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DEVELOPMENT OF AN INTERPROFESSIONAL EDUCATION AND COLLABORATIVE PRACTICE CURRICULUM FOR HEALTH SCIENCE STUDENTS AT SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY

Susara Johanna Susanna Pitout

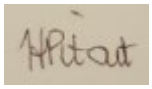
A thesis submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of PhD in fulfilment of the requirements for the degree of Doctor of Philosophy.

Johannesburg, 2023

Declaration

PhD candidate

I, Susara Johanna Susanna Pitout student number 333712 declare that this Thesis is my own work and that I contributed adequately towards research findings published in the papers stated below which are included in my thesis.



Susara Johanna Susanna Pitout 30 September 2023

Supervisors



Dr Paula Ashton-Barnard 30 September 2023

Supervisor



Dr Fasloen Adams 30 September 2023

Supervisor



Dr Sanetta Henrietta Johanna du Toit 30 September 2023

Supervisor

Dedication

To all health care workers in South Africa, past, present, and future. May you keep on improving the quality of health care for our patients.

To my husband James, son Jamie and daughter Jo-Anne. My main reason for caring.

Abstract

A South African university required a contextually relevant, Interprofessional Education and Collaborative Practice (IPECP) curriculum. The study aimed to develop and validate an IPECP curriculum for health sciences students at Sefako Makgatho Health Sciences University (SMU). Planning the IPECP curriculum necessitated both a robust theoretical foundation and pragmatic problem-solving and comprised three phases.

Phase I, the situational analysis included a scoping review of global peer-reviewed literature, focus groups with students and lecturers, and a university-wide needs survey. Brookfield's lenses of critical reflection and reflexivity condensed results of the situational analysis into factors guiding curriculum planning.

Phase II included a curriculum map analysis of profession-specific curricula of the eleven professions: occupational therapy, physiotherapy, speech language pathology and audiology, human nutrition and dietetics, nursing, medicine, radiography, pharmacy, dentistry, dental therapy, and oral hygiene. The curriculum mapping involved consultation with professions' representatives in combination with information extracted from LOOOP, an electronic curriculum mapping programme. The analysis identified the gaps in addressing interprofessional collaboration core-competencies and highlighted common topics, in the professions' specific curricula. From the curriculum foundation laid by Phase I and II, an IPECP curriculum framework and design principles were conceptualised using a Curriculum Development Research design.

In Phase III, the proposed SMU-IPECP curriculum and accompanying design principles were refined during iterative stages of design, development, testing and revision. Internal and external participants validated the curriculum by rating the relevance, consistency, practicality, and feasibility of the four-year, longitudinal curriculum. A modified Delphi guided consensus on the design principles. The curriculum escalated interprofessional role development from mere exposure to immersion, striving for competent representation in research, ethics and Primary Health care. The build-up followed a trajectory from a professional individualised role in the team, to students fulfilling a dual identity of professional and an interprofessional practice-ready practitioner, who practices in an evidence-based collaborative way as a primary health care advocate, in their final year. The curriculum validation highlighted affordances and constraints for future implementation. During validation, participants agreed on the design and commended the proposed IPECP curriculum.

Although the curriculum was planned for a specific university, the theoretical design principles developed through this research process could potentially be customised to fit similar university contexts.

Key words: Interprofessional Education and Collaborative Practice (IPECP) curriculum; undergraduate students, curriculum mapping; curriculum design research; design principles

Acknowledgements

I would like to express my sincere gratitude and appreciation to my research supervisors for their mentorship, guidance and support: Dr. Paula Barnard-Ashton, Dr Fasloen Adams, Dr Sanet du Toit and Professor Daleen Casteleijn all contributed their time and expertise through different stages of the journey.

My appreciation is extended to the Sefako Makgatho Health Sciences University colleagues, including the Deputy Vice-Chancellors, Deans, colleagues and students, for their continued enthusiasm and support. A special word of thanks to the IPECP core committee without whom we could not have achieved success in IPECP.

To my family and friends who supported me through the research journey and helped me not to lose hope.

Most important of all glory to God Almighty, who inspired and guided me to complete the thesis.

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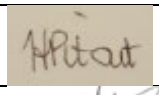
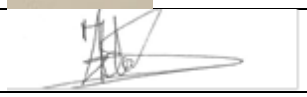
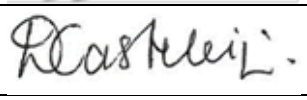
2. The Sefako Makgatho Health Sciences University Capacity Development Grant – supported the IPECP programme development.

Agreement by co-authors

By signing this declaration, the co-authors listed below agree to the use of the paper by the student as part of her thesis.

Paper 1: Pitout, H, Adams, F, Casteleijn, D (2019). Use of the logic model to develop and implement an interprofessional module for undergraduate healthcare students at a University in South Africa: A study protocol, *Journal of Interprofessional Care 33 (3)295-297.*

Student is the first author. Status: Published

Author	Name	Signature	Date
1st Author	Hanlie Pitout		30 September 2023
2nd Author	Fasloen Adams		30 September 2023
3rd Author	Daleen Casteleijn		30 September 2023
Comments by primary supervisor: Mrs Pitout is the first author of this manuscript. She did all the data collection independently. She did the preliminary data analysis which was then refined through discussion and review with the co-authors (supervisors). Mrs Pitout developed the first full draft of the manuscript and the co-authors assisted in revisions, edits and proofing, while guiding the interpretation of the results as appropriate.			

Paper 2: Pitout, H; Adams, F, Casteleijn, D; SHJ du Toit (2022) Factors to consider in planning a tailored undergraduate interprofessional education and collaborative practice curriculum: a scoping review. *South African Journal of Occupational Therapy*, 52(1): 78-95

Student is the first author. Status: Published

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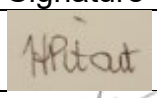
1st Author	Hanlie Pitout		30 September 2023
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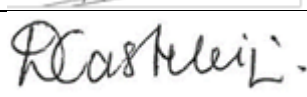
3rd Author	Daleen Casteleijn		30 September 2023
4th Author	Sanet du Toit		30 September 2023
Comments by primary supervisor: Mrs Pitout is the first author of this manuscript. She did all the data collection independently. She did the preliminary data analysis which was then refined through discussion and review with the co-authors (supervisors). Mrs Pitout developed the first full draft of the manuscript and the co-authors assisted in revisions, edits and proofing, while guiding the interpretation of the results as appropriate.			

Paper 3: Pitout, H; Barnard-Ashton, P; Adams, F, SHJ du Toit (2023). Perspectives of collaborative interprofessional curriculum evolvement at a South African University: a qualitative reflection. *BMC Medical Education*

Student is the first author. Status: in review process

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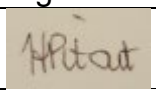
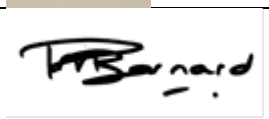
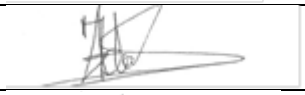
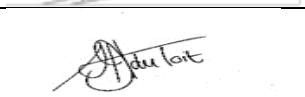
1st Author	Hanlie Pitout		30 September 2023
2nd Author	Paula Barnard-Ashton		30 September 2023
3rd Author	Fasloen Adams		30 September 2023
4th Author	Sanetta du Toit		30 September 2023
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Paper 4: Pitout, H; Barnard-Ashton, P; Adams, F, SHJ du Toit (2023). Work smarter not harder: curriculum map analysis of Interprofessional Education Collaboration core- competencies across curricula. *Scholarship of Teaching and Learning in the South (SOTL)*

Student is the first author. Status: submitted for review

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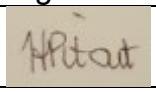
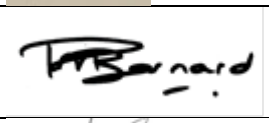
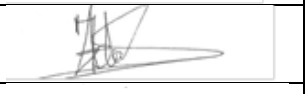
1st Author	Hanlie Pitout		30 September 2023
2nd Author	Paula Barnard-Ashton		30 September 2023
3rd Author	Fasloen Adams		30 September 2023
4th Author	Sanet du Toit		30 September 2023
Comments by primary supervisor: Mrs Pitout is the first author of this manuscript. She did all the data collection independently, with Dr Barnard-Ashton assisting in development of the data collection tool and data analysis. All authors contributed to the interpretation of the results. Mrs Pitout developed the first full draft of the manuscript and the co-authors assisted in revisions, edits and proofing. This manuscript was submitted to the following journal: Scholarship of Teaching and Learning – in the South, on 16th March 2023.			

Paper 5: Pitout, H; Barnard-Ashton, P; Adams, F, SHJ du Toit (2023). Validating a proposed Interprofessional Education and Collaborative Practice curriculum – a curriculum design process. Journal of Interprofessional Care

Student is the first author. Status: in progress

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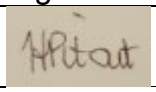
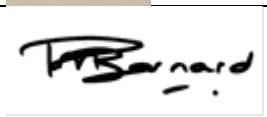
1st Author	Hanlie Pitout		30 September 2023
2nd Author	Paula Barnard-Ashton		30 September 2023
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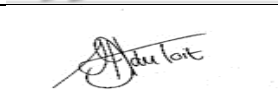
4th Author	Sanet du Toit		30 September 2023
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Paper 6: Pitout, H; Barnard-Ashton, P; Adams, F, SHJ du Toit (2023). Validating design principles of a proposed Interprofessional Education and Collaborative Practice curriculum – Modified Delphi process. *Journal of Interprofessional Care*

Student is the first author. Status: in progress

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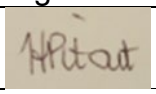
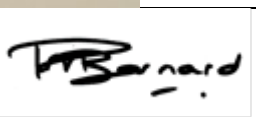
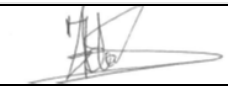
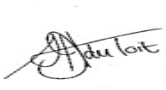
1st Author	Hanlie Pitout		30 September 2023
2nd Author	Paula Barnard-Ashton		30 September 2023
3rd Author	Fasloen Adams		30 September 2023
4th Author	Sanet du Toit		30 September 2023
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Conference Presentations

STUDY PROTOCOL PHASE

World Federation of Occupational Therapy congress; Cape Town: 26 July 2018

Format: Poster presentation
Topic: Leaving the silos
Authors: H Pitout, S du Toit, F Adams
Audience: Occupational Therapists from all over the world
Content: Explanation of the pilot phase of introducing students of SMU to Interprofessional Education
Contribution to the study: The initial results were shared with the international community of occupational therapists. Awareness about the initiation of the IPECP programme was created. Information was exchanged with presenters of IPECP in other countries.

SMU research day: 22 August 2018

Format: Oral presentation
Topic: Use of the logic model to develop and implement an interprofessional education module for undergraduate healthcare students: a study protocol
Authors: H Pitout, S du Toit, F Adams
Audience: Staff from SMU
Content: Explanation of the proposed study was presented outlining the phases of the research and how the logic model will guide the study.
C*ontribution to the study*: The presentation informed the SMU community of the research project. Questions from the audience helped the researcher to refine the stages of the research.

PHASE 1

Objective A1 Scoping review

Before publication the scoping review was presented in different format and at different forums, to present the findings but also to get input from different audiences.

1. **AfrIPEN congress in Nairobi, Kenya: 2019**

Format: Poster presentations
Topic: Factors that guide the planning of an interprofessional education and collaborative practice (IPECP) curriculum – a scoping review.
Authors: H Pitout, S du Toit, F Adams
Audience: International, different professions, including representative from WHO.
Content: Analysis of factors that influence the planning of an Interprofessional Education Module.

Contribution to the study: During the AfrIPEN congress IPECP experts were present. Feedback on the summary of factors to consider in planning was elicited and there was a 90% agreement with the identified factors.

2. Congress South African Academy of Family Physicians, August 2019

Format: Workshop presentation
Topic: Overcoming challenges in Interprofessional Education and Collaborative Practice (IPECP).
Authors: H Pitout, Z Tshabalala
Audience: South Africa Academy of Family Physicians.
Content: An increased interest in and drive towards collaborative practice and the need to prepare students to be practice-ready for teamwork when they qualify, is evident. Factors pertain to health work force needs, the healthcare worker competencies, the curriculum delivery method and content as well as the logistics at the institution.
Contribution to the study: At the end of the session participants understood factors that influence planning an IPECP curriculum and have been introduced to the Four-Dimensional Curriculum framework. The workshop received positive feedback and the attendees indicated that they now have a better understanding of the need for interprofessional education and collaborative practice. They could link it to their practice as family physicians especially in terms of how they interact with students and expose them to teamwork.

3. HPCSA National Congress, 18 Aug 2019

Format: Oral presentation
Topic: The role of professional bodies in planning an interprofessional education and collaborative practice undergraduate curriculum.
Authors: H Pitout, S du Toit, F Adams
Audience: South African Health practitioners and policy makers of the professions registered with the HPCSA
Content: In this presentation the role of the HPCSA in embedding IPECP in the curriculums of undergraduate and post graduate students as well as in Continued Professional Education of qualified Healthcare practitioners is vital. The importance of a Nationally coordinated approach was emphasized, including that national research programmes and national leadership (Steketee et al., 2014) yield results. The ASSAf report finding were also used to strengthen the message (Academy of Science of South Africa, 2018).
Contribution to the study: The message of the influence of professional bodies on driving and supporting the implementation of IPECP at universities was conveyed. Many of the presentations during this congress were linked to the National Health Insurance (NHI) with emphasis on the Health Care team. The information of the NHI was added to the scoping review.

Objective A2. **Feedback on events and focus group with students**

International congress: **AfrIPEN congress on 16 September 2021**

Format: Online oral presentations
Audience: International, different professions, including representative from WHO.

1. Oral presentation with research supervisors

Title: Undergraduate students: more than just IPECP programme consumers
Authors: H Pitout, S du Toit, F Adams
Content: The focus of the presentation was on the importance of students input in the development of an IPECP curriculum. The take home message of the presentation was that students who experienced not only the entire profession-specific, but also the IPECP programme, provided a unique view and supplied concrete examples of operationalizing curriculum guidelines, found in literature.
Contribution to the study: The presentation opened up dialogue with other presenters about eliciting students' views.

2. Oral presentation with IPECP committee

Title: IPECP during the COVID-19 pandemic
Authors: H Pitout, L Schweickerdt, E Viljoen, N Sobantu, C Macdougall
Content: Lessons learned about presenting IPECP during the Covid-19 Pandemic.
Contribution to the study: The presentation was done by the team responsible for implementation of IPECP programme at the University. The researcher took the lead in proposing the presentation. The presentation helped the researcher to formalise the importance of a blended approach to presentation of IPECP events. The presentation further made the audience aware of the type of events that are included in the curriculum and the value of educational games.

AfrIPEN webinar: 14 May 2021

The researcher was invited by AfrIPEN to participate in webinar.
Format: Online oral presentation
Title: IPECP during the COVID-19 pandemic
Author: H Pitout
Audience: IPECP facilitators at Sub-Saharan Africa universities
Content: Lessons learned about presenting IPECP in an online format instead of face-to-face
Contribution to the study: The presentation helped the researcher to formalise the importance of a blended approach to presentation of IPECP events. Innovative teaching strategies were incorporated into the IPECP curriculum e.g., online presentations of large group lectures that present important concepts such as ICF that students then apply in their small group interaction.

PHASE 2

Objective B2 and 3

SAAHE congress 2021: 21- 25 June 2021

Format: Oral presentation in symposium
*Title***:** IPECP at SMU - how we make our programme work
Authors: H Pitout, L Schweickerdt, E Viljoen, N Sobantu, C Macdougall
Audience: Health Educationalists from Africa
Content: IPECP- core committee worked together on the four presentations and the resulting group discussion session. The voice of the students, facilitators, importance of marketing and the ethics project was presented.
Contribution to the study: Preparing for and presenting with the IPECP core committee strengthened and refined the IPECP programme and disseminated information about the programme to the educationalists in South Africa

IPECP Indaba at SMU: 2 September 2021

Format: Online oral presentation
Title: Current IPECP programme at SMU
Author: H. Pitout
Audience: Students and staff, including top management hosted to explain and share the content and importance of the IPECP programme to staff and students, to engage in discussions on strengthening the programme at SMU to map the way forward. The researcher invited national and international speakers to present their IPECP programmes during the Indaba.
Content: Facilitators training, importance of marketing, student involvement
Contribution to the study: The Indaba led the way to a Strategic Planning workshop that helped to formalise the arrangements for the IPECP programme. The Indaba contributed to buy-in from management, staff and students by providing information. The SMU-IPECP programme received recognition from the invited national and international presenters. The national and international presenters lauded the SMU programme and that increased buy-in and ownership of the SMU-IPECP programme of the SMU audience.

SMU-IPECP Curriculum workshop: 21 September 2022

Format: Oral presentation
Title: Integrated curriculum for SMU
Author: H. Pitout
A*udience*: Lecturers at SMU

Content: The proposed curriculum was presented to lecturers from different professions representing different year groups. The proposed curriculum was presented. The participants were then divided into groups according to year levels of study where they are mainly involved. Each group then brainstormed the proposed spider grams for their year group and planned for implementation.

Contribution to the study: the workshops contributed to buy-in as well as refinement of the proposed curriculum. Additional activities were suggested e.g., in second year to familiarise students with the work environment of the different professions. Lecturers had opportunity to ask for clarification of the proposed curriculum elements.

SAAHE Congress, June 2022

Audience: South African health educationalists

Three workshops were presented

Workshop with LOOOP experts

Title: How curriculum mapping can enhance transparency, accreditation, effective interprofessional education.
Authors: O Ahlers, D Manning, C Hartmann, H Pitout, T Rech, I Treadwell
Content: SMU curriculum mapping was presented.
Contribution: The researcher used the opportunity to elicit feedback on the curriculum mapping process that was followed. The advantages and disadvantages of using LOOOP for curriculum mapping was discussed. The results are that the LOOOP developers see SMU-IPECP as front-runners in IPECP and is creating a separate IPECP module on LOOOP and would include IPEC-core-competency framework to LOOOP. This addition will enable other universities to map IPECP.

Workshop of SAAHE IPECP special interest group

Title: Cultivating shared leadership, interprofessional collaboration and shared decision-making in healthcare.
Authors: F Waggie, A Dreyer, H Pitout
Content: during the workshop the importance of shared decision-making and leadership was unpacked.
Contribution to the study: Engagement with the other two presenters added insight into the importance of shared decision-making as aspect to include in the planning and implementation of the IPECP curriculum. The value of incorporating short YouTube video clips to improve presentations was a valuable learning experience.

Workshop with students from different professions and universities

Format: Workshop
Title: Can we mitigate the impact of the COVID-19 pandemic on health care students' experience of learning and profit from lessons learned?
Authors: MI Onyinyechukwu, Z Nkabinde, N Makhaza, H Pitout

Content: The researcher presented on the importance of incorporating graduate attributes into the IPECP curriculum.

Contribution to the study: The researcher initiated the workshop and helped the students to develop the content. This encouraged students to value IPECP at their respective institutions and helped to prepare them for future congress presentations. The presentation on graduate attributes shaped the researchers understanding of how graduate attributes strengthen the IPECP programme.

Dirisana research day: 6 December 2022

Format: Three online oral presentations

Audience: Participants from the universities who participated in the Dirisana project including lecturers from SMU. University of Pretoria, University of Witwatersrand, University of Namibia.

Title: Curriculum mapping to identify opportunities for IPECP

Author: H. Pitout

Content: Explanation of process and outcomes of curriculum mapping process to establish a communal foundation for the development of an IPECP curriculum.

Contribution to the study: Presentation of the curriculum mapping process contributed to insight into the value of identification of overlaps between curricula. Understanding the year level of study at which the specific IPEC-core-competencies could be incorporated provided valuable insight for lecturers from other universities.

Title: Planning and development of an interprofessional and collaborative practice module at an African university: a qualitative reflection: A qualitative reflection IPECP at SMU

Author: H. Pitout

Content: Explanation of how Brookfield's lenses were used to report on critical reflexivity and critical reflection.

Contribution to the study: The presentation and comments from the audience helped to refine the contents of the paper

Title AfriVIPE: Value of virtual interprofessional education for students from multiple countries.

Author: H. Pitout, M Showstark, A Weiss

Content: The development of a complex case study by an international team of IPECP lecturers.

Contribution to the study: Preparing and presenting the presentation helped the researcher to reflect on the process and value of developing authentic case studies, in collaboration with international IPECP experts.

Phase III

No formal presentations of Phase III have been done yet as it has only completed recently. However, the researcher plans to submit abstracts to present this phase, the curriculum validation to AfrIPEN and the development and validation of design principles to All Together for Better Health congress XI at Qatar University in 2023.

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Operational definitions

Term	Description
Advocacy	Activities related to ensuring access to health care, directing clients to negotiate the health system, mobilizing resources, addressing health inequities, influencing health policy and creating change to the organisation
Authentic learning	Real-world learning, where students are exposed to problems that they would need to be able to solve when they engage in a work integrated learning setting
Autonomy	Able to work independently on own tasks
Blended learning	Learning experiences that combine online technology and face-to-face components
Communication	Share and discuss information
Contextually relevant	Suitable in terms of learning environment, activities, available resources, to address the specific needs of the university
Cooperation	Work together while respecting the viewpoints of self and others; willingness to acknowledge and change
Coordination	Divide tasks to maximise participation in group tasks and assignments
Curriculum	Curriculum is the outline of concepts to be taught to students to help them meet the content standards. Curriculum is what is taught in each course or subject. Curriculum refers to an interactive system of instruction and learning with specific goals, contents, strategies, measurement, and resources
Curriculum map analysis	The analysis of information on the curriculum that is included in the university school calendar and in LOOOP, the university's electronic curriculum mapping tool
Embedded	Integrated into existing tasks and structures
"Face of IPECP"	Students who lead their professions' students during IPECP engagement
Facilitation	The process of helping groups, or individuals to learn, find solutions, or reach consensus without imposing or dictating the outcome
Four-dimensional curriculum development framework (4DF)	An IPECP curriculum development framework with four dimensions: Future healthcare needs; Defining and understanding capabilities; Teaching, learning, and assessment; and supporting institutional delivery (Moran et al., 2015)
ICC-subjects	Subjects that have Interprofessional Education Collaboration-core-competencies
ICF	International Classification of Function, Disability and Health
Included professions	The professions at SMU who participate in IPECP, that is occupational therapy, physiotherapy, speech language pathology and audiology, human nutrition and dietetics, nursing, medicine, radiography, pharmacy, dentistry, dental therapy, oral hygiene
Interprofessional education (IPE)	When students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes (WHO, 2010)

Interprofessional collaborative practice (CP)	When multiple health workers form different professional backgrounds work together with patients, families, carers and communities to deliver the highest quality of care (WHO, 2010)
Interprofessional communication	Students form different professions communicate with each other in a collaborative, responsive and responsible manner
IPECP	Interprofessional education and collaborative practice, entailing both education and collaborative work
IPEC-competency framework	The specific competency framework that specifies values and ethics, roles and responsibilities, teams and teamwork and interprofessional competencies achieved through engagement in IPECP activities
IPECP core committee	The IPECP core committee consists of an elected representative of each profession that plan and implement the IPECP programme
IPECP programme	Activities related to the implementation of the IPECP curriculum
IPECP unit	An IPECP unit will have staff and resources that can coordinate IPECP curriculum implementation including coordinating work-integrated learning of multiple professions
Multi-disciplinary	A group of professionals who treat a client. Limited collaborative decision making and collaboration
Person/ patient/client/family/community-centered care	Students seek out, integrate and value as partner, the input and the engagement of the patient/client/family/community in designing and implementing care/services
Professional competencies in health care	Integrated enactment of knowledge, skills and values, and values/attitudes that define the domains of work of a particular health profession applied in specific care contexts
Role clarification	Students understand their own role and the roles of those in other professions and use this knowledge appropriately to establish and achieve patient/client/family and community goals
Shared values	Mutual respect and acceptance of differences in viewpoints and strengths
Simulated patients	Lay people who receive training to portray the role of a patient during simulated patient interaction in an educational environment
SMU-IPECP curriculum	The curriculum designed to be contextually relevant for SMU
Stakeholders	Stakeholders are persons with a vested interest in the decision-making and activities of the curriculum planning and design including students, staff and the broader IPECP community
Tailored	Made to match the needs of the specific context, identified through literature and a needs analysis
Team functioning	Students understand the principles of teamwork dynamics and group/team processes to enable effective interprofessional collaboration
World Health Organisation	The World Health Organization is a specialized agency of the United Nations responsible for international public health
Work-integrated learning	Links universities and clinical placement areas for students to have real-life work experiences

Please note

A full list of IPEC-competencies nomenclature can be found in chapter 5 and is provided in appendix E, where each of the core-competencies is named and the acronym indicated. The sub-competencies under each core-competency are numbered, indicating the acronyms for the core-competency and the number of the specific sub-competency e.g., VA1 is the first sub-competency under Values and Ethics core-competency

Contributions of Authors to the Study

This study was designed using as foundation the logic model. The study is presented in a hybrid format of publication and traditional. Chapters 1, 6, 7 and 8 are in traditional chapter format and Chapter 2 has a publication accompanied by information in a traditional chapter format to provide additional detail on the theoretical foundation. Within this thesis my supervisors contributed directly to the research design, implementation and writing of the publications herein. I hereby acknowledge their specific contributions towards the papers presented in this thesis.

The conceptualisation of the study, the research design and research protocol, were primarily crafted by myself, under the guidance and mentoring of my supervisors at that stage, Dr D Casteleijn and Dr F Adams. While the research implementation was conducted independently, my supervisors were available for consultation as needed.

This thesis and the papers were drafted primarily by me unless otherwise stated below. Dr S du Toit, Dr F Adams and Dr PM Barnard-Ashton reviewed and assisted in revising the body of this thesis. They reviewed each paper prior to presentation at congresses or peer-reviewed journal publication. They made suggestions to improve on the presentations and journal papers.

Nomenclature

AfrIPEN	African Interprofessional Education Network
AfriVIPE	African Virtual Interprofessional Education
ASSAf	Academy of Science of South Africa
CHE	Council of Higher Education
HPCSA	Health Professions Council of South Africa
ICC-subjects	Subjects in the profession's curriculum where aspects of core-competencies and sub-competencies were included
IPE	Interprofessional education
IPEC-core competencies	Interprofessional education collaboration core competencies
IPECP	Interprofessional Education and Collaborative Practice
IPC	Interprofessional collaboration
IQR	Interquartile range
LOOOP	Learning Opportunities, Objectives and Outcomes Platform
OSCE/OSPE	Objective Structured Clinical Examination / Objective Structured Practical Examination
SAAHE	South African Association of Health Educationalists
SAQA	South African Qualifications Authority
SMU	Sefako Makgatho Health Sciences University
VAS	Visual Analogue Scale
WHO	World Health Organisation

Chapter 1 Orientation to the study

"*You can do what I cannot do, I can do what you cannot do. Together we can do great things*" – Mother Teresa

An introductory vignette

I believe that using everyone's strengths can enhance competence in current healthcare. My interest in Interprofessional Education and Collaborative practice (IPECP) comes from a personal background of visiting my mother in hospital during a long sickbed, necessitating frequent admissions. As an occupational therapist, I had many years of experience of patient-centred interprofessional care, and appreciation of the professional value and rewards of teamwork. However, it was devastating to experience first-hand the lack of quality of care in my role as a family member. Even though she was admitted to different private hospitals over a period of ten years, limited collaborative teamwork between the health care staff e.g., the medical specialists, nurses and therapists, compromised quality of care to an extent that time and money was wasted and her quality of life during and between admissions was compromised. The different team members provided multi-disciplinary care, each acting in isolation without collaboration. Communication between the team and my mother's family and caregivers, was almost non-existent, leading to interventions that were unnecessarily invasive, time consuming and irrelevant. An example was ordering a foot splint that only fitted her foot during the period of hospitalisation when she received daily physiotherapy, which she did not have access to, after discharge. I believe if the medical team could have worked collaboratively and was person-focussed, many lives could have been enhanced in the process. I therefore strongly believe that interprofessional collaborative care could change a negative and unfortunate event in a patient's life, to one that is remembered with fondness, recalling receiving quality personal and professional care. Exposing students and facilitators to the benefit of IPECP, where they leave our IPECP course with more knowledge, skills and a caring attitude, can enhance the competence of health care workers and improve the quality of health care.

1.1 Background

Chapter 1 introduces the study and includes a brief overview of interprofessional education and collaborative practice (IPECP) in terms of its history, stakeholders and networks, relevance, barriers to implementation, and its position within the healthcare system both globally and in South Africa (SA). With these as background the study setting, problem statement, purpose, objectives, significance, and delimitations are presented.

IPECP is a complex study area where theoretical concepts and practical inferences require careful consideration when planning an IPECP curriculum. Chapter 1 sets the scene and explains where the need for the SMU-IPECP curriculum originated.

1.1.1 History of IPECP

Small initiatives, to have students of health professions learn together, started as early as the 1960's in countries such as United Kingdom (UK) and the United States of America (USA). Today such initiatives are defined as Interprofessional Education (IPE, World Health Organization, 2010). Although various IPE definition iterations occurred since the 1960's, the 2010 WHO definition of "Interprofessional education IPE occurs where students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (World Health Organization, 2010) has globally been accepted as the IPE operational definition. Interprofessional Collaborative Practice (IPC) refers to when multiple health workers form different professional backgrounds work together with patients, families, carers and communities to deliver the highest quality of care (World Health Organization, 2010). The SMU-IPECP curriculum aims to provide more than just small IPECP events, by providing a comprehensive, four-year longitudinal curriculum.

