacking should learn from the IPE programme developed for the health science faculty to develop their own. At the meso level, the researcher explored the programmes available within the FHS and collected empirical data from faculty staff to ensure the programme is acceptable to all the entities and units in the FHS that train undergraduates. At the micro level, the aims and outcomes of the programme were described, and assessment criteria were set for the programme. Specific contents were proposed and described. The researcher, in consultation with the supervisors, decided to exclude the design of specific activities to ensure flexibility for the programme implementors to make inputs and have control of the basic elements of the programme.

6.2 METHOD

A sequential multi-method research design was employed to develop this IPE programme²⁶. An innovative and flexible multi-method design within the mixed research paradigm involves a sequential, parallel or convergent combination of either qualitative and quantitative research methods or two or more qualitative or quantitative research methods in a single study²⁷. Multi-method designs are broader than mixed-method research designs in that they could consist of two or more research methods from both positivist and interpretivist paradigms or one paradigm²⁸. The particular research methods used in multi-method studies constitute stand-alone studies whose results are innovatively combined²⁶. In sequential multi-method design, the results from previous phases serve as data or tools for the next study phase. This multi-method study was designed in five phases. Phase one comprised a scoping review to synthesise the nature, development and implementation processes of IPE

programmes globally. Phase two was a qualitative document analysis that sought to analyse IPE programmes globally to guide institutions seeking to conceptualise, develop, implement and review their IPE programmes. Phase three comprised a qualitative exploratory, descriptive study and explored the perspectives of international experts on the development and implementation of IPE programmes, including challenges faced. In phase four, the researcher utilised the results of phases one, two and three to design a draft IPE programme. In phase five, the draft IPE programme was reviewed by selected staff of the Faculty of Health Sciences (FHS) for appropriateness and implementability.

6.2.1 Scientific and Ethics and Approvals

The Health Research Ethics Committee (NWU-HREC) at the North-West University (NWU) approved this study with the following ethics number: NWU-00430-20-A1. The Research Data Gatekeeper Committee (NWU-RDGC), too, granted their approval with the following reference number: NWU-GK-21-001. Informed consent was obtained from all participants in this study.

6.2.2 Scoping Review

The scoping review was directed by the enhanced framework of Arksey and O'Malley²⁹, as given in Peters et al.³⁰, and was used to synthesise the nature, development and implementation processes of IPE programmes for higher education institutions. Conducting a scoping review meant that the length and breadth of data in a study field were summarised³¹. Searches were conducted on databases such as EBSCOhost, Scopus and PubMed, using Boolean combinations of the keywords. Data from thirty-four (34) studies was extracted onto a data matrix table. Qualitative synthesis was conducted on the data that was charted on the data matrix³².

6.2.3 Qualitative Document Analysis

In this phase of the study, the qualitative document analysis (QDA) method outlined by Wach et al.³³ was used to analyse IPE programmes globally to guide institutions to conceptualise, develop, implement and review their IPE programmes. The QDA is used to measure or review documents through evaluation and interpretation of

document content for its depth in meaning and the advancement of empirical knowledge³⁴. Searches were conducted on institutional websites that have implemented IPE globally³⁴. The publicly available data was extracted onto an excel sheet using the pre-determined list by El-Awaisi et al.³⁵ and was then analysed through thematic content analysis.

6.2.4 Qualitative Exploratory Descriptive Design

The qualitative exploratory, descriptive design sought to explore the views of IPE experts through Key Informant Interviews (KII) on the implementation of IPE programmes and the challenges encountered³⁶. Purposive sampling was used to select twenty-eight experts for this study. Fifteen of the experts gave consent to participate and were subsequently interviewed. The interviews were audio-recorded with the consent of the experts; transcripts were drafted and used when thematically analysing the data on the ATLAS.ti™ software. Following the analysis, the data was initially shared to check the accuracy of the transcriptions.

6.2.5 Development and evaluation of the IPE programme

6.2.5.1 Data Synthesis

The findings from the three phases (scoping literature review, QDA and qualitative exploratory, descriptive design) were synthesised and used to develop the IPE programme. Synthesis is a process in which the integrity and credibility of research findings are enhanced by comparing data sources, results, investigators and methods, ensuring that biases that are fundamental to each method, researcher, data source or research method are checked^{37,38}. Also, to ensure the scientific integrity of a comprehensive study of a complex phenomenon such as IPE, it is necessary to triangulate results from various sources for completeness³⁷. The findings were then compared and consolidated and interpreted. The aim here was to secure credibility by determining the consistency of the data collection methods from the previous three phases.

6.2.5.2 Context Analysis

A context analysis was conducted to position the IPE programme within the FHS. The health science undergraduate programmes compiled in NWU's 2022 Yearbook¹⁷ were analysed to ascertain common modules within which the IPE programme could be integrated. First, the researcher defined the programmes to be included. The researcher then mapped all the programmes available across the university's three campuses, presenting common modules across different health science undergraduate programmes implemented by the FHS in NWU (Table 2). A decision was made to make the IPE programme compulsory or optional based on the contextual nuances.

6.2.5.3 Development of the draft programme

The development of the draft IPE programme involved a sequential multi-method research design²⁶. The triangulated results from the scoping review, QDA and KII were used, together with the contextual analysis, to develop the draft. The draft IPE programme was then reviewed by staff from NWU's FHS, who were purposively selected based on their expertise for appropriateness and implementability.

6.2.6 Evaluation of the draft programme

An exploratory qualitative method, using a nominal group technique (NGT), was used to gather solutions and suggestions from purposively selected experts from the NWU FHS. Ten experts gave consent to participate; however, eight were present for the session. The aim of the nominal group discussion and the draft IPE programme was sent to the experts a week earlier for review. The Center for Disease Control and Prevention (CDC) document on "gaining consensus among stakeholders through the nominal group technique" guided the NGT³⁹.

The session was audio recorded with the consent of the experts; the researcher then shared the draft IPE programme on a screen. A few minutes were given to the experts to reflect on their ideas and suggestions on each section of the draft programme. Each idea was presented and discussed amongst the experts who shared their opinions. Inclusions and exclusions of ideas happened, and a consensus was reached through voting. The researcher analysed the data collected using deductive analysis, in which

the sections of the programme served as the analytical framework. The results were used to finalise the programme for the faculty.

6.3 RESULTS

6.3.1 Summary of results from phases one, two and three

6.3.1.1 *Scoping review*

It was found that IPE programmes were developed by employing models, theoretical frameworks, and resources. After conducting the analysis, the researcher developed ten steps to the IPE programme development process. These steps comprised buy-in from the institution; form an IPE team; conduct stakeholder engagements regarding the IPE; learn from other institutions; articulate common IPE content of the various curricula; design the IPE programme/curricula grounded in framework, theory and ethical principles; share programme for stakeholder inputs; finalise and seek accreditation/approval for the programme; implement the programme; continually engage stakeholder involvement in evaluation and improvement.

6.3.1.2 *Qualitative Document Analysis*

After analysing the data on IPE programmes from six institutions, a step-by-step guide and to-do list were provided to guide educators in conceptualising, developing, implementing, and reviewing their IPE programmes. We found that developing an IPE programme requires stakeholder and facilitator engagement to ensure contribution to the programme. IPE programmes in nature, scope and level differ in different contexts but include the fundamentals of the IPEC competencies. Common themes identified were classified into theory, practice and research. When IPE programmes were compared, the predominant purpose was to facilitate collaborations amongst health professions' students to meet healthcare outcomes. IPE programmes required regular improvements, and there was a trend identified with staff and student evaluations, whereas there were insufficient community evaluations.

6.3.1.3 *Qualitative Exploratory Descriptive Design*

Four themes, i.e., IPE at higher education institutions; faculty and student involvement; challenges and opportunities; and evaluation and quality improvements in IPE

programmes, were identified. IPE components were a requirement in some programmes to be accredited, which meant that it became compulsory for staff and students involved. For integrating IPE and recruiting faculty, the deans of different health schools played substantial roles. The recruited faculty then championed the programme and regularly collaborated to develop and manage the programme. The findings suggested that IPE activities must be designed to incorporate the IPEC competencies.

Some experts encouraged community-based IPE activities and delivering IPE on virtual platforms was mentioned. The challenges identified were categorised as human, fiscal and logistical problems. Opportunities identified included the international collaboration of faculty and students, learning and resource sharing, increased research and publications, and engagements of individuals on related networks. Additionally, conducting impact studies on communities and evaluating staff and students was recommended.

6.3.2 Development and evaluation of the IPE programme

6.3.2.1 *Synthesis of Findings*

It was found that the WHO definition for IPE was the most prominently used. A multistakeholder collaboration was supported through idea generation, development and implementation of IPE, which was presented as either a module or programme. Themes such as collaboration, IPEC competencies, simulations and case studies, PHC, roles and responsibilities, teamwork, sharing expertise, health promotion, communication, team management, IPE theory and IPE research were shared amongst the three phases. The themes were delivered through activities such as case studies, community projects, world café simulations and innovative activities such as the amazing race. Physical, financial and human challenges were pointed out in the consolidated findings. The importance of resources, student participation and keeping students interested was noted. Finally, substantially utilised assessments were surveys, questionnaires, pre- and post-measures, reflections, and exams. Table 1 presents a synthesis of the findings from the various phases of the literature review, document analysis and key Informant Interviews.

Table 1: Synthesis of findings from Scoping review, QDA and the KII

Concept	Scoping Review	QDA	KII
Definition	WHO definition	WHO definition of IPE	WHO definition of IPE
	CAIPE definition of IPE	CAIPE definition of IPE	CAIPE definition of IPE
		Specialised IPE definition	Specialised IPE definition
Stakeholders	Brought together representatives from different health schools	Brought together representatives from different health schools	Brought together representatives from different health schools
	Included lecturers, facilitators, staff from different departments, individuals from conferences and so on who were involved with the development and implementation	Included a director, deputy dean, faculty members, facilitators, coordinators, individuals from conferences, and presidents of faculty or health schools	Involved module coordinators, support staff, facilitators, lecturers, deans of health schools, department heads, individuals from conferences and chancellors
	Involved the community during the implementation of IPE activities	Involved the community and facilitated community-based activities	Involved the community during the implementation of IPE activities
	Partner organisations that form allies with institutions through the notion of establishing IPECP	Partner organisations that assisted with the development of the IPE programme	Professional bodies such as the regulatory authorities from different professions and local administration
	IPE champions are individuals that spearhead IPE e.g., educators	IPE champions coming together to lead IPE in their institution	IPE Champions that carry the vision of IPE e.g., researchers, task team, other institutions
	Learners that may part of IPE who may participating in learning with, from and about each other for improved collaboration in healthcare delivery		Included students, especially in the initial phase, that could provide input on what components they would like to have in IPE
Mode of Implementation	Worked on an IPE research project	Research work in IPE	Collaboration on an IPE research project
	IPE module	Joint investigative module	IPE module
	IPE programme	IPE programme	IPE programme

Concept	Scoping Review	QDA	KII
Themes	Collaboration between different health professions	Collaboration between different health professions	Collaboration between different health professions
	Applying IPEC competencies during engagement	Applying IPEC competencies during engagement	Applying IPEC competencies during engagement
	Simulations and case studies addressing patients with complex health conditions	Simulations (lived experiences) and the use of standardised patients and case studies consisting of a patient with complex health needs	Simulations and case studies addressing patients with complex health needs
	Primary healthcare	Primary healthcare	Primary healthcare
	Understanding roles and responsibilities of other professions and that of one's own	Understanding roles and responsibilities of other professions and that of one's own	Understanding roles and responsibilities of other professions and that of one's own
	Teamwork and interprofessional ventures for safe and efficient health services	Teamwork and interprofessional ventures for safe and efficient health services	Teamwork and interprofessional ventures for safe and efficient health services
	Sharing of expertise, i.e., knowledge, skills and values	Sharing of expertise, i.e., knowledge, skills and values	Sharing of expertise, i.e., knowledge, skills and values
	IPE theory, practice and research components	IPE theory, practice and research components	IPE theory, practice and research components
	Promote patient/client-centred care, health and collaboration	Interprofessional health promotion and advocacy	Patient advocacy and health promotion to achieve the best possible health outcomes
	Interprofessional communication	Interprofessional communication	Interprofessional communication
IPE activities	Case Studies that require collaborative care	Video case studies done online needing collaborative care	Case studies that facilitate interprofessional team care. IPE online learning
	Community-based IPE to expose students to collaborative work in a community	Community-based IPE to expose students to collaborative work in a community	Creating digital stories in a community as an interprofessional team.

Concept	Scoping Review	QDA	KII
			Conducting community needs analysis and health promotion through a collaborative approach. Doing home visits to the elderly that commence with a debriefing session
	Didactic learning that includes teaching and group discussions	Small group learning consisting of discussions	World café, which can be termed as group discussions on a certain topic
	Simulation experience where students can use their expertise in an interprofessional team	Clinical exposure where students can use their expertise in an interprofessional team	Simulation experience where students can use their expertise in an interprofessional team
	Research done on IPE	Research on a problem related to a specific topic	Students can work on a research poster or presentation together
			Students can participate in workshops on topics
			Role play
			IPE day/ Amazing race
Benefits and outcomes of IPE	Develop Personal relations and trust with other health professions	Build relations with other professions and generate trust	Build relations with others
	Decrease in stereotypes and improves positive attitudes amongst health professions that can positively influence future practices	Understanding of roles and responsibilities and having an awareness on the importance of the roles of others for optimal healthcare	Understanding of roles and responsibilities of other professions
	Promote collaborative work amongst different health professions	Promote collaborative work whilst providing care and treatment	Promote collaborative work to provide optimal healthcare
	Learning through experience where students interact with other students	Learning through experience and collaboration with others	Learning through experience and student interaction

Concept	Scoping Review	QDA	KII
	Improved education as enhancement and transformation can be seen to facilitate holistic patient-care	Improved education as health professionals work together to treat patients	Improved education as health professions' education is re-oriented to facilitate practice-ready graduates who can work with other professions to provide healthcare
	Health promotion through collaborations	Health promotion through collaboration	Health promotion in the community
	Promote positive behavioural changes and respect for others	Show respect for the expertise, roles and responsibilities of others	Show mutual respect when working in teams as team members are required to operate in a manner that facilitates respect
	Work in teams for the delivery of healthcare and the overall well-being of patients	Work together in teams so that optimal patient-care is achieved	Work together so that better patient-care is established
	Optimal Health Services and systems as health professionals meet health outcomes, share responsibilities and expertise	Improved healthcare through expert and collaborative treatment	Improved health services as primary healthcare demands a collaborative method to address problems in healthcare services and the delivery of those services
	Identify challenges to collaborations and overcome them for optimal treatment	Identify barriers to collaborations and how to overcome them to provide treatment	Identify healthcare problems and address those problems
	Improved patient-care and safety through a combined focus on the delivery of healthcare	Provide patient-care and safety by working together	Improved patient-care as a central motive for IPE
	Exposure to the IPEC competencies and the expertise of other professions	Exposure to the IPEC competencies and the expertise of other professions	Exposure to the IPEC competencies and the expertise of others
	Develop health systems that are cost effective through collaborative healthcare		
			Expose students to common concepts and activities where collaboration can take place

Concept	Scoping Review	QDA	KII
Challenges	Human resource challenges: limited staff; lack of motivation of staff; poor attitudes and perceptions of IPE	Human resource challenges: limited staff; lack of motivation of staff; buy-in from the institution or faculty; training the faculty on IPE	Human resource challenges: limited staff; lack of motivation of staff; lack of knowledge and understanding of IPE; buy-in from the institution or faculty; training the faculty on IPE; training of standardised patients to take part in activities
	Physical resource challenges: IPE implementation at institutions; scheduling an appropriate day;	Physical resource challenges: IPE implementation at institutions; scheduling an appropriate day; lack of time; lack of space; virtual burnout caused by moving online; developing suitable measures for IPE; managing team conflicts in an interprofessional team	Physical resource challenges: IPE implementation at institutions; scheduling an appropriate day; lack of time; lack of space; moving online causing burnout; managing a large IPE group with a limited staff; developing suitable measures for IPE; hierarchy/professional rivalry leading to working in silos; managing team conflicts in an interprofessional team; transportation challenges in getting students from one setting to the next
		Financial resource challenges: lack of funds to implement and drive IPE	Financial resource challenges: lack of funds to implement and drive IPE
		Developing the IPE programme for all year levels for undergraduates so that students have enough exposure	
			Accreditation challenge as other programmes may not want to give up credits

Concept	Scoping Review	QDA	KII
Resources	Students joining workshops	Students to have workshops on a particular topic	Students to have workshops on a particular topic
	Student handbooks issued so that students may prepare before IPE sessions		Student workbooks are significant in assisting students to navigate learning and collaboration
		Facilitator guides to assist facilitators when students collaborate	Facilitator guides are important in steering IPE learning and collaboration
		Students to make use of digital resources on a particular topic	Using digital resources such as videos, photographs, PowerPoints, podcasts
			Asynchronous learning material such as notes so students can familiarise themselves before class
Participation	Student	Student	Student
	Facilitator	Facilitator	Facilitator
	Simulated patients	Simulated patients	Simulated patients
		Health Schools	Health Schools
		Student supervisors	
		Guest lecturers	
		Mentor	
Raising student expectations and keeping them motivated	Student collaboration during IPE	Student collaboration during IPE	Student collaboration during IPE
	Challenge their perceptions when working with other professions	Challenge student thinking so they may brainstorm solutions	Use critical thinking to come up with solutions
	Reflections so that students are able to deliver their thoughts	Reflections so that students are able to deliver their thoughts	Reflections so that students are able to deliver their thoughts
	Social accountability	Accountability to the team during IPE	Accountability to the team during IPE

Concept	Scoping Review	QDA	KII
	Student-colleague interactions to stimulate communication and build relations		Interacting with professionals working in the field
	Issuing quizzes to students to measure their understanding		Issuing quizzes to students to measure their understanding
Assessment	Questionnaires	Questionnaires	Questionnaires
	Examination	Examination	Pre and post tests
		Surveys	Surveys
	Evaluations	Evaluations	Evaluations
	Reflections	Reflections	Reflective writing
		Oral and written presentations	
		Quizzes	
			Group discussions and interviews to enrich the programme

6.3.2.1.1 Definition

Generally, the most prominent definition of IPE adopted by institutions and researchers was the WHO definition, which states that IPE occurs when two or more professions' "students learn about, from and with each other"⁷. The CAIPE definition was used by certain institutions (found in the scoping review, QDA and KII), while others formulated their institutional definitions. In all these cases, the underlining principles remain the same: a) students from two or more health professions, b) learning together, and c) the purpose is to enhance collaborative practice.

6.3.2.1.2 Stakeholders

IPE requires a multi-stakeholder collaboration in its conceptualization, development and implementation. From the results, the stakeholders, who include lecturers, support staff and heads of departments, facilitators, directors, deans and deputy deans, coordinators, individuals from conferences, chancellors and conference delegates too, were involved in the development and/or implementation of IPE programmes. Other stakeholders can include the community, especially in terms of community-based IPE activities, partner organisations that assist in developing IPE, professional bodies and regulatory authorities for the different professions and the local administrations. Students were emphasised as critical stakeholders in the development and implementation of IPE.

6.3.2.1.3 Mode of implementation

IPE was implemented in four different modes at learning institutions. The analysis found that IPE had been implemented through research, IPE module and as undergraduate and graduate IPE programmes.

6.3.2.1.4 Themes

Amongst the numerous themes on IPE programmes, the most distinguished themes are shown in Table 2 below:

Table 2: Consolidated IPE themes from the scoping review, QDA and KII

No.	Consolidated IPE themes
a.	Collaboration between different health professions
b.	Application of IPEC competencies during engagement

c.	Engaging in simulations and case studies catering to patients with complex health conditions
d.	Emphasis on Primary Health Care
e.	Understanding the roles and responsibilities of other professions and that of one's own
f.	Teamwork and interprofessional ventures for safe and efficient health services
g.	Sharing of expertise, i.e., knowledge, skills and values
h.	Emphasis on IPE theory, practice and research components
i.	Patient advocacy and health promotion for the best possible health outcomes
j.	Interprofessional communication amongst team members
k.	Interprofessional team conflict management

6.3.2.1.5 IPE activities

A range of activities were found, such as case studies, community-based IPE and doing home visits to the elderly in the community, didactic learning, discussions in the format of a world café and simulations with standardised patients; these were prominent activities where students collaborate. Conducting IPE research and doing posters or presentations were acknowledged as IPE activities. Doing role plays, where students dress up according to their professional roles, was also an innovative activity. Participating in workshops on certain topics and taking part in an IPE day similar to the concept of the Amazing Race, where different stations or health challenges were places for the IPE team to overcome, was a fun way to offer IPE.

6.3.2.1.6 Benefits and outcomes of IPE

From all three phases, it was discovered that IPE enhances the building of relations and trust among health professions, provides the opportunity for professionals to understand their roles and responsibilities and that of others and promotes collaborative work whilst providing optimal care and learning through experience. Additionally, IPE improves the educational experiences of the participating students and improves patient outcomes. Also, positive behavioural changes, together with respect for the expertise of others, were promoted. Furthermore, health services and systems were optimised through collaborations and the sharing of responsibilities and expertise.

6.3.2.1.7 Challenges

The most common IPE challenges identified were limited or lack of human, physical and financial resources. The human resource challenges included staff challenges, lack of motivation and poor attitudes and perceptions, lack of knowledge and understanding, lack of buy-in from institutions, and lack of training of faculty and the standardised patients. Physical resource challenges identified included the overall implementation of IPE in institutions, scheduling and lack of time, lack of space and moving online, causing virtual burnouts. Furthermore, developing suitable IPE measures, managing conflicts within a team, managing large groups during IPE activities and the presence of hierarchy/professional rivalry causing professionals to work in silos were amongst the most common physical resource challenges. Other physical resource challenges included transportation in terms of moving students from one location to the next, especially when doing community-based IPE activities. The financial resource challenge was that of limited funds to run an IPE programme in a higher learning institution.

6.3.2.1.8 Resources

Workshops were seen as a resource where students could be exposed to a particular topic. Guidebooks for the facilitators on how to operate during IPE were very important, whilst on the other hand, issuing students with student workbooks to prepare beforehand was deemed necessary. Using digital resources such as videos, PowerPoints, photographs, and podcasts complimented IPE in terms of learning and activities.

6.3.2.1.9 Participation

Students would be the direct recipients when it comes to participating in IPE. Facilitators would participate in the sense that they would oversee student collaborations and guide the students; rather than providing students with the answers; they would encourage them to look for solutions amongst themselves. The standardised patients would participate in simulations where students were given a patient with complex conditions so that they work as an interprofessional team to provide optimal healthcare. The participation of health schools, student supervisors,

guest lecturers and mentors were not commonly used, however, they were noted during the analysis.

6.3.2.1.10 Raising student expectations and keeping them motivated

With the notion of collaborating with other professions, students attended IPE sessions well-motivated. Since IPE was an innovative way to get two or more health professions to work together, challenging their way of thinking in terms of coming up with solutions was a strong way in which students were kept engaged. Students were able to complete reflections in which they could express their views and thoughts around IPE, teamwork and other components. There was an essence of social accountability, meaning that the decisions made by the healthcare team impacted the recipients of healthcare services; thus, team members needed to be socially accountable to patients. Team members, too, held each other accountable for what occurred during the interprofessional process of delivering optimal healthcare services. It was found that students enjoyed interacting with their professional counterparts and seeing those professionals working in the healthcare field. Students were found to have appreciated the issuing of quizzes to complete in order to measure their understanding and other aspects of IPE.

6.3.2.1.11 Assessment

Surveys, questionnaires, examinations, pre and post-tests, evaluations and reflective writing were the assessments identified. Surveys are used as evidence-based research for data collection, analysis and interpretation to test a phenomenon or intervention⁴⁰. There are different types of surveys, e.g., questionnaires, face-to-face, telephone, self-administered and internet surveys⁴⁰. A questionnaire is a research tool and a central component of a survey, with a set of standardised questions or items used to collect data from respondents on a phenomenon or intervention^{40,41}. Questionnaires need to be developed and validated properly for use in clinical investigation and trials⁴¹. Examinations or exams are formal tests conducted to determine knowledge, proficiency or skill regarding a particular topic⁴². Exams can include essays, oral and written, short and long answers, multiple choice, case studies, open book, or take home⁴³. Pre and post-tests are used to measure the change or difference in views, knowledge, and skills after being exposed to a situation⁴⁴. According to Wanzer⁴⁵, evaluation is a systemic process for regulating the importance,

meaning, significance or impact of a programme or situation. Benson⁴⁶ stated that there are four types of evaluations, i.e., *placement evaluations* measuring readiness (pre-tests), *formative evaluations* to monitor learning through continuous feedback (tests or exams), *diagnostic evaluations* to measure learning difficulties (following formative evaluation) and *summative evaluations* determining the scope of the programme objectives that have been met. Reflective writing is used to analyse and examine a situation and how it has impacted the writer. For example, in IPE, students can discuss what they have learnt, their experiences and the skills learnt⁴⁷. Other types of assessments not dominantly mentioned but noted included oral and written presentations, quizzes, group discussions and interviews.

6.3.2.2 Context analysis

6.3.2.2.1 Programmes included

Once the findings from the three phases had been consolidated, the health professions programmes at NWU were examined by employing the Faculty of Health Sciences Undergraduate 2022 yearbook¹⁷. Each programme was critically analysed based on its outcomes and if it captured the essence or concept of IPE. The researcher excluded some programmes based on the inclusion criteria: a) must display IPE idea, concept or theme, b) must be a minimum of 3 years in length for adequate exposure, and c) programme must include more health modules than modules from non-health faculties. Therefore, 14 programmes that did not meet IPE requirements were excluded.

6.3.2.2.2 Cross-campus programmes

From Table 3, the researcher found that only the Bachelor of Social Work and Bachelor of Health Sciences Honours in Psychology programmes are implemented across the Potchefstroom, Mafikeng and Vanderbijlpark campuses. The common programmes between Potchefstroom and Mafikeng campuses were Bachelor of Health Sciences with Sports Coaching and Human Movement Sciences and Bachelor of Nursing.

Table 3: Health professions programmes on the three main campuses of the NWU

<u>Programmes</u>	<u>Potchefstroom</u>	<u>Mafikeng</u>	<u>Vanderbijlpark</u>
Bachelor of Social Work	√	√	√

Programmes	Potchefstroom	Mafikeng	Vanderbijlpark
Bachelor of Health Sciences Honours in Psychology	√	√	√
Bachelor of Nursing	√	√	
Bachelor of Health Sciences with Sport Coaching and Human Movement Sciences	√	√	
Bachelor of Health Sciences with Physiology and Psychology	√		
Bachelor of Pharmacy	√		
Bachelor of Science in Dietetics	√		
Bachelor of Health Sciences in Occupational Hygiene	√		
Bachelor of Health Sciences in Biokinetics	√		
Bachelor of Health Sciences Honours in Human Movement Sciences with Kinderkinetics	√		
Bachelor of Health Sciences Honours in Human Movement Sciences with Sport Science	√		
Bachelor of Science Honours in Nutrition	√		
Bachelor of Health Sciences Honours in Physiology	√		
Bachelor of Social Science with Psychology		√	

6.3.2.2.3 Cross-programme modules

The researcher found that the WVGW 222 module (know and understand the health world), previously WVGW 221, comprising some components of IPE (interprofessional group work and teamwork) is present in all Health Sciences programmes at the second year, second-semester level.

Competencies of IPE, concepts around IPE and patient-centred care were among the requirements when including programmes for developing a draft IPE programme. The researcher, under the guidance of the supervisory team, further analysed the modules within the FHS to identify which ones sought to teach common IPE concepts (interpersonal communication, teamwork and collaboration, problem-solving, diagnosis, community intervention, roles and responsibilities, ethics in healthcare, health promotion, patient-centred care and research).

Table 4: Shared modules across the different health schools at the NWU

No.	Common Module	Dietetics	Human Movement Sciences	Nursing Sciences	Occupational Hygiene	Pharmacy	Physiology	Psychology	Social Work
1	WVGW 222	√	√	√	√	√	√	√	√
2	PSYC 121		√	√			√	√	√
3	PSYC 321		√				√	√	√
4	PSYC 221		√				√	√	√
5	PSYC 212		√				√	√	√
6	PSYC 111		√				√	√	√
7	FLGX 213	√			√		√	√	
8	FLGX 113	√			√		√	√	
9	PSYC 322						√	√	√
10	PSYC 311						√	√	√
11	FLGX 328				√		√	√	
12	FLGX 313				√		√	√	
13	FLGX 329	√					√	√	
14	FLGX 224	√					√	√	

6.3.2.2.4 Common IPE Concepts across programmes

Table 4 depicts that only WVGW 222 runs across all the health schools. One module (PSYC 121) was shared in five programmes and at best, only four schools shared specific modules. Thus, currently, at NWU, the existing context makes it difficult for IPE integration into the curricula. The researcher decided to determine common IPE concepts between those selected programmes and then develop the IPE programme

through concepts as there was no common module running across the programmes. Figure 1 shows the interprofessional concepts that have been identified in the different modules.