In the 1980's IPE gained increased momentum when the WHO endorsed this pedagogy as one method to increase quality of health care as well as staff satisfaction (Rodger,Hoffmann & World Health Organization Study Gro, 2010) . The establishment of the Journal of Interprofessional Care in 1987 contributed to the establishment of IPE as a well-organised philosophy, grounded in scholarship of teaching and learning and a worthy academic venture (Chopra et al., 2009).

Paradis and Whitehead (2018) refer to four waves in the historic evolution of what today is known as IPECP. However, these waves are not mutually exclusive. Wave 1,

the most prominent from 1954–1979 in Canada and the USA, introduced IPE mainly from educational settings, where universities tried to manage the health workforce through shared curricula, to train more generalists. Wave 2 spanned the period 1978–2008 where the focus was on the health system and on primary and community-orientated care with a teamwork and an intersectoral approach to address population health through government measures to improve health workforce planning. The predominant focus of wave 3, 1999 to the present, was on fixing individuals to fix health care. During this time, the focus was on increased awareness of safety and quality care that required the nurturing of relationships between team members (Fransworth et al., 2015). The focus was on how changing the individual health care worker could mitigate challenges related to the health care system. Wave 4, the most recent wave, addresses workplace systems and structures. The emphasis is on professions using their existing professional structures to build alliances across systems (Lutfiyya et al., 2019). The four waves indicate how the thinking of IPECP changed from an initial focus on local health needs changed to having a more global focus, and from focussing on individual changes to the healthcare system. IPECP cannot continue to be seen as the panacea for fixing the inert healthcare system (Paradis and Whitehead, 2018).

Through the evolvement of the curriculum design, the researcher reflected on whether a newly designed IPECP programme could approach IPECP from any of the perspectives identified by the various waves. In Africa, specifically in South Africa, IPECP is still evolving. Many universities are only starting to introduce IPECP to undergraduate curricula. The focus of IPECP may therefore be different locally than it is globally. Therefore, an IPECP curriculum needs to fit the university context.

For undergraduate students to appreciate the full benefits of interprofessional care (Interprofessional Education Collaborative, 2016b), students need to be exposed to interprofessional education (IPE) in class or through simulation, but also need the opportunity for knowledge to be reinforced and skills and competence to be developed, in interprofessional collaborative practice (IPC). Interprofessional collaboration (IPC) aims to reduce professional silos and prepare students to be collaborators and practice-ready when they graduate (Khalili and Orchard, 2020; World Health Organization, 2010; Frenk et al., 2010). Collaborative care requires shared decision making and regular communication, which does not automatically happen when different professions are involved in treating the same client in a multi-disciplinary manner. Educators and clinicians need to appreciate the value of collaborative care,

model teamwork and create opportunities where students can experience the benefits of collaborative care. Collaborative care contributes to reduce fragmentation in health services and therefore can contribute to improved quality of care and better job satisfaction of health care workers (Julie et al., 2016).

Equally interprofessional education (IPE) requires exchange-based learning, where students learn through collaborative interaction sharing insights from personal perspectives. Simply sharing the same subject and classroom (Bainbridge and Wood, 2012; Thistlethwaite and Vlasses, 2021) or when the lecturer includes information about the roles of other professions during uni-professional lectures is not IPE. Such strategies can contribute to building the knowledge base for IPECP but fail to meet the requirement of students learning directly from, with and about other professions. Uni-professional learning or parallel learning fails to fulfil on the intention of IPECP defined as “Interprofessional education and collaborative practice (IPECP) occurs where students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes” WHO, 2010:55.

1.1.2 Stakeholders and Networks

The variety of stakeholders involved in the development and implementation of IPECP include policymakers in higher education and health, educators, healthcare students, health workers, community leaders, and global health advocates (Fransworth et al., 2015; Agnew, 2021). IPECP is not merely a function of education of undergraduate and post graduate students, but also rooted in continuous professional development of health care workers. The understanding and collaboration of all respective stakeholders is necessary to strengthen IPECP in all health care service delivery systems. Ultimately, the aim of IPECP is to develop, and support the development of a healthcare workforce with the relevant skills and capacity to address health needs of their customers from their local, but also from a global context.

IPECP forms an integral part of various health professions’ education offerings globally. The development of a global perspective on IPECP is fostered by dissemination of information, fostering research, and sharing resources about IPECP across countries participating in IPECP. Such global network resource sharing occurs through Interprofessional.Global’s, the Global Confederation for Interprofessional Education and Collaborative Practice (https://interprofessional.global/).

Interprofessional.Global's mission is to promote, and advocate for, evidence-informed policies and practices through fostering and facilitating theory-driven, methodologically rigorous IPECP research (Khalili et al., 2021). The total of 45 countries involved in Interprofessional Global consists of nine regional networks, including three emerging networks. The regional networks include:

- Africa: African Interprofessional Education Network (AfrIPEN) with members from the following countries: South Africa, Zimbabwe, Namibia, Ghana, Nigeria, Kenya, Rwanda, and Malawi (AfrIPEN website, 2022).
- Australasia: Australasian Interprofessional Practice and Education network (AIPPEN), including Australia and New-Zeeland,
- Canada: Canadian Interprofessional Health Collaborative (CIHC).
- German-speaking countries: Society for Interprofessionalism in Healthcare (IP-Health) including Germany, Austria, and Switzerland,
- Indian subcontinent: Indian Interprofessional Education Network (IndIPEN) for India,
- Scandinavia: Nordic interprofessional network of Europe (Nipnet) include Denmark, Finland, Norway, Sweden and Iceland.
- South & Central America & Caribbean: Regional Network for Interprofessional Education in Americas (REIP) include Argentina, Brazil, Chile, Columbia, Costa Rica, Honduras, Peru, Uruguay, Guyana, Panama, Suriname.
- United Kingdom: Including England, Scotland, Wales, Northern Ireland: Centre for the Advancement of Interprofessional Education (CAIPE)
- United States of America: American Interprofessional Health Collaborative (AIHC).

There are two additional emerging networks that are based in:

- Arabic-speaking countries including Egypt, Iran, Jordan, Kingdom of Saudi Arabia, Kuwait, Lebanon, Morocco, Oman, Qatar and United Arab Emirates.
- The Asia Pacific region where there are 40 countries of which Philippines and Indonesia are most active.

Although China and Japan are not part of the Global Interprofessional Education networks, they are active in Interprofessional Education, for example, the Japanese Association for Interprofessional Education (JAIPE).

The global interprofessional networks enable different region-based countries to collaborate among themselves to create IPECP-related strategies and to play leading roles in addressing the health needs of the respective countries. AfrIPEN, with South Africa playing a leading role, contributes to improving the health workforce and therefore the effective functioning of systems for health in Sub-Saharan Africa. This is achieved by advocating for, collaborating on, promoting, and sharing good IPECP practices. AfrIPEN members contribute to IPECP training through collaboration and sharing resources in work groups and during congresses (Botma, 2019; Reitsma, 2019).

1.1.3 Importance of IPECP

The importance of IPECP can be deduced by looking at some important advantages. These advantages were important to consider while planning the curriculum as it could either provide confirmation of need of the IPECP curriculum.

1. Healthcare worker shortage: The health care worker crisis, or shortage, refers to the scarcity of qualified healthcare workers who need to be deployed optimally to complement each other. The WHO suggests that IPECP can play an important role in mitigating the workforce shortage by improving student competence in teamwork, leadership and collaboration (World Health Organization, 2010). An educational grounding in IPECP can enhance future workforce deployment and allow health care workers to respond appropriately to complex health needs of the population that is served (Julie et al., 2016). Healthcare workers who understand the scope of practice are able to work more effectively to address the health care needs by providing timely and effective intervention. However, Paradis and Whitehead (2018) warned that IPECP is often proclaimed a solution to fixing all problems in an inflexible healthcare system and this oversimplifies a very complex issue.

Implementation of IPECP in health care services would allow different team members to concurrently contribute to service delivery from their unique professional perspective, while at the same time being equipped to operate as collaborative team members. In addition, the policy on Universal Health Coverage (UHC) requires students to have the necessary skills, competence and adaptability to address future health care needs (World Health, 2013). IPECP is seen as a credible strategy to mitigate the health worker crisis, as it addresses both quality of healthcare worker's work satisfaction as well as skills required to work as a team (Barr et al., 2016). The

IPECP curriculum needs to address teamwork skills. Students should learn from role models about how good interprofessional teamwork contributes to health workers job satisfaction, during work-integrated learning.

2. Enable better use of scarce health resources through focus on and involvement of service users, where improved communication amongst health care providers can reduce unessential interventions and thereby reduce health care costs (Barr et al., 2016). Collaborative practice can improve better access to healthcare and optimal health outcomes for patients in terms of lower patient turnover and shorter patient hospital stay, less patient related complications and better patient safety through, for example, fewer clinical errors (Khalili et al., 2021). IPECP can contribute to health policy standards, for example, improved workplace practices and productivity, raised staff morale, less tension and conflict among caregivers. IPECP's impact on addressing health resources, such as improving health care workers' skills, could contribute to more cost-effective and efficient health care (Frenk et al., 2010). Students need to be made aware of how policy influences availability of health resources and their responsibility to use resources effectively.

3. Reconceptualization of healthcare worker education Emphasis on the need for IPECP is addressed both on a global platform by the WHO (World Health Organization, 2010) and by the authors in a seminal Lancet paper on *Transforming Health Education* (Frenk et al., 2010) and confirmed in South Africa in the ASSAF report on Reconceptualising health professions education in South Africa *(Academy of Science of South Africa, 2018).* To keep the education of health workers up to date with changing needs, it is important to ensure first integrated information, secondly use of the latest trends in teaching and learning, and lastly, provide sufficient opportunities for student participation (Dent et al., 2021). The importance of the use of innovative teaching strategies to promote, recognise, and prioritise teamwork is especially highlighted. IPECP could provide students with real-world experiences and develop insight into patient care. Thus, students learn first-hand about the scope of work of other professions. Various professions provide input into IPECP programmes, including curriculum development, and therefore contribute to the richness of the educational experience.

4. Foster networking and research between educational institutions through regional networks to share resources and collaborate in research and education. Collaboration

from different professions, when preparing for IPECP programmes and/or curricula, builds relationships that could foster collaborative research.

5. Contribution to graduate attributes IPECP can address a wider range of graduate attributes that all students need to acquire during undergraduate training and that can be fostered together with core-competencies. Teamwork and collaboration are obvious focusses that could be addressed by IPECP, but IPECP can also address skills such as the effective use of evidence and ethical decision making), leadership and management capabilities (awareness of resource constraints), and communication skills (when communicating with team members, patients and care givers) (Frenk et al., 2010).

6. IPECP addresses parity between professions by providing equal opportunities with a concurrent respect of the integrity and contribution of each profession. IPECP creates opportunities for socialization as students from different professions learn together before graduation (Frenk et al., 2010) affording an appreciation of one another's unique contribution to health care. Through receiving recognition in a team, IPECP contributes to an increase in professional satisfaction. Team members' different backgrounds, insights and perspectives increase the chances of generating unique and innovative solutions to challenges that often arise with regards to care quality in work-integrated learning practice, where collaborative care could ensure quality, equity, justice, and safety (Samuriwo, 2022). Consideration should be given to the impact of diversity in teams, including the variation in professional cultures, which may elicit conflict (Paradis and Reeves, 2013). IPE provides valuable opportunities for learning how to deal with conflict and power play (Skyberg, 2022; Müller and Couper, 2021).

1.1.4 Barriers to implementation of IPECP

Barriers could be categorized as those encountered in planning, initiating, and implementing IPECP in various locations. However, barriers can also be referred to systemic, behavioural, attitudinal, and methodological barriers (Herath et al., 2017). In planning a IPECP curriculum it would be important to recognise barriers that could hinder implementation and to identify possible methods to mitigate the impact of the barriers.

Silos: Health profession education and service delivery predominantly occurs in isolation, or what we can call silos. Silos inhibit sharing and create barriers to

collaboration. The university situation is one where students are exposed during teaching almost exclusively to only students in their own profession. There is limited sharing of information between lecturers of different professions, especially across schools at the university. Silos often occur due to pressure on professions to comply with accreditation standards and to cover profession-specific learning material, leaving limited time to foster interaction.

Institutional barriers related to both universities and health facilities include lack of financial resources, scheduling IPECP opportunities between different professions programs, and differences in assessment requirements. The importance of buy-in and commitment from institutional management, at both universities and health facilities, that cascades down to staff, cannot be overemphasized (Milot et al., 2015). Management's support of IPECP could ensure that staff and students value the inclusion of IPECP into curricula (Iachini et al., 2019). Barriers specific to universities include negative faculty attitudes toward IPECP and a desire of faculty members to preserve the integrity of their own professions. Faculty development plays a key role in ensuring staff awareness of the value of IPECP, to provide them with skills to cope with resistance of colleagues, and to enable them to optimally develop and facilitate suitable activities for IPECP (Botma, 2019; Hall and Zierler, 2015).

Profession-specific (uni-professional) knowledge and identity. Profession-specific knowledge forms the bulk of learning in any profession (Freeth, 2013). However, the continued emphasis on profession-specific knowledge, with the exclusion of learning to work with other professions during IPECP and to become skilled in interprofessional teamwork, could have a negative effect on preparing workplace-ready graduates. This uni-professional focus could contribute to inability of students to develop their interprofessional identity (Khalili et al., 2013). Both identities, that is, both profession-specific and interprofessional, are needed to enhance professional practise (Khalili and Price, 2022).

Tribalism and turf battles between professions Tribalism and turf battles between health professionals and negative stereotypes of each other could hinder teamwork and openness to learn from other professions resulting in less effective learning during IPECP events (Julie et al., 2016). Students' self-identity, understanding of their identity as part of the healthcare team, and their preparedness to deal with challenges in patient care may affect their engagement in IPECP (August et al., 2020). Students need to be encouraged to reflect on preconceived notions about other professions,

reflect on their perception of their own role (professional-specific identity) on the team, and ultimately shift their perspective from an individual-focus and develop their own interprofessional identity (Joyce et al., 2015).

Logistical complexity, for example, scheduling (timetabling) activities, especially where there are inflexible and overcrowded profession-specific curriculums, with no time intentionally allocated (ringfenced) to participate in IPECP, creates a barrier to offering IPECP activities (Birk, 2017; El-Awaisi et al., 2016). It is challenging to schedule and identify suitable times for large-scale IPECP activities when students from all professions are available (Paradis & Whitehead, 2018). Support and cooperation from timetable planners of all professions, and appreciation of the value of IPECP from management, are required to overcome this barrier.

Resource constraints, for example, limited institutional support is required to overcome barriers related to resource constraints such as commitment of both human and financial resources. Without these resources IPECP cannot develop to its full potential. The management of the university, both top management as well as profession-specific management, needs to be committed to support planners of IPECP (El-Awaisi et al. 2016; Iachini et al.; 2019; Gum et al., 2013). Resource constraints are mitigated when management of the university embrace and support the implementation of IPECP.

Lack of a national mandate: The majority of IPECP occurs in developed countries and one reason for their success in implementing IPECP is national, country specific, policies that guide IPECP implementation (Fransworth et al., 2015). South Africa lacks a national IPECP implementation policy. Consequently, recognition of IPECP is lacking in South Africa, resulting in delays of full implementation of IPECP in this country (Academy of Science of South Africa, 2018). The ASSAf report on IPECP thus advocated for the formation of a committee that could address the need for uniform expectation on IPECP from all accreditation bodies (Academy of Science of South Africa, 2018).

Unorganised IPECP programme can be damaging if it results in a negative experience which could generate a reluctance for students and staff, to engage in subsequent interprofessional collaboration (Freeth, 2013). The impact of a negative experience may have long-term effects. If students do not value and enjoy their IPECP exposure, they may not participate fully or be motivated to implement their learning

during future team interactions (Gilligan et al., 2014). The preparation and commitment play an important role in the success of IPECP. The most suitable teaching method for IPECP is small group teaching, where trained and dedicated facilitators are required. The barrier is that the low teacher-student ratio means recruiting and training a large number of facilitators (Hall and Zierler, 2015). The lack of commitment of IPECP facilitators in terms of availability to participate in events and acquire skills needed for effective facilitation could negatively impact IPECP (George et al., 2015; Rokusek et al., 2014). When students perceive that facilitators are not committed to IPECP it provides a negative role model. Careful logistic preparation for IPECP events and programmes may have financial implications and require additional funding. Committed leadership from IPECP programme planners, as well as support from management, could overcome these challenges.

Conflict in small groups IPECP harnesses diversity to enrich the student learning experience. Students from different professions offer diversity of knowledge, skills and viewpoints (Freeth, 2013). However, facilitating and managing students from a wide range of professions and the diversity of opinions, especially during small group engagement, often elicits conflict (Julie et al., 2016). In IPECP conflict could create a barrier; however, it could offer valuable opportunities to teach students how to deal with conflict. The need for effective conflict management should be specifically acknowledged by facilitators and included in reflection on IPECP learning events.

The IPECP curriculum may not be tailored to the specific context of the University. A university's institutional culture, diversity, needs, and range of engaging professions could influence the development of an IPECP module (Pitout et al., 2022). Although developed countries have IPECP curricula, these curricula cannot be transferred uncritically from developed to developing countries without considering differences in context and culture (Barr et al., 2016). It is important to consider the unique characteristics of the university when a module is developed, as no 'one-size-fits-all' curriculum is available by be adopted to any or all institutions. All included professions need to feel that their contribution in a case study is important and valued. IPECP events must be on the appropriate level of complexity to align with profession-specific teaching.

Stakeholders in education and health care delivery have different needs. Healthcare providers, professional associations, regulatory bodies, universities, and researchers may agree that IPECP is valuable. Collaboration between education and

health could decrease tension through improved teamwork. Reform of professional education (Fransworth et al., 2015) may be necessary to ensure that professional accreditation bodies include IPECP in their expectations of professional curricula. However, differences in needs and interpretation of IPECP in education and health can delay the implementation of the training of IPECP, as part of all professions. It may result in differences of how regular IPECP training must occur, at what year level of study, the most suitable learning methods and access to suitable venues. Without clinicians creating opportunities for students to work collaboratively and for clinicians to role model teamwork, IPE would remain a theoretical exercise instead of becoming an expectation in health care.

1.1.5 Elements of IPECP curriculum planning

1.1.5.1 IPECP competency frameworks

The IPECP competency frameworks, or as some countries refer to it, capability frameworks, developed in the respective countries, guide the development of IPECP outcomes (Thistlethwaite et al., 2014; Filies and Frantz, 2022). Although IPECP's outcomes are phrased differently, with some having more categories while other have more specific sub-categories, they share some common concepts. The overlap in concepts between competency frameworks is that all include interprofessional communication skills, teams and teamwork, roles and responsibilities and values. Some frameworks add ethics, attitudes and collaboration; aspects that could be included in the overlapping competencies. For IPECP to be effective, a common practice-related competency framework should be adopted in the health education facility to inform specific teaching and learning strategies and outcomes (Julie et al., 2016). For this study, the IPEC- core-competency framework was selected as it provides a comprehensive list of core competencies and sub-competencies (Interprofessional Education Collaborative, 2016b). The essence and application of IPEC core-competency frameworks is discussed in chapter 5.

1.1.5.2 The association between health systems and health professions education

The health system and higher education in health need to work in partnership for effective IPECP implementation. This obvious connection between health and higher education exists in the needs and demands brought by both (Frenk et al., 2010). Higher education needs to supply an educated workforce to meet the current demands of the

health system. In a seminal document, Frenk et al. (2010) urged for education to keep abreast of innovations and in health care by designing new instructional and institutional education strategies. The need was further emphasised by Khalili et al, 2021 There thus needs to be a focus on providing education that is transformative, that is, develop leadership attributes and enable students to become change agents who are able to adapt what they have learned to the local health context. (Frenk et al., 2010). Botma and Snyman (2019) advocated for the increased drive towards ensuring that IPECP to become the new paradigm of health professions education and work-integrated learning.

1.1.5.3 Health system and healthcare delivery

Healthcare across the world is one of the biggest governmental expenses. Health is a basic human right for all individuals, yet globally not everyone has access to quality health care. One of the drivers of healthcare training transformation is the obvious gaps and inequities in health when there is limited sharing of health advances (Frenk et al., 2010; Agyeman-Manu et al., 2023) . These threats in the healthcare system, add to the ever-increasing demands on healthcare workers knowledge and skills. One way to address these threats is through IPECP, where core-competencies include Values and Ethics.

There is a worldwide shortage of health care workers (Mayosi and Benatar, 2014; Agyeman-Manu et al., 2023). A culture shift is necessary in healthcare delivery that necessitates a shift in the training of heath care professionals to ensure more focus on collaborative care, to foster a strong and flexible health work force (World Health Organization, 2010; Skyberg, 2022).

The healthcare worker shortages could be attributed to the changing demographics of those who need healthcare, with increased prevalence of long-term chronic diseases such as HIV AIDS and TB, as well as an aging population, with increased longevity (Thistlethwaite, 2012). There needs to be an increased focus on prevention and promotion, as this is in line with universal health care (Valiani, 2020). These changes require a change of focus from an acute to a more chronic care model. The chronic care model necessitates more interaction between health care workers, to use each team member's complimentary skills to consult with patients and caregivers (Kadu & Stolee, 2015). Further, patients and the community expect to be included in the decision making of their health (Muller et al., 2019). Globally, the healthcare quality

and safety agenda is gaining increased attention where a lot of unnecessary health expenditure derives from patients suing health professionals due to neglect. IPECP could contribute to a safer way of treating patients with the team collaborating and monitoring one another to avoid medical errors.

The quadruple aim of healthcare is to improve firstly the patient's care experience including quality care in terms of safety, effectiveness, patient-centeredness, timeliness, efficiency and equity. Secondly, to improve the health of a population through education of patients to manage their own health, thirdly, to reduce per capita healthcare costs by providing quality, affordable care and fourthly, to improve clinical experience therefore improving the experience of healthcare providers (Khalili et al., 2019). There is now mention of adding an additional aim, health equity, to make it a quintile aim (Itchhaporia, 2021).

1.1.5.4 Health care in South Africa (demographics and inequalities)

In South Africa, the public health system is responsible for 84.9 % of people accessing health care, although more money is spent on private health care (Stats SA, 2019). All South African citizens have access to public health care where they pay according to their level of income. However, these health care services are at times limited and under-resourced. Patients need to travel long distances to access it. Private health care refers to the access to medical care from private practitioners and private institutions and is accessed mainly by members of medical aids. Medical aids usually pay in full for hospitalisation; but not consistently for all associated costs, however, health services as outpatients may require an additional contribution from the medical aid member. Medical aid contributions are in some instances subsidised by employers, e.g., for people who are employed in public services. Belonging to a medical aid is usually not compulsory for all employees.

There are considerable differences between access and quality of health care between the public and private sectors, especially in more rural areas, where there are fewer facilities and often a higher incidence of poverty (Van Staden, 2021). Private health care is usually seen to be better resourced. Despite the South African government spending more money on health, there seems to be limited progress in the health services provided to the South African population, compared to similar developing countries (Moyakhe, 2014; Van Staden, 2021). Even a decade since the end of Apartheid, the quality of health care services and the skills of health care workers

remains a challenge (Maphumulo and Bhengu, 2019). Addressing the challenges in health care forms part of South Africa's long-term plan to try to reduce poverty and inequality by 2030, called the National Development Plan (NDP) (National Planning Commission, 2012). Looking at these needs IPECP can play an important role through both the higher education as well as the health system involvement. The long-awaited implementation of the National Health Insurance system is envisaged to address the inequalities in health access; however, the implementation is delayed by several serious logistical challenges (National Department of Health, 2015).

To address the quality of health care different government sectors, need to come to the table. Higher education needs to address challenges in terms of education of health care workers, for which innovative transformation is required. An example is to focus on upscaling skills and teaching students to work in teams where they each understand their professions' unique contribution and how they need to collaborate with other professions. The health sector needs to address the quality of services provided in the public sector, including addressing the current health care workers training and job satisfaction (Van Staden, 2021).

South Africa's health system is based on the Primary Health Care approach which provides opportunities to strengthen all levels of health care and resonates with IPECP (Botma & Snyman, 2019). The increase in the incidence of complex cases requiring comprehensive care, where symptom control, maximizing patients' level of independence and empowering families to cope with long-term illnesses confirms the need for a team to assist patients and families to deal with complicated care required. Contrary to this, a lack of resources including challenges in supply of enough human resources, inadequate facilities and unavailability of essential consumables such as medication, negatively affect implementation of primary health care (Rispel, 2016).

Examples of conditions where such collaborative healthcare is required are addressing the HIV pandemic, people living with chronic diseases and the aging population (World Health Organization, 2010). People with these types of conditions require collaborative care, as they are frequent users of the health care system. Although these chronic conditions could perhaps be managed more effectively in a primary care setting, rather than in a more expensive hospital setting, training of health workers still occurs mostly in hospital settings with limited opportunities for students to work in clinics and in rural settings. It is envisaged that IPECP could expose students to working with team

members to optimize health outcome and quality of health, for example, encouraging referral to and follow-up in primary care settings

1.1.5.5 Health professions education in South Africa

Health professions education cannot be separated from health care, as students, during their education contribute to service delivery in health. Constraints in the health care system where students are trained could compromise students' training as they may not be aware that there could be better methods of providing care. The ultimate goal of health professions' education is to deliver to the health workforce, appropriately trained and skilled workers who can function at all levels of the health-care system (Botma & Snyman, 2019). Changes in patient demands in terms of both need for services and increasing numbers of complicated conditions, necessitate the transformation of systems for health and technologies and thereby impact health profession's education (Academy of Science of South Africa, 2018). Health professions education did not keep up with challenges faced by health workers, due to factors such as curricula that are fragmented, outdated and static resulting in graduates who are ill equipped to provide necessary high quality health care (Frenk et al., 2010). Another contributing factor is that health workers skills do not match the patients and populations needs, due to inadequate preparation for teamwork; an aspect directly related to lack of exposure to IPECP.

The changes in healthcare, from mostly acute to more chronic care as well as the shift to primary health care, necessitates applying different educational strategies, including IPECP (Pardue, 2015). Health educators need to strive to develop students who are critically conscious, able to use appropriate technology and can provide appropriate patient care (Jacobs et al., 2005). This is no easy task but through IPECP students could be encouraged to reflect on what they do and how technology could enhance patient treatment.

Transformation of healthcare education is needed due to several converging environmental forces, for example, the need to improve quality and effectiveness of healthcare worldwide (Fransworth et al., 2015).The demographics of the population need to be reflected in the trained health care workers that delivers the health care services. Even though an attempt was made to increase access of previously disadvantaged students to higher education, there are challenges with social inclusivity preventing full implementation (Mzangwa, 2019).

The demands in terms of both quality and quantity of health care workers in South Africa is a concern, as is the supply and demand (Agyeman-Manu et al., 2023; Essack, 2012). These healthcare workers need to be able to collaborate to provide universal health-care coverage and advance health for all (Botma & Snyman, 2019). The challenges that health care workers face due to the demand for services for which they do not have the capacity in terms of training and manpower, results in inability to meet the demands of their scope of practice (Van Staden, 2021). Equipping health care workers with the skills to work together through exposure to IPECP could alleviate some of the challenges.

In South Africa the majority of universities offer IPECP, but the extent, format and level of involvement differs (Botma and Snyman, 2019). The most developed university in this regard is the University of Western Cape which has had an IPECP unit since 2012 and started offering a postgraduate diploma in IPECP in 2022 (http/www.uwc.ac.za).

1.1.6 IPECP at Sefako Makgatho Health Sciences (SMU)

Sefako Makgatho Health Sciences University (SMU) (previously known as MEDUNSA and then later as University of Limpopo, Medunsa Campus) is a university that predominantly focuses on the training of health care professionals. Four of the five schools of the university train a total of 11 health professions' students. The included professions are occupational therapy, physiotherapy, nursing, speech language pathology and audiology, dietetics and human nutrition, pharmacy, radiography, medicine, dentistry, dental therapy, and oral hygiene.

The university has a strong community focus with a strong belief in Ubuntu. Ubuntu refers to "I am because we are" (also "I am because you are"), implying appreciation for teamwork (Waghid, 2020). The community focus can serve as an affordance in planning the curriculum where relationship building could be threaded throughout the curriculum and needs to be considered in work-integrated learning (Muller et al., 2019).

Many students at SMU are from rural areas, are first-generation university students. Only a small minority have English as a first language in SA and very few are first language English speakers. Students have several aspects in common. Students study and live together (the majority live on campus, which is far from the city centre). However, students are not, as would generally be assumed, aware of what each profession is taught, and which practices apply in the respective professions. Although

there are eleven different health professions courses offered at SMU, the education of each profession occurs in a silo with almost no interaction between students and staff of different professions. Most exposure to patients, takes place in the public sector in hospitals, in the area surrounding the university, and in community clinics.

The mission statement of the recently established Sefako Makgatho Health Sciences University (SMU, 2015) includes the promotion of interprofessional research, education and skills training focused on holistic healthcare provision to individuals, the family, the community, and the population. SMU acknowledges the importance of including IPECP into curricula of health care students at the university (SMU, 2015). Different stakeholders are involved and play an important role in IPECP at SMU, as seen in Figure 1.1.