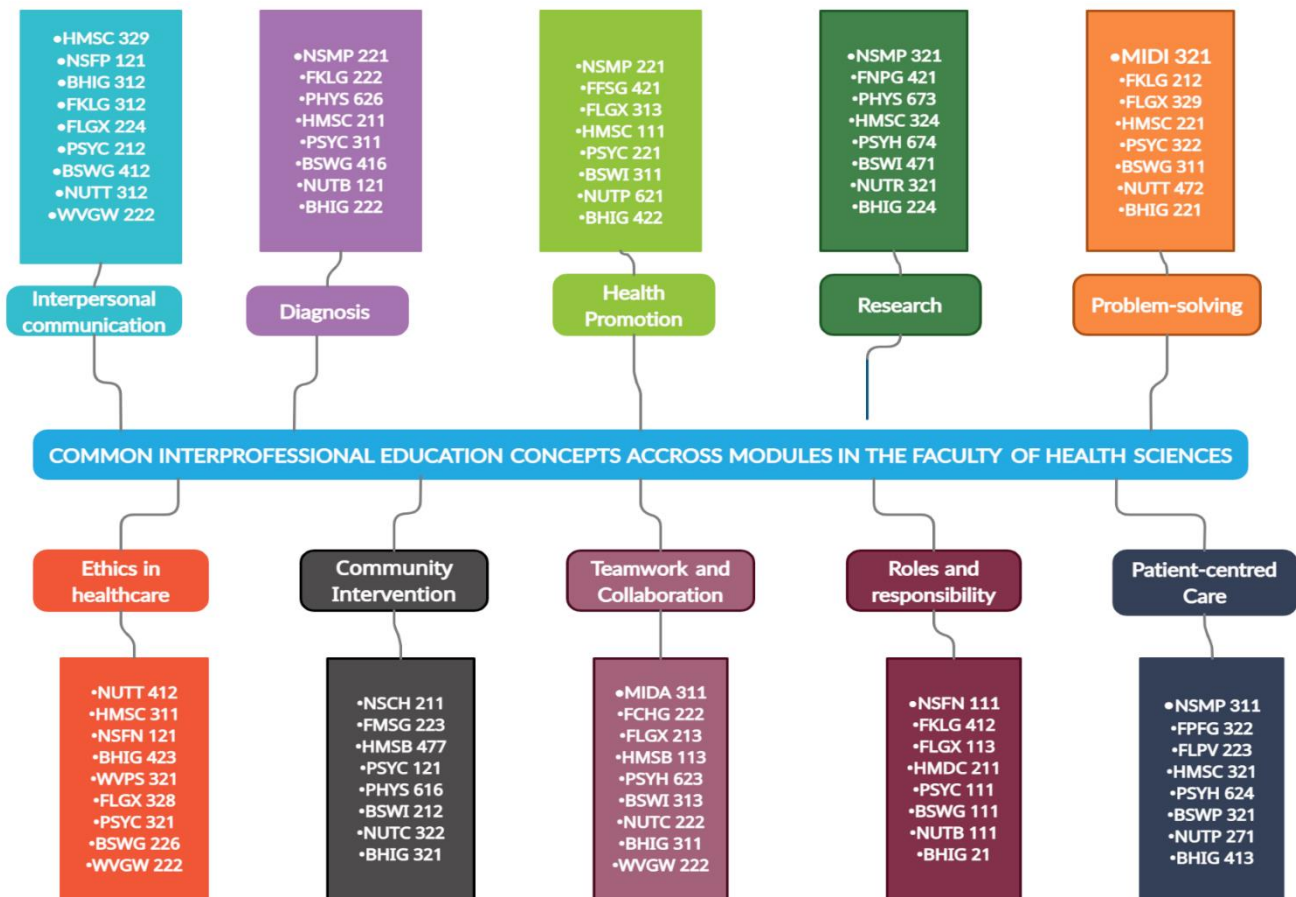


Figure 1: A consolidation of the NWU’s health professions modules to implement the key concepts through IPE activities

(Note: Descriptions of the module codes are given in the Supplementary Material [SM])

6.3.2.2.5 Compulsory versus Optional IPE Programme for the NWU

IPE programmes were either compulsory^{7,48–52} or optional^{50,51}. Compulsory IPE programmes were mainly implemented in undergraduate health training. They were more formal and explicit in their nature (aim, target audience, experience, and assessment). Optional IPE programmes might be implemented too, but the duration, nature and timing of each programme might differ⁵¹. Furthermore, staff training and programme evaluations might not be as extensive as for compulsory programmes. In either structure, the development and implementation aim were to improve

collaboration between professions, improve teamwork skills, improve health outcomes and quality care and increase learning from other professions⁵³.

Compulsory IPE programmes provided some benefits. Firstly, the institute could close the gap between siloed learning and health professions; schools, and students could work together in interprofessional activities^{50,54} and assessments^{50,55}. Facilitators could be innovative in designing creative and fun activities and challenge student thinking⁵⁰. Students were exposed to competencies and knowledge required in clinical practice and enhanced their skills to plan and implement those plans effectively as an interprofessional team⁵⁶. Students could collaborate in a safe and secure environment to provide optimal healthcare services to patients with complex needs⁵⁶. They could work together and appreciate the roles and responsibilities of other professions⁹. Healthcare outcomes could improve as patients were provided with better quality care⁴⁸. Lastly, the programme would serve as an enrichment opportunity as students would be equipped with the expertise when they graduated⁵⁷.

However, there were specific challenges associated with implementing a compulsory IPE programme. For instance, buy-in from the faculty might be a challenge as staff from certain health schools might not want to include an IPE programme for their students or might be resistant to its benefits. Health schools might not want to give up accreditation to make room for an IPE programme. Recurriculation might need to occur to implement the programme and avoid logistical challenges, which NWU does not presently allow. Health students might not find the time to take up another compulsory programme with their already packed schedules. In terms of the IPE activities, they would need to be structured to accommodate most, if not all, professions. Limited resources, such as finance and staff, would be another challenge, as a dedicated IPE team would need to carry out the programme. Staff would need to handle clerical work, be ratioed according to the student group, and design reliable and parallel assessments to IPE standards.

The researcher determined that a compulsory programme was not suitable for NWU after discovering the various challenges that NWU may encounter with attempting to implement a compulsory IPE programme. The decision that a compulsory programme would not be appropriate was based on the evidence collected and the analysis and synthesis conducted. The programme would be non-credit scoring and run throughout

the year. Students could be issued certificates of completion. It could be established as an optional module and eventually be implemented as compulsory once mass rearticulation occurs. By this time, the benefits of IPE would be apparent, and the programme would have gained support.

6.3.2.3 *Draft programme*

The design of the IPE programme for the FHS at NWU was systematic in nature. Findings from the scoping review, QDA and KII were used to design the programme for the FHS while considering the context critically. The idea was to ensure that extra work was not added to the content of the undergraduate health professions curricula but to use existing content to achieve IPE outcomes innovatively.

Due to the context of NWU, an optional programme was developed. The programme was developed in three-year levels, and each level in the programme content included common concepts, the modules that reflected those concepts, the outcomes and assessment criteria of each level, the proposed IPE activities and the resources needed to carry out those activities. The draft programme proposed how to implement the programme, i.e., who implements the programme, the policy and legislation to follow, promotion and administration of the programme, proposed hours required, suggested resources for the activities and reviewing of the programme.

6.3.2.4 *Programme evaluation*

Depending on the nature of the IPE activities, experts agreed that activities taking place in smaller groups would be best. Some concepts might be more relevant to bigger groups (from the three campuses) who could participate online, whereas smaller groups could be in-person. Experts agreed that face-to-face meetings would be more effective. Still, contextual nuances, such as financial implications and challenges with transporting students, would not permit participation from all the professions in a small face-to-face group.

For IPE 1, the experts agreed that students should be taught theory to understand their scope of practice before interprofessional teamwork. A common activity for IPE 1 could address, for example, communication, so students could learn communication components and how to communicate with others. Implementing IPE in three-year levels would be ideal as there was not much student representation in the fourth year.

For IPE 1, the outcomes 'e' and 'f' were merged, and the outcome 'g' and assessment 'g' were swapped. The outcomes and assessment criteria for IPE 2 and IPE 3 remained unchanged. Only one activity (world café) for IPE 1 was supported, and the experts agreed to move the other (clinical simulation) activity to IPE 3. The activities for IPE 2 included community intervention, health promotion and research. The activities for IPE 3 included the amazing race, a case study and clinical simulation. The resources, according to the agreed activities, remained unchanged. The experts agreed that the IPE unit responsible for the programme should determine and finalise the allocation of hours needed for each activity.

“I also agree with the increments, but I don't think we are in a position to suggest any number of hours; I think that will lie with the admin, especially as I think it was (expert 5) who mentioned the module credits and program credits, will play a large role here which we don't have a say about, so I think we should leave it for them to finalise”-Expert 2

The experts supported including individuals in senior positions in the discussions and getting an awards programme such as the annual Institutional Teaching Excellence Awards (ITEA) to get staff to volunteer. The volunteering staff then source students and administer the programme. Additionally, staff could be invited to join through IPE symposia or workshops. To guide IPE policy and legislation, experts supported using the World Health Organization's⁷ *Framework for Action on Interprofessional Education and Collaborative Practice* and the *Interprofessional Education Collaborative*⁵⁸ *Core Competencies for Interprofessional Collaborative Practice*.

“The implementation of the programme would be fine if the directors and line managers are included in the discussion as well” -Expert 3

Students could be encouraged to register for the IPE programme on the Learning Management System (LMS). Experts agreed that the IPE unit, that would be established to run the IPE programme, must use what is available at the university, and for transport and refreshments, the unit could apply for funding. The teaching and learning approaches in the different clusters would be built using the following: team-based learning (TBL) and case-based learning (CBL), simulation-based learning (SBL) and problem-based learning (PBL). Self-Directed Learning (SDL) was added as IPE 1 would be theory-based.

The experts agreed that students should complete a customised evaluation tool for the programme. Posting the survey on the LMS or requesting staff to take a few minutes to ask students to complete the surveys was supported. The experts agreed on these evaluation approaches, emphasising the challenge associated with obtaining student responses. Experts noted the importance and need for the programme and the challenges with implementing the programme, and that sufficient data would be required to prove the feasibility of the IPE programme.

“I enjoyed the nominal group session; it was nice to discuss it like this and get agreements and see different viewpoints and good luck; yes, it is not easy to implement the IPE, but I think it's very important and we need it, we really need it, especially in the faculty of health sciences so good luck”-
Expert 7

6.3.3 The IPE programme for FHS-NWU

The programme (see SM) aimed to provide students with the opportunity to learn with, from and about each other by developing interprofessional knowledge, skills, and attitudes through theoretical and practical underpinnings for Interprofessional Education and Collaborative Practice (IPECP). There were nine outcomes that the programme aimed to achieve with ten concepts divided into three-year levels, i.e., IPE 1, IPE 2 and IPE 3, with exclusive outcomes and assessment (for learning) criteria. Thus, first-year students experience IPE 1, second-year students experience IPE 2 and third-year students experience IPE 3. IPE 1 comprised the concepts of interpersonal communication, roles and responsibilities, ethics in healthcare and teamwork and collaboration with a world café activity. IPE 2 incorporated the concepts of community intervention, health promotion and research with community diagnosis and public health campaign as an activity. IPE 3 comprised diagnosis, problem-solving and patient-centred care with three activities, i.e., amazing race, case study and clinical simulation.

The programme implementation addressed the individuals responsible for the programme, the policy and legislation that would govern the programme, the programme promotion and administration and resources for IPE 1, 2 and 3. The allocation of the hours would be at the discretion of the IPE unit responsible for the programme, who would then determine the necessary hours for the successful

completion of each activity. The programme requires regular evaluations from both staff and students to refine the programme and implement the relevant suggestions.

6.4 DISCUSSION

This study was motivated by insufficient interprofessional education opportunities provided by the current health professions curricula of NWU. The development and implementation of an IPE programme would create an opportunity for NWU health professions' students to better prepare for a collaborative practice work environment to optimise healthcare and health outcomes⁷. This study employed a sequential multi-methods research design, supported by a scoping review, a document analysis, key informant interviews, programme development and evaluation through a nominal group discussion to develop an interprofessional education programme for FHS, NWU.

A three-year optional (non-credit bearing) IPE programme was developed with the concepts of interpersonal communication, teamwork, and collaboration, problem-solving; diagnosis, community intervention, roles and responsibilities, ethics in healthcare, health promotion, patient-centred care, and research. Although there was strong advocacy for compulsory, credit-bearing IPE programmes⁵⁹, the NWU context does not allow for it at the moment. It was recommended that the optional programme should be slowly integrated into credit-bearing modules during major programme reviews and rearticulation. James et al.⁶⁰ and Brooks et al.⁶¹ also found that implementing an optional IPE is an essential starting point.

We found that the multi-campus nature of NWU and the lack of many health professions' programmes on the Mahikeng and Vanderbijlpark campuses made it impossible for the two campuses to have on-campus, face-to-face, interprofessional activities. Also, the distance between the three campuses and the cost of transportation, in addition to the risks of travelling to and from campuses, made it difficult for face-to-face IPE programmes. These circumstances necessitated an innovative online interprofessional group activity. The increased capacity of NWU staff and students for online teaching and learning during the COVID-19 pandemic provided an opportunity to harness an online IPE programme.

There are disproportionate numbers of health professions' student groups in each programme, which means the different professions' students could not be matched equally, creating a situation where each professional group is not represented in equal proportion in one small group or is left unmatched. Great effort is required to ensure that no professional group dominates another and no student is left behind.

The content of the programme was arranged to ensure that first-year students, who would not have been fully socialised into their professions, engaged with theory and general IPE skills development (See SM). The second year engaged in research, which, to an extent, informed problem-solving. The third years then participated in clinical application activities using what they had learnt in IPE 1 (theory) and IPE 2 (research).

From the nominal group discussion, it was suggested that it would be difficult to attract faculty participation due to the optional nature of the programme. Innovations such as participation awards should be instituted to motivate faculty to join. The experts supported the institution of a dedicated unit to administer the IPE programme. The unit would include the voluntary staff, invited through IPE symposia or workshops, and would also be responsible for sourcing the students and marketing the programme. We found that the programme should be evaluated by participating students and staff regularly. Staff should encourage students to complete the evaluation so that the programme can be improved. WHO⁷ added that substantial effort is still necessary to evaluate IPE and its initiatives with globally recognised best practices.

6.5 CONCLUSION

Globally, IPE programmes have been contextualised to meet the local and current health needs of the community. The Faculty of Health Sciences, NWU context was permissive of an optional programme despite the recommended compulsory (credit-bearing) IPE modules by international bodies. The optional three-year IPE programme developed, however, will serve as a percussor for the integration of a credit-bearing IPE programme into the Faculty of Health Sciences curricula during future rearticulation. Although the NWU context provides opportunities to surmount the common challenges to the development and implementation of IPE programmes, we envisage other contextual challenges during the full implementation of the programme

and believe the leadership and academics will be motivated enough to implement the programme. We will recommend other institutions learn from the processes involved in this study to develop their programmes or adapt this programme for their context to increase the presence of IPE on the African continent.

Finally, the advocacy of regional networks such as AfrIPEN on the continent needs to be intensified to stimulate the development and implementation of more IPE programmes. This will ensure a growing community of practice and sharing of expertise across the African context for the sustenance of the IPE programmes.

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6.7 SUPPLEMENTARY MATERIAL: AN INTERPROFESSIONAL EDUCATION PROGRAMME FOR NORTH-WEST UNIVERSITY FACULTY OF HEALTH SCIENCES

AN INTERPROFESSIONAL EDUCATION PROGRAMME FOR NORTH-WEST UNIVERSITY FACULTY OF HEALTH SCIENCES

1. Aim of the IPE Programme

The aim of an interprofessional education (IPE) programme for the Faculty of Health Sciences (FHS) of the North-West University is to provide students with the opportunity to learn with, from and about each other by developing interprofessional knowledge, skills, and attitudes through theoretical and practical learnings for Interprofessional Education and Collaborative Practice (IPECP).

2. Outcomes of the Programme

The programme outcomes align to: a) teamwork and collaboration to reach common health goals, b) interpersonal communication to communicate within the team, with the patients, their families and communities c) ethics in healthcare to practice according to a code of conduct and maintain ethical integrity, d) respect and appreciation for the roles and responsibilities of other professions, e) problem-solving abilities to come up with health solutions, f) being able to diagnose conditions and provide measures of control, g) identify the needs of the community through community intervention, h) offering patient-centred care and i) the ability to conduct research in IPE.

3. Assessment Criteria

In this programme, there would not be an assessment of learning, i.e., no formal assessments. There will, however, be assessment for learning to determine whether students have met the outcomes for the specific levels (IPE 1, IPE 2, and IPE 3). The assessment criteria are there to measure the undergraduate students' successful accomplishment of the stipulated outcomes and are not necessarily put in place for formal assessment. The three levels are presented in detail, where the concepts, outcomes and assessment criteria; the proposed activities have been given.

4. Programme Content

Because some undergraduate programmes are implemented over three years, it is imperative that the IPE programme is planned in a way that students can complete the content before graduation. Ten common IPE concepts were restructured into a three-year IPE programme

i.e., IPE 1, IPE 2, and IPE 3. First-year students should complete IPE 1, second-year students should complete IPE 2 and third-year students should complete IPE 3.

From the scoping review, Qualitative Document Analysis (QDA) and the Key Informant Interviews (KII), we found that certain IPE programmes were structured or put together in year levels¹, supporting the decision to develop a three-year IPE programme for undergraduate students. Thus, undergraduate students from first to the third year would have the opportunity to experience IPE at all levels. Figure 1 shows the clustering of the concepts and activities from IPE 1 to IPE 3.

¹ Scoping review: Stubbs, C., Schorn, M. N., Leavell, J. P., Espiritu, E. W., Davis, G., Gentry, C. K., Friedman, E., Patton, T., Graham, A., & Crowder, R. (2017). Implementing and evaluating a community-based, inter-institutional, interprofessional education pilot programme. *Journal of interprofessional care*, 31(5), 652-655.

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Frantz, J. M., & Rhoda, A. J. (2017). Implementing interprofessional education and practice: Lessons from a resource-constrained university. *Journal of interprofessional care*, 31(2), 180-183.

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Van Gessel, E., Picchiottino, P., Doureradjam, R., Nendaz, M., & Mèche, P. (2018). Interprofessional training: Start with the youngest! A program for undergraduate healthcare students in Geneva, Switzerland. *Medical teacher*, 40(6), 595-599.

QDA: University B – University D

KII: Incorporated IPE into undergraduate learning

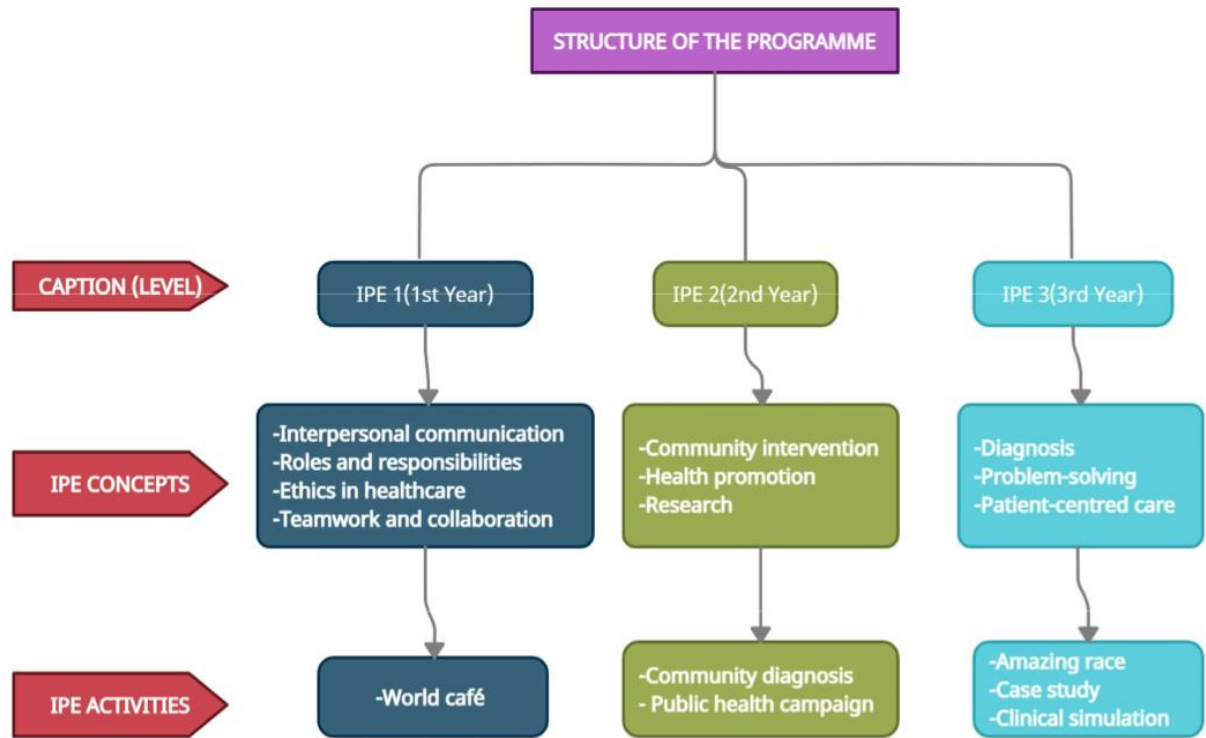


Figure S1: The combination of IPE concepts and activities in the three years

4.1 Interprofessional Education 1 (IPE1): Ethics in healthcare, teamwork, and collaboration

Interprofessional Education 1 seeks to inculcate the fundamentals of healthcare ethics, ability to work in healthcare teams and collaboratively solve clinical problems, a hallmark of Interprofessional Collaborative Practice (IPCP), which is the original intent for IPE. Although the North-West University (NWU) Health Sciences curricula do not accommodate the option of teaching of these concepts through IPE, most of the content is taught in isolated modules. For example, *NUTT 312 (Medical nutrition therapy, BSc Dietetics)*; *HMSC 329 (Clinical exercise physiology, BHSc Human Movement Sciences)*; *NSFP 121 (Nursing science practice: fundamental 2, B.Nursing)*; *BHIG 312 (Occupational hygiene legislation, BHSc Occupational Hygiene)*; *FKLG 312 (Pharmacology 2A, B.Pharm)*; *FLGX 224 (Metabolism, BHSc Physiology)*; *PSYC 212 (Personality psychology, BHSc & B.SocSc Psychology)*; and *BSWG 412 (Social work in host settings, BSW)* seek to inculcate interpersonal communication, which is a critical component of teamwork and healthcare. Interpersonal communication is a skill employed by healthcare professionals to attain and comprehend the concerns of the patients, to describe healthcare problems and participate in joint decision-making through the establishment of an immediate relationship^{1,2}.

Similarly, *NUTB 111 (Introduction to the professions, BSc Dietetics)*; *HMDC 211 (Introduction to sport injuries, BHSc Human Movement Sciences)*; *NSFN 111 (Nursing science: Fundamental 1, B.Nursing)*; *BHIG 211 (Fundamentals of occupational hygiene, BHSc Occupational Hygiene)*; *FKLG 412 (Pharmacology 3A, B.Pharm)*; *FLGX 113 (Introduction to physiology, BHSc Physiology)*; *PSYC 111 (Introduction to psychology, BHSc & B.SocSc Psychology)* and *BSWG 111 (Introduction to social work as a profession, BSW)* seek to inculcate roles and responsibilities as a critical component of teamwork in healthcare. According to Oldland et al.³, roles and responsibilities are the duties carried out by certain professions to promote quality healthcare.

In addition, *NUTF 471 (Food service management practice, BSc Dietetics)*; *HMSC 311 (Healthcare management and ethics, BHSc Human Movement Sciences)*; *NSFN 121 (Nursing science: fundamental 2, B.Nursing)*; *BHIG 423 (Management, occupational safety and environmental health, BHSc Occupational Hygiene)*; *WVPS 321 (Ethics for the pharmacist, B.Pharm)*; *FLGX 328 (Reproduction physiology, BHSc Physiology)*; *PSYC 321 (Basic counselling and ethical conduct, BHSc & B.SocSc Psychology)* and *BSWG 226 (Developmental welfare policy A, BSW)*, seek to inculcate ethics in healthcare. Runciman et al.⁴ state that ethics is the code of conduct through which a professional operates in terms of safety and management.

Regarding Teamwork and collaboration, *NUTC 222 (Introduction to community nutrition, BSc Dietetics)*; *HMSB 113 (Introduction to biokinetics, BHSc Human Movement Sciences)*; *MIDA 311 (Midwifery: Antenatal care, B.Nursing)*; *BHIG 311 (Toxicology 2, BHSc Occupational Hygiene)*; *FCHG 222 (Pharmaceutical chemistry 1B, B.Pharm)*; *FLGX 213 (Endocrine system and digestion, BHSc Physiology)*; *PSYH623 (Child and adolescent psychology, BHSc Hons Psychology)* and *BSWI 313 (Social group work: theory and practice B, BSW)* attempt to foster the concept through their individual learning. Teamwork and collaboration is the engagement of professionals to offer quality healthcare and improved access to health services⁵.

IPE 1, seeks not only to enhance the teaching and learning in these modules but also to help students learn from, with and about each other to promote their ability to practice efficiently in an interprofessional healthcare team.

4.1.1 Outcomes and assessment for IPE 1

The outcomes and assessment criteria were drawn from the concepts of IPE 1. The criteria were analysed from the listed modules. The analysis of the outcomes and assessment criteria was done by examining the existing ones of the modules and determining the most suited criteria aligned to the concept. A set of criteria was presented that represents the concepts in IPE 1. Table S1 shows the outcomes and assessment for learning criteria for IPE 1.

Table S1: Outcomes and assessment for learning criteria for IPE 1

Outcomes	Assessment for learning
<ul style="list-style-type: none"> a) Understand and respect the roles, responsibilities and expertise of other professions. b) Work in teams to overcome health challenges and offer optimal health services. c) Work together to reach common goals, improve productivity, reduce workload and increase problem-solving abilities. d) Accept responsibility and accountability for own actions and operate in a manner where others can be held accountable. e) Practice and justify healthcare decisions through moral and ethical grounding, while maintaining ethical values and upholding those values under influence or conflict situations in both individual and team aspects. f) Show an ability to think and respond quickly and be able to educate and advise accordingly. 	<ul style="list-style-type: none"> a) Identify and describe the roles and responsibilities of each professional in the team and show respect towards their expertise in their field. b) Display teamwork abilities to overcome health challenges and offer optimal health services. c) Demonstrate collaboration to meet common goals, improve output, decrease workload and improve problem-solving. d) Demonstrate maturity in actions and decision making and be able to answer accordingly. e) Display profession-specific and shared values and work ethics and be able to behave in a cooperative manner to ensure the output of health services. f) Communicate to convey information through giving advice, recommendations, insights, explanations, and solutions.

4.1.2 Activity design for IPE 1

For IPE 1, one activity was identified for the concepts included, i.e., world café. The world café is an informal activity where students are given a case study to explore through discussions in their teams⁶. The world café can include large groups at a time and team members engage in constructive discussions drawing from diverse opinions.

4.2 Interprofessional Education 2 (IPE 2): Health Promotion and Research

Community intervention, health promotion and research seek to inculcate the fundamentals of healthcare research, the ability to work in healthcare teams and collaboratively solve community health problems. Although the NWU Health Sciences curricula does not accommodate the option of teaching of these concepts through IPE, most of the content is taught in isolated modules.

NUTC 322 (Community nutrition, BSc Dietetics); HMSB 477 (Biokinetic practice and community service, BHSc Human Movement Sciences); NSCH 211 (Nursing science: community health 2, B.Nursing); BHIG 321 (Chemical stressors 1, BHSc Occupational Hygiene); FMSG 223 (Pharmaceutics 1B, B.Pharm); PHYS 616 (determinants of blood pressure and hypertension, BHSc Physiology); PSYC 121 (Social and community psychology, B. Soc.Sc + BHSc Psychology) and BSWI 212 (Community work: theory and practice, BSW) drew attention to the concept of community intervention, which involves community-based care where students examine the setting as well as the challenges encountered by that community in order to meet health outcomes⁷.

NUTP 621 (Public health nutrition, BSc Hons Nutrition); HMSC 111 (Health promotion and wellness, BHSc Human Movement Sciences); NSMP 221 (Nursing science practice: medical and surgical 2, B.Nursing); BHIG 422 (Employee wellness an epidemiology, BHSc Occupational Hygiene); FFSG 421 (Integrated pharmaceutical care, B.Pharm); FLGX 313 (Respiration, BHSc Physiology); PSYC 221 (Positive psychology, BHSc and B.Soc.Sc Psychology) and BSWI 311 (Social work with children, BSW) address the concept of health promotion. According to Bultas et al.⁸, health promotion occurs when students collaborate on healthcare delivery issues in order to advocate for health.

Lastly, *NUTR 321 (Nutrition research methodology, BSc Dietetics); HMSC 324 (Research methodology, BHSc Human Movement Sciences); NSMP 321 (Nursing science practice: Medical and surgical 4, B.Nursing); BHIG 224 (Research methodology, BHSc Occupational Hygiene); FNPG 421 (Pharmaceutical research project, B.Pharm); PHYS 673 (Research methodology, BHSc Hons Physiology); PSYH 674 (Research report: Theory and practice, BHSc Hons Psychology) and BSWI 471 (Social work research: Theory and practice, BSW)*

form part of the research component that identifies gaps in healthcare, reforms health and promotes Interprofessional Education and Collaborative Practice (IPECP)^{9,10}.

IPE 2 thus aims to improve health training in the sense that students are challenged in thinking, can improve their knowledge, become better problem-solvers, improved researcher with better analytical and writing skills.

4.2.1 Outcomes and assessment for IPE 2

Complying with the previous clusters, IPE 2 made use of the same method to draw up a set of criteria. Thus, the criteria for the listed modules were used to align and group the criteria for the concepts of IPE 2. The assessment for learning criteria regulates the achievement of the outcomes. Table S2 shows the outcomes and assessment for learning criteria for IPE 2.

Table S2: Outcomes and assessment for learning criteria for IPE

Outcomes	Assessment for learning
<ul style="list-style-type: none"> a) Integrate knowledge and understanding of basic research principles, how to conduct research and the application of critical thinking. b) Use multiple sources to analyse and explain concepts when writing up evidence and reinforcing scientific findings. c) Use knowledge on Primary Healthcare (PHC) through awareness and describing public health needs. d) Identify and describe components of cultural sensitivity and an understanding of beliefs and values of an individual or community. e) Report on the health needs or shortfalls of health services at individual and community level. 	<ul style="list-style-type: none"> a) Apply knowledge on research and draw up a report on an IPE concept. b) Demonstrate the ability to gather information from existing sources. c) Describe and explain public health needs as well as the solutions thereof. d) Establish an awareness of a patient's culture and beliefs so that trust and better healthcare can be promoted, e.g., providing interpretation. e) State problems in health services and how an interprofessional team can mitigate those problems.

4.2.2 Activity for IPE 2

Community diagnosis preceding a public health campaign as an activity can be used to create health awareness in a community^{11,12}. Home visits can be followed with a needs analysis to identify problems that a patient or community faces¹³. Students go out into communities and visit homes to identify and evaluate the problems or gaps in health. They then determine solutions and develop certain goals for the patient or community. Conducting home visits and needs analysis provides students with opportunities to develop skills in a non-controlled

environment; they can experience first-hand what the gaps in healthcare are and what measures need to be put in place.

4.3 Interprofessional Education 3 (IPE 3): Diagnosis, problem solving and patient-centred care

IPE 3 attempts to educate students through diagnosis, problem-solving and patient-centred care. As previously stated, the essence of this topic is taught in isolated modules and not in IPE. For example, *NUTT 472 (Applied therapeutic nutrition, BSc Dietetics)*; *HMSC 221 (Biomechanics, BHSc Human Movement Sciences)*; *MIDI 321 (Midwifery: Intrapartum care, B.Nursing)*; *BHIG 221 (Risk management, BHSc Occupational Hygiene)*; *FKLG 212 (Pharmacology 1A, B.Pharm)*; *FLGX 329 (Cardiovascular physiology applications, BHSc Physiology)*; *PSYC 322 (Applied psychology, B.Soc.Sc + BHSc Psychology)* and *BSWG 311 (Theories and approaches in social, BSW)* were found to host problem-solving as a concept. Problem-solving in IPE requires critical thinking and the sharing of solutions amongst an interprofessional team¹⁴ leading to shared decision making¹⁵.

The concept of diagnosis too was found across; *NUTB 121 (Nutrients, BSc Dietetics)*; *HMSC 211 (Sport injuries, BHSc Human Movement Sciences)*; *NSMP 221 (Nursing science practice: medical and surgical 2, B.Nursing)*; *BHIG 222 (Ergonomics for occupational hygiene, BHSc Occupational Hygiene)*; *FKLG 222 (Pharmacology 1B, B.Pharm)*; *PHYS 626 (Cardiovascular pathology and treatment, BHSc Hons Physiology)*; *PSYC 311 (Psychopathology, B.Soc.Sc + BHSc Psychology)* and *BSWG 416 (Social work interventions with regard to substance abuse and dependency, BSW)*. Diagnosis is the analysis of a disease or condition leading to its treatment or management¹⁶.