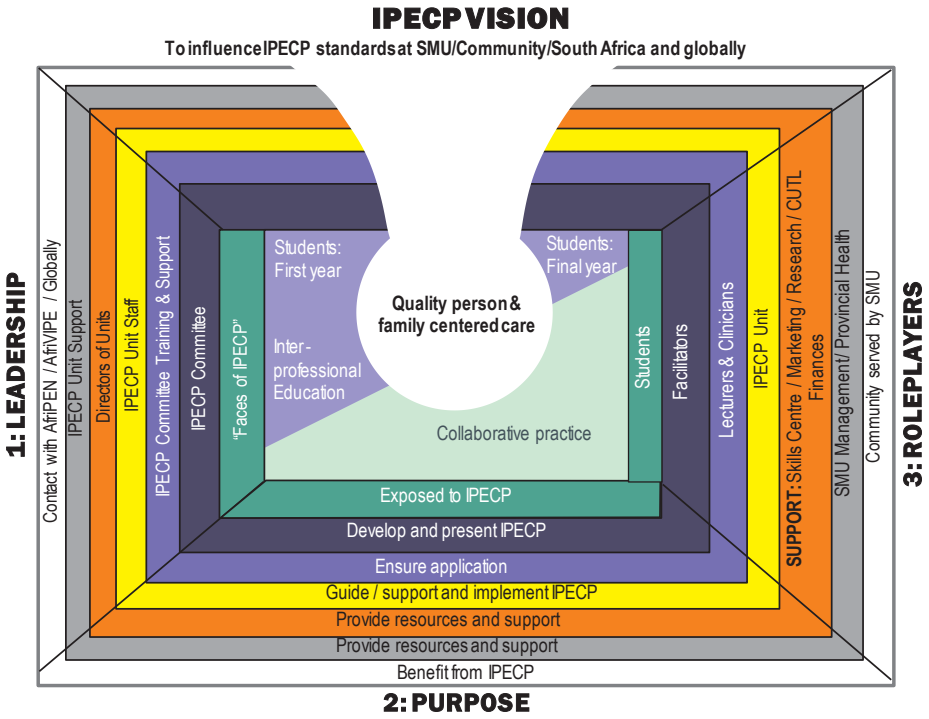

Figure 1.1 Stakeholders involved in IPECP at SMU

The impact of IPECP at SMU has not been officially measured. Since IPECP's inception at SMU in 2015, IPECP has been implemented from grassroots level on a small scale including medical, physiotherapy and occupational therapy students in a simulation of a hand trauma patient mainly using a bottom-up approach (Pitout et al., 2016). The TeamSTEPPS programme (King et al., 2008), aimed at teaching students teamwork skills (leadership, communication, situation monitoring and mutual support) has also been offered to a group of third year students in a series of four Friday

afternoons including students and lecturers from physiotherapy, occupational therapy, nursing and human nutrition.

During an IPECP workshop in 2017 staff from different health professions agreed that a larger scale IPECP event should be offered for final year students in the first academic week of the year. The rationale for the final year module was to prepare students to be ready to work in interprofessional teams. The only week that suited all professions was, however, the first academic week of the year, not a very easy week to implement a complex programme. The first academic week when all final year students are still on campus, nevertheless, allows exposure to IPECP before they start their work-integrated learning.

Planning a large scale IPECP module for SMU, including student education related to eleven professions, is a complex undertaking. Many different stakeholders' opinions and cooperation would be required to obtain buy-in and to ensure sustainability of the IPECP module. One way of accomplishing such undertaking is through a Community of Practice that can address the social theory of learning (Farnsworth et al., 2016). A Community of Practice, including the researcher, and representatives from all the different professions who will participate in IPECP, was established to develop the IPECP module. IPECP related literature and operational realities at SMU were considered.

1.2 Rationale for the research study

1.2.1 Problem statement

In 2018, the management of Sefako Makgatho Health Sciences University (SMU) agreed to the development and implementation of an IPECP module for all health professions final year students. SMU envisaged such development as part of a larger IPECP curriculum applicable to all year groups, irrespective of the particular health profession.

Until 2018, a specific IPECP module meeting the criteria of being grounded in the most appropriate education theories, offering the best learning outcomes linked to opportunities and activities for learning, with suitable assessment strategies and specific outcomes relevant to SMU, had not been investigated. It was to develop an IPECP module taking in consideration SMU's unique and diverse needs.

IPECP is widely accepted, promoted, and expected as a possible way to influence the delivery of quality healthcare. However, there is an explicit lack of literature to inform the development and implementation of a uniquely South African undergraduate IPECP curriculum (Pitout et al., 2022). The University of the Western Cape is one of the few South African universities that have a specific IPECP curriculum (Frantz & Rhoda, 2017; Filies & Frantz, 2021; Waggie and Laattoe, 2014). Such a curriculum should be suitable for a South African university setting required to cater for mostly under-resourced communities.

An abundance of literature is available with examples of IPECP events to incorporate in a curriculum. However, there are limited evidence factors to consider related to curriculum development and implementation of IPECP. Most examples are either too generic or the mix of professions reported on are not transferable to the setting at SMU. A systematic process to develop a SMU-IPECP curriculum became apparent. Such an approach was necessary to ensure that all needs and requirements of all professions were addressed, the unique needs of SMU students were considered and incorporated in the uniqueness of a SMU-IPECP *per se* that continued to be theoretically substantiated.

1.2.2 Justification of the study

The endorsement of IPECP in South Africa and in Sub-Saharan Africa is evolving. The development of an IPECP curriculum, based on empirical findings, that considers the needs of the local population could be applicable in similar settings.

The successful development and implementation of an IPECP curriculum will contribute to SMU's vision of being a benchmark institution providing holistic health sciences education that meets the health needs of the individual, the family, the community, and the population (Setgusa, 2016).

Moreover, the successful development and implementation of a SMU-IPECP curriculum will provide ground-breaking empirical evidence for Universities in Africa, to utilise in establishing their unique IPECP curricula.

1.2.3 Research questions

What are the factors that need to be considered in the planning and development of a contextually relevant IPECP curriculum?

To answer the research question, the following sub questions need to be explored:

- What factors may influence the development of an IPECP curriculum considering available theoretical knowledge and the situation at SMU? (Phase I)
- How could the content and structure of an IPECP curriculum, for health science students at SMU, be developed to prepare students to optimally address healthcare needs? (Phase II)
- What outcomes, learning activities, and assessment and evaluation methods and programme need to be incorporated in an IPECP curriculum? (Phase II)
- What is the validity of the newly developed curriculum? (Phase III)

1.2.4 Purpose of the study:

The purpose of the study was to develop a contextually relevant, realistically feasible IPECP curriculum. The following aims, phases and objectives were used:

1.2.5 Aim, phases and objectives

Aim: The overall aim of this study was to develop and validate an IPECP curriculum for health sciences students at SMU. To meet this aim, the research was conducted in three phases. Each phase addressed a particular aim and objectives.

Phase I: Situational analysis (conceptualisation)

A. Aim: To explore factors that need to be considered in the development of an IPECP curriculum through conducting a situational analysis

Objectives:

A1. To map and summarise the research evidence of factors that affect planning of an undergraduate IPECP curriculum through a scoping review.

A2. To explore current contextual factors to consider at SMU that could affect planning of an undergraduate IPECP curriculum.

A3. To establish needs and expectations of the SMU stakeholders in terms of the factors that affect planning of an undergraduate IPECP curriculum.

The information obtained in phase 1 was used to inform phase 2.

Phase II: Input and output (development)

B. Aim: To develop the IPECP curriculum structure and content for undergraduate students using the Four-Dimensional Curriculum Development Framework

Objectives:

B1. To develop learning outcomes for each year level of study based on the specific IPEC core competencies for each year.

B2. To suggest suitable content, structure, learning opportunities and assessment plans to achieve learning outcomes for each year level of study.

B3. To suggest evaluation and feedback protocols for the IPECP curriculum.

Phase III Outcomes (evaluation): Expert evaluation of the validity of the newly developed curriculum

C. Aim: To establish the validity of the newly developed curriculum

Objectives:

C1. To investigate the validity of the curriculum in terms of relevance, consistency, practicality, and effectiveness.

C2. To develop and validate the design principles that could guide further development and implementation of the IPECP curriculum.

1.3 Research method

1.3.1 Study design

The logic model, as explained in the beginning of chapter 2, represented the overarching framework of the study. In this study an advanced mixed method design, specifically a multistage application was used (Creswell & Plano Clark, 2011). In a multistage mixed methods design, researchers use multiple stages of data collection that may include various combinations of exploratory sequential, explanatory sequential, and convergent approaches (Nastasi et al. 2007). The reason for selecting the multistage mixed method sequential design was to enable a comprehensive

description of not only the outcomes but also the process used, to increase confidence in findings and capitalise on the experiences of participants (Merten, 2010).

Data were collected and analysed in three phases, namely phase 1: contextualising, stage 2: input and process and phase 3: the product. All the data of a stage were used to inform the next step and the next phase. The main theoretical drive in this study was inductive reasoning, afforded by the qualitative design of the study. Qualitative data analysis of information collected afforded the researcher to generalise and synthesis data. The main component was qualitatively driven with a smaller quantitative component collected sequentially to support qualitative data (QUAL + quan). Quantitative data were mainly obtained via descriptive surveys which allowed for explanatory data analysis. The quantitative data's main purpose was explanatory to add to the triangulation of data. The mixed method sequential study design supported triangulation and confirmation of data.

1.3.2 Sampling, data collection, data analysis and outputs

In this study data were collected and analysed in three phases, namely phase 1: contextualising, stage 2: input and process and phase 3: the product. All the data collected during a stage were used to inform the next step, including the next phase.

Due to the complexity of the data collection, sampling, and data analysis a chapter is dedicated to each phase of the research study. Each respective dedicated chapter will address the specific objectives, data collection method, sampling, data analysis and outputs.

1.3.3 Structuring of an IPECP core committee

Development of an IPECP curriculum is not a process that could be done by one person at a university. It requires continuous input from all professions and including regular input and discussion to ensure that the planned curriculum meets the needs of all stakeholders.

The IPECP core committee was established and led by the researcher. This committee collaborated during the data collection process in terms of presenting their professions' views as well as coordinating input from their particular profession e.g., setting up focus groups for their professions, distributing the needs analysis, contributing to the

curriculum mapping, and providing input in the IPECP curriculum during the validation process. The IPECP core committee functioned as a community of practice where committee members gathered and shared information relevant for the IPECP initiatives.

Inclusion criteria for a member of the IPECP core committee

- Representative of a profession and nominated by the profession.
- Willing to participate and committed to the development of the curriculum.
- Worked in the profession's department for at least 6 months or part of previous IPE at another institution.
- Have a clear understanding of the profession's curriculum.

The IPECP core committee consisted of at least one representative per profession, i.e., a total of 11 members participated, however additional staff who were motivated and interested in being involved, were encouraged to do so.

1.3.4 Student representation

The development of the IPECP curriculum could not be successful without input of the end-users, the students. Students are important role players and were involved throughout the planning of the curriculum. Early in the development of the curriculum students, who participated in the research, coined the term "Face of IPECP". Their proposal intended to elicit better buy-in from all students if students saw the faces of representatives of their profession on a poster during marketing of IPECP events. Students were trained to act as co-facilitators during IPECP events, and they contributed to the execution of events. Students' inputs were elicited during the situation analysis. They provided a valuable link to fellow students from their profession when information was shared.

1.4 Trustworthiness

Trustworthiness criteria, i.e., credibility, transferability, dependability, and confirmability mostly apply to qualitative data. Most of the data collected in this study were qualitative. Additional, more specific information is included in the different papers, i.e., paper 2, 3, 5 and 6. The methods in this study to ensure trustworthiness included:

Credibility: member checking after focus groups, peer examination of findings during presentation of the research and the participative process of involving the IPECP committee and Face of IPECP students, as well as the extended period of engagement (more than five years) with the participants contributed to credibility of the findings.

Transferability: dense description of the methods of data collection and analysis of each phase of the research as well an explanation of the planning and how the staff and students took responsibility for the curriculum were measures to ensure transferability.

Dependability: dense description of the research process, triangulation of data between for example qualitative data obtained through different focus groups, the scoping review and qualitative data in the needs survey contributed to dependability. The peer review process of submission papers for publication further added to dependability.

Confirmability: triangulation between data collected from students and facilitators Critical reflexivity of researcher by constantly and systematically being aware of her own background and viewpoint especially in the Brookfield's paper attested to confirmability.

1.5 Reliability and validity

The quantitative data in the study included three questionnaires. The needs assessment questionnaire developed after collecting data from the situational analysis. Please note that specific aspects of validity and reliability are presented in paper 3. The curriculum mapping questionnaire was used to collect data on profession-specific curricula (specific aspects of validity and reliability are presented in paper 4). The validation questionnaire was used to capture panellists' responses to the validity of the SMU curriculum and the accompanying design principles. The specific aspects of validity and reliability are presented in paper 5 and 6).

1.6 Bias

Bias in mixed-method research is referred to as a systematic error. Respondent bias, response bias and researcher bias applied in this study. Respondent bias was minimised throughout the research process encouraging honest feedback to improve

on the curriculum. The focus groups were conducted by a researcher not employed by the university who ensured that there was no subservience between the participants and the focus group leader. Also, the focus groups were done after the IPECP sessions were done, thus the students were free to comment without having to consider facing the researcher again during future IPECP sessions. The researcher acknowledges that the Halo and Hawthorne effect could perhaps have influenced the data in that participants may, due to the knowledge that their responses are used in research, respond more positively than they would have otherwise. During curriculum mapping, participants' opinions were elicited, looking for help with curriculum development – it was not the participants that were evaluated. All participants in the different phases were invited to participate and provided informed consent that indicated that they could withdraw from the study at any time. Response bias was minimised by involving representatives from all different professions. Triangulation of data obtained via instruments, e.g., needs assessment questionnaire and expert opinions of the IPECP committee, in an attempt to minimise bias. Researcher bias was minimised through researcher critical reflexivity, peer review by IPECP committee, and research supervisors and member checking.

1.7 Ethical considerations

Ethical clearance was applied for and obtained from Human Research Ethics Committee of the Faculty of Health Sciences of the University of the Witwatersrand. (Certificate No: M171145) and permission was obtained from the Sefako Makgatho University Research and Ethics Committee (SMUREC). The POPIA Act's prescriptions in terms of data collection were considered throughout the study. An information sheet with background on the study was provided to participants. Informed consent was obtained prior to data collection in all three phases and in each step of the research. (Appendix B). Specific strategies to ensure adherence to ethical principles were reported on in the papers.

Permission to conduct the study at SMU was obtained from SMUREC. Through each phase of the research School management and all professions involved in IPECP at SMU gave permission. Regular progress reports regarding the research project were forwarded to SMU School management and all professions.

Participants involved in the development of the curriculum (Neiworth, Allan, D'Ambrosio, & Coplen-Abrahamson, 2014) were informed that they are participating in a PhD study and that without their input the curriculum would not be optimally relevant and sustainable. The IPECP core committee especially were advised that their continued self-selected participation was valued, but they were not forced to continue. No participants were coerced to participate – they were free to participate and to withdraw if they wanted to as specified in the informed consent forms

1.8 Scope of the study

The study focusses on the planning and development of the undergraduate IPECP curriculum that is contextually relevant and feasible at SMU.

The delimitations of the study include the following:

1. Although the study looked at international evidence, the focus was on the needs of the specific university where the study was conducted and therefore the results are most suitable for use in this specific context. However, the researcher attempted to, at each stage of the study, provide guidelines for other curriculum planners of how to plan an IPECP curriculum for health care students.
2. The study was done over a period of 5 years. During this period the researcher attempted to attend and present IPECP events to increase her knowledge over and above what was found in literature e.g., to learn from IPECP experts. The curriculum is therefore not only based on literature but integrates lessons learned from international experts.
3. The researcher tried to include as much theoretical input in terms of health professions education, learning theories and ideas; however, the main point of departure remained to measure the theory, found in literature, against what is feasible and would be acceptable at the specific institution for which the curriculum was developed.

1.9 Outline of chapters

The thesis contains eight chapters as delineated in Figure 2. A brief overview of each Chapter is provided, based on the logic model (discussed in chapter 2), that framed the study.

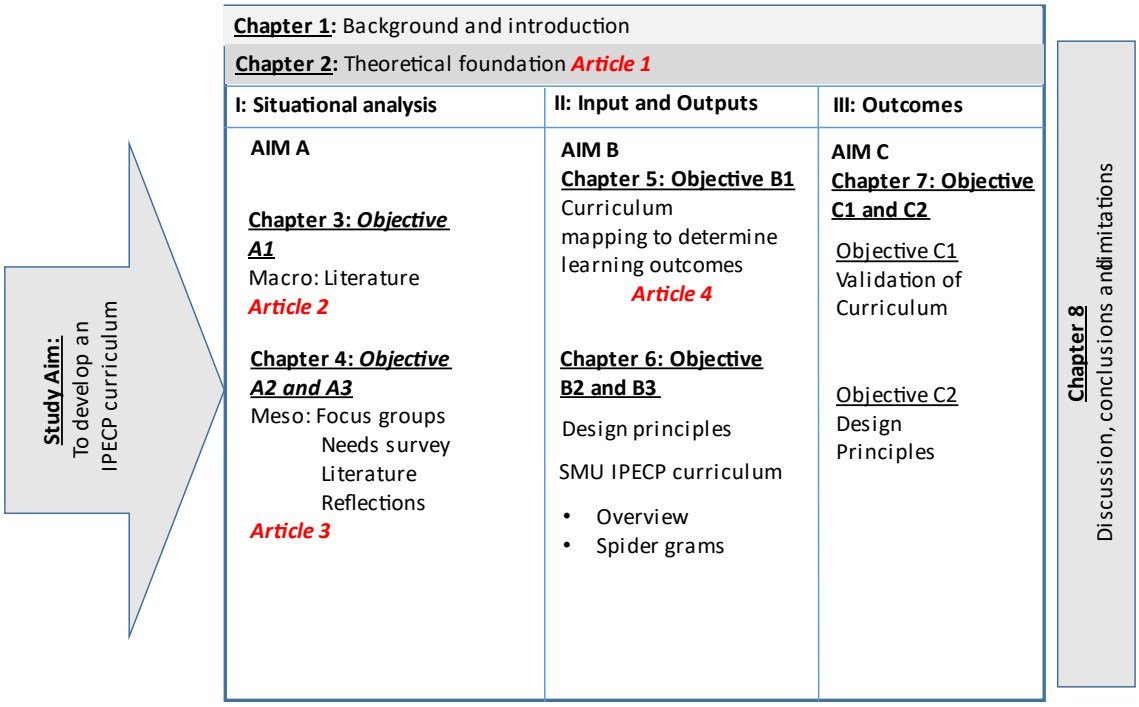

Figure 2: Overview of the chapters

Chapter 1: Introduction

Chapter 1 presents the introduction and background, problem statement, justification, research question, purpose, aims, phases, objectives, and scope of the study.

Chapter 2: Theoretical foundation

Chapter 2 presents the foundation of the study. The logic model guided the study. A published paper is included. The logic model is presented as a published paper entitled: *Use of the logic model to develop and implement an interprofessional module for undergraduate healthcare students at a University in South Africa: A study protocol.* The chapter further explains the philosophical stance of the research as well as the research method.

Phase I: Situational analysis: Conceptualisation

Phase 1, addressing objectives A1-A3, is presented in chapters 3- 5, addressed objectives A1 – A3, each unpacking a different aspect of the situational analysis. Chapter 3 presents the literature and evidence-based background, Chapter 4 the overview of the data collected and analysed on factors that needs to be considered in planning the curriculum. Chapter 5 presents the actual analysis of the curriculums of the involved professions.

Chapter 3: **Scoping of current literature**

The focus of chapter 3 is to report on the data gathered to complete objective A3, which was to map and summarise the evidence for the factors that affect planning of an undergraduate IPECP curriculum through a scoping review to establish factors that influence the planning of an IPECP module. The scoping review conducted is presented as a published paper entitled*: Factors to consider in planning a tailored undergraduate interprofessional education and collaborative practice curriculum: a scoping review.* The scoping review identified that interprofessional education is best presented as a tailored curriculum, i.e., fitting the specific institution's needs, based on formal rather than a voluntary participation and presented longitudinally. Buy-in from institutional management assists to overcome barriers and contribute to sustainability, related to resourcing and staff participation. An interplay of factors such as specific professions involved, future healthcare needs of the country, expected capabilities and competencies of graduates, content and teaching methods, and available resources should be considered in planning the tailored curriculum.

Chapter 4: **Critical reflection and critical reflexivity of the situational analysis: Objective A1 and A2**

The conclusion of the situational analysis based on results of the scoping review, focus groups with staff and students, feedback on events and a needs survey, culminated into a critical reflection publication applying Brookfield's lenses. This included paper titled: *Perspectives of collaborative interprofessional curriculum evolvement at a South African University: a qualitative reflection*, conveys contextual factors that needs consideration during the preparation for planning curriculum content. During planning the IPECP curriculum with lecturers and students from under-resourced communities, critical reflexion on their perspectives on possible solutions and challenges could be incorporated to make the exposure more authentic for all participants. Due to this critical reflexivity the direction of the development of the curriculum changed from a

final year programme to the planning for a longitudinal, integrated curriculum. The conundrum of IPECP curriculum planning was addressed by spotlighting the specific angle provided from each of the four lenses when discussing aspects of the formal curriculum and of the teamwork between stakeholders. The critical reflection and critical reflexivity presented from the four lenses elucidated both the unique views as well as diverse and complimentary perspectives.

Phase II: Input and output (development)

Chapter 5: Mapping to identify preparedness for engaging in IPECP in final year: Objective B1

Chapter 5 provides a published analysis of existing profession specific curriculums that identified to what extent IPECP core-competencies were addressed in foundational parts of the professional programs as a preparation for final year IPECP curriculum content. Existing curricula subjects incorporated Interprofessional collaboration (IPEC) core-competencies, especially the Values and Ethics core-competency. Teams and Teamwork was the least incorporated core-competency. IPEC-sub-competencies common across professions within the year level of study were identified and essential but under-represented sub-competencies were highlighted. The extraction of multi-faceted information through curriculum map analysis is a pragmatic option for curriculum planners and lecturers responsible for IPECP implementation and offers a process for other sectors wishing to embark on IPECP.

The SMU-IPECP curriculum: Objective B2 and B3

Chapter 6: Development of the IPECP curriculum

The chapter consists of two specific components. The first is the development of the overall curriculum in terms of themes per year, three main streams that is interprofessional role development, research and ethics and primary health care with the outcome for each, the build-up from first to fourth year of role development and competence as well as outcomes. The second part is the explanation of each year level in terms of 10 aspects including aims and objectives, core-competencies that need to be achieved, learning activities, resources required.

Chapter 6 further explains the design principles that were formulated based on the curriculum development that could also guide other IPECP curriculum planners.

Phase III: Validation of the IPECP curriculum Outcome

Chapter 7: Validation of the IPECP curriculum: Objective C1 and C2

The validation of the curriculum is presented with two papers explaining and reporting on the validation process. The first paper reports on the validation process where curriculum design research was used. The four cycles of the validation process involved external and internal IPECP panellists, who provided both quantitative input in terms of rating as well as quantitative comments on how to improve the proposed curriculum. Curriculum validation assisted to identify and explore concerns that curriculum planners should refine, when implementing the proposed IPECP curriculum.

Conclusion of thesis

Chapter 8: Discussion, conclusion and limitations

Chapter 8 encapsulates the entire study and contains the conclusion of the process of planning a curriculum for IPECP as well as discussing the limitations of the study and recommendations for further research.

1.10 Conclusion

Chapter 1 set the scene for the research study. It provided a summary of the history and positioned the need for planning of an IPECP curriculum within the global and South African context. It is clear that there are considerable challenges and development in both health and higher education that requires more research, to find solutions that are suitable and sustainable at the specific university for which the curriculum is developed. It is envisaged that by planning this IPECP curriculum both the local needs as well as the wider national and international community would benefit. The chapter includes the research questions, aims and methods. The chapter concludes with an overview of the study in terms of what could be expected in the next chapters. Chapter 1 provided the aims, objectives and scope, the overall research design, trustworthiness, validity and reliability and ethical principles. The most important stakeholders during the development of the SMU-IPECP curriculum were introduced including IPECP core committee, facilitators and students. These stakeholders assisted the researcher to remain accountable during the research study.

Chapter 2 explains how the aims will be addressed by an in-depth explanation of the theoretical framework.

Chapter 2 Theoretical foundation

"Make no little plans; they have no magic to stir anyone's blood. Make big plans, aim high in hope and work" **- Daniel H Burnham**

2.1 Introduction

Chapter 2 presents the theoretical foundation of the thesis and the overall plan of the research. Chapter 1 has already set the scene and provided justification for the need to the study and explained the research methods. Chapter 2 elaborates on the research paradigm that guided the researcher's thought processes.

Chapter 2 contains the first paper that was published from this research study. The paper explains the research protocol and how the logic model guided decision making. The researcher applied a logic model representing the overarching framework of the study.

2.2 Research paradigms: interpretivism, pragmatism and constructivism

A research paradigm can be defined as a comprehensive believe system, worldview or framework that guides the research process to influence practice (Abdul Rehman & Alharthi, 2017). A research paradigm explains the researchers' worldview and guides the way meaning is made out of data. The researcher's main research paradigm is interpretivism; however, aspects of constructivism and pragmatism are also acknowledged.

2.2.1 Interpretivism

The interpretivist world view accepts that reality is subjective and that there is not only one truth, but rather multiple realities (McMillan, 2015). The researcher therefore did not expect to find a simple solution. IPECP is a multi-dimensional concept where the unique views, experiences, and interpretations of participants, will influence the IPECP curriculum. Interpretivism assumes that there are multiple realities which are context-dependent because meaning is grounded in experience. This allowed the researcher to consider input from a variety of stakeholders to shape a contextually relevant

curriculum that could resonate with the stakeholders. Having their voices influence the curriculum design then contributed to their buy-in in the curriculum.

2.2.2 Pragmatism

The pragmatic paradigm, as a worldview, resonates with the researcher and is appropriate for the study. The pragmatic paradigm can be defined as a philosophical movement of systems having various forms, but generally stressing practical consequences as constituting the essential criterion in determining meaning, truth, or value – it is about what works (Creswell & Poth, 2016). The researcher interprets the applicability of the pragmatic paradigm in this study as finding out from different stakeholders what the best method would be to plan and present the IPECP curriculum, using the logic model described in 2.2. A pragmatic paradigm further suggests that knowledge needs to be suitable, practical, and feasible to guide a development of the curriculum that is specific and realistic for each year level of study. A pragmatic paradigm also guided the presentation and sharing of information to stakeholders in a way that made practical sense and could be easily comprehended by all stakeholders. The researcher developed the curriculum in line with how Teddlie and Tashakkori (2009) describe pragmatism, which is not only practical, but also in line with the personal and institutional values and including envisioning approaches to solve the problems. The pragmatic paradigm (Tashakkori & Teddlie, 2003) contributed to the integration of the different perspectives and different qualitative and quantitative methods of the multistage mixed method sequential design, to best answer the research question. Through the pragmatic paradigm the researcher similarly acknowledges, as Feilzer (2009) so succinctly states, that in solving practical problems, there are many realities. The researcher's emphasis was on finding practical solutions and sharing of meaning, making it a useful approach for curriculum development (Shanon-Baker, 2016).

2.2.3 Constructivism

Constructivism suggests that knowledge is constructed through the interaction of prior knowledge and considering current needs. The researcher built the curriculum through communal construction between lecturers. Curriculum construction is student-centred, through the way that students learn through facilitation rather than through lecturing (Bada & Olusegun, 2015). The needs and experiences and their responses were

incorporated in all phases of the planning and development of the curriculum, where the student representative and the IPECP core committee participated in the planning of aspects of the curriculum. The constructivist world view allowed the researcher to use the collected opinions of the participants, giving them the opportunity to share their personal values in the study (Adom et al., 2016). Honebein (1996) describes the philosophical constructivism paradigm as an approach through which knowledge is constructed through experiences people have and their reflection that builds their understanding of their world. By sharing their experiences of the IPECP pilot programme, stakeholders reflected collectively through focus groups (reflecting themselves while hearing the reflexions of other stakeholders), and thus knowledge was collectively constructed to support a contextually relevant curriculum that is developed 'for us, by us'. Constructivism guided the exploration of what is available in the literature through the scoping review, and thus contributed to build a curriculum that is tailored to the needs of the specific university stakeholders. The perspectives of staff and students that were elicited through focus groups and the needs survey helped the researcher construct a curriculum to address the newly identified reality in which the IPECP curriculum must prepare undergraduates to become practise-ready practitioners. Student and staff shaped the researchers' thoughts in constructing the curriculum that is adaptable to the changing needs in education and health. Constructivism ensured that the curriculum is tailored to the needs of the specific university stakeholders because their views on this matter have been constructed through their circumstances, engagement in the initial IPECP programmes.

2.3 Paradigm of the research method, guiding the development of sequential stages

2.3.1 Epistemology

Epistemology is defined as the theory of knowledge. The main aim of the epistemology was to understand the factors and type of exposure that needed to be considered in the development of an IPECP curriculum that will allow students to learn with, from, and about each other in order to be able to work collaboratively in a work-integrated learning setting (Maxcy, 2003). In this study epistemology was knowledge focussed on of the development of the curriculum; to both understand and address the problem (Hall, 2013; Morgan,2007). Linking epistemology with the researcher's research paradigms of interpretivism, pragmatism, and constructivism, allowed the researcher

to search for knowledge derived from the perceptions and experiences of participants (including the researcher's) and except that there are multiple ways of knowing (McMillan, 2015). The curriculum is designed to provide thought-provoking problems and assessments that students will be confronted with in the workplace. Therefore, the IPECP curriculum is transformative, as it is envisaged that exposure of students to IPECP may contribute to transform their interaction with patients and for the university to transform relationships between professions and lecturers to a more collaborative approach to teaching and clinical guidance (Botma, 2019).