The concept of patient-centred care is found in *NUTP 271 (Nutrition practice 2, BSc Dietetics)*; *HMSC 321 (Clinical exercise physiology, BHSc Human Movement Sciences)*; *NSMP 311 (Nursing science practice: Medical and surgical 3, B.Nursing)*; *BHIG 413 (Physical stressors 2, BHSc Occupational Hygiene)*; *FPFG 322 (Clinical pharmacy 3B, B.Pharm)*; *FLPV 223 (Physiology for pharmacy 1A, BHSc Physiology)*; *PSYH 624 (Child and adolescent psychopathology, BHSc Hons Psychology)* and *BSWP 321 (Social work practicum A, BSW)*. Patient-centred care is a concepts that brings students together and leads to enhanced patient care and patient safety¹⁷.

4.3.1 Outcomes and assessment for IPE 3

IPE 3 follows the same order as IPE 1 and IPE 2 where the outcomes and assessment criteria were drawn from the concepts of IPE 3. The listed modules were used to draw up the concepts under IPE 3 and the criteria from these modules were analysed to align with the concepts. A collection of criteria was developed for the concepts of IPE 3. Once again, the assessment for

learning criteria for IPE 3 does not stipulate formal assessment rather, it is to determine whether the students have met the outcomes of the activities. Table S3 shows the outcomes and assessment for learning criteria for IPE 3.

Table S3: Outcomes and assessment for learning criteria for IPE

Outcomes	Assessment for learning
<ul style="list-style-type: none"> a) Prevent, manage and solve problems through analysis, interpretation and evaluation of the problems. b) Identify and understand the condition of a patient through diagnosis and how the condition affects his/her functioning. c) Implement strategies to treat, mitigate and control harm in the long-term, and be able to provide continuous plans on support. d) Educate and advise according to the disease or disorder and display the correct attitude when managing health needs. e) Account for patient history and possible causes of his/her condition. f) Communicate with and advise a patient on possible treatment and, if necessary, work with his/her families and community to enable optimal treatment. g) Treat patients with dignity and respect whilst maintaining their right privacy and confidentiality 	<ul style="list-style-type: none"> a) Demonstrate a systemic approach to solving health problems by working together in teams and using appropriate techniques to examine findings in an objective manner. b) Demonstrate diagnostic abilities and how patient functioning is affected through teamwork. c) Develop plans of action and implement them to control harm and continue support. d) Recommend management strategies and display the correct team attitude. e) Interpret a patient's history and justify possible causes of his/her condition. f) Correspond and advise a patient on the best solution for his/her condition and if there is a need to extend treatment by involving the family and community. g) Conduct professional ethics when dealing with a patient and sustain patient's rights.

4.3.2 Activity for IPE 3

The activities proposed for IPE 3 include the amazing race, a case study and clinical simulation. It must be noted that an IPE unit can choose which activities form part of IPE 3 or adjust them to fit the context.

The amazing IPE race supports active learning and can include outdoor experiences, physical challenges and problem-solving activities¹⁸. Students can be divided into groups of 5-8 students and case studies are given where they must overcome health challenges. There could be different stations around campus and students could be given clues from each station until the finish line. Students need to design innovative strategies when completing the tasks. Each station should focus on an exclusive health problem or a complex condition so that students can collaborate. The facilitator should issue the next clue to the next station after

successful completion. In total, there should be between eight and ten stations where students can experience IPCP. The stations need not always follow serious conditions or case studies, they can also be fun and innovative.

A patient case study is a detailed examination of a person, group, situation or community¹⁹. Through case studies, rigorous and complex conditions in health and health services can be explored²⁰. Here, complex cases can be written up and presented to the students for discussion. Students can then determine solutions as interprofessional teams by offering explanations and resolutions from their perspectives.

For clinical simulation, students are provided with the opportunity to practice in a safe and controlled setting²¹. Through the simulation experience, students should be challenged technically, cognitively and affectively²¹.

5. IPE Programme Implementation

5.1 Who will implement the programme?

Individuals in senior positions should be included in the discussions. An awards programme, such as the teaching awards programme, which is the university's annual Institutional Teaching Excellence Awards (ITEA), could be coupled with the IPE programme to get staff to volunteer. The staff that volunteer can then become the champions and be responsible for sourcing the students and administering the programme. Inviting staff from an IPE symposium or workshop to become champions and form the unit was seconded too as another approach to gain support and build the unit.

5.1.1 What policy and legislation should the IPE programme follow?

For the policy and legislation aspect of the programme, two reports, i.e., the World Health Organization²² *framework for action on interprofessional education and collaborative practice* together with the *Interprofessional Education Collaborative*²³ *core competencies for interprofessional collaborative practice*, can be used.

5.1.2 How will the programme be promoted and administered?

The programme can be shared on the Learning Management System (LMS). It can be marketed by the IPE unit as an innovative and fun way to learn with, from and about each other to overcome health challenges and providing optimal health care. The LMS can contain a link for students to follow should they wish to register for the programme. The IPE unit can then distribute the IPE calendar to the students. The intent for the calendar is to make students aware of the dates, times, venues and activities that they will be completing. In terms of initially financing the programme, the unit may have to arrange with the institute to make use of certain

resources e.g., simulation venues, computer labs, equipment. For transport and refreshments, the unit can apply for funding from the university. The teaching and learning approach in the different clusters will be built on the following four approaches: team-based learning (TBL) and case-based learning (CBL), which foster learning through collaboration and teamwork, simulation-based learning (SBL), which promotes learning through 'lived experiences' and problem-based learning (PBL), where learning takes place through the understanding and resolution of a clinical problem²⁴. Due to the nature of IPE 1, Self-directed learning (SDL) is required.

5.1.3 How many hours are needed?

An IPE unit should be responsible for the programme and should, therefore, determine the hours needed and the allocation of those hours. This allows the unit to flexibly determine the number of hours needed for each activity or cluster.

5.1.4 What resources are required?

5.1.4.1 Resources for IPE 1

The world café activity requires a special venue that accommodates student groups and furniture such as tables and chairs need to be arranged. A lecture hall on campus would be a convenient option to host a world café and facilitators can then move from one group to the next to guide the discussions.

5.1.4.2 Resources for IPE 2

For the community diagnosis and public health campaign, students will conduct home visits and a needs analysis. Transport may be required for students to be driven to the disadvantaged communities. Refreshments can be provided as well as notepads and pens to complete a needs analysis. Students will be required to have enough knowledge on diseases, disorder, prevention and health promotion. The IPE unit can create information pamphlets or requests students to create then as part of the activity.

5.1.4.3 Resources for IPE 3

The amazing race requires the use of different venues on the campus so that IPE tasks can be completed. Students would initially need to be split into teams using different colours and from there on be given clues. Each clue should be formed in a way that challenges students' thinking and leads them to the next station. The clues need not necessarily be written clues, certain symbols or objects could be used so that students are challenged. For the stations, proper settings need to be done and enough space needs to be allocated so that students can do the activities of that station. Students and personnel involved must be given refreshments after the halfway mark. Personnel can be given walkie-talkies to communicate with others so that they are able to inform the progress of the different teams. First-aid kits need to be put at

all stations and personnel need to have basic training on handling injury. Students should be timed at each station and should have to complete the activities in that timeframe.

The case study requires the creation of written cases, which are then given to students to discuss. An activity sheet can be printed with the case study for students to complete. The activity sheet can include blank sections representing different health fields and students need to complete those fields based on the given case.

For the clinical simulation, a standardised patient can be used and a training centre should be set up to match the aesthetics of a clinical ward. The standardised patient, who is essentially an actor, needs to undergo training so that he/she can ascribe to the needs of the case study or scenario. The actor playing the standardised patient can be a student or staff member and needs to be trained not to deviate from the situation, e.g., not start speaking about their personal lives with the students and stick to the script. Students can be issued with notepads and pens or be requested to bring their own to take notes.

5.1.5 IPE programme reviewing

The students should complete a customised evaluation tool for the programme as opposed to a university-wide tool that speaks to programme and lecturer evaluations. The evaluation can be posted on the LMS, or staff can be requested to take out a few minutes to ask students to complete the surveys.

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CHAPTER 7: SUMMARY, CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

Globally, Interprofessional Education (IPE) is seen as an innovative way to inculcate Interprofessional Collaborative Practice (IPCP) competencies in health professions students to ensure they practice collaboratively after qualification with the end goal of improving patient-care and healthcare outcomes (Reeves, 2016; Reeves et al., 2016; World Health Organization, 2010). Thus, IPE is seen as a primary step in breaking the siloed training of health professionals and producing work-ready graduates who are equipped with collaborative care competencies (Van Diggele et al., 2020). Many organizations and institutions support the introduction of IPE in health professions curricula because of the potential to solve many healthcare problems that exist and to prepare health professionals for the ever-increasing complexities of the health systems globally (Van Diggele et al., 2020; World Health Organization, 2010). Around the globe, the importance of IPE implementation in health curricula is supported (Buring et al., 2009; O’Keefe & Ward, 2018; Van Diggele et al., 2020; World Health Organization, 2010).

Breaking the siloed training of health professionals through the introduction of IPE programmes has not been smooth across all contexts, although the introduction of IPE in the health professions education curricula in the developed world has seen much more progress than in the developing world (Herath et al., 2017; Sunguya et al., 2014). Challenges faced include lack of space in the already packed health science curricula, lack of buy-in from leadership and educators, lack of physical and fiscal resources, lack of experienced educators, lack of context-specific benchmarks of frameworks and professional hierarchy, which tend to breed conflict among the professions. These challenges are experienced to various extents, with that of the developing world experienced profound compared to the developed. Additionally, there are gaps in the literature on IPE from developing countries as opposed to the vast published data available from developed countries. The paucity of empirical evidence and context-

specific frameworks on the development, implementation and evaluation of IPE in the developing world makes it more difficult for institutions to develop and implement IPE programmes in developing countries.

In South Africa, in particular, there is no governing framework that details or provides a blueprint for IPE programme development and implementation. Hence, to contextualise IPE for South African institutions, a literature review was essential, and lessons from other institutional IPE programmes and experiences of the academics that developed and implemented them were inevitable. Additionally, the importance of contextualizing the lessons learnt in the institutional environment cannot be overstated.

This study employed a sequential multi-method design consisting of five phases to develop and evaluate an IPE programme for a faculty of health sciences in South Africa. In phase one, a scoping review was conducted to synthesise the nature, development and implementation processes of IPE programmes globally. In phase two, a Qualitative Document Analysis (QDA) was used to analyse IPE programmes globally to guide institutions seeking to conceptualise, develop, implement and review their IPE programmes. In phase three, a qualitative exploratory, descriptive design using Key Informant Interviews (KII) was employed to explore the perspectives of international experts on the development and implementation of IPE programmes, including challenges faced. Phase four involved the design of the draft IPE programme using the results from the previous three phases, which was guided by the 12 steps for introducing IPE in Health Professions' Education (HPE) by El-Awaisi et al. (2016). Phase five employed an exploratory qualitative research method using a Nominal Group Technique (NGT) to review the designed IPE programme in terms of appropriateness and implementability for the Faculty of Health Sciences (FHS) at the North-West University (NWU).

In this chapter, the summary of the results for all the phases of the study has been discussed. The recommendations, limitations of the study and conclusion followed.

7.2 SUMMARY

This study aimed to develop an IPE programme for a health science faculty whilst focusing on five objectives. This study consisted of five phases which were sequential, in that each phase informed the next.

7.2.1 Chapter 1

Chapter 1 provided information on IPE, what it is, its value, the different IPE programmes, designing an IPE programme, implementation of an IPE programme and evaluation of an IPE programme. Chapter 1 further outline the problem statement, the purpose of the research, research questions, sub-questions and objectives, the significance of the study and structure of the thesis. The specific objectives were presented and addressed in Chapters 3-6 and submitted to various journals for publication.

7.2.2 Chapter 2

Although Chapters 3-6 present the methodologies of each of the papers submitted to journals, Chapter 2 thoroughly explains the research paradigm, research design and methods of each phase of the study in detail. Furthermore, the quality and rigour of the research, as well as the ethical considerations of each phase, were presented.

7.2.3 Chapter 3

Chapter 3 presented the first article titled, "Nature, development and implementation of Interprofessional Education programmes: A Scoping Review", currently under review in the *Journal of Interprofessional Education and Practice*. Chapter three sought to answer research question 1: '*What is the nature, development and implementation processes of IPE programmes globally?*' The objective was to synthesise the nature, development and implementation processes of IPE programmes globally.

A scoping literature review guided by the enhanced Arksey and O'Malley framework for scoping reviews. A total of thirty-four articles were included in the study. Most articles were published in the United States of America. As presented in Chapter 4, the nature of IPE programmes could be described according to their purpose, target

audience and modes of assessment of their outcomes. Also, many IPE programmes (Acquavita et al., 2019; E. Anderson et al., 2016; Forstater et al., 2019; Frantz & Rhoda, 2017; Prast et al., 2016) were developed using already existing models for developing IPE programmes: Substance Abuse and Mental Health Services Administration (SAMHSA) model (Acquavita et al., 2019), Three Strand Model of Interprofessional Learning (IPL); flipped classroom model (Forstater et al., 2019), the Boyer's model of scholarship (Frantz & Rhoda, 2017); and Interprofessional Collaborative Practice Domains model (Prast et al., 2016). The process for developing IPE programmes has been synthesized into ten steps, including buy-in from the institution; forming an IPE team; conducting stakeholder engagements regarding the IPE; Learning from other institutions; learning from other institutions; articulating common IPE content of the various curricula; design the IPE programme/curricula grounded in framework, theory and ethical principles; share programme for stakeholder inputs; finalise and seek accreditation/approval for the programme; implements programme; and continually engage stakeholders in evaluation and improvement.

The time (academic year) in which IPE was introduced into the health science curricula varies from programme to programme, with some institutions introducing it in the first year, while others are much later into a health curriculum, possibly due to curricula load or the prerequisites needed for activities such as patient diagnosis. It was recommended that IPE in higher learning institutes should be introduced early in their training so that students are adapted to providing health services in an interprofessional and holistic manner once they graduate.

The challenges hindering the development and implementation of IPE programmes as described in Chapter 3 include the lack of buy-in from leadership and educators, lack of space in the already packed health science curricula, and there was no space in the learning schedules of students. IPE was a requirement for students to work collaboratively and be equipped with the expertise of collaborative, practice-ready graduates in the world of work.

7.2.4 Chapter 4

Chapter 4 presented article 2 titled, 'Conceptualisation, development and implementation of Interprofessional Education Programmes: Points to Consider', which was submitted to the *Journal of Taibah University Medical Sciences*. This chapter sought to answer research question 2, '*What are the characteristics of IPE programmes implemented globally?*' The objective of this paper was to analyse the characteristics of IPE programmes globally using the 12 steps of introducing IPE into health professions education outlined by El-Awaisi et al. (2016) as the analytical framework. This is to guide institutions seeking to conceptualise, develop, implement and review their IPE programmes.

A qualitative document analysis was used to retrieve, evaluate and synthesise information from the existing IPE programmes. IPE programmes from six institutions were analysed according to the 12 steps of introducing IPE into health professions education outlined by El-Awaisi et al. (2016). A step-by-step and to-do list to guide educators in the process of conceptualising, developing, implementing and reviewing their IPE programmes.

Although the development process shares similarities across programmes, it varies from institution to institution, the underlining principle being the development and implementation of the programme in a way that all the stakeholders feel involved and contribute their expertise to the programme. Also, the WHO definition for IPE was the most used, and the IPEC competencies were used to guide the development of IPE programmes. It was also deduced that the institutions sought to make their programmes internationally accepted.