2.3.2 Ontology

Ontology refers to the reality of the phenomenon and how it exists in the world. Ontology guided the understanding of what to include in the curriculum by considering the relationships by looking at actions and interactions of stakeholders. Ontology was incorporated through an in-depth study of literature on IPECP to enable the researcher to understand the multiple realities that came through experiences of participants. Eliciting the views of both the staff and students as well as through interaction with national and international IPECP specialists further contributed to the researcher' ontological understanding. The input from stakeholders in terms of their needs and experiences, collected through the focus groups, feedback, and the needs survey, guided the development of the curriculum in terms of providing a clear understanding of factors to consider in the development, where the IPECP curriculum would be located and how the needs of the stakeholders could be addressed in the IPECP curriculum. The acknowledgment that the reality is complex and influences both the content and the structure of interactions. The importance of considering the context of the different stakeholders had a significant impact on the curriculum development (McMillan, 2015).

2.3.3 Axiology

Axiology refers to what the researcher values in terms of what makes the study good research and what steps the researcher takes to ensure that the research is done correctly. Axiology thus refers to aspects of teleology, deontology, morality, and fairness (Kivunja & Kuyini, 2017). In this study the researcher considered both trustworthiness for qualitative research and validity and reliability for quantitative research, in the different phases of the research. More detail is provided in chapter 1

and in each of the six papers. The researcher's worldview of pragmatism and constructivism further guided the inclusion of aspects that needed investigation before the curriculum was compiled. The development of different phases of the research followed the components of the logic model, a well-known model used for planning projects to ensure a systematic approach to the study.

In terms of teleology the researcher looked at the meaningful outcome of the curriculum to ensure the curriculum could satisfy the university community but could also be meaningful for other universities in Africa who are starting to plan and develop their own IPECP curriculum. The deontology was considered in terms of the actions taken that could benefit the stakeholders, specifically the staff and students on the university. The morality issue was addressed in terms of looking at the trustworthiness and considering all ethical principles, as mentioned in the research protocol, during all data collection as well as interpretation of data. In terms of fairness, all participants gave consent for data collection at each data collection stage.

2.4 Logic Model

The logic model was used to investigate the context, guide the development of input and output that would culminate in the outcome, which is an IPECP curriculum. The logic model guided the steps in developing the curriculum, focussed the data collection and assisted in interpreting the multiple methods and sources into an integrative framework (Cooksy et al., 2001). Using the logic model further ensured the voices of all stakeholders are included in the planning, design, implementation, analysis, generation (WK Kellogg Foundation, 2006).

The logic model guided the phases of the study and therefore the systematic approach applied to develop the IPECP curriculum. The logic model consists of four steps. These steps include firstly, a situational analysis (available resources, similar programmes at other institutions, current strengths, weaknesses, opportunities, and threats) as presented in phase 1. Step 2 consists of input and output (what needs to be invested, activities, participation) as outlined in phase 2. Step 3 is the outcomes (product). The outcomes considered here are the validation of the curriculum, the actual curriculum, and the design principles. The last step, step 4 of the logic model, investigating impact, was not part of the current study but will form part of a follow-up study after implementation of the curriculum.

The study protocol on the “Use of the logic model to develop and implement an interprofessional module for undergraduate healthcare students at a University in South Africa” (Pitout et al., 2019) was published in a specific edition of the Journal of Interprofessional Care. The special edition focused on IPECP in Sub-Saharan Africa in particular. In paper 1 you will find in-depth detail, of the use of the logic model.

Please note that at the stage of presentation of this paper the researcher planned to only develop a final year module. Through careful consideration during the following phases the researcher decided to change to the development of an entire undergraduate curriculum.

Paper 1

Pitout, H; Adams, F & Casteleijn, D (2019) Use of the logic model to develop and implement an interprofessional module for undergraduate healthcare students at a University in South Africa: A study protocol, *Journal of Interprofessional Care*, 33:3,295-297, DOI: 10.1080/13561820.2018.1515192

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SHORT REPORT

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Use of the logic model to develop and implement an interprofessional module for undergraduate healthcare students at a University in South Africa: A study protocol

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ABSTRACT

Interprofessional education and collaborative practice, supported by the World Health Organisation and the local Health Professions Council is not fully established at all universities and for all health professions in South Africa (HPCSA, 2014). In this study protocol, the logic model is proposed as a framework for the development of a module for final year healthcare students. The logic model will guide planning and implementation following the steps of situational analysis, input and processes, output and outcome. A community of practice will develop the module. Large-scale buy-in from management, faculty and students is required for successful implementation and sustainability.

ARTICLE HISTORY
Received 28 December 2017
Revised 31 March 2018
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KEYWORDS
Community of practice; health care students; IPECP; logic model; study protocol

Background

Healthcare students are expected to be able to work interprofessionally before and after qualification. Even though the benefits of interprofessional education and collaborative practice (IPECP) is known, the majority of courses at the University are offered in the individual professions' departments with limited interaction between students and overlapping of curriculum between courses (Gilbert et al., 2010). A specific IPECP module, which will take the institution's unique and diverse needs into consideration, has not been investigated. Such a model will be grounded in the most appropriate education theories with the best learning outcomes (Reeves, Goldman, Burton, & Sawatzky-Girling, 2010). It will also be linked to opportunities and activities for learning, suitable assessment strategies and specific outcomes for the students and facilitators. Olson and Bialocerkowski (2014) indicated that in IPECP large gaps in terms of methods, theory and context remains due to the limited number of studies that use theory and that take an inductive approach to understand processes behind IPE or detailed participant description. Although an abundance of examples of IPECP events is reported in literature there is limited evidence of effective methods for the development and implementation of IPECP at this specific University. Examples are either too generic or the mix of professions are not similar to the context at this University. In this study protocol, it is proposed that the logic model, as described by the W.K. Kellogg Foundation (2006), considers the input, output, and outcomes and will serve as a framework in the planning and implementation of a new IPECP module. The new module will be presented to about 650 students from ten healthcare professions including medicine, occupational therapy, physiotherapy, speech-language pathology and audiology, dietetics, nursing, pharmacy, dentistry, dental therapy, and oral hygiene. Trained facilitators of each profession will be involved. The research question is: How could the content of an IPECP module, for final year health science students at SMU, be developed that can prepare students to optimally address healthcare needs? The objectives of the research will be to explore factors that could impact the development of an IPECP module, to develop the IPECP curriculum structure and content for the module using the Four-Dimensional Curriculum Development Framework (Lee, Steketee, Rogers, & Moran, 2013; Thistlethwaite, 2015) and to establish the ecological validity of the newly developed module.

Methods

A multistage mixed method exploratory sequential design (Mertens, 2010) will be used in the study. The qualitative data would be collected through mostly focus groups to explore each aspect. Quantitative data would be collected through electronic questionnaires to further expand on the specific aspect through triangulation.

For qualitative data analysis, the framework method will be used to identify themes and categories (Gale, Heath, Cameron, Rashid, & Redwood, 2013). The results will be used to inform the quantitative data collection tools. The quantitative data analysis would be mainly descriptive statistics. Data for each phase will be published in one or more articles and will also be used to inform all stakeholders for the next phase.

The researcher together with an IPECP community of practice will be responsible for the development of the module. The IPECP community of practice will consist of

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Inputs	Outputs	Outcomes	
What we invest	What we do and who we do it with	Changes that occur as a result of outputs	
Situation and resources	Activities and participation	Short	Medium and long term
Phase 1	**Phase 2**	**Phase 3**	**Follow up study**
Situational analysis and scoping review	Development of IPECP module	Establish ecological validity	

Figure 1. Logic model linked to the research phase: Insert under method.

representatives from all ten professions involved in the IPECP module as well as students and preceptors. The IPECP community of practice will be united through their belief in the value of IPECP and their interest in the development of a custom-made module for the University (Wenger-Trayner & Wenger-Trayner, 2015).

The research will be conducted by following the three phases of the logic model (Figure 1). Phase 1, the situational analysis and input section of the logic model, will explore the factors that could impact the development of an IPECP module through an analysis of the current situation at the university and a scoping review of the literature to look at the national and global situation of the development of IPECP modules. The situational analysis will be done through focus groups with university management as well as focus groups with representatives of each profession involved in the module. The focus groups of the professions will involve the head of the department, academics, students as well as clinical supervisors or preceptors.

The results of the qualitative data would be used by the IPECP community of practice to develop a needs analysis questionnaire to collect quantitative data. The needs analysis questionnaires will be distributed to the senior students who will participate in the module as well as to the lecturers and preceptors who were not involved in the focus groups. The quantitative data collection will endeavour to obtain input from a large number of participants during the development of the module and through this, large-scale buy-in from stakeholders will be stimulated. The information obtained in phase 1 would be used to inform phase 2.

In phase 2, the logic model's activities and output stage, the IPECP module will be developed to meet the university's needs as identified in phase 1. For the curriculum structure, the Four-Dimensional Curriculum Development Framework (Lee et al., 2013) will be used. The Framework considers the workforce needs of the twenty-first century and the rationale for IPE; define learning outcomes taking into account national and professional accreditation standards; learning activities and assessment; as well as institutional support (Thistlethwaite, 2015). Information gathered during phase 1 will enable the IPECP community of practice to determine the expected learning outcomes for the IPECP module and develop learning activities and assessment strategies that are aligned with the expected outcomes. A variety of learning and social interaction theories will inform the student-centred teaching and learning activities as well as the assessment strategies.

In phase 3, the output phase of the logic model, the ecological validity of the newly developed module will be established by investigating the levels of verisimilitude (the degree to which module resemble demands of university environment, i.e., plausibility, authenticity, credibility) and veridicality (empirically related truth). The developed module will be sent to IPECP experts for their input. The IPECP experts who will have at least five years' experience in designing and implementation of an IPE module in Sub-Saharan Africa, will be recruited through AfrIPEN (African Interprofessional Education Network).

The outcome phase of the logic model will fall outside the scope of the current study but will be done as a second study where the outcome of students' engagement in the module will be determined.

Discussion

XBy making use of the logic model the voices of all stakeholders are included in planning, designing, implementation, analysis, and knowledge generation (W.K. Kellogg Foundation, 2006). The logic model fits well with the proposed four-dimensional curriculum development framework (Thistlethwaite et al., 2015) that will be used in planning as both the logic model and the curriculum model has complimentary categories. The logic model is a valuable tool for programme planning and design to develop the programme strategy, clearly explain the sequence as well as illustrate the concepts and approaches to key stakeholders. The logic model can also serve as a visual aid when presenting the concept of the module to the variety of stakeholders, including the IPECP community of practice, the facilitators and the 650 students. The use of the logic model will contribute to the success of the planning and implementation of a unique module for the university that will be context specific to address the needs of students and academia (Barr, 2016). The logic model will also guide the identification and collection of data that will be required to monitor and improve the module. Making use of the logic model allows for the progress in the development of the module to be used in delivering feedback to stakeholders and advocate for the continuous development of the module.

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2.5 Conclusion

Chapter 2 presented the theoretical foundation of the study. Elaborating on the logic model advanced the framework that guided the phases of the study. Detail on the research paradigm provided the philosophical foundation for the study.

Chapter 3 will now explain the scoping review. The scoping review contributes to the study as first part of Phase I, the situational analysis.

Chapter 3 Scoping of current literature

***"Great works are performed not by strength but by perseverance."* – Samuel Johnson**

3.1 Introduction to chapter 3

The scoping review formed the first stage of Phase I, the situational analysis. The focus of the scoping review was to look at the factors that the international literature indicates need to be considered in planning an IPECP curriculum.

3.2 Scoping review paper

The scoping review enabled the researcher to obtain a global overview of current stand of IPECP. There is an abundance of literature available on the topic, but the majority comes from developed countries with very few papers that present findings of the African continent, and especially of Sub-Saharan Africa.

The scoping review was done using the Four-Dimensional Curriculum Framework (4DF) of (Lee et al., 2013) further described by (Moran et al., 2015) and that helped the researcher to understand the integration of a variety of factors that shape an IPECP curriculum. The 4DF guides tailored curriculum development to include (1) health care needs and available resources; (2) application of IPECP competencies; (3) teaching, learning and assessment variations; (4) institutional support and available resources.

The scoping review revealed that successful IPECP curricula are dependent on an interplay of various factors such as specific professions involved, future healthcare needs of the country, expected capabilities and competencies of graduates, content and teaching methods, and available resources.

The findings of the scoping review are valuable for IPECP facilitators, as well as policymakers of academic and clinical institutions as it synthesizes evidence of a variety of publications. It can also be used at the specific university to help in planning and provide evidence to validate IPECP activities. It forms an important part of the curriculum planning.

Paper 2

Pitout, H; Adams, F, Casteleijn, D; SHJ du Toit (2022) Factors to consider in planning a tailored undergraduate interprofessional education and collaborative practice curriculum: a scoping review. *South African Journal of Occupational Therapy*, 52(1): 78-95.

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Factors to consider in planning a tailored undergraduate interprofessional education and collaborative practice curriculum: A scoping review

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ABSTRACT

Background: Heath care students need to be practice-ready at qualification. Increased interest in and drive towards more collaborative practice necessitate consideration of teaching and learning factors unique to learning settings, to plan a tailored interprofessional education and collaborative practice curriculum, based on empirical findings.
Method: The Joanna Briggs Institute's scoping review methodology guided this study. Eight online databases were searched, with 72 articles included for full review. Charted data, analysed quantitatively, included year, context, study design and population. The four-dimensional curriculum framework model, consisting of future health care needs, interprofessional competencies, methods of teaching and institutional support, directed the deductive analysis.
Results: Interprofessional education is best presented as a tailored curriculum, i.e. fitting the specific institution's needs, based on formal rather than a voluntary participation and presented longitudinally. Buy-in from institutional management assists in overcoming barriers related to resourcing and staff participation.
Conclusion: Successful interprofessional education and collaborative practice curricula are dependent on an interplay of various factors such as specific professions involved, future healthcare needs of the country, expected capabilities and competencies of graduates, content and teaching methods, and available resources. Facilitators, as well as policymakers of academic and clinical institutions, could benefit from the synthesized evidence.

Keywords: interprofessional learning, pre-licensure, Joanna Briggs, four-dimensional curriculum model, graduate competencies

INTRODUCTION

The increasing complexity of patients' needs has influenced health professional education and health policy and as a result, has strengthened a drive for preparing a "collaborative practice-ready" health workforce to respond to local health needs[1]. Despite well-evidenced advantages of Interprofessional Education and Collaborative Practice (IPECP), the continued lack of implementation as part of undergraduate curricula, may be related to limited attention to factors that influence planning of a tailored IPECP curriculum. This scoping review initiated a research process for planning a university specific IPECP programme in South Africa.

Literature describing IPECP curriculum planning in Africa is limited. A variety of published documents, e.g., interprofessional education and practice guides and competency frameworks from different countries, such as, Australia[2], USA[3] and Canada[4], are available. However, despite the value of competency frameworks and practice guides for curriculum planning, these guides have a limited evidence base and mostly rely on field experts' experience[5].

Most models guiding curriculum development either use a linear approach or do not explicitly address IPECP competencies e.g., Kern curriculum design model, Context, Input, Process and Product (CIPP model), Biggs model[6]. In contrast, the four-dimensional curriculum framework (4DF) was specifically developed for IPECP[7]. The scope of the 4DF allows curriculum planners to shape the IPECP curriculum, offering the most comprehensive learning activities[8]. Although the 4DF has been applied in a range of studies[9,10], none indicated its use to develop a tailored IPECP curriculum.

When a university plans an IPECP programme, the unique context and how it differs from what available literature describes, should be considered. The 4DF guides tailored curriculum development to include (1) health care needs and available resources; (2) application of IPECP competencies; (3) teaching, learning and assessment variations; (4) institutional support and available resources.

The African context has unique challenges related to healthcare needs of the population and in equitability of available resources to ensure quality of life. In addition, within South Africa, implementation of IPECP programmes differ vastly due to lack of clear policy, differing IPECP competency applications and the level of commitment by university management. For example, health profession accreditation bodies or councils e.g., the Health Professions Council of South Africa[11], expect universities to include interprofessional education in their curricula. However, when professional accreditation bodies do not apply uniform guidelines on how IPECP should be incorporated into curricula of different professions, it causes additional challenges for planners of IPECP curricula that deals with a large variety of professions[9].

The scoping review forms part of the first author's PhD study aimed at developing an IPECP module for final year health care students at a South African university. The objective of this review was to identify the factors that affect planning of a tailored undergraduate IPECP curriculum by identifying, analysing, and synthesising relevant articles.

METHODOLOGY

The five-step Joanna Briggs[12] scoping review method was followed:

Stage 1: Identifying the research question

The research question was: *What is known, from the published, peer-reviewed literature about the factors that influence the planning of a tailored IPECP curriculum for health care professionals?*

Stage 2: Identifying relevant articles

A search strategy including seven databases (MEDLINE, CINAHL, Science Direct, PubMed, NexusIPE, Scopus) as well as Google Scholar search engine identified articles in English between 2009 and 2020. The Boolean search phrases were:

- "Interprofessional education" AND "Collaborative practice" AND/OR "Interprofessional learning"
- "Planning" OR "Development"
- "Undergraduate students" OR "Undergraduates" OR "Pre-Qualification students" OR "pre licensure"
- "Curriculum" OR "Programme" OR "Module"

The articles reviewed included: participants who were undergraduate students enrolled in a health care professional programme, as well as course developers, and experts in IPECP. The included article context focused on curricula delivered at universities in classrooms clinical settings, and in urban or rural areas. Articles published globally were considered. Inclusion criteria for concepts covered "interprofessional education", "interprofessional learning" and/or "collaborative practice".

Initial exclusion criteria were studies that focused on single activities (e.g., oncology ward rounds), postgraduate students, qualified health care professionals, and non-health care professional students.

Stage 3: Study selection (please refer to PRISMA guide, Figure 1, page 80)

Selection was based on initial screening by title (n = 25704), then abstract (n=1324) and lastly full text (n=72). Two team members reviewed the articles and referred any disagreements to a third reviewer for the final decision for inclusion[12]. The search strategy was refined after the initial research yielded a large number of articles. One of the main additional inclusion criteria added is that only empirical research articles in peer-reviewed journals were included. After initial screening it was decided that all articles based on secondary data with no evidence (e.g., guidelines) as well as literature summaries (as these could have been based on primary articles) were also excluded. Seventy-two articles were included and analysed. Figure 1 (page 80) summarises the study inclusion process after applying the refined inclusion criteria.

Stage 4: Charting the data

The author/s, publication year, title and journal information, country (study location), context (university or clinical setting), research method/study design, study population

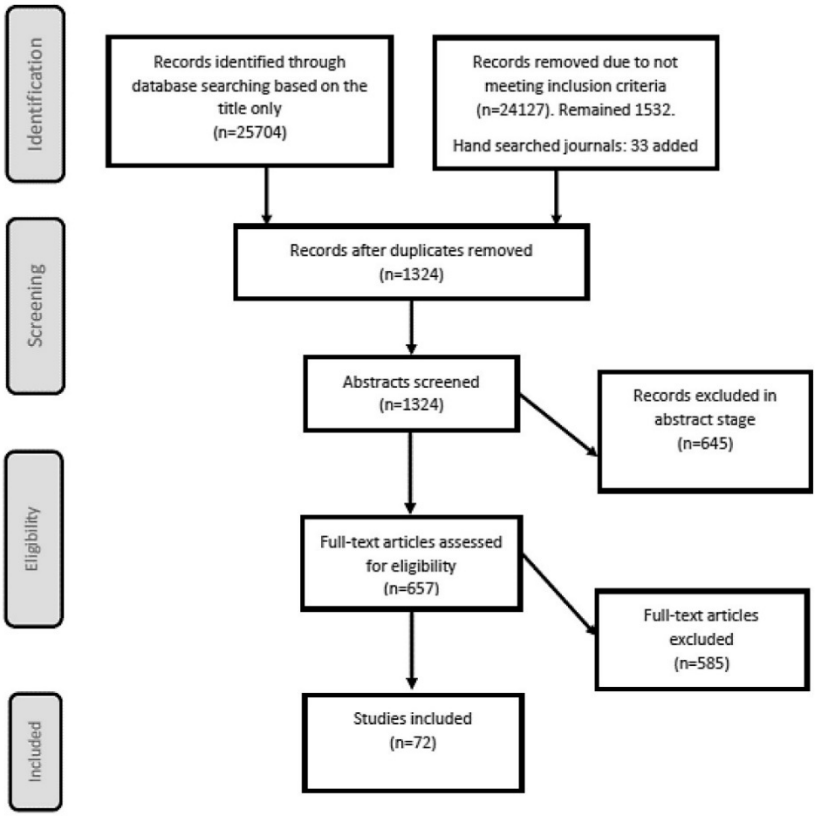

Figure 1: PRISMA flow diagram for scoping review.

(e.g., students or experts, their level as juniors/seniors, their professions), were charted using Microsoft Excel. See addendum A.

Stage 5: Collating, summarising, and reporting the results

Quantifiable data were analysed descriptively, and a deductive qualitative thematic analysis based on the 4DF7 directed the thematic analysis. For included articles please refer to addendum A, page 88.

RESULTS

Quantitative data are presented in a narrative descriptive format. (The included articles are identified with an asterisk* in the reference list.)

Descriptive summary of demographic information

Participants: Of the 72 articles reviewed, 15 (20.8%) included key role players, e.g., IPECP experts, or course developers as participants. The remaining 57 (79.2%) of articles consisted of students as participants.

Course progression: Twenty-eight (49%) of the 57 articles that focused on students indicated that senior students participated, 16 (28%) focused specifically on first year students, and 13 (23 %) did not specify the year group of participants.

Professions: Nursing was the most represented profession with 42 (58.3%) studies followed by physiotherapy and medicine with 28 (38.8%) each, and occupational therapy and pharmacy with 26 (36%) each. A variety and different combinations of professions participated, from at least two up to 10 professions per session. The most frequent number of professionals included in a session were six as mentioned in 47 studies (65.3%), followed by five professions mentioned in 9 studies (12.5%) and three to four professions mentioned in eight studies each (22.2%).

Number of participants: A vastly different number of students were included in IPECP sessions, ranging from less than a 100 to 1 873 students. Not all studies mentioned the number of students. Of the 46 studies (64%) where the number of participants was stated, most studies, 24 (52.2%) reported on participation of less than 100 students, but seven (15.2%) involved more than 1 000 students. Fifteen studies (32.6%)

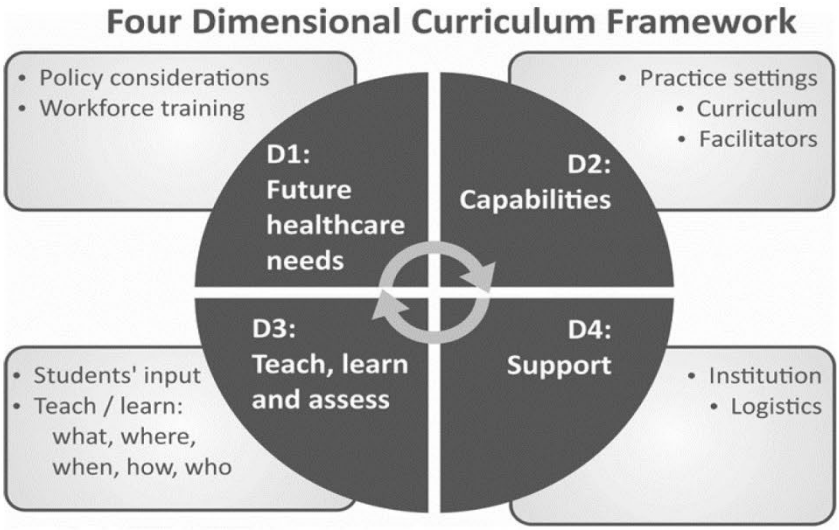

Figure 2: Factors extracted and aligned with the Four-Dimensional Curriculum Framework.
The four quadrants in the middle refer to the four dimensions of the Framework, e.g., D1 is dimension 1. The textboxes on the outside refer to the factors identified in the analysis of the articles and described in detail in the text.

reported on small group teaching, with student numbers varying between three to 14 students per group.

Country: Only five studies (6.9%) from Africa met the inclusion criteria. The majority of the included studies, 48 (66.6%), were from countries with IPECP competency frameworks – 15 (20.8%) each from USA and Australia, and nine (12.5%) each from Canada and UK.

Geographical considerations: The geographical suitability for offering joint IPECP activities refers to the availability of a variety of professions at the same university. Universities who do not offer courses to a variety of health care professions relied on nearby universities to join their IPECP initiatives[13]. Only three studies (4%) focussed on exposure of students to rural communities[14,15,16], one study described a mobile outreach exposure[17] and one study referred to exposure to a non-profit organisation[18]. The rest of the articles referred to studies in the local area where the university was located.

Focus of the programme: Six articles (8.3%) focused on the importance of a theoretical model to guide planning. The majority of articles, (45=62.5%) addressed interprofessional education in classroom settings. Eleven articles (15.3%) included only interprofessional collaboration and 10 (13.9%) focused on both education and collaboration.

Descriptive summary of factors according to the four dimensions framework

The data were analysed deductively using the 4DF. The 4DF guided the mapping of thematic data to each dimension. Findings are presented under each of the four dimensions. Figure 2 (above) provides a visual representation of the dimensions and associated factors.

Dimension 1: Identifying future health care needs – preparing and capacity building to ensure meeting the needs of the population

The planning of an IPECP curriculum should address the training needs of the health work force, i.e., the need for and required competencies of the included professions and consider national policy related to health care worker training and health care delivery.

Policy considerations: National policies address the political, social, and cultural factors that influence health care worker training and health care delivery. Positive results were achieved with a nationally driven and coordinated approach, associated with research i.e., coordinated nationally amongst universities and departments of health and embedded in government policies[19,20].

Health workforce training: An awareness of specific population health care needs, e.g., identifying care contexts and the variety of professionals needed, should inform training[20]. IPECP can conserve resources when professionals are aware of their unique roles and duplication of services are prevented[18].

Dimension 2: Defining and understanding interprofessional capabilities required for future success in practice

When planning to address the capabilities of the health care workers in the IPECP curriculum, environmental needs and staff requirements need consideration.

IPECP Curriculum: IPECP should be part of a profession's core curriculum and not seen as optional[21]. The curriculum needs to be presented as a tailored programme based on the specific needs of the included professions[22]. To tailor

the curriculum, planners need to identify shared prioritised themes for the specific professions involved, for example case studies where the role of each profession is overt[23]. Learning and teaching activities should be staggered and graded from theoretical appreciation to placement learning, to examining the complexity of modern teamwork in a range of clinical settings[6]. The advances in students' knowledge and experience should reflect the increasing complexity of IPECP activities[24].

Time frames for IPECP curriculum implementation were disputed[25]. For example, Wilbur and Kelly[26] stressed starting in first year, to allow for exposure before biases develop, in contrast to Imafuku et al.[27], who found it advantageous to start with final year students with an established sense of their own roles that they could apply during placements.

Setting/environment: Positive safe spaces, which could be shared, or neutral spaces, are experienced as supportive and conducive to learning and thus enable students to explore beliefs, learn to network professionally and to reflect on their own and others' personal and professional culture and values[28,29]. Clinical settings need to allow students opportunities to observe the real world and learn about the respective professions and their interprofessional roles[30,31].

Facilitator requirements: Planning IPECP is a complex and dynamic process[32] requiring an interprofessional team actively involved in planning and development[33]. IPECP facilitators/trained lecturers, need to be both familiar with the institutions' environment, and skilled in facilitation and student supervision[34], Facilitators should rather self-identify and be able to role model teamwork and be passionate about IPECP[34,35].

Dimension 3: Teaching, learning and assessment to address the development of core competencies

Teaching, learning and assessment: Specific teaching and learning components need to be tailored to student variables (who), context (where), timing (when), content (what) and teaching methods (how). When grouping students, planners need to appreciate, acknowledge and maximise diversity[24]. It is advisable to use intentional grouping of students (focused, heterogeneous in terms of gender, age, professions and cultures)[36], in groups with students of four to five professions[37]. Learning activities need to ensure students appreciate each other's roles and contributions while being able to acknowledge both the usefulness as well as the limitations of their own knowledge[38]. Jernigan et al.[39] therefore suggested authentic case studies, with significant clinical detail, necessitating involvement of the interprofessional team for problem solving and encouraging clinical reasoning.

Findings highlighted theoretical frameworks conducive to IPECP including Social Capital Theory[40] Socio Cultural Learning[41], Problem Based Learning[42] Complexity Theory[24] and Constructivist Theory[43]. Andragogical strategies to consider incorporated blended, face-to-face, flipped classroom, interactive and experiential learning/teaching[44]. Rosenfield et al.[45] caution about the use of large-scale activities as it could limit the amount of meaningful interaction. Assessments need to be aligned instructional methods with required outcomes[46].

Students input: Senior students, especially in their final year of study, can provide valuable input to curriculum development[47]. Students could comment on internal factors (insight and motivation to participate) as well as factors outside the programme (logistics and timing), that impact students' participation, due to their lived experience of the profession specific and IPECP curriculum[48]. Students identified authentic learning opportunities as experiencing problem solving in class, simulation, and clinical practice. Students appreciated opportunities to socialise both formally and informally with peers from other professions[49].

Dimension 4: Supporting institutional delivery

For long-term sustainability, IPECP needs to be part of the collective institutional vision[50], be embedded on symbolic and organisational culture levels[35] and part of a valued curriculum[48]. The characteristics of the institution and available resources requires special consideration.