Additionally, this paper highlighted the need for IPE, stakeholder involvement, having common standards and ideals, formation of outcomes for students and faculty, resource development, support, IPE championing and collaborative works. Content of the IPE programmes cut across patient-centred care, clinical practice, research, IPEC competencies, Primary Healthcare (PHC), and health promotion. Evaluations and feedback were necessary to improve the quality, and effectiveness of the IPE programmes.

When comparing the different IPE programmes, it was quite evident that the overarching aim of facilitating an environment that encourages health professions' students to learn from, with and about each other was necessary to facilitate collaborative healthcare practice. Additionally, there were differences amongst the universities in terms of the learning methods used and how students were trained for the world of work.

7.2.5 Chapter 5

Chapter 5 presented article 3 titled, 'Development and implementation of Interprofessional Education: Global perspectives' submitted to *Medical Education*. This chapter sought to answer research question 3 '*What are the perspectives of international experts on the development and implementation of IPE programmes, including challenges faced?*' The objective of this chapter is to explore the perspectives of international experts on the development and implementation of IPE programmes, including the challenges faced.

A qualitative exploratory, descriptive design using key informant interviews to gather data. Fifteen experts shared their experiences with their IPE programme development and implementation as well as challenges faced, and four themes emerged.

For the qualitative exploratory, descriptive study, four themes were identified: a) IPE structure in higher education institutions (*sub-themes: Definition of IPE, motivation for IPE, the objective of the IPE programme, stakeholder involvement and components of IPE*); b) faculty and student involvement (*sub-themes: student involvement and facilitator/faculty involvement*); c) challenges and opportunities; and (*sub-themes: challenges and opportunities*); d) evaluation and quality improvements in IPE programmes (*sub-themes: suggestions for improvements, dissemination of findings and evaluations*). The results added to the need for IPE and its institutionalization, followed by IPE champions who could drive IPE. The fundamentals of IPE employment, such as activity design, resources required, time allocation, participation, challenges, piloting the programme and so on, were mentioned. Evaluations, too, were done by using the feedback to improve the quality of the programme.

It was found that the siloed working culture and professional rivalries in the faculties of health sciences created resistance to the development and implementation of IPE

programmes. Resources and logistic challenges included insufficient funds, difficulties moving online, physical space for IPE, staff and knowledge limitations, training standardised patients, activity planning, scheduling, managing large groups and transportation to sites. Primarily, the challenges with IPE were buy-in, accreditation, implementation, lack of interest or will and understanding. Also, giving up credits to accommodate IPE was challenging when its value was not understood. Influencing individuals to get out of their comfort zone was seen as challenging.

It was also found that stakeholder engagements were necessary to gain support for IPE and that IPE comes with its challenges and opportunities. Although experts agreed to make IPE compulsory in order for it to become effective, considering the context is necessary as accreditation will go hand-in-hand with such decisions.

7.2.6 Chapter 6

Chapter 6 presented article 4 titled, 'Developing an Interprofessional Education programme for a Health Science Faculty in South Africa: A multi-method study' submitted to the *Journal of Interprofessional Care*. This chapter sought to answer research question 4, '*What does a developed IPE programme for NWU's FHS comprise?*' and 5, '*What are the opinions of academics in the FHS regarding the appropriateness and implementability of the developed IPE programme for FHS NWU?*' The objective of the study was to develop and review the IPE programme for the FHS NWU for appropriateness and implementability through an exploratory qualitative research method using the Nominal Group Technique.

The results of the preliminary studies presented in Chapters 3 to 5 were synthesized in addition to a context analysis to develop the IPE programme.

Overall, the results from the synthesis of findings from the three phases indicated the need for multistakeholder collaboration, development of common themes focusing on theory, practice and research, activities and resources based on the themes and outcomes with the aim of engaging students, and assessments to measure competence and programme quality.

To develop the programme for the FHS of the NWU, a context analysis was conducted to position the IPE programme within the FHS. The context analysis involved mapping undergraduate health science programmes compiled in NWU's 2022 Yearbook

(North-West University, 2022a). The researcher searched for common modules from each of the health science programmes within which the IPE programme could be integrated. First, the researcher defined the programmes to be included. The researcher then mapped all the programmes available across the university's three campuses, presenting common modules across different health science undergraduate programmes implemented by the FHS in NWU. The researcher found that only two out of the fourteen programmes included in the IPE programme were implemented across the three campuses of the university. Further, only one module was common to all the programmes included. Further analysis of the modules shows that some modules contain common IPE concepts; interpersonal communication, teamwork and collaboration, problem-solving, diagnosis, community intervention, roles and responsibilities, ethics in healthcare, health promotion, patient-centred care and research. A decision was made to make the IPE optional based on the contextual nuances, although the literature strongly recommended compulsory IPE programmes with the recommendation that a compulsory IPE programme is introduced when the re-implementation of the health sciences curricula is done.

During the development of the programme, the researcher ensured that extra work was not added to the content of the undergraduate health professions curricula but to use existing content to achieve IPE outcomes innovatively. Due to the context of NWU, an optional programme was developed. The programme was developed in three-year levels, and each level in the programme content included common concepts, the modules that reflected those concepts, the outcomes and assessment criteria of each level, the proposed IPE activities and the resources needed to carry out those activities. The draft programme proposed how to implement the programme, i.e., who implements the programme, the policy and legislation to follow, promotion and administration of the programme, proposed hours required, suggested resources for the activities and reviewing of the programme.

The nominal group session was presented with a draft IPE programme so that the participants could review the programme for appropriateness and implementability for the context of the NWU. The results obtained indicated that there might be a primary challenge with getting stakeholders and students on board, as the programme was an optional one. To curb the engagement challenge, marketing the programme was a

necessary step. Integration of an awards programme was crucial to motivate staff to join the programme as IPE champions and form the IPE unit. The programme was presented as a three-year level (IPE 1 – IPE 3) and in general, ten concepts i.e., interpersonal communication, roles and responsibilities, ethics in healthcare, teamwork and collaboration, community intervention, health promotion, research, diagnosis, problem-solving, patient-centred care, were identified. Activities such as a world café, community diagnosis preceding a public health campaign, amazing race, clinical simulation and patient case study accompanied the concepts. Each IPE contained its own outcomes and assessment for learning criteria. The programme implementation was described through how and who implements it, the policy and legislation to be followed, promotion and administration of the programme, the guideline of the hours and resources required as well as the reviewing of the programme.

7.3 OVERALL CONCLUSION

Chapters 3-6 presented papers that provided evidence and background information for the development of the IPE programme for the FHS of the NWU. The findings in these studies were synthesized to produce consolidated evidence to guide the development of the IPE programme for the FHS of the NWU (Chapter 6). It was necessary to analyse the institutional context to ensure the programme is well positioned with the institution. Five objectives guided this study (Section 1.5.2). The following sections detail how these objectives were met.

7.3.1 Research objective 1: To synthesise the nature, development and implementation processes of IPE programmes globally

To meet this objective, a scoping review was conducted to synthesize the nature, development process and implementation of IPE programmes globally. This objective was fully achieved in article 1 (Chapter 3), in which a scoping review looked at the nature, development and implementation of Interprofessional Education Programmes globally.

It was found that most articles published were from the USA, suggesting the thriving nature of IPE in that country as compared to other countries. The nature of IPE programmes included their purpose/outcomes, target audience and mode of

assessment. A ten-step process of developing IPE programmes has also been synthesized (Section 3.3.3). To implement IPE programmes, substantial support is needed, especially in developing countries such as South Africa. Institutional buy-in is the most crucial step, followed by bringing together stakeholders and individuals with a common IPE philosophy to assist in developing a programme.

7.3.2 Research objective 2: To analyse the characteristics of IPE programmes implemented globally

The second objective of the study was to analyse the characteristics of IPE programmes implemented globally. The second article (Chapter 4) met this objective by analysing six IPE programmes developed across the globe using QDA using 12 steps of introducing IPE into health professions education outlined by El-Awaisi et al. (2016) as the analytical framework.

This paper describes the characteristics of IPE programmes in a step-by-step and to-do list to guide educators in the process of conceptualising, developing, implementing and reviewing their IPE programmes. We recommend institutions review, contextualise these findings and implement them in their IPE programme conceptualisation, development, implementation and review.

7.3.3 Research objective 3: To identify the challenges encountered in the implementation of IPE programmes

The third objective, which sought to explore the perspectives of international experts on the development and implementation of IPE programmes, including challenges faced, was met in paper 3 (Chapter 5). It presented global experts' perspectives on the structure of IPE programmes, faculty and student involvement, challenges and opportunities for development and implementation of IPE programmes, and evaluation of IPE programmes.

Each continent presents special contextual issues regarding the development and implementation of IPE programmes; nevertheless, the challenges and opportunities that confront the development of the programmes are universal, although to different extents. Institutional culture, resource limitations, already packed curricula, professional hierarchies and rivalry were challenges identified. Comprehensive stakeholder engagements are very important in overcoming challenges and sustaining

the IPE programme. Despite the push for making IPE compulsory in undergraduate health professions education, with some accreditation bodies requiring IPE as a component of the curricula for accreditation, it is important to consider the context when making such decisions. Consideration should be given to innovative IPE activities such as community-based projects.

7.3.4 Research objectives 4 and 5

Chapter 6 present article 4, which covered objectives 4 and 5.

Objective 4 sought to design an IPE programme for the NWU's FHS. The design of the IPE programme for the FHS at NWU was systematic. Findings from the scoping review, QDA and KII were used to design the programme for the FHS while considering the context critically. The idea was to ensure that extra work was not added to the content of the undergraduate health professions curricula but to use existing content to achieve IPE outcomes innovatively.

Due to the context of NWU, an optional programme was developed. The programme was developed in three-year levels, and each level in the programme content included common concepts, the modules that reflected those concepts, the outcomes and assessment criteria of each level, the proposed IPE activities and the resources needed to carry out those activities. The draft programme proposed how to implement the programme, i.e., who implements the programme, the policy and legislation to follow, promotion and administration of the programme, proposed hours required, suggested resources for the activities and reviewing of the programme.

Objective 5, which sought to review the developed IPE programme in terms of the appropriateness and implementability for the FHS NWU, was also met in article 4 (Chapter 6). A nominal group technique was employed to gather the opinion of the FHS staff on the appropriateness and implementability of the IPE programme developed. The staff provided critical inputs which were used to revise and finalize the IPE programme for the FHS of the NWU. From the nominal group discussion, it was suggested that it would be difficult to attract faculty participation due to the optional nature of the programme. Innovations such as an award for participation should be instituted to motivate faculty to join. The experts supported the institution of a dedicated unit to administer the IPE programme. The unit would include the voluntary

staff, invited through IPE symposia or workshops, and would also be responsible for sourcing the students and marketing the programme. We found that the programme should be evaluated by participating students and staff regularly. Staff should encourage students to complete the evaluation so that the programme can be improved. WHO (World Health Organization, 2010) added that substantial effort is still necessary to evaluate IPE and its initiatives with globally recognised best practices.

Overall, the study was successful in meeting all the objectives and answering all the research questions. An optional IPE programme was developed for pilot testing and implementation in the short term while awaiting the opportunity to integrate a compulsory IPE programme when re-curriculation of the health sciences curricula occurs. Evaluations should occur on a continuous basis to provide feedback for quality improvements. This IPE programme has been developed for the context of the NWU and its health professions students. This study was guided by the pragmatic paradigm through a sequential multi-method research design. Although the programme sought to address the challenge of students learning in silos and not being equipped with the necessary collaborative expertise to practice as health professionals once they graduate, challenges were identified that would potentially influence the implementation. However, the context provides enough opportunities to succumb to such challenges.

7.4 CONTRIBUTIONS OF THIS STUDY

7.4.1 Contribution to theory

This study contributed to the theory of IPE programme development, implementation and evaluation. Chapters 1 and 2 provided details of the background to IPE and an empirical research methodology in developing IPE programmes for health sciences faculty.

Chapter 3 added to the theory of IPE programme development by synthesising ten steps to IPE programme development and implementation. This will provide step-by-step guide to institutions seeking to develop IPE programmes globally. These were synthesised from programme papers presenting processes used in their IPE programme development. Building a consolidated IPE programme development will

ensure uniformity, replicability and stimulate the academic discourse towards standardisation of IPE programme development globally.

Chapter 5 also provided a to-do list for institutions seeking to develop and implement IPE programmes. This involves what other institutions have implemented, the roadblocks and what suggestions they made in overcoming such roadblocks. These practical guides provided in this paper will foster institutions that do not have the opportunity to evaluate other programmes to have access to characteristics of such programmes to guide them in their development.

Regarding methodology, this study has contributed to the application of the multimethod research design by successfully applying it within the pragmatic paradigm to develop and evaluate an IPE programme in the South African context. Most IPE programmes are developed as institutional programme and have not gone through critical research processes such as proposal development, scientific and ethics review, gatekeeper permissions and other components of the research process.

7.4.2 Contribution to practice

The IPE programme developed for pilot testing and implementation in the FHS of the NWU will improve the ability of students to learn from, with and about each other in the FHS of the NWU. This study highlighted the use of a multi-method design to support the development and implementation of an IPE programme by learning from other institutions, interviewing experts and reviewing the programme for applicability and implementability for the context of the NWU. Other institutions within the context can learn from, adapt or adopt the IPE programme for the NWU context.

7.5 LIMITATIONS OF THE STUDY

7.5.1 Methodological limitation

- Although it would have been conclusive to implement this programme as part of this study, the pilot testing and implementation are beyond the scope of this study. It is not known what other challenges this programme will face during the implementation phase, and this should be investigated with further research.

- For the QDA only six institutions were included; thus, the results presented in the QDA do not represent the IPE programmes of all universities presenting IPE.
- Although there were fifteen experts who participated in the key informant interviews, the inputs and views may not be a complete and thorough representation of all the IPE experts around the globe.
- For the nominal group session, while there was representation from most health schools, challenges were experienced in terms of the non-availability of participants from psychology; thus, complete reviewing could not be possible.
- All the eight participants in the nominal group session belonged to one campus, although, sending invitations to experts from all campuses, others did not respond to participate, making it challenging to get their views on how implementation can take place across the three campuses.
- There is a gap in this study in terms of the exclusion of the views of the health professions students. Although the programme was developed for health professions students, there was no provision made for their opinions, feedback and recommendations on the proposed programme.
- Even though research supports that IPE should be compulsory, introducing an optional programme at the NWU may limit participation as students may not want to invest time in a programme that is not accredited to meet the requirements of their degree.

7.6 RECOMMENDATIONS

7.6.1 Recommendations for further research

- (a) Further research is needed to review and validate the ten steps for IPE programme development synthesised in this study.
- (b) Further research is also needed to evaluate and validate the step-step points to consider in the development and implementation of IPE programmes developed in this study.

- (c) Although it is recommended that staff should undergo training to prepare them for the development and implementation of IPE programmes, no training programme has been developed. Further research should seek to develop a formal programme short course to prepare staff for IPE programme development and implementation.
- (d) Staff should undergo some formal training before working with students through the IPE programme which can be offered by IPE experts.
- (e) Continuous evaluation of the programme should be done through empirical research and student and staff to provide feedback for quality improvement.

7.6.2 Recommendations for IPE

- (a) Other institutions should learn from the processes involved in this study to develop their programmes or adapt this programme for their context to realise the full potential of IPE.
- (b) The advocacy of regional networks such as AfrIPEN on the continent needs to be intensified to stimulate the development and implementation of more IPE programmes. This will ensure a growing community of practice and sharing of expertise across the African context for the sustenance of the IPE programmes.
- (c) IPE should be championed in health professions institutes throughout the country to encourage other institutions to develop and implement the programme.
- (d) Although the literature on the development of IPE programmes is becoming more and more available, doing a context analysis is important in situating IPE programmes within once context. We recommend all institutions conduct context analysis before developing IPE programmes.