Characteristics of the Institution: Multi-tiered support is required from committed staff members, both academics and clinicians, institution leadership/management and governmental stakeholders[50]. Pragmatic considerations include faculty timetabling, structural complexities of university partnerships, institutional systems and processes[51].

Physical, attitudinal, and human resources: IPECP is resource and time intensive, due to significant coordination required[52]. Centralised planning at a university, where planning is coordinated between different professions and involved schools could collectively address the logistics of implementation[33]. Focused effort to provide resources or infrastructure, necessitates inclusion of strong administrative support[24]. Attention should be on capacity to deliver the curriculum, e.g., sufficient human resources in terms of trained facilitators and sufficient administrative support. In addition, there should also be a concerted effort made to overcome perceived challenges such as time constraints in the timetable and lack of funds to present the programme[53, 54].

DISCUSSION

This review revealed a growing body of literature that describes factors influencing IPECP planning. Articles increased steadily from 2009 to 2020, reflecting the possibility that more universities incorporated IPECP on a larger scale into their curriculum; or more research conducted into the planning of IPECP curriculum. Analysis of the 72 articles found most originated in countries where government policies as well as competency frameworks for IPECP are in place. The benefit of having such support is acknowledged. In South Africa, as in many other African countries, the policies of IPECP are emergent. Even though an abundance of international literature is available, few South African specific guidelines were found. Nevertheless, the authors gained an in-depth understanding of intertwined factors to consider when planning and IPECP curriculum and realized the gaps for the South African context.

The descriptive summary of factors according to the four dimensions reflected the dynamic interaction between the

four dimensions. Specific professions, future healthcare needs, expected capabilities, curriculum content, teaching methods and available resources impacted one another.

It was evident that local, national, and international health and education policies influence IPECP application[20]. For a tailored curriculum, planners need to be cognisant of the purpose and content of the policies, while aligning the curriculum with the specific institution's mission and vision. In the South African context, the impact of possible changes related to the proposed National Health Insurance needs specific consideration when developing a national IPECP policy. ASSAF[55] proposed embedding IPECP in Health Professions Education in South Africa, as a multi-stakeholder, to make it more sustainable, by forming a national working group to develop and guide the implementation of a strategic plan for IPECP. The requirements of included professions' professional regulators, e.g., Health Professions Council of South Africa (HPCSA) consisting of different professional boards for different professions, in addition to the Nursing Council and Pharmacy Council, need to be considered when the programme is planned. If the specific expectations in terms of IPECP of these regulators could be same, it would make it easier for programme planners to plan the curriculum for a range of stakeholders. Organisations such as the South African Association of Health Educationalists (SAAHE) and the African Interprofessional Education Network (AfrIPEN), where IPECP experts work together to develop policies and resources for IPECP, contribute to growth in IPECP.

Worldwide there is an increasing demand for trained health care workers. From the scoped articles it became clear that IPECP in Africa is not as established as it is in developed economies[56], and one possible reason is the lack of national policies guiding IPECP. South Africa, with its particular geographical, socio-economic, cultural diversity, resource limitations and political history, has both universal as well as some unique challenges when it comes to the need for IPECP. The quadruple burden of disease in South Africa namely challenges in maternal, new-born and child health; HIV/AIDS and tuberculosis (TB); non-communicable diseases; and violence and injury combined with insufficient resources and the influence of poverty and workforce shortages makes the need for IPECP even more pronounced[34]. In tailoring a curriculum, the health work force needs of the specific included professions, individually and collectively, must be considered. For example, include the common conditions treated by the profession, to ensure that the IPECP activities are authentic and reflect practice needs[57]. IPECP could contribute to address health care's triple aim for improving patient experience quality and satisfaction with care, and through this addressing the health of the population and reduce the per capita cost of health care. Through collaborative practice patient care could be rendered more effectively by preventing unnecessary delays in care, unnecessary duplication of services and avoiding the need for re-admission because patients were discharged prematurely. IPECP forms an important part of the plans of the National Health Insurance which emphasizes the need for patients to be treated by a team[58].

To present a tailored curriculum, the IPECP core competencies, that guide the outcomes of the IPECP curriculum and therefore the selection of learning opportunities (activities, teaching methods and assessment methods), need to determine the duration and timing of the curriculum. Selected learning opportunities should suit the student characteristics for example the needs of the year group and combination of professions involved[3]. IPECP then facilitate the dual identity development of students as professional and as interprofessional team members[59,3]. In the South African context, it is important to pay attention to the type of case study that is most relevant to the specific professions involved and to address challenges related to diversity during IPECP group work. Examples could be stroke, head injuries, substance induced psychosis, post-traumatic stress disorder, spinal cord injuries.

Facilitators need to understand the institution and the health care system where the programme is presented. Knowledgeable, enthusiastic facilitators who make student's involvement enjoyable, contribute to students' positive attitude to future interprofessional collaboration[60].

Student involvement in curriculum planning increase IPECP programme acceptance and involvement[60,61]. Students who have experienced not only their own professions specific curriculum, but also the IPECP curriculum could share their experience of the learning opportunities' relevance[29].

For the sustainability of any IPECP programme, buy-in from the specific institutions' management is vital to overcome logistical barriers, such as financing and provide the necessary resources[35,48].

Throughout the review and the discussion, the relevance of sources was contemplated to ensure that it supports the South African context.

Limitations of the scoping review

Due to the abundance of available literature, important articles may have been inadvertently excluded, despite rigorous effort. Only five articles originating in Africa adhered to the inclusion criteria though there was abundance of international articles. This further highlighted the paucity of South African research in IPECP in terms of planning a curriculum relevant for the country's needs. The IPECP articles from Africa focussed more on IPECP implementation and is evident of IPECP in Africa as an emerging research area. Even though the scoping review did not provide sufficient information related to planning a specific South African IPECP curriculum, the discussion did however, indicate how differences in the context could be identified and considered in planning and aligning information to the specific university context.

CONCLUSION

The results from this scoping review have the potential to guide the planning of a tailored IPECP curriculum for an African university. Several intertwined factors were presented for consideration by curriculum planners and IPECP organisers and presenters. Findings could support university

management and policymakers as it provides summarised and synthesised evidence on how to establish a tailored IPECP curriculum. Key considerations include the specific professions involved, future healthcare needs of the country, expected capabilities and competencies of graduates, content and teaching methods and available resources influence one another.

Consideration of unique institutional contexts could guide planning a new or revised IPECP curriculum. A tailored curriculum will ensure that the healthcare needs of the local population is met and that students master interprofessional competencies using context-relevant teaching strategies.

AUTHOR CONTRIBUTIONS

Hanlie Pitout designed the study, collected, and analysed the data and drafted the initial manuscript and revised the manuscript. Fasloen Adams and Sanet du Toit contributed to the study design, supervised the data collection and analysis, and was actively engaged in the writing of the manuscript and Daleen Casteleijn assisted with refining the manuscript for publication. All authors were included in aspects of study design, data collection, analysis, interpretation of data; and/or drafting the paper; as well as final approval of the submitted version to be published and agreement to be accountable for included information.

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The authors have no declarations of competing interests to make, and no funding was received for this research.

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Addendum A: Table I Summary of included publications

	Author names and year	Name of article	Main concept (IPE, IPECP or CP)	Name of journal		Research approach and method QN= Quantitative QL= Qualitative MM = Mixed methods	Frequency Longitudinal (L); twice (T) once off (1x)	Participants and (year level) N= nursing; M=medicine, SW= social work, OT= occupational therapy, PT=Physiotherapy, PS=Psychology SP= speech therapy D= Dentistry HN/D: Human nutrition/Dietetics, Pha= Pharmacy, RD: radiography [group size specified]	Country and Context (university /clinical setting/ community area
1	Alinier et al. 2014	Immersive Clinical Simulation in Undergraduate Health Care Interprofessional Education	Simulation (IPE)	Clin Simul Nurs		QN: quasi randomised control group	L: 3 years	237 N, Pha, RD, PT, paramedic, SW [+/- 8 in group]	UK: British university
2	Anderson et al. 2016	Evaluating an interprofessional education curriculum: A theory-informed approach	Conceptual frameworks, theory (IPE)	Med. Teach.		MM: Meta-analysis	L: several years	Different stakeholders: 10 professions students, teachers, practitioners, patients, carers	UK: university, clinical
3	Avrech Bar et al. 2018	The role of personal resilience and personality traits of healthcare students on their attitudes towards interprofessional collaboration	Personality and attitude (IPECP)	Nurse Educ Today		QN: cross sectional, descriptive	1X	184 fourth year students N, OT, PT	Israel: Tel Aviv University
4	Beck et al., 2018	Attitudes toward interprofessional education improve over time	Attitudes (IPECP)	J Interprof Edu & Prac		QN: pre and post assessment	L: 3 years	175 students Allied Health, M, N, Pha, Public Health	USA: Universities of Nebraska and North Carolina
5	Berger et al., 2019	Encountering complexity in collaborative learning activities: an exploratory case study with undergraduate health professionals	Learning activities (IPE)	J Interprof Care		QL: case studies	1X	67 students: Lab Tech, M, N, PT, OT, SLPA, RD, Midwifery [4-5 students/team]	Germany: University Hospital Heidelberg
6	Berger et al. 2017	Anchoring interprofessional education in undergraduate curricula: The Heidelberg story	Change management (IPE)	J Interprof Care		QL: Case study	1X – pilot study	Faculty: IPG and Medical	Germany: Heidelberg University
7	Botma, Y. 2019.	Consensus on interprofessional facilitator capabilities.	Facilitator capabilities (IPECP)	J Interprof Care		QN: Delphi study	1X	IPECP experts	South Africa: University of Free State
8	Brault et al. 2015	Implementation of IP learning activities in a professional practicum: technology	Technology (IPC)	J Interprof Care		QL: focus groups	1X- pilot study	31 students, 10 professions; cl supervisors, man. (4000 students participate	Canada, Quebec Clinical
9	Cerbin-Koczorowska, , 2019	As the twig is bent, so is the tree inclined: a survey of student attitudes toward interprofessional collaboration supported with the curricula analysis	Curriculum (IPECP)	J Interprof Care		QN: cross-sectional survey-based	L: 3 years	502 final year students: Pha, M	Poland: Poznan University of Medical Sciences
10	Chicorelli et al 2016	Canadian student leaders' perspective on IPE: A consensus statement	Student's input (IPE)	J Interprof Care		QL: focus group	1X	12 student leaders N, SW, 8 Universities	Canadian Universities
11	Claramita et al, 2019	Interprofessional communication in a socio-hierarchical culture: development of the TRI-O guide	Communication skills (IPE)	J Multidiscip Healthc		QN: Pre-post, quasi experimental	1X pilot	53 first- and 107 fourth-year undergraduate students M, N, HN/D	Indonesia: Universitas Gadjah Mada, Yogyakarta,
12	Conway 2009	Implementing interprofessional learning in clinical education: findings from a utility-led evaluation	Clinical training (IPC)	Contemp Nurse		QL: interviews	1X	students, academics, clinicians	Newcastle, Australia: University and hospital ward
13	Cradock et al. 2013	A top-down approach impedes the use of theory?	Theory (IPE)	J Interprof Care		QL: Interviews: Grounded theory	1X	IPE curriculum developers	UK: 8 Universities
14	Croker et al. 2016	Educators working together for IPE : From "fragmented beginnings" to "being intentionally IP"	Educators attitude (IPE)	J Interprof Care		QL: interviews and focus groups: collaborative dialogical inquiry	1X	M, N, radio, SW, OT, PT, SP, HN: IPE educators	Australia: Newcastle University
15	Curran et al. 2010	Longitudinal study of effect of IPE curriculum on student satisfaction and attitudes toward IP team	Logistics (IPECP)	J Interprof Care		QN: 3 questionnaires; time series	L: 3 years	M, SW, N, Pha [group but size not specified]	Canada: Newfoundland. University and Nursing School
16	Cusack + O'Donoghue, 2012	The introduction of an interprofessional education module: students' perceptions	Theory (IPE)	Prim. Care		QN: questionnaire with qualitative and quantitative data	1X	92 PT, N, M, RD; elective [8-10 students]	Ireland: Dublin University
17	De Vries-Erich et al., 2017	Identifying facilitators and barriers for implementation of IPE: medical educators in the Netherlands	SWOT: Barriers and enablers (IPE)	J Interprof Care		QL: Interviews	1X	14 health educators: professions not specified	Netherlands: Amsterdam different universities IPE-SIG
18	Engel et al., 2017	A Power Experience: A Phenomenological Study of Interprofessional Education	Social interaction (IPC)	J Prof Nurs		QL: Interviews Hermeneutic phenomenology	1X	17 students M (1st + 2nd , N: 3rd and 4th year	Canada: Ontario: two Universities
19	Fitzsimmons et al. 2014	A learner developed longitudinal interprofessional education curriculum	Student input (IPE)	J Interprof Care		QN: pre-post-test experimental	1X	480 1st years: M, N, D, Pha	USA: University: California
20	Fook et al. , 2013	Taking the long view: exploring dev of IPE	Logistics especially leadership (IPE)	J Interprof Care		QL: exploratory case study	L: 15 years	19 key informants biochem, clinical sciences, N, OT, PT, podiatry, RD, SW	UK: London: service providers
21	Forte + Fowler, 2009	Participation in interprofessional education: An evaluation of student and staff experiences	Group dynamics, theory (IPE)	J Interprof Care		QL: focus groups staff and students	L: 5 years	Undergraduate students and staff: OT, PT, RD	UK: London University with full time and part time students

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22	Fougner + Horntvedt, 2011	Students' reflections on shadowing interprofessional teamwork: a Norwegian case study	Clinical learning (IPC)	J Interprof Care		QL: focus groups	1X	2nd year students: OT, PT, N, 30 reps [3 in group]	Norway; Oslo: hospital and homes
23	Gilligan et al., 2014	Recommendations from recent graduates on improving IPE in university programs	Student input (IPECP)	BMC Med. Educ		QL: focus groups	1X	68 recent graduates, 12 focus groups	Australia: Perth hospital
24	Gordon, et al. 2010	Developing an e pedagogy for IPL: lecturers thinking on curriculum design	Use of technology (IPE)	J Interprof Care		QL: interviews	1X	21 lecturers: SW, PT, OT, N, Sport and exercise, RD, Oncology	UK: Sheffield university
25	Hallam et al. 2016	Do commencing students differ in IP learning and practice attitudes	Team and group (IPE)	BMC Med. Educ		QN: GPSES, ATCHTS, IEPS, International big 5 mini markers test	1X	210 N, paramedic 1st year students	Australia, Melbourne, University
26	Hayashi et al, 2012	Changes in attitudes toward interprofessional health care teams	Influence of year level (IPE)	J Interprof Care		QN: On line survey, ATHCTS, RIPLS	1X	Sudents: 1st and 3rd years of N (80), OT(20), PT(20), Lab (40)	Japan: Gunma University
27	Hean et al., 2012	Theoretical insights into IPE AMEE Guide no 62	Theory (IPE)	Med. Teach.		QL: case study	1X	AMEE Guide	UK: University Bournemouth, Southampton, Birmingham
28	Homeyer et al., 2018	Effect of IPE on Medicine and Nursing	Curriculum implications (IPECP)	BMC Nursing		QN: Delphi	1X	25 experts	Germany: University, Greifswald
29	Imafuku, et al, 2018	What did first-year students experience during their IPE? A qualitative analysis of e-portfolios	Learning (IPE)	J Interprof Care		QL: exploratory case study: Phenomenography: analysis of reflections	1X	26 1st year students: M, N, Phar, N, PT, OT [8-9 students in group]	Japan: University and clinical areas: Showa
30	Jernigan et al, 2018	Teaching for Practice: The Impact of a Large-Scale Interprofessional Foundational Program	TeamSTEPPS (IPE)	J Allied Health		MM: Questionniares	1X	715 students of 15 professions: OT, PT, SLPA, HN/D, M, N, Pha, SW, 1-3 rd years	USA: University of Kansas
31	Jorm et al., 2016	Using complexity theory to develop	Learning and theory (IPE)	BMC Med. Educ		MM: questionnaire and analysis of video and case study	1X	1220 students different year groups: Rad, M, N, OT, Pha, PT, ST [5 – 6 students per group]	Australia: University: Sydney
32	Junod Perron, et al. 2014	Needs assessment for training in interprofessional skills in Swiss primary care: a Delphi study	Themes and skills (IPC)	J Interprof Care		QN: Delphi study: Electronic survey	1X	12 categories of health professionals: practitioners, trainers, trainees	Switzerland: University and Hospitals: Geneva
33	Karuguti et al., 2017	Analysing the cognitive rigor	Assessment (IPE)	J Interprof Care		QL: Quantitative content analysis: DOK framework	1X	Curriculum for PT, OT, Psych, N, Natural Medicine, Sport Sciences	South Africa: University: Western Cape
34	Kesselheim et al. 2019	Discharge Day: A Case-Based Interprofessional Exercise About Team Collaboration in Pediatrics	Discharge planning (IPECP)	MedEdPortal		MM: survey	3X	Final year: 192, M, SW, Pha, HN/D [9 per group]	USA, Harvard Medical School
35	Kickett et al. 2014	A Model for Large-Scale, Interprofessional, Compulsory Cross-Cultural Education with an Indigenous Focus	Teaching (IPE)	J. Allied Health,		QN: survey with qualitative and quantitative data	2X	1570 students, 1st years, 50 groups, 19 professions N, Public Health, PT, Pha, S P, N, Psych, oral health others	Australia, Perth University Curtin
36	Kururi et al. 2014	Professional identity acquisition process model in interprofessional education using structural equation modelling: 10-year initiative survey	Professional identity (IPE)	J Interprof Care		MM: model dev and testing	L: 9 years	3rd years: nursing, lab science, PT + OT	Japan, Gunma University
37	Laraimore et al., 2017	Impact of team composition	Team composition (IPE)	J Interprof Care		QN: survey 2 group quasi experimental: RIPLS and IEPS	L: 6 years	991 Students 5 – 10 professions: D, N, OT, PT, SLP, Pha, PS, Exercise Science	USA: Universities in Arkansas
38	Lehrer et al., 2015	Peer-led problem-based learning in interprofessional education of health professions students	Students input (IPE)	Med. Educ online		QL: Case control study design: IEPS	1X	M + Pha: 97 students [10 – 14 students in group]	USA, University and hospital, Arizona
39	Levett-Jones, 2018	Case Studies of Interprofessional Education Initiatives From Five Countries	Case studies of application (IPC)	J Nurs Scholarsh		MM	1X	Comparison of settings with different types and numbers of students in each	Australia: University of Technology Sydney and 6 others
40	Lockeman et al., 2017	Outcomes of Introducing Early Learners to IPE competencies in Classroom Setting	Socialisation (IPE)	Teach Learn Med.		MM: case series, students self-assessment with SPICE-R2 pre and post, Student peer assessment, Faculty Assessment	1X	1st years: 555: D, dent hygiene, M, N, OT, PT, Pha [5–6 students in group]	USA, University Virginia
41	Mathews et al, 2011	Building capacity in Australian	National coordinated approach (IPECP)	Aust Health Rev.		QL: 27 interviews and 2 focus groups	1X	key stakeholders in Higher Edu and health	Australia, University in Sydney
42	McKenna et al., 2014	Promoting interprofessional understandings through online learning :A qualitative examination	Online learning (IPE)	NHS		QL: 3 focus groups withy 13- 15 students each	1X	Students: different year groups: OT, PT, N, HN, emergency care	Australia, University in Melbourne
43	McMurty, 2010	Complexity, collective learning and the education	Learning: collective (IPC)	J Interprof Care		Action research	3 spiral cycles	M, D, N, Pha and Rehab [8 – 10 students in group]	Canada, University: health team course: Ottawa

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44	Mellor et al., 2013	Just working in a team was a great experience... - St perspectives on the learning experience of an IPE program	Students experiences (IPE)	J Interprof Care		QL: interviews: Interpretative phenomenological analysis	1X	M, Pha, N, OT, PT [6 – 8 students in group]	Australia, University: Queensland
45	Michalec et al. , 2017	Health Professions Students' Perceptions of Their IPE program	Students perceptions (IPECP)	J Allied Health		Case study: interviews	2X	20 students from 6 professions (Couple and family therapy, M, N, OT, Pha, PT) 1st and 2nd years	USA: University Delaware
46	Milot et al., 2015	Building an interfaculty IPE curriculum: Université Laval	Logistics (IPE)	Edu Health		Case study	L: 10 years	10 health and social sciences programs, 400 students [8 – 10 students in group]	Canada, University Quebec
47	Muller et al., 2019	The value of interprofessional education in identifying unaddressed primary health-care challenges in a community: a case study from South Africa	Primary health care (IPECP)	J Interprof Care		QN: case study	L; 4 years	Students: M, OT, PT, SLPA, HN/D, SW, N, RD, Podiatry	South Africa, Stellenbosch University: community, rural area
48	O'Hara, et al., 2018	Development of an e-learning programme to improve knowledge of interprofessional education. British Journal of	E-learning in IPECP	Nursing, 27 (21), 1242-1245.		QN: case study	1X.	Students: M, OT, PT, SLPA, HN/D, SW, N, RD, Podiatry	Ireland: Queen's University Belfast
49	Olson + Brosnan, 2017	Examining IPE through the lens of Interdisciplinarity: Power, Knowledge and new ontological subjects	Conceptualisation; theoretical framework (IPE)	Minerva		QL: 19 Interviews	L: first 2 years	9 professions, 400 – 900 students, 1st and 2nd year: OT, PT, podiatry, therapeutic recreation, health service management	Australia, University: New Castle
50	Olson et al., 2016	Reimagining health professional socialisation	Professional ID (IPE)	Health Sociology review		QL: interviews	L: first year	19 students: 1st years, 6 professions: OT, PT, podiatry, Therapeutic recreation, Traditional Chinese medicine,	Australia, University, Queensland
51	O'Neil-Pirozzi et al., 2019	Impact of Early Implementation of Experiential Education on the Development of Interprofessional Education Knowledge and Skill Competencies	Early exposure (IPE)	J Allied Health		QN: pre post intervention	1X	127 students: 1st years, N, Pha, PT, SLPA	USA: North Eastern University
52	Pardue, 2013	Not left to chance: curriculum framework	Curriculum content dual ID (IPECP)	J Interprof Care		QL: appreciative enquiry	1X	N, OT, Applied exercise science, athletic training, dental hygiene,	USA, Portland University
53	Paslawski, et al. 2014	Action, reflection and evolution: a pilot implementation of IPE across 3 disciplines	Less successful (IPECP)	J Res Interprof Pract Educ		Action research	1X	OT, ST, PT curriculum developers	Canada, University, Alberta
54	Prast et al., 2016	Practical Strategies for Integrating IPE	Faculty (IPECP)	Occup. Ther. Health Care		QL: focus groups	1X	OT, N, SW, Med Lab [8 -12 students in group]	USA, University, Saginaw Valley
55	Reitsma et al. 2019	Health students' experiences of the process of interprofessional education: a pilot project.	IPE process	J Interprof Care		MM: sequential	1X	N, Pha, HN/D, Ps, SW, HM	South Africa: North West University.
56	Rosenfield et al., 2011	Perceptions versus reality	Student expectations (IPE)	Med. Educ		QL: exploratory case study, focus groups	2X	M, Pha, D, OT, SW	Canada: University; Ontario,
57	Rotz et al., 2015	Exploring first-year pharmacy and medical students' experiences during longitudinal IPE	IPE intro early or late (IPE)	Curr Pharm Teach Learn		QL: focus group, 6 students per group	1X	18 Pha and M, 1st year students [3 students in a team]	USA, University, Philadelphia
58	Stanley & Stanley, 2019	The HEIPS framework: Scaffolding interprofessional education starts with health professional educators	Educators framework (IPE)	Nurse Education Practice		QL: Interpretive phenomenological, individual interviews	1X	26 educators	Perth, Western Australia, 5 Universities
59	Steketee et al., 2014	Interprofessional health education in Australia: 3 project for curriculum	Curriculum (IPE)	Appl Nurs Res		MM: surveys and interviews	1X	9 Univ, NGOs and industry bodies	Australia: Universities:
60	Skolka et al. , 2020	Attitude adjustments after global health inter-professional student team experiences	Mobile outreach (IPC)	Md Med J		MM: questionnaire and survey	3X	45 Students, first to 4th year: M, Physician assistants, N	USA: Penn State University Community involvement
61	Soubra et al., 2018	Effect of Interprofessional Education on Role Clarification and Patient Care Planning by Health Professions Students	New course (IPE)	Health Prof Edu		QN Descriptive survey	1X	266 senior students D, Med Lab, N, HN/D, PT, Pha	Lebanon: Beirut Arab University
62	Stanley & Stanley, 2019	The HEIPS framework: Scaffolding interprofessional education starts with health professional educators	Framework for facilitators (IPE)	Nurse Edu in Prac		QL: Interpretive phenomelogical framework	1X	26 Educators	Australia: Charles Sturt University
63	Tartavoulle et al., 2016	Using the IDEA framework in an IP didactic elective course; roles and responsibilities	Dual ID : social (IPE)	J Interprof Care		QN: RIPLS, IPEC	1X	Allied H, D, M, N, Pha and Public Health [10 students in group]	USA, University, New Orleans
64	Titus & Roman (2019).	Predictors if student agency: the relationship between student agency, learning support and learning experience in an interprofessional health science faculty.	Students support (IPE)	J Interprof Care		QN: questionnaire	1X	PT, OT, N, SW, Ps, D/HN, Nat Med	South Africa, University of Western Cape
65	Van Lierop et al. , 2019	Jointly discussing care plans for real-life patients: The potential of a student-led interprofessional team meeting in undergraduate health professions education	Real life cases (IPC)	Perspect Med Educ		QL: focus groups	2X	360 X 2 M, N, Allied Health [10 students of which 5 M]	The Netherlands: Maastricht University, hospital
66	Venville & Andrews, 2020	Building great health care teams: enhancing interprofessional work readiness skills, knowledge and values for undergraduate health care students	Patient voice (IPECP)	J Interprof Care		QN: Pre post study	1 X	28 Final year students: SW, OT, PT, SLPA, N, Psy, HN/D [8 students per group]	Australia, Victoria University
67	Walker et al., 2019	Students' experiences and perceptions of interprofessional education during rural placement: A mixed methods study	Rural placement learning opportunities (IPC)	Nurse Educ Today		MM: RIPL and interviews	1 X	60 students of Allied Health, M, N, Midwifery	Australia: Monash University Rural area

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	Author names and year	Name of article	Main concept (IPE, IPECP or CP)	Name of journal		Research approach and method QN= Quantitative QL= Qualitative MM = Mixed methods	Frequency Longitudinal (L); twice (T) once off (1x)	Participants and (year level) N= nursing; M=medicine, SW= social work, OT= occupational therapy, PT=Physiotherapy, PS=Psychology SP= speech therapy D= Dentistry HN/D: Human nutrition/Dietetics, Pha= Pharmacy, RD: radiography [group size specified]	Country and Context (university /clinical setting/ community area
68	Waller et al., 2019	Interprofessional simulation in a student community clinic: insights from an educational framework and contact theory	Framework development (IPE)	BMC Adv Simul (Lond)		QL: Interviews	1X	40 students, 12 SPs and 5 facilitators	Australia: Monash University, Clayton
69	Ward et al., 2016	Development, implementation and evaluation of longitudinal IPE	Longitudinal (IPE)	J Res Interprof Pract Educ		QN: Pre post test	1X	N, M. Pha, SW, Diet [6–8 per team]	USA, Washington university
70	Waterston, 2011	Interaction in online interprofessional education case discussions	Online (IPECP)	J Interprof Care		MM: survey, online discussions, care management plans	1X	490 students, 77 facilitators, D, M, N, OT, Pha, PT [8–9 students]	Canada, University, Toronto
71	West, et al. 2016	Implementation of IPE in 16 US medical schools: Common practices, barriers and facilitators	Barriers and enablers (IPE)	J Interprof Educ Pract		MM: observational cross sectional: survey	1X	16 Medical Schools	USA: Universities
72	Wilbur + Kelly, 2015	Interprofessional impressions among nursing and pharmacy students	Students attitudes, beliefs, values (IPE)	BMC Med. Educ		QL: focus groups and interview	1X	200 students, N and Pha, year not indicated	Middle East: Qatar: University

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3.3 Conclusion

The scoping review results provided an empirical basis for the planning of the curriculum. There is a vast amount of literature available on IPECP. Structuring the literature under the 4DF not only helped to organise the literature, but it also formed the basis to guide the researcher thinking of factors to consider in planning the curriculum. The scoping review further allowed the researchers to understand the field of study and identified important theoretical guidelines for the planning of the IPECP curriculum.

Chapter 4 will now explain further how the literature was incorporated with the results from the data from focus groups, feedback on events and a needs survey, through critical reflection and reflexivity to identify the important factors that guided the planning of the curriculum.

Chapter 4 Critical reflection and critical reflexivity of the situational analysis

"*Reflective thinking turns experience into insight*." – John C Maxwell

4.1 Introduction to chapter 4

Chapter 4 presents the integrated findings of the first phase of the research: the situational analysis done as the conceptualisation phase for developing the SMU-IPECP curriculum. The research question for the situational analysis was "*What factors may influence the development of an IPECP curriculum considering available theoretical knowledge and the situation at SMU*?"

The purpose of Phase I was to explore the factors that must be considered in the development of an IPECP curriculum by conducting a situational analysis. Situational analysis evaluated existing interprofessional education and collaborative practise opportunities. The scoping review reported on in Chapter 3, illuminated the theoretical knowledge. The focus groups were conducted with staff in each of the four schools, clinicians involved in training students during work-integrated learning, as well as with students in three schools, to determine barriers and facilitators in the present situation at SMU in terms of human resources, equipment, technology, and finances. Five focus groups were conducted with staff, one per school and one additional one with clinicians. The included schools were the School of Health Care Sciences, School of Medicine, School of Pharmacy, and School of Oral Health Sciences. Four focus groups were conducted with students from three different schools who at that stage have already participated in the pilot IPECP week – that is, students at School of Health Care Sciences, of School of Medicine, and of School of Pharmacy. Focus groups with staff and with students were analysed separately.

In analysing the focus groups for staff, three overarching themes were identified. The first theme focused on the establishment of a formal, longitudinal curriculum and included all year levels of study; based on a designated formal subject/unit and centralized coordination of the professions' activities included. Theme 2 referred to the benefits of the IPECP programme and included a relationship-based approached based on equality, respect and confidence, good communication and teamwork

supporting patient centred care, in addition to equipping staff to master improved teaching practices. The third theme focused on promoting a collaborative teaching culture between departments, overcoming hierarchies, identifying leadership and IPECP champions to advocate for the IPECP programme. The conclusion of staff focus groups were that staff members identified both educator and curricular mechanisms that would foster relationships for translating change to ensure a collaborative culture between role players and support a university commitment for advancing IPECP to the benefit of staff and patients.

The focus groups analysis together with information from the scoping review were used to develop a needs analysis questionnaire (see Appendix F) for all staff and students at SMU in order to confirm the results and to ensure buy-in for the implementation of an IPECP curriculum, through eliciting input from a wider range of stakeholders. The key findings were that buy-in from management is essential, all year levels of study need to be involved, preferably IPECP should be a stand-alone subject with a scaffolded approach to presenting increasing complexity across year levels of study. The outcomes of the IPECP curriculum need to be based on achieving core-competencies. A variety of teaching methods need to be used. The importance of role models was stressed.

Each of the data collection methods yielded a lot of data, however, due to the abundance of available literature on IPECP the researcher in consultation with the supervisors decided that the results of the situational analysis could be presented in one paper, using Brookfield's lenses of reflection. By combining information from the researcher's reflexivity and critical reflection on the experience of developing and presenting an IPECP module, the input gained from the focus groups and needs survey and combining all of these with the literature, a more comprehensive and unique contribution could be made to IPECP literature.

Paper 3

Pitout, H; Barnard-Ashton, P; Adams, F, SHJ du Toit (2023). Perspectives of collaborative interprofessional curriculum evolvement at a South African University: a qualitative reflection. *BMC Medical Education.*

RESEARCH

Title

Perspectives of collaborative interprofessional curriculum evolvement at a South African University: a qualitative reflection.

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Abstract

Background: Developing Interprofessional Education and Collaborative Practice (IPECP) curricula benefits from multiple stakeholder perspectives. The critical reflection and reflexivity of the curriculum developer allowed her to incorporate not only her own the perspectives but also lecturers, students and literature, spotlights factors that need to be considered in planning

and IPECP curriculum. There is a shortage of recent South African studies that provides guidelines on the initial development of an IPECP curriculum.

Method: Brookfield's four lenses of critical reflection guided the critical reflexive and critical reflection process of this embedded mixed-methods study. Brookfield's lenses provoked critical reflexivity and critical reflection within the principal investigator (lens 1) confirmed through the critically reflective lenses of: 2) students, 3) lecturers and 4) literature. Qualitative data were collected through focus groups with students and lecturers and literature and analysed through thematic content analysis. The descriptive quantitative data that were collected through scoping review of literature, feedback on events and a needs survey of all students and staff of involved schools, that was analysed descriptively and was used to support qualitative data. The aim of this paper was to critically reflect on pilot IPECP events and describe how reflection and reflexivity of the principal investigator shaped the planning and design of an IPECP curriculum that is contextually appropriate and viable at a South African university that primarily serves under-resourced communities.

Results: The two identified themes: that is firstly the formal curriculum and secondly teamwork between stakeholders encapsulated several categories each. Theme A: "Formal IPECP curriculum", refers to a carefully planned series of events and exposure of students to IPECP to ensure that students have enough time to achieve the important IPECP outcomes. The categories of theme A are: embeddedness across professions curricula, highlighting the importance of buy-in from management, offering it across all years of study as an integrated subject and curriculum management issues. The content of the curriculum, presented through a scaffolded approach, addressing core competencies and benchmarking with other institutions. The methods used for teaching, learning and assessment included the preparation of lecturers to facilitate and use of a variety of learning and assessment methods. Theme B: "Teamwork between stakeholders" refers to interpersonal relationships. The categories include: the importance of teamwork role models, team's focus on patient-centred care, appreciation of diversity e.g., vernacular of the professions and level of preparedness for

IPECP and the importance of egalitarian relationships based on respect, recognition and hegemony.

Conclusion: During the collaborative planning of the IPECP curriculum with lecturers and students from under-resourced communities, critical reflexion on their perspectives on possible solutions and challenges was incorporated to make the IPECP exposure more authentic for all participants. Due to this critical reflexivity, the direction of the development of the curriculum changed from a final-year programme to the planning for a longitudinal, integrated curriculum. The conundrum of IPECP curriculum planning was addressed by spotlighting the specific angle provided by each of the four lenses when discussing aspects of the formal curriculum and of teamwork between stakeholders. The critical reflexivity and critical reflection presented from the four lenses elucidated how perspectives of the different lenses steered the curriculum development.

Key words**:** undergraduate curriculum, Brookfield's lenses, Interprofessional Education and Collaborative Practice, under-resourced communities.

Background

Although the World Health Organization (WHO) has promoted Interprofessional Education and Collaborative Practice (IPECP) for the past 62 years [1] [2] the most effective way to implement it in African and specifically in South African universities remains challenging. Interprofessional Education (IPE) refers to students learning with, from and about each other in an educational setting [1]. The knowledge gained from IPE prepares students for Collaborative Practice (CP) which happens when students have the opportunity to apply what they have learned in class, in a clinical setting when they collaborate during patient treatment, with professionals from a variety of professions [1].

The scoping review by Pitout et al. [3] highlights that the majority of IPECP curricula originated from developed economies including Canada, United States of America, Australia and the United Kingdom, where there are overt expectations of adopting IPECP as educational reform

in health professions' education. In South Africa, incorporation of IPECP is an expectation of accreditation bodies such as the Health Professions Council of South Africa and its professional boards [4]. However, factors such as differing expectations across the professions' boards and the lack of implementation guidelines delays IPECP adoption at many institutions.

Within South Africa, there are multiple contextual factors that accentuate the need for IPECP, but these factors could simultaneously thwart the incorporation of IPECP. Firstly, the legacy of apartheid and colonialism is still causing marginalized communities to have limited access to adequate social determinants of health, which in turn cause further disempowerment by the limited choices available for sustaining health and well-being [5]. Secondly, many health care students come from marginalized, under-resourced communities resulting in inadequate preparation of these students for tertiary studies [6]. Thirdly, the quadruple burden of disease influences health of South Africans, including, challenges in maternal, new-born and child health; HIV/AIDS and tuberculosis (TB); non-communicable diseases; violence and injury [7]. This burden is aggravated by insufficient resources, the influence of poverty due to lack of work opportunities and health workforce shortages [8],[9]. IPECP could contribute to addressing the quadruple burden of disease, while considering the social determinants of health by focussing the curriculum content on addressing primary health care needs. In planning the IPECP curriculum with students (and lecturers) from under-resourced communities, their perspectives on possible solutions and challenges could be incorporated to enrich the exposure of all participants.

Developing an IPECP curriculum, for a health sciences university in South Africa, is a complex process. Visionary lecturers established an IPECP module for final year health care students at the university in 2019. Smaller IPE events were initiated before 2019, including a project where medical, occupational therapy and physiotherapy students participated in a simulated outpatient clinic [10]. Input from other South African IPECP teams helped to lay the foundation in terms of preparing lecturers to develop a pilot IPECP module. In this paper the critical

reflexivity of the Principal Investigator (PI) explains how Brookfield's [11] lenses of critical reflection, guided the IPECP curriculum planning and development.

Critical reflection supports professional practice improvement [12], as it interrogates assumptions [13], assists with problem solving and transforms learning [14],[15]. Brookfield [11] page 15, defines critical reflection as "the attempt to understand how power dynamics work, to exercise one's own power responsibly, becoming aware of how dominant ideologies frame one's thinking and actions, how hegemony manifests itself in our lives, and how to create greater participatory". Critical reflection can be further defined to be "a form of criticality, concerned with critique of oneself, one's internal dialogue, performance, cognitive biases and development" [15]. Brookfield's lenses inspired the PI to use both critical reflection as well as critical reflexivity. Critical reflexivity allows us to take a step back and appraise the unquestioned and dominant philosophies embedded within our lives and our professional practices [16]. Critical reflexivity highlights the limitations of your own knowledge and to better understand the social norms and values of others in order to challenge structures and processes that create and maintain power imbalances [17]. Engaging in critical reflection and reflexivity brings about transformative actions by assessing and understanding our experience, assumptions, and practice [18] toward a socially responsible and ethical practice [19]. Brookfield [11] proposed four lenses to direct critical reflection within the education landscape: Lens 1 - autobiographical, as a learner of practice (PI lens), Lens 2 - the IPECP module seen through the student's eyes (Student lens), Lens 3: academics and clinicians who are facilitators of the curriculum (Lecturer lens) and lastly, Lens 4: the lens of theoretical literature (Literature lens).

The critical reflections and critical reflexivity were based on the IPECP pilot event. The pilot event was an IPECP week was run for final year students from School of Health Care Sciences, School of Pharmacy and School of Medicine. Approximately 500 students and 50 facilitators participated in the event. During the week, students did role clarification, participated in a simulated patient discharge event, and had to do research and compile a

patient safety. In preparation for the event, lecturers were trained to be facilitators. A specially selected group of student representatives was also prepared to assist with facilitation and were tasked with marketing the event. The students were vital in providing communication to and from the organising committee. The critical reflexivity and critical reflection was based on all experiences of curriculum development including the pilot implementation in the different years, the focus groups, the needs survey and feedback from sessions. Also, during interaction with colleagues and students throughout the period and interaction with colleagues at other universities the researcher continuously reflected on the needs of SMU.

The decision to move from a final year module to a longitudinal course was taken at the end of Phase 1 of the study, that is after doing the scoping review and analysing data from focus groups, feedback and the needs survey.

The research question addressed in this paper is what are the expectations of the PI, students, lecturers and literature to achieve a tailored IPECP curriculum? The aim of the research was for the PI to understand factors to consider in the planning of a tailored IPECP curriculum; specifically, what would work in the specific South African university. The critical reflection and critical reflexivity reported on in this paper may help IPECP curriculum planners to consider different perspectives that may be transformative to their understanding of factors that influence IPECP. The information presented could support the need for educational reform to establish a structured programme or could be confirmative of their current IPECP teaching and thus shed light on aspects to consider during planning and revision of IPECP curricula.

Methods

An embedded mixed method research design was used [20]. The quantitative data was collected and embedded in the description of qualitative data. Refer to table 1 for details on data sources and methods

Setting and Context

Brookfield's four lenses of critical reflection guided the critical reflexive and critical reflection process of this embedded mixed method study design [20]; [21]. The paper reports on the situational analysis at a South African university. The focus on the situational analysis was to identify factors that will make the IPECP curriculum contextually relevant, sustainable and viable for the context of a South African university, that primarily serves an under-resourced community. The PI initiated a pilot IPECP programme to expose staff and students to IPECP. The content and structure of the pilot events were informed by IPECP literature and input from other South African universities on what worked in their environment. The experience of the pilot events enabled students and staff to provide input on factors that needs to be included in the curriculum during the subsequent focus groups. The first step, as in other research, was to analyse factors that were identified in the literature lens and to analyse the focus groups, feedback on events and needs survey (students' lens and lecturers' lens), and. Instead of concluding on the situational analysis, by only reporting on the summary of the analysis from the combined data sources, the PI lens used critical reflexivity and reflection of all the collected data, including her own reflective diary and compared it to her experience of the events, to shape the planning and design of an IPECP curriculum. The critical reflection and reflexivity contributed to the analysis of the needs of all stakeholders, including accreditors, the university management, staff and students that served as the foundation for the IPECP curriculum. The aim of this paper is to provide guidance for curriculum planners and implementers, as seen through the reflection and reflexivity lens of the PI, based on the lived experience of planning a curriculum.

Data collection

A range of sources were accessed for data collection including qualitative data collected through five focus groups with lecturers and three focus groups with students. The main question in focus groups was "what factors at this university should be considered in planning an IPECP curriculum, based on your experience and knowledge of IPECP". The critical reflection and critical reflexivity of the PI is based on a variety of sources. The previously

collected and analysed data were entered in a reflexive journal [22], that captured the insights gained through the engagement with the IPECP programme, interaction with colleagues at the university and at other universities, critical discussions with research team as well. Quantitative data was collected through a needs survey and the IPECP event feedback forms that were completed by students and lecturers and contribute to substantiate the findings in lens 2 (student lens) and lens 3 (lecturer lens). The PI did a scoping review in the first phase of the study gathering peer reviewed literature on factors to consider in the planning of an IPECP curriculum. The literature as well as more recent, especially South Africa studies were included. The literature lens provided additional support or contradiction of the data from the other three lenses. The specific population, research method, inclusion and exclusion criteria for each data collection is summarised in table 1.

Insert table 1 here.

Stakeholder / population description

The stakeholders are represented by the perspectives they contribute, according to each of Brookfield's four critical reflective lenses. It is important to note that all four lenses are of equal importance.

Lens 1: Principal investigator (PI) Lens

The PI (first author) is the (unofficial) coordinator of IPECP curriculum at the university. She is a lecturer in the occupational therapy department. She entered academia later in life, after sixteen years as a clinician. As clinician, she valued the impact of the team and the importance of building relationships with other professions. In transitioning from clinician to academic, she completed a Post-graduate Certificate in Higher Education, where she discovered the value of critical reflection, as well as the value of education theories such as constructivism. She established valuable relationships with colleagues from different universities through attending and presenting at congresses where education of different professions is addressed e.g., South African Association of Health Educationalists (SAAHE) and African Interprofessional

Education Network (AfrIPEN). The PI lens reports on both critical reflexivity as well as critical reflection from a pragmatist and constructivist paradigm. The PI entered this study process with a pragmatist world view before addressing her curriculum design and development considerations. Critical reflexivity was stimulated through a discussion with three supervisors who asked questions to challenge her positionality and assumptions. One supervisor is international and all three are from different universities to the PI, bringing contextual diversity to challenge the PI's perspectives, ultimately contributing to the shifts in the PI's world view that are elucidated in this paper. The PI lens was influenced by first hand experiences of the events that were planned together with a community of practice of IPECP facilitators. The critical conversations with research team and colleagues contributed to the PI's interpretation of data gathered from other sources.

Lens 2: Student Lens

Students who participated in the pilot IPECP module were from three different schools, namely the School of Pharmacy, the School of Health Care Sciences (occupational therapy, physiotherapy, nursing, speech language pathology and audiology, human nutrition and dietetics) and the School of Medicine (medicine and radiography). Data collected from students were in the form of three focus groups with students who participated in the pilot event, students' feedback on events where they participated and a needs survey including all final year students at participating schools. Students were not only recipients of the IPECP events but were also instrumental in marketing and organising IPECP events.

Lens 3: Lecturer Lens

The lecturers include academic facilitators, clinical facilitators, or lecturers whose students participated in the pilot IPECP module. Lecturers were from diverse personal and professional backgrounds, working environments, level of experience in facilitating IPECP, age and profession-specific clinical experience. Data collected from lecturers and clinical facilitators were in the form of five focus groups with different cohorts of lecturers as well as clinical facilitators, feedback on events from facilitators involved in the events, and a needs survey

involving all the university's lecturers. All the involved professions' lecturers were invited to give input during focus groups and 39 participated. For the needs survey all lecturers, even those who did not participate in IPECP were encouraged to complete the needs survey to elicit input from a wider range of stakeholders.

Lens 4: Literature Lens

An enormous amount of literature on IPECP is available that could be confusing and overwhelming for universities commencing IPECP. Therefore, this paper aims to provide a starting point to identify literature specifically aimed at guiding planning of an IPECP curriculum. A scoping review conducted by the PI [23] focused on factors that affect IPECP curriculum planning. Specific additional literature of curricula at South African universities as well as literature on curriculum development were added in this paper. Literature used in this paper either support or contrast findings from other lenses. The contrasting literature is valuable as it spotlights how a different context could influence curriculum planning. The supporting literature on the other hand provides evidence of why the practical aspects included in the pilot events are supported.

Data analysis

Focus groups' data of lecturers and students were initially analysed separately from each other and analysed thematically. All focus groups were transcribed verbatim and coded inductively [24] using Braun and Clarke's steps for thematic analysis [25]. This process involved initial open coding using NVivo™ as an online tool to record codes. Inter-coder reliability was adhered to, with two additional researchers (two of the co-authors) who reviewed the coding [20] in order to identify themes and categories.

Trustworthiness in relation to credibility, transferability, confirmability and reflexivity [20], were observed. Credibility was promoted by frequent debriefing sessions between the research team. Transferability was ensured by dense description of the research process. Confirmability was addressed by triangulation between data collected from different student groups as well

as comparing information with literature on the topic. Researcher reflexivity encouraged constant and systematic awareness of personal background and viewpoints. The PI acknowledged the fact that her insider position made it challenging to remain neutral during the data collection and analysis processes, consciously considered bracketing throughout the process of data analysis [22].

Initially the PI plotted the analysed data from both the qualitative and quantitative analysis against the four lenses, creating a process of critical reflection when viewing the data through the perspectives of lens 2 (student lens) and lens 3 (lecturer lens), examining it for assumptions, power relations and how these shape practice ([17]. Where data disparity was found the PI went back to lens 4 (literature lens) while continually paying attention to her own reactions, thoughts and perspectives, as also evident in her reflective diary. Through critical reflection of the data the PI was able to pause and ponder; reflect on her own positionality in line with the critically reflexive contribution of lens 1.

After the detailed analysis of all data sources of lens of students, lecturers and PI was completed, the results of the scoping review where the global factors to consider in planning a curriculum were added. Through the PI immersing herself in the data as well as her first-hand experience of planning for and participating in the events of the pilot study over four years, and engaging with students and lecturers throughout the period, attending of and presenting at congresses and workshops, the PI was constantly engaged in the process of critical reflexivity and critical reflection to refine her thoughts regarding factors to consider. In combining all these different sources of information, further thematic analysis was done to identify both divergent as well as convergent thoughts, through a constructivist approach. The different data sources, that is literature, focus groups for lecturers, focus groups for students, feedback on events, were then used to compile the questionnaire used in the needs survey. The results of the needs survey were analysed.

The different data sources were triangulated with the qualitative data analysis of focus groups and from reflexivity of the PI, supported with quantitative data from the feedback and the needs

survey, supported by literature. The quantitative data collected through analysis of feedback forms as well as the analysis of needs survey contributes to the data by providing concrete data to either confirm or reject initial assumptions of the PI.

Results

Introduction to results

The results focus on triangulating findings from the different lenses of the students and lecturers where both qualitative and quantitative data were collected, with literature and personal insights (reflexivity). Thereby the findings are combined with interpretations that puts them in context, and explains why they matter (Maree, 2020). The critical reflection is captured through the way that the focus group data is not only presented through verbatim quotes from participants but also compared to the perceptions from other lenses. The sequence of presenting information under each category varies, depending on the perspective that is most relevant, followed by the supporting or contradictory perspectives from the other lenses.

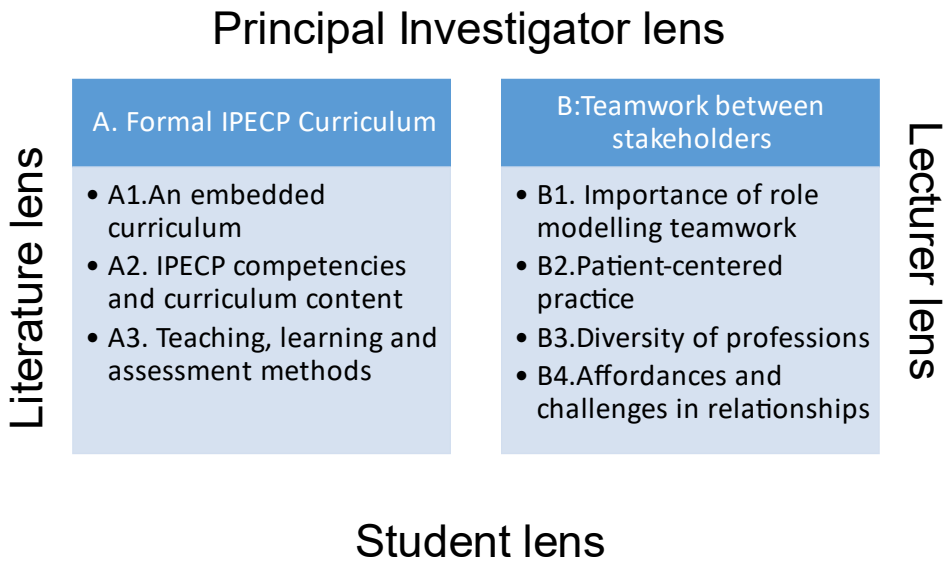

Figure 1 Lenses and themes

The data analysis yielded two themes namely A) Formal IPECP curriculum and B) Teamwork between stakeholders (see Figure 1). Each theme is supported by categories to provide insights for developing the IPECP curriculum at the university. At the end of each subsection a textbox is included to summarize practice considerations that could promote the development of collaborative IPECP curricula.

Theme A: Formal IPECP curriculum

A formal curriculum refers to a carefully planned series of events and graded exposure of students to IPECP rather than students participating in some loose standing events e.g., exposure only in final year. A formal curriculum ensures that graduates have enough time to achieve the important IPECP outcomes.

Three categories were identified within theme A, namely: A1) An embedded curriculum, A2) IPECP core competencies and curriculum content and A3) Teaching, learning and assessment methods.

Category A1: An embedded curriculum

An embedded curriculum refers to the curriculum content and logistics of IPECP, and how it is integrated into the involved professions' existing curricula.

Subcategory A1.1: Buy-in from management is essential.

The success of an IPECP curriculum is dependent on the stance of the university and faculty management, as would be evident by IPECP's inclusion into the university's Key Performance Areas. The **Lecturer Lens** indicated that buy-in from all levels of management is essential as without management's commitment and support, lecturers and students would not be allowed to and willing to participate fully:

> "… the moment it comes from management it [support for an IPECP curriculum] proves the relevance of it. And, if the relevance is clear … people follow and … more willingly do it." (Focus_group_Pharmacy_ lecturer)

> "…[We] need a strong top-down approach to ensure commitment. Deans and HOD's [Heads of Departments] should find ways of letting [commitment to IPECP] cascade down into the Schools. It cannot happen at [lecturer] level". (Focus_group_Oral_ Health Sciences_ lecturer)

From the **PI Lens** the IPECP curriculum at this university started from a bottom-up approach, with lecturers from four professions designing a single IPECP event. The PI reflected that the need for a more formalised IPECP curriculum gained recognition through a publication [10], successful award of funding (2018) and an institution wide project organised by the Deputy Vice Chancellor (DVC, 2021) that included the IPECP Indaba with internal and external presenters, followed by an IPECP Strategic Planning session. This resulted in the top-management incorporating IPECP in the University's Strategic Plan and Performance Management system (2022). This process created buy-in for the IPECP curriculum allowing the PI to initiate the development of a more comprehensive IPECP curriculum and investigate the possibilities for integration across all professions. Substantial power relations are at play between management levels, between professions and between colleagues that could result in either cooperation or resistance to the planning and implementation of IPECP.

The **literature lens** supports this premise that management buy-in is essential to an IPECP curriculum [27]; [28]; [29]. Management buy-in is especially important in the provision of human and financial resources.

Sub-category A1.2: Year levels to initiate IPECP

The **Literature Lens** revealed a lack of consensus on when to initiate IPECP. Filies et al. [30] reported that in South Africa the senior students were more ready for interprofessional learning than first year students. Rotz et al. [31] suggested starting IPECP in first year before there are any negative associations between the professions, while Wilbur and Kelly [32] indicated that in first year, the students do not know enough of their chosen profession to participate optimally with students from other professions. In support of IPECP starting only in the final year, Imafuku et al. [33] indicated that students need to understand their own profession and have

gained knowledge and skills before engaging in collaborative work. The scoping review [23] found that in the majority of studies, IPECP were initiated in the final year of study (49%), as opposed to 28% initiated in the first year, while 23% of studies scoped did not specify the year for IPECP initiation.

The **Student Lens** revealed the need to start from first year to build up knowledge, skills, and attitude regarding cooperative learning with other students. The IPECP needs survey showed that 59.6% of students felt that IPECP should be included at all year levels, whereas only 24.7% felt that only senior/final year students should participate.

> "So, if [IPECP] starts in first year, at least you … build up knowledge until you graduate…to have a clearer understanding [of the roles of professions]". (Focus_group_Health_Care_Sciences_students)

> "It is hard to change a habit like [working with own profession only]. So, if you start by teaching them from first year they will get used to working with other people [in other professions] and take those systems to the clinical site". (Focus_group_ Medical_ and_Radiography_student)

The **Lecturer Lens** supported students' suggestion to start at a first-year level; 78.7% of lecturers indicated in the needs survey that IPECP should include all year levels, with only 14.9% indicating it should focus on senior/final year students.

> "I think it should be taken from first year so that the importance of group work and the links of different professionals to care for a patient is understood well from first year. This mode of learning should form part of the orientation of first years and should be included from this level to the final year". (Needs_survey_lecturer)

The PI's perspective was shifted by the students' and lecturers' consensus that a longitudinal curriculum should be developed (**PI Lens**). The PI initially believed that students need to have a strong personal sense of professional identity before exposure to IPECP. However, part of the IPECP curriculum could be the focus on the gradual attainment of the dual identity of

professional as well as interprofessional team member [34] as well as an evolving role clarification between professions as students gain professional expertise. One of the PI's primary concerns remains that a longitudinal curriculum would be more resource-intensive and complex to logistically implement, especially the IPE part of it, than offering a module for only final year students. The suggestion would be that all lecturers of a profession who are responsible for work-integrated learning need to be facilitators of IPE for the year level, as this will have the additional benefit of ensuring the implementation of IPC during clinical work.

Subcategory A.1.3: Logistical curriculum management

The **Literature Lens** cautions that embedding IPECP across all profession's curricula needs careful logistical considerations. Focused effort is required to provide resources and infrastructure, including strong administrative support [35]. The scoping review of Pitout et al. [23] findings highlights that the number of professions that participate in a specific event varies and is often dependent on the variety of professions trained at the same university. Events also vary in size and duration, with some events having up to 1000 participants. Findings suggest the optimal size of small groups were three to 10 students, depending on the availability of students and lecturers [23]. Time allocation in the curriculum is also controversial as IPECP is resource and time intensive and requires significant coordination. Attention to delivery-capacity may overcome the perceived time and resource challenges [36]. Centralized planning could address the logistics of implementation [37].

From the **PI Lens,** there are both advantages and disadvantages when trying to include all students in the same event. At this university, there are 11 professions from four schools included in the curriculum, which includes about 650 students and ideally requiring 65 lecturers to have one facilitator per group of 10 students. Managing such high number of students and lecturers in a single event requires a lot of preparation, planning, coordination, financial support, and facilities, however, including a variety of professions in an event. A complicating factor experienced during the pilot IPECP events was the differences in year levels and number

of students per profession. Medical students outnumber other students five to one, and they are sixth year students compared to most students from the other professions who do four- and three-year degrees. It was satisfying to be able to expose students to ten other professions, where they were able to do role clarification and learned to value and appreciate each profession's contribution Planning and presenting an IPECP curriculum that spans different schools and professions require additional support e.g., administrative support. Without a constant person who is knowledgeable about IPECP, who focus on the development and who can drive the process through establishment of relationships between professions, it is difficult to ensure the success of a curriculum. Having an IPECP unit would help to address some of the logistical challenges, however, a concern will be that professions may then abdicate their responsibility in terms of providing facilitators for small groups because they will see the staff of the IPECP unit as needing to take over all IPECP teaching.

One of the challenges expressed through the **Lecturer Lens** remains the synchronization of timetables and coordination of IPECP activities including work-integrated learning, accentuating the need for an interprofessional coordinating committee or an IPECP unit as indicated by 85.1% of the lecturers in the needs survey. A specific suggestion that came from lecturers was that there needs to be ringfenced time made available for IPECP in all professions' timetables, to ensure that professions do not allocate the time for teaching profession-specific subjects, and thereby denying their profession's students the opportunity of participating in IPECP and also students from other professions, to benefit from learning from them.

> "…not everybody's clinical curricula run at the same time and not all our students are at the same clinical areas, so it is difficult for them to also get there and practice what they have learnt in terms of collaborating with other team members". (Focus_group_Health_ Care_Sciences_lecturer)

"I feel that the staff [lecturers] is overwhelmed with preparing and implementing this week - we need a dedicated IPECP Unit to be able to optimally implement this program". (Feedback_IPEC _week_lecturer)

Box A1. Practice considerations to promote IPECP Embedded Curricula

- Requires institutional management's inclusion of IPECP into university's key performance areas.
- The IPECP curriculum should be presented as a longitudinal, to start in the first year and continue to final year, to advance of dual identity development of being a professional and interprofessional tam member.
- Formation of an IPECP unit, as an institutional IPECP unit can overcome some logistical challenges such as coordination of the curriculum between professions, plan and present some of the content, and manage the resource allocation. However, an IPECP unit cannot replace profession-specific small group facilitators.