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ADDENDA

ADDENDUM A: ETHICS APPROVAL



Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 086 016 9698
Web: <http://www.nwu.ac.za/>

**North-West University Health Research Ethics
Committee (NWU-HREC)**

Tel: 018 299-1206
Email: Ethics-HRECApply@nwu.ac.za (for human
studies)

21 May 2021

ETHICS APPROVAL LETTER OF STUDY

Based on approval by the North-West University Health Research Ethics Committee (NWU-HREC) on 21/05/2021, the NWU-HREC hereby approves your study as indicated below. This implies that the NWU-HREC grants its permission that, provided the general and specific conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

Study title: Developing an interprofessional education programme for a health science faculty
Principal Investigator/Study Supervisor/Researcher: Prof GM Reitsma
Student: F Delawala - 24965480

Ethics number:

N	W	U	-	0	0	4	3	0	-	2	0	-	A	1
Institution			Study Number					Year		Status				

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation;
A = Authorisation

Application Type: Single study
Commencement date: 21/05/2021
Expiry date: 31/05/2022

Risk: Minimal

Approval of the study is provided for a year, after which continuation of the study is dependent on receipt and review of an annual monitoring report and the concomitant issuing of a letter of continuation. A monitoring report is due at the end of May annually until completion.

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- *The principal investigator/study supervisor/researcher must report in the prescribed format to the NWU-HREC:*
 - *Annually on the monitoring of the study, whereby a letter of continuation will be provided annually, and upon completion of the study; and*
 - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
- *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the principal investigator/study supervisor/researcher must apply for approval of these amendments at the NWU-HREC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*
- *Annually a number of studies may be randomly selected for active monitoring.*
- *The date of approval indicates the first date that the study may be started.*
- *In the interest of ethical responsibility, the NWU-HREC reserves the right to:*
 - *request access to any information or data at any time during the course or after completion of the study;*

- to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;
- withdraw or postpone approval if:
 - any unethical principles or practices of the study are revealed or suspected;
 - it becomes apparent that any relevant information was withheld from the NWU-HREC or that information has been false or misrepresented;
 - submission of the annual monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and/or
 - new institutional rules, national legislation or international conventions deem it necessary.
- NWU-HREC can be contacted for further information via Ethics-HRECApply@nwu.ac.za or 018 299 1206

Special conditions of the research approval due to the COVID-19 pandemic:

Please note: Due to the nature of the study i.e. (semi-structured interviews with IPE experts and nominal group technique with IPE experts from the Faculty of Health Sciences, North-West University via an online platform), this study will be able to proceed during the current alert level, following receipt of the approval letter. No additional COVID-19 restrictions have been placed on the study except that the researcher must ensure that before proceeding with the study that all research team members have reviewed the North-West University COVID-19 Occupational Health and Safety Standard Operating Procedure.

Special in process conditions of the research for approval (if applicable):

- a. Please provide the NWU-HREC with a copy of the goodwill permission letter from the Executive Dean of the Faculty of Health Sciences, indicating that the study can proceed, before recruitment starts in this Faculty.

As the study progresses the aforementioned conditions should be submitted to Ethics-HRECProcess@nwu.ac.za with a cover letter with a specific subject title indicating "Outstanding documents for approval: NWU-XXXXX-XX-XX." The letter should include the title of the approved study, the names of the researchers involved, that the documents are being submitted as part of the conditions of the approval set by the NWU-HREC, the nature of the document i.e. which condition is being fulfilled and any further explanation to clarify the submission.

The *e-mail*, to which you attach the documents that you send, should have a *specific subject line* indicating the nature of the submission e.g. "Outstanding documents for approval: NWU-XXXXX-XX-XX". The e-mail should indicate the nature of the document being sent. This submission will be handled via the expedited process.

The NWU-HREC would like to remain at your service and wishes you well with your study. Please do not hesitate to contact the NWU-HREC for any further enquiries or requests for assistance.

Yours sincerely,



Chairperson NWU-HREC

ADDENDUM B: RESEARCH DATA GATEKEEPERS PERMISSION



Private Bag X6001, Potchefstroom
South Africa 2520

Tel: +2718 299-1111/2222

Web: <http://www.nwu.ac.za>

Research Data Gatekeeper Committee

NWU RDGC PERMISSION GRANTED / DENIED LETTER

Based on the documentation provided by the researcher specified below, on 19/03/2021 the NWU Research Data Gatekeeper Committee (NWU-RDGC) hereby grants permission for the specific project (as indicated below) to be conducted at the North-West University (NWU):

Project title: Developing an interprofessional education programme for a health science faculty.

Project leader: Prof GM Reitsma
Researcher/Project Team: F Delawala

Ethics reference no: NWU-00430-20-S1
NWU RDGC reference no: NWU-GK-21-001

Specific Conditions:

- Due the COVID-19 pandemics the Committee would like to advise the researcher to practice the necessary caution and adhere to the National Covid-19 Guidelines when conducting research with participants.
- The research may not be provided with personal details (e.g. contact details) of prospective participants without the prospective participants' consent. Many publicly available details of prospective participants may be used freely.

Approval date: 19/03/2021 **Expiry date:** 18/03/2022

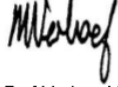
General Conditions of Approval:

- The NWU-RDGC will not take the responsibility to recruit research participants or to gather data on behalf of the researcher. This committee can therefore not guarantee the participation of our relevant stakeholders.
- Any changes to the research protocol within the permission period (for a maximum of 1 year) must be communicated to the NWU-RDGC. Failure to do so will lead to withdrawal of the permission.
- The NWU-RDGC should be provided with a report or document in which the results of said project are disseminated.

Please note that under no circumstances will any personal information of possible research subjects be provided to the researcher by the NWU RDGC. The NWU complies with the Promotion of Access to Information Act 2 of 2000 (PAIA) as well as the Protection of Personal Information Act 4 of 2013 (POPI). For an application to access such information please contact Ms Annamarie De Kock (018 285 2771) for the relevant enquiry form or more information on how the NWU complies with PAIA and POPI.

The NWU RDGC would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the NWU RDGC for any further enquiries or requests for assistance

Yours sincerely



Prof Marlene Verhoef
Chairperson NWU Research Data Gatekeeper Committee

Original details: (22351930) C:\Users\22351930\Desktop\test 2.docm
13 November 2018

Current details: (22351930) M:\DSS118533\Monitoring and Reporting Cluster\Ethics\Applications RDGC\Updated RDGC Permission Letter.docm
15 November 2018

File reference: 1.1.4.3

ADDENDUM C: INVITATION FOR THE INDIVIDUAL INTERVIEWS

TITLE OF THE RESEARCH STUDY: Developing an interprofessional education programme for a health science faculty

ETHICS REFERENCE NUMBERS: (NWU-00430-20-S1)

PRINCIPAL INVESTIGATOR: Dr Gerda Reitsma

POST GRADUATE STUDENT: Ms F Delawala

ADDRESS: Faculty of Health Sciences (FHS), Centre for Health Professions Education (CHPE), North-West University (NWU), Potchefstroom.

CONTACT NUMBER: 0623195940

You are invited to take part in a **research study** that forms part of my PhD research. Please take some time to read the information presented here, which will explain the details of this study. Please ask me or the person explaining the research should you have any questions or if you do not fully understand what is expected of you. Your participation is **entirely voluntary** and you are free to say no to participate and this will not negatively affect you in any way, you will also be free to withdraw from this study at any stage.

We plan to develop a formal Interprofessional Education programme for FHS at the NWU, South Africa. This part of the study will be conducted on an online platform, which means that you do not have to attend the meeting in person and will take about 60-70 minutes. You have been invited to be part of this research because you are an expert in IPE. You will be expected to share with me on an online platform how your institution developed and implemented their IPE training programmes and the challenges encountered with implementing IPE programmes. Once the researcher has developed an IPE programme for the FHS NWU, it will be sent to you to for your views on it.

Should you agree to participate via e-mail, an informed consent form will be sent to you by the independent person where you and a witness will sign to participate in this part of the study.

Sincerely,

Farhin Delawala

PhD Student

ADDENDUM D: SEMI-STRUCTURED INTERVIEW SCHEDULE FOR INDIVIDUAL INTERVIEWS

1. Research Title:

Developing an interprofessional education programme for a health science faculty.

2. Qualitative Interview Introduction

The length of the session is 60-70 minutes. The aim of this session will be to explore criteria associated with effective IPE training programmes and the challenges encountered with implementing IPE programmes.

3. Protocol of the researcher

The researcher will:

- (a) Introduce herself.
- (b) Seek consent to record (for purpose of record keeping and report for ethics committee).
- (c) Thank the participant for his/her inclination and time to participate in this study.
- (d) Make sure that the informant is comfortable and ready for the individual interview.
- (e) Describe the aims and objectives of the research.
- (f) Notify the informant of his/her role in this phase of the research.
- (g) Explain the need of the interview and the time required to gather the information.
- (h) Verify the ethical considerations for the semi-structured interview. Confirm the use of the audio recorder and the purpose of using the audio recorder whilst maintaining privacy and confidentiality.
- (i) Confirm voluntary participation and withdrawal at any time without facing negative consequences.
- (j) Request the participant for any comments, queries or concerns and provide clarification thereof.

4. Verbal Consent and Re-consent

Indicate to the informant of their written consent and request verbal consent if they agree to participate in this study. Should the participant not confirm, they may withdraw

from the research without any consequences. Obtain re-consent regarding the recording of the interview conducted on the online platform.

5. Commencing the semi-structured interview schedule

Different communication techniques such as probing or further questioning for clarification, will be used for the possibility of gaining a better insight into the criteria associated with effective IPE training programmes and challenges encountered with implementing IPE programmes.

6. Interview Schedule

Schedule based on the framework of El-Awaisi (2016).

(Addendum E may be used to follow-up during the interview if the individuals are not providing all the information).

Question 1: Please tell me how you started with IPE at your institution, and what was the objective of bringing IPE into your institution.

Question 2: Please share with me how IPE is implemented at your institution. Please be as specific as possible, I may ask follow-up questions should I need clarification or more information.

Question 3: Please explain to me what role the students plays in your IPE programme (roles, activities, assessment, experiences, feedback, etc)

Question 4: Please explain to me what role the lecturers play in your IPE programme.

Question 5: Please explain to me what other stakeholders are involved with your IPE programme, what are their roles, and how do you collaborate with them?

ADDENDUM E: CHECKLIST FOR INDIVIDUAL INTERVIEWS BASED ON THE EL-AWAISI ET AL (2016) FRAMEWORK.

Key Areas

Yes No

How the IPE programme started.

Who the main stakeholders were then and now?

How IPE is defined in their programme.

What the values and standards are of IPE in their programme.

What outcomes are stated for their IPE programme.

How the participation and selection of students and faculty was done.

Do they implement IPE according to specific themes? If so, how did they decide on those themes?

(a) Who took part in designing the cases and activities for IPE?

(b) How did they collaborate?

(c) Challenges and opportunities?

What their programme looks like in terms of level and stages and how the levels and stages were determined.

What kind of learning activities are the students involved in and how learning was facilitated?

How students were kept involved and motivated and how the expectations and experiences of students were raised.

How student feedback was assessed and utilised.

How the impact of the IPE on the community (if any) was evaluated.

How experiences of the health students were shared (with who).

Any other comments to share?

Comment about study and what do they think?

ADDENDUM F: INFORMED CONSENT FORM FOR PARTICIPANTS IN THE INDIVIDUAL INTERVIEWS

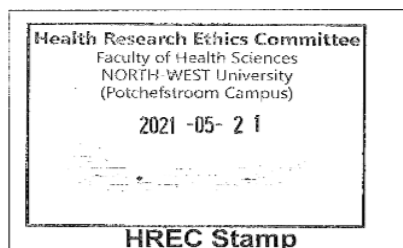


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Informed consent form for participants in the individual interviews using a semi-structured interview schedule

TITLE OF THE RESEARCH STUDY: Developing an interprofessional education programme for a health science faculty

ETHICS REFERENCE NUMBERS: (NWU-00430-20-S1)

PRINCIPAL INVESTIGATOR: Prof GM Reitsma

POST GRADUATE STUDENT: Ms F Delawala

ADDRESS: Faculty of Health Sciences, Centre for Health Professions Education, NWU, Potchefstroom.

CONTACT NUMBER: 0623195940

You are invited to take part in a **research study** that forms part of my PhD research. Please take some time to read the information presented here, which will explain the details of this study. Please ask me or the person explaining the research to you any questions about any part of this study that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how you might be involved. Also, your participation is **entirely voluntary** and you are free to say no to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part now.

This study has been approved by the Health Research Ethics Committee of the Faculty of Health Sciences of the North-West University (NWU-00430-20-S1) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records. This research has been approved by the Research Data Gatekeeper Committee (RDGC) of the NWU: (NWU-00430-20-S1).

What is this research study all about?

- We plan to develop a formal Interprofessional Education programme for the NWU. Interprofessional Education is a teaching and learning process in which associates or undergraduates of two or more health and/or social care professions participate in learning with, from and about each other in order to improve collaboration in the delivery of healthcare (Buring et al., 2009; Journal of Interprofessional Care, 2020; Olenick et al., 2010).
- This part of the study will be conducted on an online platform (which means that you do not have to attend the meeting in person), and will be done by experienced health researchers trained in Health professions education. At least 15 participants will be included in this part of the study. The researcher opted for online interviews instead of face-to-face ones in order to maintain the social distancing rules in light of the current Covid-19 crisis.

Why have you been invited to participate?

- You have been invited to be part of this research because you are an expert in IPE
- You will unfortunately not be able to take part in this research if you do not have a background in the relevant field.

What will be expected of you?

- You will be expected to share with me on an online platform how your institution developed and implemented their IPE training programmes and the challenges encountered with implementing IPE programmes. The online session will be 60-70 minutes.

Will you gain anything from taking part in this research?

- There will be no direct gains for you in the study.
- The other gains of the study is for the institute, the students and the community as well as the research field.

Are there risks involved in you taking part in this research and what will be done to prevent them?

- Privacy and fear of loss of anonymity.
- Participants may not want to have audio recordings done and kept for later use.
- The interview session will be audio recorded for referral during the analysis of the semi-structured interview.

- Technical problems for online interviews.
- Time constraints.
- There are more gains for you in joining this study than there are risks.
- Confidentiality and anonymity will be maintained in this phase. Gathered data will not be distributed. Names of participants and universities will be coded. No personal information will be asked.
- Consent will be taken before audio recordings.
- Making use of another device for a back up or rescheduling of the interview.
- The researcher will keep track of time and may schedule another session with the participant, only if required, to conduct the remainder of the interview.

How will we protect your confidentiality and who will see your findings?

Anonymity of your findings will be protected by not requesting personal details of participants. You will also receive a codename to use, and the name of your university will be replaced with a code. Your privacy will be respected by not including personal details in the research. Your results will be kept confidential by storing them on a password protected computer. Only the researcher, the promoters, co-coder and independent person checking the transcribed interviews for correctness, will be able to look at your findings. Data will be kept safe by locking hard copies in locked cupboards in the researcher's office and for electronic data it will be saved on the researcher's password protected computer. Data will be stored for 5 years and after 5 years, the data will be destroyed by deleting soft copies and shredding the hard copies in the presence of the promoter and a representative of IT.

What will happen with the findings?

- The findings of this study will only be used for this study to develop an IPE programme for the FHS at the NWU.

How will you know about the results of this research?

- We will email you a report on this research
- You will be informed of any new relevant findings by e-mail

Will you be paid to take part in this study and are there any costs for you?

You will be provided with a document stating that you have participated in this study and where the researcher expresses their gratitude for your time. You will have no travel expenses and do not need to be refunded for traveling. Data costs for attending the online meeting will be covered by the researcher if you do not have access to wifi.