Textbox A1 summarises practice considerations that could promote the development of IPECP embedded curricula.

Category A2. IPECP core competencies and curriculum content

The IPECP pilot module was designed around achieving the IPECP core competencies [38] and to ensure that the IPECP curriculum content was tailored to meet local healthcare needs [23]).

Subcategory A.2.1. Scaffolded approach

According to the **Literature Lens**, it is important to build skills over time, that is offering IPECP as a longitudinal course from first to final year, so that when students graduate, they are practice-ready [39]. Building skills can be achieved through a scaffolded approach and backward curriculum design, where each year levels' achievements, forms the basis for the next year level, and where the IPECP core competencies, guided planning [40]. Scaffolding could provide a" just-in-time" approach to enhance learning, where the content, complexity and

learning environments are scaffolded [41]. This is in line with the previous suggestions in theme 1 of offering IPECP to all year levels.

The **Student Lens** confirmed that IPECP requires repeated and re-enforced exposure:

> "not just be stuck on at the end of your studies when you are ready to move on, … [needs to] allow for continuous repetition, establish a habit and encourage students to invest more effort." (Focus_group_Medical_ and_ Radiography_student)

The **Lecturer Lens** also encouraged more longitudinal engagement of students, rather than limited exposure in a once-off event:

> "We need to find a way to have students working together on a project throughout the year or on a quarterly basis and submit work done on those case studies. In this way we ensure that there is continuous interprofessional learning and teaching." (Needs_survey_lecturer)

While a longitudinal, scaffolded approach is indicated in the other lenses, the **PI Lens** advocates for caution as longitudinal projects requires additional lecturers' and students' time investment. During previous IPECP projects at this university e.g., portfolio submission, students and lecturers were reluctant to respectively submit, and mark submitted work, as it was seen as superfluous addition to their workload. However, in line with the previous category the PI supported the suggestions of students, lecturers and confirmed by literature, that there needs to be enough opportunity for repetition in a spiral curriculum where there is reiterative visiting of topics e.g., role clarification and role plays, throughout the course in an increasing depth with each revisit [42].

<u>Subcategory A2.2 Interprofessional core competencies and learning activities.</u>

The **Literature Lens**, Filies indicated that interprofessional core competencies should provide the framework of a competency-based curriculum, to ensure that IPECP outcomes are incorporated into all activities. The IPEC core competency framework includes roles and responsibilities, teams and teamwork, interprofessional communications and values and

ethics, and this core competency framework was found to be most relevant [38]. Authentic learning activities could be offered when the context of the learning environments is considered [45] for example in South Africa, exposing junior students to an under-resourced community near the university could guide students' understanding of the impact of determinants of health [46].[47]. Activities such as home visits as part of ensuring students application of what they learned during class in their local community during clinical work provides an authentic link between IPE and primary health care [48].

The **Student Lens**' highlighted how IPECP contributed to their skills:

> "…everyone individually gains that knowledge [role clarification] in their own professions but only during IPECP and during your collaborative practice, can you really interpret it." (Focus_group_Health_Care_Sciences_student)

Seventy-six percent of students supported the need for alignment of IPECP core competencies with learning activities. Students specified that simultaneous interaction with students from a variety of professions optimizes appreciation of roles and responsibilities, as well as of teams and teamwork, contained in the core competency framework [38].

Students found different aspects of learning activities meaningful. For example, some enjoyed the educational games, others learned most through the role-play, specific presentations on pain management and ethics.

From the **PI Lens**, one explanation for the students appreciating specific activities more, may be due to students' different learning styles. Accommodating different learning styles, by offering a variety of learning activities, enhances students' learning [49]. The **PI Lens** appreciated that formulating learning activities that resonates with 11 different professions is complex and time-consuming and needs collaborative input from all professions. Within this current curriculum there was initially conflicting opinions about case study development: should it be a very complex case study, or just a general condition, to ensure each profession have a

significant role in the case study. The PI experienced the benefits of collaborative development of a suitable complex case study, as is done in African Virtual Interprofessional Education (AfriVIPE) [47], where lecturers from a variety of international institutions and professions contributed the development of virtual interprofessional learning process and offer a once-a-year event. The detailed development by the AfriVIPE team resulted in a complex yet authentic case, supported by visual material in the form of a video made at the university demonstrating the context of the case. The community of practice were involved in the collaborative making of the video which helped with detailed role clarification and provided opportunities, also for lecturers to learn from each other and to gain respect and recognition from other professions. The setting of the case study in primary health care contributes to preparing students to be collaboratively work-place ready when they graduate to work in primary health care settings, as they had the opportunity to practice during simulation at university, before applying what they learned during work-integrated learning.

Lecturer lens supported the development of complex case studies

> "The reality is that when many different professions are involved, either case studies should be complex, requiring intervention from multiple professions, or more than one case study may be needed, to ensure an overt role for each of the involved profession." (Focus_group_Health_Care_Sciences_lecturer)

Subcategory A2.3 Benchmarking against national and international practice

Through the **PI Lens** it became evident that planners of a new IPECP curriculum need to be cognizant of the standards of IPECP at other universities. Through international exposure, the PI became sensitised to how the local context and access to learning and financial resources, largely influenced the content and implementation of an IPECP curriculum, a fact that became evident when designing the AfriVIPE case studies. Building relationships and sharing resources with other universities, creates opportunities for benchmarking the curriculum. Many universities in sub-Saharan Africa and even in South Africa, are still in the early implementation phase of IPECP curriculum development. Sharing ideas during congresses and discussions

with colleagues from African universities exposed the PI to innovative initiatives at other universities, such as a communal community platform where all students can have exposure to collaborative team based case that could be incorporated into the new planned curriculum (Muller et al., 2019). Another valuable addition to the IPECP curriculum came from learning about the relevance of the International Classification of Function, Disability and Health that can be used to teach student a universally relevant terminology that fosters collaborative discussion [50]. Sharing virtual learning events with students and staff from other universities enriches students' awareness of global differences and similarities.

Both the **Student and Lecturer Lenses** confirmed the importance of benchmarking where 85% of students and 93% of lecturers indicated in the needs survey that they want to know about IPECP curricula at other universities.

Textbox A2 summarises practice considerations that could promote the development of IPECP core competencies in curricula.

Box A2. Practice considerations to promote IPECP core competencies and curriculum content

- Plan the content of the curriculum around achievement of IPECP core competencies integrating it in a primary health care approach.
- Use scaffolded curriculum approach to gradually build-up and re-enforce learning.
- Present a variety of learning activities for students with different learning styles, to make learning meaningful.
- Benchmark with other institutions to establish and align with national and international standards yet be cognizant of local needs to ensure authenticity.
- Foster national and international relationships to create opportunities to share resources and learning opportunities.

Category A3 Teaching, learning and assessment methods

Teaching, learning and assessment methods that facilitated interprofessional competencies may require strategies that differ from profession-specific subjects.

Subcategory A3.1 Lecturers preparation to facilitate learning.

The **Literature Lens** emphasize the value of facilitator preparation for both lecturers and students, as an integral part of the preparation for IPECP modules [51]; [52]). Lecturers may feel threatened in a situation where they need to incorporate their profession-specific roles as well as role model interprofessional behaviour [53], due to the perceived loss of professional identity and concerns in relation to the erosion of professional boundaries [54].

The **Lecturer Lens** confirmed the value of, and need for, thorough facilitator preparation:

> "Because you know when there is no training and you are pushed to do a curriculum and you do not understand first, it will be very difficult."
> (Focus_group_Oral_Health_Sciences_lecturer)

Through the **PI Lens**, the PI acknowledged that lecturers often experience fear and uncertainty when they need to facilitate a group of students from different professions or where their field of practice differs from the presented case. However, the PI observed that the personal and professional growth that is facilitated through interaction with other facilitators and students during IPECP facilitation, creates increased job-satisfaction and collaborative competencies of facilitators. Involving both novice and experienced lecturers in training and presentation allows all to benefit from shared learning. Incorporating co-facilitation in allocating lecturers to small groups is valuable in terms of adding additional in-service learning, enriching experiences for students and lecturers, helping to share workload and boost confidence. The PI noticed that lecturers' exposure to the use of simulated patients in IPECP, created skills transfer to the lecturers' profession-specific teaching.

The **Lecturer Lens** further accentuated the benefits of co-facilitation, for not only IPECP but even overflowing into benefits in profession-specific teaching:

> "oh, another lecturer does something else", and "I could incorporate that into my teaching methodology", "…and that in itself should form, or start forming a culture of lecturers or facilitators…, that teach in such a way that the students benefit a lot more than just being giving a lecture." (Focus_group_Medical_and_Radiography_lecturer)

In developing the IPECP curriculum there is an additional need for preparing and involving clinical supervisors, as they should guide the application of IPECP knowledge in clinical practice:

> "Clinical supervisors need to be made aware of students' exposure to IPECP and the expectations of implementing collaborative care during clinical blocks." (Focus_group_Clinician_lecturer)

The **Student Lens** supported the need for clinical facilitator preparation and buy-in.

> "Even if students are taught not to work in silos, clinical placements may derail the process [if clinicians are not practicing collaboratively]."
> (Focus_group_Medical_and_Radiography_students)

Subcategory A3.2 Teaching methods for IPECP learning

The **PI lens** acknowledges that teaching methods in IPECP is different from teaching a profession–specific subject, as IPECP focuses more on facilitating learning than on being a content-expert. Therefore, the students and lecturers needed to be reminded that the focus needs to remain on providing opportunities to learn with, from and about each other and achieving IPECP core competencies instead of focussing only on content. Fear and uncertainty of facilitators often resulted in lecturers giving lectures instead of facilitating learning as lecturers felt safer in the traditional role of "teacher". IPECP provided opportunities to be more creative in the design of learning opportunities that are relevant for the students at the specific university incorporating unique elements e.g., adding a visit to the newly established simulated ICU ward at the Skills Centre and making changes to improve the curriculum in response to feedback from students and facilitators e.g., adding additional educational games for each year

level. The PI involved a group of IPECP student leaders, in planning and operationalising the IPECP programme. The PI realised that these students who experienced not only their own professional curriculum but also the IPECP programme, provided a unique view and supplied concrete examples of operationalizing curriculum guidelines found in literature.

The **Students Lens** highlighted the value of student involvement in planning and presenting the IPECP curriculum so that a curriculum is recognising the importance of "by us, for us" where student agency is developed. Students indicated some very relevant expectations e.g., activities that are novel and encourage interaction, or have new content:

> "Like [during the IPECP curriculum] play games at some point. Or maybe during that week or that time, there is just something to interact." (Focus_group_Health_Care_ Sciences_student).

> "...one of the things we did was disaster management, …. something very new to us, … we did not even know that in an emergency situation we could play a role." (Focus_group_Health_Care_ Sciences_student)

In the **Lecturer Lens**, lecturers elaborated on how alternative teaching methods differed in IPECP, especially the use of role-play and multi-facetted, interprofessional team-developed case studies

> "The fact that role-play and the SP's (simulated patients) are a part of it…role-play in itself is a phenomenal dynamic, teaching method, because it's a safe space where students can test and try and receive feedback."
> Focus_group_Medical_and_Radiography_lecturer)

Through the **Lecturer Lens** it became evident that lecturers became more confident in and recognised the benefits of using technology such as learning management systems (LMS) through their COVID19 emergency remote online teaching.

> "I think blended learning will work in the second, third and fourth years, where you then not only have class, but you can on [the university's LMS] … have assignments to do, online questionnaires…for them to complete." (Focus_group_Pharmacy_lecturer)

Parts of the curriculum is presented online, however, 73% of students wanted to have more face-to-face sessions. The **Student Lens** highlighted the following advantages of face-to-face learning:

> "I had no idea that I preferred face-to-face, as it allowed me to bond with my group mates on a more personal level." (Feedback_IPECP_week_student)

Through the **Lecturer Lens,** 65% of lecturers indicated, in the needs survey, that IPECP opportunities for both face-to-face and online learning is preferable to only face-to-face learning. This lens also highlighted the disadvantages of online teaching and learning in IPECP as connectivity issues, as well as lack of engagement of students in online sessions. However, most lecturers, 76%, reported that students do use blended learning opportunities e.g., accessing information in preparation for learning.

The **Literature Lens** supports the use of blended learning with synchronous and asynchronous online activities to implement a successful IPECP curriculum [55] as well as to stimulate collaborative learning [56]. According to Ngussa and Makewa [57] involving students in curriculum planning empowers them through a constructivist approach, to become active participants in their learning, including opportunities to influence what they learn. Student involvement can further contribute to student agency where especially for students from under-resourced communities, their contribution to the curriculum planning could enable them to develop autonomy and personal responsibility [58].

Subcategory A3.3 Assessment

Assessment of learning in IPECP is controversial. The **Literature Lens** cautions that IPECP is about achieving team skills, and therefore assessment of individual student's work is not necessarily the most effective method. The assessment activities are often poorly aligned to

the instructional methods and learning outcomes in IPECP curricula [59]. Common practice is to provide students with surveys to assess their professional and personal growth for example to assess either their Readiness for Interprofessional Learning (RIPLS) [60] or alternatively achievement of Interprofessional Collaborative Competencies Attainment Survey (ICCAS) [61], however, this reflects the lack of constructive alignment of the assessment. Reflection as an assessment opportunity has the dual role of providing evidence of the student's achievement of the IPECP competencies and forms a record of the students' growth over time [62].

The **PI Lens** revealed that students benefit from feedback on the daily reflections. Students' personal and professional growth is seen when lecturers are committed to mark the daily reflections. Most students and lecturers require training on critical reflection, as without understanding the importance of the link between reflection and the development of values and norms such as compassion and honesty that are important in collaborative quality patient care, reflection is often neglected. The PI proposed that assessment of learning could be formative during IPECP events e.g., through feedback on reflection but should form part of summative assessment as part of profession specific subjects such as work-integrated learning and submission of learning portfolios, to ensure alignment of learning and assessment in IPECP with profession-specific subjects.

The **Student Lens** raised concerns regarding the time and effort spent on IPECP without allocated marks, as happened in the pilot IPECP events. When IPECP is not included in assessment, students are less committed to participate and to appreciate the value of IPECP. Students showed less conviction than the lecturers that IPECP activities should contribute to marks (56.3%: value IPECP if it contributed to marks; 29.2%: it should continue to be non-compulsory and not for marks).

The **Lecturer Lens** supported the student lens with 84.8% of lecturers indicated that students would value IPECP if it contributes to marks, whereas only 8.7% felt that there was no need for a formal IPECP assessment - it should continue to be non-compulsory.

Textbox A3 summarises practice considerations that could promote teaching and learning.

Box A3: Practice considerations for teaching, learning and assessment methods

- Prepare lecturers to accept the role as facilitator rather than teacher and to learn through co-facilitation.
- Incorporate different teaching methods, including blended learning
- Involve students in planning to provide valuable input in planning and presenting the IPECP curriculum that contributes to buy-in by the student cohort.
- Assessment strategies that are suitable for IPECP needs to assess teamwork rather than individual performance for example longitudinal learning portfolios to showcase students' growth.

Theme B Teamwork between stakeholders

The success of the IPECP curriculum depends to a large extent on interpersonal relationships. Theme B yielded three categories, namely: B1) Importance of role modelling teamwork, B2) Patient-centered practice and B3) Diversity of professions.

Category B1: Importance of role modelling teamwork

Subcategory B1.1 Engagement of all stakeholders

From the **PI Lens** it became apparent that even though educational theory and facilitator preparation is important, it remains vital for all stakeholders to collaborate to prepare workplace-ready graduates. Planning the curriculum needs to be a collective process where all professions lecturers and students are involved and where they can experience the value of collaboration and be seen to role model teamwork.

The **Lecturer Lens** further encourages transformation of the teaching culture, with more collaborative practice amongst clinicians and academics, from different professions and health care facilities.

"…that could also establish a teaching culture… where people are beginning to work a lot more on a level, aiming for something bigger than just my little area of expertise and my little knowledge…" (Focus_group_Medical_and_Radiography _lecturer)

Subcategory B1.2 Importance of role models

The **Student Lens** emphasized the importance of role models in preparing students to work collaboratively, rather than competitively.

"They [clinicians] lead by example [as a way of teaching]. The people who teach us set that example, so we know what we are meant to do." (Focus_group_Medical _and _Radiography_student)

"It [IPECP] allows students from different professions to learn from each other and understand that they are team members rather than each other's competition" (Needs_ survey_student)

The **PI lens** recognised the importance to keep clinicians updated on the students' exposure to IPE, in order for clinicians to create opportunities where students could experience the benefits of being part of an interprofessional team during work-integrated learning. Additional information on IPECP was shared during clinical supervisors' workshops and clinicians were encouraged to role model teamwork and make students aware of opportunities for collaborative practice in the specific setting.

Textbox B1 summarises practice considerations that could promote role modelling teamwork.

Box B1: Practice considerations for role modelling teamwork

- Engage all stakeholders during planning to foster collaboration.
- Students benefit from having role models for teamwork, but clinicians need to be informed of students' exposure to IPE

Category B2: Patient-centred practice

The **Lecturer Lens** indicated that IPECP should expose students to collaborative treatment of real patients during clinical practice, to improve patient-centred care and enhance patient outcomes, thus improving the quality of health care.

> "The students learn very early in their careers that they have a role to play in ensuring that the patient's health needs are holistically met, collaboration with other health team members is key." (Needs_survey_students)

The **PI Lens** recognised that working on real patients is an important progression from practicing in class, and in simulation using trained simulated patients. The university is linked to a large academic hospital; however, it is logistically challenging to find suitable patients, where all professions are involved in the treatment. The PI advocated that patient interaction is more feasible and realistic during clinical practice, than as part of the IPE sessions. During clinical practice, lecturers and clinicians need to expect students to treat patients for whom they are responsible, collaboratively by incorporating marks into clinical performance assessment.

The **Literature Lens,** Ntsea et al. [63] demonstrated that at another South African university using live streamed real patients was a good IPECP learning experience, but students also felt it was invasive having a group of students around the patient as well as live streaming to a much larger remote group. These students commented that instead, a simulated patient group consultation could be crafted to accommodate all involved professions.

Textbox B2 summarises practice considerations that could promote patient-centred care

Box B2: Practice considerations for patient-centered practice

- Provide opportunities for students to work collaboratively during clinical practice to ensure patient-centered care.
- While simulated patients offer broader role exposure, there is a recognized benefit to having real patient contact.

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Category B3: Diversity of professions

IPECP prepares students for the reality of the work environment, where they will need to cope with diversity in terms of professions, varying levels of professional competence, and professional vernaculars.

Subcategory B3.1: Expectations of the professions and accreditation bodies

From the **Literature Lens** accreditation bodies expect students to be exposed to IPECP during undergraduate training. Thistlethwaite [64] and Steketee et al. [65], concluded that lack of uniform guidelines across different professions on how to incorporate IPECP into curricula, hampers implementation. To address the lack of uniform guidelines in South Africa, the Academy of Science report [66] recommended a national working group to develop and guide the implementation of a strategic plan, to make IPECP more sustainable.

The **PI Lens** found that three different accreditation bodies accredit the professions included in the IPECP curriculum. Even within the major accreditation body, the Health Professions Council of South Africa (HPCSA), that accredits nine of the eleven professions, there are different professional boards, each with its own criteria for incorporating IPECP. The developers of a curriculum need to ensure that the curriculum meets the needs of all accreditors to ensure students are allowed to participate in IPECP and that their involvement meet the requirement of the professional accreditation bodies.

Subcategory B3.2: IPECP competence and preparedness at the start of curriculum

The **Student Lens** provided valuable inputs by comparing what they learnt in their own professions, with IPECP. Students suggested that an understanding of their profession-specific scope of practice was important before contributing during IPECP case studies. Students suggested that, as prerequisite to IPECP, the teaching content should include the roles of other team members; especially when considering specific conditions/diagnoses (e.g., head injury or asthma). The pharmacy students specifically felt disadvantaged during IPECP activities due to their limited knowledge of other professions and their overall lower exposure to patient contact.

> "I think before they could come to the IPECP curriculum, they should be informed of what other professions do in their own Schools" (Focus_group_Pharmacy_student)

> "…most medical students, nurses and radiographers actually experienced the benefits of… interacting with the patients... speaking from experiences and things they have worked on before. (Focus_group_Pharmacy_student)

The **PI lens** initially found the diversity that the planned curriculum needs to address, in terms of professional scope of practice, student competencies and teaching methods an almost insurmountable challenge until engaging with lecturers and students from the diverse professional backgrounds, as well as each person's own experiences of IPECP, opened up her mind to the advantages offered through the diversity. As confirmed by Birk [67] diversity actually creates opportunities for higher quality of health care, as it taps into the diversity of thinking of all the different persons involved in the care. The diversity provides constant challenges during discussion and real opportunity for learning with, from and about each other. The exposure of students to other professions further also contributes to the development of the dual identity of professional and interprofessional team member.

Subcategory B3.3 Vernacular of the professions

The **Student Lens** indicated that students realized the professional terminology from one profession might not be familiar to other professions. For example, if an occupational therapist uses the term occupational deprivation, other professions may not know what they were referring to. Students transitioned from using profession-specific terminology, to using more generic medical terminology during IPECP, combined with lay terms during interaction with simulated patients, to make themselves understood.

> "…we can actually learn more as we go by different terms that we use [during role clarification exercise] … everyone was trying to talk in the most layman's terms, but with regards to certain medical things [general medical terminology] everyone there could basically understand what was being said." (Focus_group_Health_Care_Sciences_ student)

The **Lecturer Lens** confirmed the importance of terminology as baseline when interacting with other professions during patient discussions:

> "We talk [speak] the same language; the more everybody is really on track with the whole prognosis of the patient, from the very beginning to the end" (Focus_group_Clinician_ lecturer)

The **PI Lens** contributed to addressing the discrepancies in terminology used by professions by acquainting students and lecturers with the International Classification of Function, Disability and Health (ICF) [46], that The PI realised that importing ICF into the IPECP curriculum not only offers universal terminology, but it also teaches students and lecturers a valuable method for holistic patient-centered care classification and can be time-saving as all professions collaboratively use a single form for patient record keeping. Integrating the ICF into the case study analysis, and expecting students to complete combined ICF forms, as part of their clinical performance during work-integrated learning, enhanced collaborative patient care and re-enforced role clarification. The main aspect of diversity that needed to be addressed was the academic diversity, rather than diversity of culture, student home language, and demographics.

Literature lens reported on a study done at another Sout Africa university [68] where students who needed to apply the ICF found it difficult due to their lack of knowledge of this classification. However, the same students after training in the ICF, experienced that the ICF provided structure to the clinical placements, making it a more positive experience.

Box B3: Practice considerations for diversity of professions

- The level of preparedness, especially in terms of exposure to patients, with which students arrive to engage in the IPECP curriculum, could influence student's competence during participation in discussions of case studies and planning patient-centered care.
- The ICF can address diversity and the differences in vernacular between profession as it not only presents a uniform terminology but also contributes to holistic, patient centered care.

Textbox B3 summarises practice considerations that could promote relationships between diverse students and lecturers.

Category B4. Affordances and challenges in relationships

The IPECP curriculum provides positive opportunities, that are the affordances of relationships. However, inherently there are also some challenges or more negative integral consequences for example hegemony and conflict during interaction between different professional groups' lecturers and students, that planners of the IPECP curriculum need to consider. Recognition of both affordances and challenges in relationships, can improve the outcome of the IPECP curriculum.

Subcategory B4.1. Fostering egalitarian relationships led to respect and recognition.

The **PI Lens** highlighted the importance of relationships between stakeholders, that forms the foundation for ensuring IPECP curriculum sustainability. Many challenges to IPECP curriculum implementation can be overcome by fostering both personal and professional relationships,

building on a culture of caring, and the recognition and respect of every person's valuable contribution. It takes time and a community-of-practice to build relationships between lecturers of different professions, however, building relationships could have long lasting positive effects in terms of increased collaboration, even culminating in interprofessional collaborative presentations and research.

The **Literature Lens** indicated a number of barriers to developing relationships between lecturers, including power undercurrents, negative communication patterns, unclear roles and responsibilities and conflicts related to disparate approaches to patient care [69]. Khalili et al. [70] refer to ''turf protection'' behaviours that are deeply rooted in socialization and education of healthcare professionals. Interprofessional socialization [70], [71] need to be fostered to develop trust, respect and positive interprofessional relationships with colleagues across professional borders [53]; [12]. Unlike the difficulties in shifting the power balance in interprofessional relationships, trust and respect can be fostered by building personal relationships and establishing agreed rules that govern collaborative care and that are perceived as fair [72]. Profession-specific socialization may be hindering the development of interprofessional relationships [54]. In addition, there is a need to gradually initiate professionals to work within interprofessional teams needing insight into the socialization processes, as well as a culture of interprofessional respect [73]. The hegemony of uni-professional beliefs and practices poses a possible barrier to interprofessional relationship development.

The **Student Lens** emphasized the importance of students learning to respect the contribution of their own and other students' professions, specifically highlighting the following:

> "Respect for one's profession; this will enable the students to easily work together in a healthcare environment, without being biased towards one another." (Needs_survey_student_comment)

It was also interesting that students anticipate the long-term benefit of IPECP in terms of professional recognition and building professional identity:

> "… [in IPECP] make every single profession to feel how important they are…if every single profession [is made] to feel important, they [students in the IPECP curriculum] will bring value into the health care system" (Focus_group_Pharmacy_student)

The **Lecturer Lens** highlighted opportunities for students to form more egalitarian relationships because they have more insight in the contribution of other professions as well as the importance of establishing personal relationships:

> "… not only do you gain more insight into what they [other professions] do, but you actually meet the person behind the professional, and in doing so you realize that the professional is one thing, but the person is another…. (Focus_group_Medical_and_Radiography_lecturer).

Sub-category B4.2. Conflict within and between professions

Within professions, lecturers often experience disapproval from peers, when they spend time preparing to participate and while participating in IPECP events because it is seen as neglecting their profession-specific duties. The **Lecturer Lens** indicated: "Commitment of staff [lecturers] members … gets impacted upon because of time and other responsibilities that they have". (Focus_group_Medical_and_Radiography _lecturer)

> "…it's a lack of insight. They don't realize the value [of IPECP], and [how it] links to the training." (Focus_group_Pharmacy_lecturer)

> "…if the responsibility was maybe spread …everybody taking ownership and the same amount of responsibility, sharing the load will definitely help." (Focus_group_Clinician_lecturer)

The **PI lens** recognised the importance for IPECP curriculum planners to identify champions and leaders, that can overcome conflict and create a change of institutional culture to work more as a collaborative team. The PI could see how facilitators who embraced the IPECP opportunities found increased job satisfaction through interaction with students and with other lectures. However, as indicated before it is difficult for lecturers to be fully involved without the

back-up of management to sanction their participation. The need for an institutional culture change was also highlighted by the **lecturer lens**:

> "A culture change for the university should focus on collaboration between professions and using the available champions and leaders, who are already convinced of the value of teamwork, to move IPECP to the next level." (Focus_group_Oral_Health_Sciences_lecturer)

During IPECP small group participation the **Student Lens** noted that friction and resistance may occur which may limit participation:

> "Conflicts may arise within the group regarding role play and role overlap which might make the other members of the profession not want to participate anymore" (Feedback_IPECP_week_student)

> "…you get people who are very resistant… but they always feel they are so superior to everyone" (Focus_group_Pharmacy_student)

Through the **Literature Lens** explains how diversity, friction, and harmonization influences teamwork, especially if an aspect is missing or out of balance, indicating that each of these three aspects are important [75].

The **Student Lens** pointed out that IPECP created opportunities to address negative feelings by exposing students to the reality of conflict and learning strategies to deal with such conflict, in other words harmonisation. An example offered was racial tensions that could potentially be explored through IPECP, to prepare students for the reality of the world of work:

> "You will be taken to a set-up where we are practicing with people of different races …IPECP can potentially make things better" (Focus_group_Pharmacy_student)

Textbox B4 summarises practice considerations that could promote affordances and overcome challenges in relationships.

Box B4: Practice considerations for affordances and challenges in relationships

- Focus on fostering interprofessional relationships, both personal and professional, to prevent and overcome challenges.
- Foster more egalitarian relationships, to build respect and trust between professions and individuals.
- Engagement with other professions' lecturers and students affords opportunities to form new relationships that diminish prejudice.
- Lecturers guide students to bring their professional expertise to team-based care, to adopt a dual identity of uni-professional and of interprofessional team member.
- Consider how to address hegemony and attitudinal resistance to change during interaction with and between students, as well as between lecturers.
- Address the cause of negative emotions such as fear, friction and rivalry through showing respect and recognition of the value of each contribution.
- Engagement in IPECP can provide an opportunity to teach students how to deal with conflict.
- While conflict and negative attitudes may occur, engagement in IPECP can provide an opportunity for harmonization and provide balance to diversity and friction.

Discussion

Critical reflection and critical reflexivity shapes IPECP curriculum development

According to Brookfield [76], the purpose of critical reflection in education is to illuminate the assumptions of power and dominant ideologies; and uncover assumptions about the hegemony of our own teaching practice. This critical reflection, with the additional critical reflexivity, shaped the IPECP curriculum development at a South African Health Sciences University that typically serves local under-resourced communities.

The major changes in the PI's initial thinking, in response to the critical reflection and reflexivity, include aspects related to theme A: firstly, the recognition of the importance of buy-in from

management for the growth of the curriculum and ensuring the availability to ring-fenced time and access to resources. The PI initially set out to develop only a module for final year students. The input from lecturers, students, own experience as well as confirmation from a more comprehensive literature search, convinced the PI secondly, that all year levels need to be included in a scaffolded approach to the curriculum development. Thirdly, through interaction and benchmarking with national and international IPECP programmes the PI recognised the importance of including a variety of authentic learning activities related to primary health care that addresses core competencies and prepare students for the dual identity of professional and interprofessional team member.