Is there anything else that you should know or do?

- You can contact the postgraduate student Ms Farhin Delawala at 0623195940 if you have any further questions or have any problems, or the promoter, Prof Gerda Reitsma at gerda.reitsma@nwu.ac.za.
- You can also contact the Health Research Ethics Committee via Mrs Carolien van Zyl at 018 299 1206 or carolien.vanzyl@nwu.ac.za if you have any

concerns that were not answered about the research or if you have complaints about the research.

- You will receive a copy of this information and consent form for your own purposes.

Declaration by participant

By signing below, I agree to take part in the research study titled: Developing an interprofessional education programme for a health science faculty

I declare that:

- I have read this information/it was explained to me by a trusted person in a language with which I am fluent and comfortable.
- The research was clearly explained to me.
- I have had a chance to ask questions to both the person getting the consent from me, as well as the researcher and all my questions have been answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be handled in a negative way if I do so.
- I may be asked to leave the study before it has finished, if the researcher feels it is in the best interest, or if I do not follow the study plan, as agreed to.
- I hereby give consent for audio recording of the interview.

Signed at (place) on (date)
20....

.....

Signature of participant

.....

Signature of witness

Declaration by person obtaining consent

I (name) declare that:

- I clearly and in detail explained the information in this document to

-
- I did/did not use an interpreter.
 - I encouraged him/her to ask questions and took adequate time to answer them.
 - I am satisfied that he/she adequately understands all aspects of the research, as discussed above.
 - I gave him/her time to discuss it with others if he/she wished to do so.

Signed at (place) on (date)
20....

Signature of person obtaining consent

Declaration by researcher

I Farhin Delawala declare that:

- I explained the information in this document to the participant
- I did not use an interpreter
- I was available should he/she want to ask any further questions.
- The informed consent was obtained by an independent person.
- I am satisfied that he/she adequately understands all aspects of the research, as described above.
- I am satisfied that he/she had time to discuss it with others if he/she wished to do so.

Signed at (place) on (date)
20....



Signature of researcher

Signature of witness

Current details: (23239522) G:\My Drive\G_ Research and Postgraduate Education\9.1.5.6
Forms\HREC\9.1.5.6_HREC_ICF_Template_Apr2018.docm
25 April 2018
File reference: 9.1.5.6

ADDENDUM G: INVITATION FOR THE ONLINE NOMINAL GROUP SESSION

TITLE OF THE RESEARCH STUDY: Developing an interprofessional education programme for a health science faculty

ETHICS REFERENCE NUMBERS: (NWU-00430-20-S1)

PRINCIPAL INVESTIGATOR: Prof Gerda Reitsma

POST GRADUATE STUDENT: Ms F Delawala

ADDRESS: Faculty of Health Sciences (FHS), Centre for Health Professions Education (CHPE), North-West University (NWU), Potchefstroom.

CONTACT NUMBER: 0623195940

You are invited to take part in a **research study** that forms part of my PhD research. Please take some time to read the information presented here, which will explain the details of this study. Please ask me or the person explaining the research should you have any questions or if you do not fully understand what is expected of you. Your participation is **entirely voluntary** and you are free to say no to participate and this will not negatively affect you in any way, you will also be free to withdraw from this study at any stage.

We plan to develop a formal Interprofessional Education programme for FHS at the NWU. This part of the study will be conducted on an online platform, which means that you do not have to attend the meeting in person and will take about 1-2 hours. You have been invited to be part of this research because: you are an expert from a health field in the Faculty of Health Sciences at the NWU, you possess a qualification in a health professions field, you are involved in the academic aspects of that particular field, e.g. nursing, you have a minimum of 2 years of experience in working with students, you are involved in theory or practice in an educational context, you are willing to attend the nominal group session. You will be expected to participate in a nominal group technique process to review and provide feedback on the developed IPE programme for the FHS NWU. You will review the developed IPE programme for appropriateness and implementability for the FHS NWU.

A Nominal Group Technique is a method of retrieving important and new information to establish an order of shared opinions (Bitzer & Botha, 2011). You will start by reviewing the programme for appropriateness where you will have to type out your ideas or suggestions privately to the researcher on the 'chat. Once you have typed your idea or suggestion, you will be required to present and discuss it with the group. Similar ideas will be grouped and clarified, inclusions and exclusions of ideas may happen, and consensus will be reached, through voting, for the most appropriate idea or suggestion. You will then be required to review the programme for implementability following the same steps to reach consensus.

Should you agree to participate via e-mail, an informed consent form will be sent to you by the independent person where you and a witness will sign to participate in this part of the study.

Sincerely,

Farhin Delawala

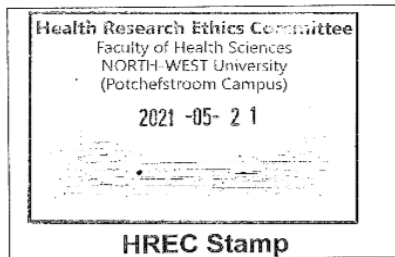
PhD Candidate

ADDENDUM H: INFORMED CONSENT FORM FOR PARTICIPANTS IN THE NOMINAL GROUP DISCUSSION



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Informed consent form for experts participating in the online Nominal Group Session

TITLE OF THE RESEARCH STUDY: Developing an interprofessional education programme for a health science faculty

ETHICS REFERENCE NUMBERS: (NWU-00430-20-S1)

PRINCIPAL INVESTIGATOR: Prof GM Reitsma

POST GRADUATE STUDENT: Ms F Delawala

ADDRESS: Faculty of Health Sciences, Centre for Health Professions Education, NWU, Potchefstroom.

CONTACT NUMBER: 0623195940

You are being invited to take part in a **research study** that forms part of my PhD research. Please take some time to read the information presented here, which will explain the details of this study. Please ask me or person explaining the research to you any questions about any part of this study that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how you might be involved. Also, your participation is **entirely voluntary** and you are free to say no to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part now.

This study has been approved by the Health Research Ethics Committee of the Faculty of Health Sciences of the North-West University (NWU-00430-20-S1) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records. This study has been approved by the Research Data Gatekeeper Committee (RDGC) of the NWU: NWU-00430-20-S1

What is this research study all about?

- We plan to develop a formal Interprofessional Education programme for the NWU. Interprofessional Education is a teaching and learning method in which associates or undergraduates of two or more health and/or social care professions participate in learning with, from and about each other in order to improve collaboration in the delivery of healthcare (Buring et al., 2009; Journal of Interprofessional Care, 2020; Olenick et al., 2010).
- This part of the study will be conducted on an online platform, and will be done by experienced health researchers trained in Health professions education. 15 participants, which is 14 participants and one from CHPE, will be included in this part of the study. The researcher opted for an online NGT session instead of a face-to-face one to maintain the social distancing rules in light of the current Covid-19 crisis.

Why have you been invited to participate?

- You are an expert from a health field in the Faculty of Health Sciences at the NWU.
- You possess a qualification in a health professions field
- You are involved in the academic aspects of that particular field, e.g. nursing
- You have a minimum of 2 years of experience in working with students
- You are involved in theory or practice in an educational context
- You are willing to attend the nominal group session
- You have been informed on the process of the Nominal Group Technique and what is expected from it.

What will be expected of you?

- You will be expected to participate in a nominal group technique process to review and provide feedback on the developed IPE programme for the FHS NWU. You will review the developed IPE programme for appropriateness and implementability for the FHS NWU. A Nominal Group Technique is a method of retrieving important and new information to establish an order of shared opinions (Bitzer & Botha, 2011). The online Nominal Group session will be 45-60 minutes. You will start by reviewing the programme for appropriateness where you will have to type out your ideas or suggestions privately to the researcher on the 'chat'. Once you have typed your idea or suggestion, you will be required to present and discuss it with the group. Similar ideas will be grouped and clarified, inclusions and exclusions of ideas may happen, and consensus will be reached, through voting, for the most appropriate idea or suggestion. You will then be required to review the programme for implementability following the same steps to reach consensus.

Will you gain anything from taking part in this research?

- There will be no direct gains for you in the study.

Are there risks involved in you taking part in this research and what will be done to prevent them?

The risks are minimal and we have taken specific precautions to minimize any risks for you:

- You may feel that you do not have privacy and may fear loss of anonymity.
- You may feel that there is only partial confidentiality as you will be sharing ideas or suggestions with a group.
- There will be exposure to other lecturers in the same online platform that may discomfort you.
- Audio recording: You may not want to have audio recordings done and have it kept for later use.
- Field notes, where the researcher takes notes for referencing and analysing later on, will be taken during the Nominal Group session.
- Time constraints: The session will take about 45 minutes to one hour and you should be available for that period.
- There are more gains for you in joining this study than there are risks.
- Considering the current Covid-19 crisis, instead of a face-to-face session in a designated room where social distancing will not be possible, the researcher has opted to host the NGT using an online platform. Thus, audio recording will be done and consent will be required for audio recordings from you.
- Partial confidentiality will be assured and consent will be taken. Gathered data will not be made available to others.
- You will not be required to connect with video.
- Consent will be taken for audio recordings.
- A member from CHPE will be present for control.
- The researcher will plan out the session and the member from CHPE will keep track of time.

How will we protect your confidentiality and who will see your findings?

- Anonymity of your findings will be protected replacing your name with a code. Your privacy will be respected by not including personal details in the research. The information that you share will be added to a larger data set and it will not be possible to identify your individual information once data analysis commences. All the data of this study will be stored safely on a password protected computer and in a locked cupboard in the researcher's office. Only the researchers, the promoter, co-coder and independent person checking the transcriptions for accuracy will be able to look at the data. Data will be stored for 5 years and after 5 years, the data will be destroyed by deleting soft copies and shredding the hard copies in the presence of the promoter and a representative of IT.

What will happen with the findings?

- The findings of this study will be used to develop an IPE programme as part of a PhD study. The IPE programme may be implemented in future, and the results of this study may be published in scientific journals and/or presented at conferences.

How will you know about the results of this research?

- You will receive a report of the research by email once the study is concluded.
- You will be informed of any new relevant findings by e-mail.

- I clearly and in detail explained the information in this document to

.....

- I did/did not use an interpreter.
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above.
- I gave him/her time to discuss it with others if he/she wished to do so.

Signed at (place) on (date) 20....

Signature of person obtaining consent

Declaration by researcher

I Farhin Delawala declare that:

- I explained the information in this document to the participant
- I did not use an interpreter
- I was available should he/she want to ask any further questions.
- The informed consent was obtained by an independent person.
- I am satisfied that he/she adequately understands all aspects of the research, as described above.
- I am satisfied that he/she had time to discuss it with others if he/she wished to do so.

Signed at (place) on (date) 20....



Signature of researcher

Signature of witness

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ADDENDUM I: PROOFS OF PAPERS SUBMITTED

Article 1: Under review

Journal of Interprofessional Education & Practice

04/28/2022,

Submission to Journal of Interprofessional Education & Practice - manuscript number
to: "Christmal Dela Christmals" <christmal.christmals@nwu.ac.za>

This is an automated message.

Manuscript Number: XJEP-D-22-00112
Nature, development and implementation of Interprofessional Education programmes: A Scoping Review

Dear Dr Christmals,

Your above referenced submission has been assigned a manuscript number: XJEP-D-22-00112.

To track the status of your manuscript, please log in as an author at <https://www.editorialmanager.com/xjep/>, and navigate to the "Submissions Being Processed" folder.

Thank you for submitting your work to this journal.

Kind regards,
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Article 2: Under review

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Action	Manuscript Number	Title	Authorship	Initial Date Submitted	Status Date	Current Status
Action Links	JTUMED-D-22-00521	Conceptualisation, development and implementation of Interprofessional Education Programmes: Points to Consider	Other Author	May 24, 2022	Jun 14, 2022	Under Review

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Article 3: Under review



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Submitted Manuscripts

STATUS	ID	TITLE	CREATED	SUBMITTED
• Under Review	MED-2022-0761	Development and Implementation of Interprofessional Education: Global perspectives View Submission	31-May-2022	31-May-2022

Article 4: Under review



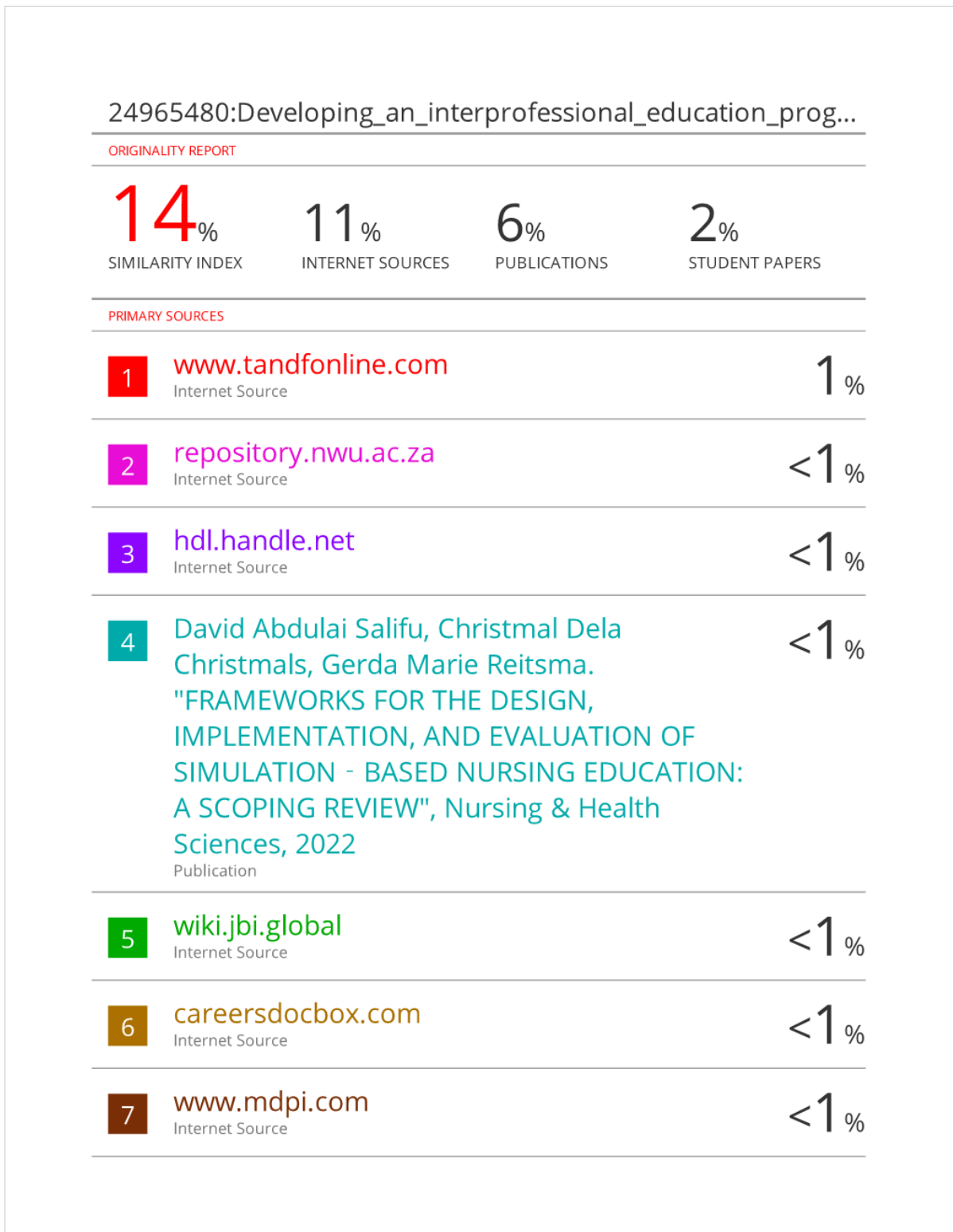
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