Theme B guided the PI to acknowledge power and challenges associated with diversity during IPECP, but also how this could enrich the IPECP curriculum. The challenges in establishing egalitarian relationships should not be underestimated but could ensure not only the collaboration between students but also between colleagues. The foundations for successful implementation of the curriculum lie within the stakeholder cohesion and supportive team culture.

Limitations

The paper is a critical reflection on the pilot IPECP module in one South African university and compares the perspectives of the PI, students and lecturers to literature. The very specific focus of the project did not attempt to report on other curricula in the country. Due to the extensive range of factors that could influence curriculum planning, only the most common factors were addressed and some factors, that may influence other curricula significantly, could have been excluded. The project's focus is limited to the perspectives of its participants. Even though reminded on several occasions via different platforms, not all students and lecturers provided input into in the feedback and needs survey.

Conclusion

Critical reflection and critical reflexivity added a qualitative element to the analysis of the factors in the planning and development of an IPECP curriculum. The four lenses of the PI, students, lecturers and literature, considered the different perspectives on the same aspect which helped to identify factors that could impact development and offered possible practical solutions to address it. Practice considerations added to each category under Theme A and B provided guidelines that could be considered by curriculum planners and implementers.

When designing an IPECP curriculum for students destined to serve under-resourced communities it is vital to collaborate with the lecturers who have authentic knowledge and experience as well as the students, many of whom live in these same communities. From Theme A, it became clear that the IPECP curriculum needs to be authentic and address not only the health needs of the population served by the students during work-integrated learning but needs to be designed with input from all stakeholders – “for us, by us”.

Breaking the perception of “this is just more work” or and “add on” as expressed by both lens 2 (student lens) and lens 3 (lecturer lens), the PI recognised the importance of the cultivation of the value-base for collaborative practice. Many South African universities have largely focused on IPECP as one-off or a short series of senior student “extra-curricular” events. The PI was all set on the path of investigating content and learning activity for the design of a “better extra-curricular senior student event” but through this critical reflection and critical reflexivity process, has realised that for collaborative practice to be embraced by newly qualified health practitioners, IPECP needs to be integrated from first to final year, be authentic in addressing real community needs as part of the primary health care approach, and assessment should not only focus on IPECP as a “possible new silo” but contribute to student performance within their professional subjects [Filies & Frantz, 2021; Frantz & Rhoda, 2017]. This could be achieved through designing an integrated, longitudinal curriculum that scaffolds the development of the dual identity of the uni-professional and of the interprofessional team member, as explained in theme A. Recognition of the importance of affordances and challenges inherent in team work should shape the interactions that form part of the exposure

of students to deal with diversity that is encountered during their training but that they will also encounter further in their careers as explained in theme B. Further research on the effect of changes in health care policies in the country, on IPECP and teamwork, is encouraged.

List of abbreviations

ASSAf: Academy of Science of South Africa

AfrIPEN: African regional network of Interprofessional Education

AfriVIPE: African Virtual Interprofessional Education

IPECP: Interprofessional Education and Collaborative Practice

LMS: Learning Management System

PhD: Doctor of Philosophy

PI: Primary Investigator

WHO: World Health Organisation

Declarations

Ethics approval and consent to participate

The research proposal was reviewed and approved by the University of Witwatersrand Faculty of Health Sciences Post Graduate Protocol Committee. Ethical approval for this study was granted by the University of Witwatersrand's ethics committee. (approval number M171145/2019). Informed consent was obtained from all participants. The authors confirm that all methods were carried out in accordance with University of Witwatersrand guidelines and regulations. Permission was obtained from Sefako Makgatho Health Sciences University Research and Ethics Committee to collect data (approval number R14/49).

Consent for publication

Not applicable

Availability of data

The datasets are available from the corresponding author on reasonable request.

Competing interests

The authors declare they have no competing interests.

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Authors' contributions

HP was responsible for the acquisition of data and drafting the manuscript as this forms part of her PhD study that is done under supervision SdT, PBA and FA. All authors contributed to the concept and design, analysis and interpretation of data, critical revision of the paper for important intellectual content. The statistical analysis and administrative, technical, or logistic support was performed by HP and PBA. All authors read and approved the final manuscript.

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Table 1: Data sources

Data source	PI's Reflective Journal and personal communications	Scoping review (Pitout et al, 2022).	Focus groups with students	Focus groups with lecturers	IPECP committee-developed feedback form for the IPECP events	Needs survey questionnaire
Lens	Lens 1: PI	Lens 4: Literature	Lens 2: Students	Lens 3: Lecturer	Lens 2: Students and Lens 3: Lecturer	Lens 2: Students and Lens 3: Lecturer
Population	N/A	8 online databases	380	64	444	508
Recruitment	N/A	N/A	All students who participated in the pilot event were invited to participate via their professional representative	All staff responsible for facilitating in the IPECP programme were invited to participate via their professional representative. All professions' clinicians were invited for the clinicians' focus group. The School of Oral Health Sciences have not been involved before; however, an introductory training was provided to potential facilitators before they participated in the focus group for the school	All students and facilitators who participated in the events were invited	All final year students and all their lecturers were invited to collect data from a wider group of stakeholders.

Data collection method	The PI maintained a journal of experiences, ideas and reflections. Personal communications within the IPECP community both locally and internationally of practice informed the PI's perspective. The research team's critical prompting elicited reflection on conclusions of data analysis	Screened papers by topic, then abstract and then full text, for final inclusion.	Research assistant* conducted three focus group interviews with representatives of different schools. All groups were audio-recorded and transcribed verbatim. There were no names mentioned during audio-recording, so responses were anonymous	Research assistant* conducted five focus group interviews with representatives of different schools. All groups were audio-recorded and transcribed verbatim. There were no names mentioned during audio-recording, so responses were anonymous	All participants were encouraged to provide feedback via a Google form on Blackboard	Questionnaire based on results of focus groups and scoping review. All students and lecturers were encouraged to complete the survey. The survey was sent via core IPECP committee and student coordinators for distribution.
Data analysis	Critical reflection and critical reflexive analysis on events and data	Analysed quantitatively and qualitatively	Thematic analysis, with the use of NVivo	Thematic analysis, with the use of NVivo	Quantitative analysis of responses. Comments were analysed qualitatively	Quantitative analysis of responses. Comments were analysed qualitatively

** To avoid subordination, the research assistant holds a PhD in Occupational Therapy and is an independent researcher not linked to the university where the study was done.*

4.2 Conclusion

Chapter 4, with the included paper conveys contextual factors that needs consideration during the preparation for planning curriculum content. During planning the IPECP curriculum with students and lecturers from under-resourced communities, critical reflexion on their perspectives on possible solutions and challenges could be incorporated to make the exposure more authentic for all participants. Due to this critical reflexivity the direction of the development of the curriculum changed from a final year programme to the planning for a longitudinal, integrated curriculum. The conundrum of IPECP curriculum planning was addressed by spotlighting the specific angle provided from each of the four lenses when discussing aspects of the formal curriculum and of the teamwork between stakeholders. The critical reflection and critical reflexivity presented from the four lenses elucidated both the unique views as well as diverse and complimentary perspectives. It helped to focus the researcher's thoughts on what needed to be considered in planning the curriculum.

Chapter 5 will now report on the first part of Phase II of the research, the phase of curriculum development. The results of Phase I informed the data the research process required in Phase II. Phase I, especially chapter 4, provided a strong foundation for the IPECP curriculum.

Chapter 5 Curriculum map analysis

"*Sometimes it is not enough to do your best; you have to do what's required*."
Winston Churchill

5.1 Introduction to chapter 5

Chapter 5 is the first chapter that forms part of Phase II: input and output part of the logic model that guided the study. Phase I identified the factors that must be considered in planning an IPECP curriculum and provided a strong emphasis on tailoring the curriculum to the needs of the specific university. Chapter 5, the input section of the logic model, of phase 2 therefore presents a thorough investigation of what knowledge students already have when the IPECP curriculum is introduced. In the profession-specific teaching that could be the baseline for the IPECP curriculum? The research question related to Chapter 5 is: What content is available? The curriculum mapping analysis enabled the researcher to establish what Interprofessional Education Collaboration-core competencies, from here on referred to as IPEC-core competencies, students were already exposed to in their profession-specific subjects. The analysis of the IPEC-core competencies with the specific year levels is presented in paper 4. The rest of this chapter adds to the paper by presenting additional data that were not included in the paper but played an important role in guiding the IPECP curriculum. The additional aspects are topics, teaching methods, and assessment methods that are used in profession -specific teaching. This is presented in two parts. Part 1 of paper 4, analysed the curricula to identify where the IPEC core competencies were addressed as part of objective B1, the learning outcomes for each year level of study based on the specific IPEC core competencies for each year level. In Part 2, objective B2, the content, learning opportunities, and assessment plan. Chapter 5 therefore considers research question 2 that identifies how the content and structure could be developed. To achieve the objectives, the existing curriculum was analysed for IPECP opportunities in terms of common topics, work-integrated learning and teaching, and assessment methods.

5.2 Part 1: Introduction to paper 4

Paper 4 presents the curriculum mapping of the 11 health professions' curriculums at SMU. The results of the Phase 1: Situational Analysis, established the need for a formal IPECP curriculum and put forward that it be a stand-alone subject, yet the curriculums of all professions are already at or beyond the credit value recognised by the CHE and SAQA for each degree. Adding an additional subject would involve re-accreditation of professions from their professional body (such as the South African Nursing Council, the Health Professions Council of South Africa, and the South African Pharmacy Council); a process that is time consuming and human resource intensive. The alternate option that was thus explored was to investigate the opportunities and gaps in professions' current curricula to determine if and where the interprofessional education collaboration (IPEC) core-competencies are currently achieved (in part or full) in profession specific teaching.

The university mapped the curricula of the 11 professional degrees onto the Learning Opportunities, Objectives and Outcomes Platform (LOOOP), providing a comprehensive view of each professions' curriculum from first to final year. The curriculum maps include the exit level outcomes, learning objectives with their associated learning and assessment events and each objective mapped to the following education frameworks: The South African National Qualifications Framework, the Physician Competency Framework CanMEDS 2015 (Frank et al, 2015), the Medical Subject Headings Framework and the Critical Cross Field Outcomes (Remesh, 2017; Lipscomb, 2000). Review of each professions' curriculum through in-depth discussion with the IPECP representative and curriculum representative of each profession explored the specific shared curriculum topics as well as work-integrated-learning exposure which presented opportunities for IPECP participation between students of two or more professions.

Paper 4 focused on curriculum map analysis to identify the subjects that included learning events that contribute to the students' development of the IPEC-core-competencies and construct a map of the patterns, relationships, and gaps across the years of study and the degree programmes. However, the information contained in the analysis of common topics and communal subjects played an important part in the planning of the IPECP curriculum. The explanation of these elements is presented after the curriculum mapping paper at the end of this chapter.

Paper 4

Pitout, H, Ashton-Barnard, P, Adams, F and du Toit, S. Work smarter not harder: curriculum map analysis of Interprofessional Education Collaboration core-competencies across curricula.

This paper was submitted to the Scholarship of Teaching and Learning in the South journal for first review.

Title page for Scholarship of Teaching and Learning in the South (SOTL)

Title: Work smarter not harder: curriculum map analysis of Interprofessional Education Collaboration core- competencies across curricula.

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Work smarter not harder: curriculum map analysis of Interprofessional Education Collaboration core- competencies across curricula.

Abstract

An analysis of the curriculum maps of the eleven health care professions at a South African university, identified where Interprofessional Education Collaboration core-competencies were taught. The aim of the study was to identify opportunities to develop core-competencies for collaborative, longitudinal learning, as an evidence-based foundation for an interprofessional education and collaborative practice (IPECP) curriculum. The data collection tool was completed for all courses through in-depth consultation with two representatives from each profession. Findings indicated that existing curricula subjects incorporated IPEC core-competencies, especially the Values and Ethics core-competency. Teams and Teamwork was the least incorporated core-competency. IPEC sub-competencies common across professions within the year level of study were identified and essential, but under-represented sub-competencies, were highlighted. The extraction of multi-faceted information through curriculum map analysis is a pragmatic option for curriculum planners and lecturers responsible for IPECP implementation and offers a process for other sectors wishing to embark on IPECP.

Key words: curriculum mapping; IPEC core competencies; undergraduate curriculum; curriculum analysis; health professions education

Introduction

Interprofessional Education and Collaborative Practice (IPECP) is crucial to achieve the exit level outcome of dual identity of professional and interprofessional team member, for all health care profession (Khalili & Orchard, 2020). However, IPECP is typically considered a frustrating “add-on” in already over-full profession-specific curricula. Both students and lecturers often value profession-specific content over IPECP learning opportunities (Boyce et al., 2009) (Oandasan & Reeves, 2005).

Interprofessional education and collaborative practice (IPECP) includes both Interprofessional Education (IPE), where students learn with, from and about each other in an educational setting as well as the application of the knowledge during work-integrated learning opportunities where students work collaboratively (collaborative practice or CP) with students and health professionals from a variety of professions (WHO, 2010). Controversy remains over the most effective method for

IPECP curriculum development and implementation. It starts with how other subjects in students' curriculum are taught; that is uni-professionally, multi-professionally (where professions learn in parallel); or in interprofessional education where students learn with, from and about each other (Anderson et al., 2016; Brewer & Jones, 2013; G. C. Filies & Frantz, 2022). In addition, the dilemma between offering a stand-alone IPECP subject versus an integrated approach, where IPECP is addressed throughout the curriculum, requires critical decisions on the optimal methods to foster knowledge, skills and attitudes (Harden, 2000), in order to work smarter not harder. However, it is agreed that students need exposure to appropriate educational activities, whether class-based or during work-integrated learning, where the relevance to practice is overt (Greidanus et al., 2013). Thus, a shift from knowledge transfer to skill and competency development is needed.

It remains unclear exactly how IPECP can be optimally integrated and constructively aligned, in a competency-based educational approach, while fulfilling the needs of university management, lecturers and students (Lising et al., 2021; O'Keefe et al., 2017; Filies & Frantz, 2022). Different countries have developed different, but very similar competency frameworks required for interprofessional collaboration, including Interprofessional Capability Framework (United Kingdom), the National Interprofessional Competency Framework (Canada), the Core Competencies for Interprofessional Collaborative Practice (United States), and the Curtin University Interprofessional Capability Framework (Australia) (Thistlethwaite et al., 2014). The most commonly implemented is the core-competencies for Interprofessional Collaborative Practice (Interprofessional Education Collaborative, 2016) that was used in the analysis in this paper. The four main Interprofessional Education Collaborative (IPEC) core-competencies are Values and Ethics (VE), Roles and Responsibilities (RR), Interprofessional Communication (CC) and Teams and Teamwork (TT). Each of these IPEC core-competencies has between eight and eleven sub-competencies (see appendix A) with each sub-competency referred to herein by the core-competency abbreviation with the sub-competency number e.g., the first Values and Ethics sub-competency is VE1. (see addendum 1)

The IPEC core-competencies mapped and matched to the learning objectives and assessments, should contribute to shifting the focus from mere knowledge transfer to skill and competency development (G. C. Filies & Frantz, 2022; Neiworth et al., 2014). The use of IPEC core-competencies to drive curricular planning has several advantages, including use of a common language, clarity, open dialogue between professions, collaboration between educators, accountability, creates a guide for assessment, informs interprofessional learning, and ensures relevance to practice (O'Keefe et al., 2017); (Rhoda, 2016). Through mapping the IPEC core-competencies against the subjects offered in the different professions, identification of what (Barr, 1998) refers to as common, as well as collaborative competencies is elucidated. These common and collaborative competencies are dependent on the equally important complementary competencies included in profession-specific teaching, where the unique contributions of professions are taught.

Curriculum mapping, originally introduced by (English, 1980) and also applied to IPECP by others (Bridges & Hanson, 2012; Langlois, 2016; Masava et al., 2022; Murphy et al., 2018), could contribute to the identification, development, review, improvement and refinement of IPECP curricula (Al-Eyd et al., 2018). A curriculum map's benefit is that curriculum information is presented from multiple viewpoints which illuminate the relationships between key curriculum elements e.g., subjects, learning outcomes and assessment (Steketee, 2015); (Sharma et al., 2020). When curriculum planners compare the curriculum map information from different professions, it allows them to visualize the overlap between different professions curricula, which could stimulate deliberations of where IPECP

can most effectively be situated across the university's professional programmes. This was an objective of the current study, partially reported on in this paper.

A web-based curriculum mapping platform, Learning Opportunities, Objectives and Outcomes Platform (LOOOP) designed by Charité Universitätsmedizin Berlin, Germany, is a tool designed to facilitate the curriculum mapping process and generates reports from custom filters to provide a synopsis of the overlaps and gaps between professions' curricula (Balzer et al., 2016; Treadwell et al., 2019). Although LOOOP maps to different competency frameworks e.g., CanMEDS core competencies, Medical Subject Headings, National Qualifications Framework, Critical Crossfield Outcomes and exit level outcomes, a current limitation to the implementation of LOOOP in IPECP is that it does not yet map to the IPEC competency framework.

The current study was conducted at a public South African university. Four of the health science schools participated in IPECP, covering the following professional undergraduate degrees: occupational therapy, physiotherapy, human nutrition and dietetics, speech language pathology and audiology, nursing, medicine, radiography, pharmacy, dentistry, oral hygiene and dental therapy. The undergraduate curricula of these professions have been fully mapped on LOOOP since 2019 providing a basis for comparing professions' curricula.

The current study aimed to identify the optimal opportunities to develop IPEC core-competencies for collaborative, longitudinal learning, in an integrated IPECP curriculum across the eleven existing undergraduate curricula. As one of the steps in the development the curricula were mapped to identify the optimal opportunities to develop IPEC core-competencies for collaborative, longitudinal learning, in an integrated IPECP curriculum across the eleven existing undergraduate curricula. A curriculum analysis provided a synopsis of the overlaps and gaps between professions' curricula. All subjects in the profession's curriculum where aspects of core-competencies and sub-competencies were included were identified and these subjects were for the purpose of this paper called ICC subjects. The purpose of the analysis was not to establish to what extent the core-competencies and sub-competencies were taught but rather to identify subjects where students had exposure to IPEC core-competencies and sub-competencies in their profession-specific subjects, which could then be used as baseline in planning the IPECP curriculum. The limited time and resources available for IPECP need to be optimised, instead of developing the curriculum assuming that it is students first and only exposure to IPEC core-competencies and sub-competencies. This was achieved by curriculum map analysis to:

- overview the eleven professions' curricula in terms of number of credits, year of study, and number of subjects,
- identify subjects within each profession that incorporated the IPEC core-competencies (ICC-subjects)
- establish the frequency of IPEC core- and sub-competencies incorporated in ICC-subjects across professions and per year level of study,
- identify the gaps of IPEC core- and sub-competencies that are not well represented in the existing professions curricula, and
- identify priority IPEC sub-competencies for undergraduate students per year level of study.

The anticipated outcome of the curriculum map analysis of the eleven professions is an evidence-based foundation for the development of an integrated IPECP curriculum that uses resources more effectively and prepares practice-ready graduates, by working smarter not harder.

Method

A curriculum analysis provided a synopsis of the overlaps and gaps between professions' curricula.

Research design

A quantitative, cross-sectional, descriptive design directed the curriculum analysis of the eleven undergraduate profession's curriculum maps, similar to Langlois (2016).

Data collection instrument

An electronic data collection instrument was developed using the Research Electronic Data Capture (REDCap) software hosted by the University of the Witwatersrand (Harris et al., 2019; Harris et al., 2009). REDCap is a secure online platform developed specifically for individualized instrument design, data collection and data management within health sciences by Vanderbilt University.

The instrument consisted of two forms: a general curriculum information form and a linked repeating subject-specific form. The general curriculum information form gathered information on the duration in terms of years of study and the allocated credits in terms of the notional hours of study for the professional undergraduate degrees. The subject-specific form captured the number of credits, year level of study, whether it is a profession-specific subject, and the details of the IPEC core-competencies and sub-competencies for the ICC-subjects (as identified through branching logic). ICC-subjects are a subset of the subjects in each profession that have content or learning experiences that can be considered to develop the foundational knowledge of the IPEC core-competencies.

Data collection process

The principal investigator consulted with two representatives from each profession. One representative was a profession-appointed member of the university IPECP committee, responsible for implementing existing IPECP activities. The second representative was the school Curriculum committee member; these members are mainly responsible for curriculum matters in the professions and were involved in the LOOOP curriculum mapping process for their profession. During the consultation, the principal investigator completed the data collection instrument for each profession. The curriculum maps on LOOOP and the representatives' knowledge and experience of IPECP and their profession, formed the primary data sources. Purposive sampling was used with representatives of different professions – as indicated both the person responsible for the curriculum as well as the person coordinating IPECP in the profession. This was a document analysis assisted by the profession's representatives and not seeking their opinions only clarification on existing documentation. Thus, coercion is not applicable. Each consultation lasted on average two hours. The researcher had access to these documents as a factor of her involvement in both the LOOOP project and the IPECP project. Access to LOOOP for all professions were granted by the person who coordinated the uploading of LOOOP information. The school calendars are open access documents available to all staff and students.

Secondary data sources to ensure validity of the results included verification by colleagues, information available on LOOOP, information available in school calendars and review of supporting university policy and procedure documents.

Study reliability was ensured through the principal investigator repeating the study method consistently with each of the professions' representatives; clarifying where necessary to ensure consistent understanding of the variables of data captured for each subject. While this could be considered a possible source of bias, the data being captured was what exists in the curricula rather than personal interpretations.

Data analysis

The general curriculum information data were documented as an overview across the professions. Descriptive statistics were used to analyse data from the from the subject-specific form. Data were exported from REDCap to Excel and were analysed using pivot tables. The IPEC core-competencies and sub-competencies of the professional curricula were compared to identify the frequency per year and per profession.

Results

Overview of the professions' curricula and percentage of ICC-subjects

A summary of the professions from the general curriculum form, including number of subjects, credits, and year level of study, is presented in table 1. All eleven professions collectively covered a total of 356 subjects, of which 195 (54.8%) were ICC-subjects, even though these subjects are not taught interprofessionally. Three ICC-subjects were common to all professions, namely English for Health Professionals, Psychology and Research Methodology. There are several other common subjects e.g., Anatomy, Basic Sciences and Pharmacology, but representatives agreed that these subjects did not incorporate IPEC core-competencies (i.e., were not ICC-subjects).

Data from Pharmacy and Occupational Therapy indicated that most of the subjects taught in these professions were ICC-subjects (20, 80% and 22, 78.6% respectively), while data gathered from Speech Language Pathology and Audiology indicated that only 21 (38%) of the 55 subjects were ICC-subjects.

Table 1. Overview of the professions and percentage of ICC-subjects

School	Profession	Overall credits	Number of years of study	Number of subjects in the profession	Number of ICC-subjects (%)
Health Care Sciences	**Occupational Therapy**	480	4	28	22 (78.6)
	Nursing	512	4	37	22 (59.5)

	Human Nutrition and Dietetics	512	4	28	20 (71)
	Physiotherapy	512	4	20	12 (60)
	Speech Language Pathology and Audiology	512	4	55	21 (38)
Medicine	**Radiography**	540	4	28	13 (46)
	Medicine	920	6	41	23 (49)
Oral Health Sciences	**Dentistry**	804	5	41	19 (46)
	Dental Therapy	356	3	26	12 (46)
	Oral Hygiene	364	3	27	11 (41)
Pharmacy	**Pharmacy**	502	4	25	20 (80)

Frequency of core-competencies incorporated in the professions' curricula

The Values and Ethics (VE) core-competency was incorporated in the majority of the ICC-subjects in all eleven professions (percentage of ICC-subjects within a profession that incorporated the VE core-competency), while seven of the professions indicated the Teams and Teamwork (TT) core-competency as the least frequent of the four core-competencies (figure 1).

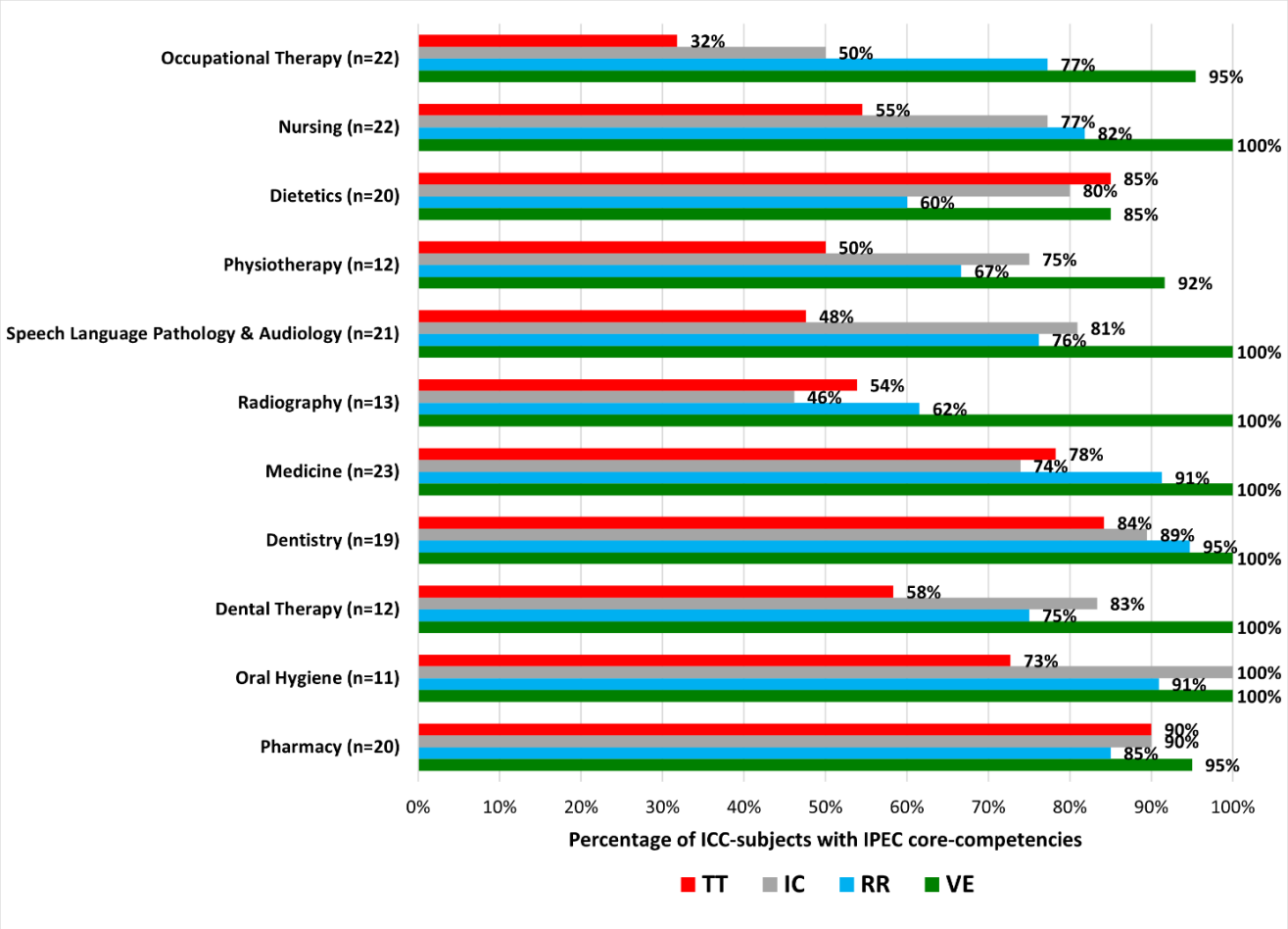

Figure 1 Percentage of ICC-Subjects incorporating IPEC core-competencies per profession

IPEC sub-competencies representation

The representation of each sub-competency of the four IPEC core-competencies were investigated both in terms of number of ICC-subjects representing each sub-competency within each core-competency and the number of professions representing each sub-competency within each core-competency per year level of study. The Table 2 thus provides details on two aspects, firstly the number of ICC-subjects that incorporate each of the thirty-nine IPEC sub-competencies and secondly details on the number of professions for each year level that incorporate each IPEC sub-competency.

Table 2. The representation of sub-competencies in terms of ICC-subjects per IPEC core-competency and professions per year level.

Core-competency Year level		**Sub-competency** *** Number of ICC-subjects per core-competency (%)** ** Number of professions per year level (%)											**Overall distribution** ***ICC-subjects** ******Professions	
Values and Ethics		**VE1**	**VE2**	**VE3**	**VE4**	**VE5**	**VE6**	**VE7**	**VE8**	**VE9**	**VE10**		Mean (m)	Range (%)
***ICC-subjects**		**108 (55)**	**11 (59)**	**128 (66)**	**98 (50)**	**98(50)**	**119 (61)**	**103 (53)**	**108 (55)**	**115 (59)**	**21 (11)**		**101.2**	**21-128 (11- 66)**
**Year level	1 (n=11)	11 (100)	7 (64)	11 (100	3 (27)	4 (36)	9 (82)	4 (36)	5 (45)	10 (91)	1 (9)		6.5	1-11 (9-100)
	2 (n=11)	9(82)	10 (91)	10 (91)	9 (82)	8 (73)	11 (100	9 (82)	6 (55)	10 (91)	1 (9)		8.3	1-11 (9-100)
	3 (n=11)	10 (91)	10 (91)	11 (100	9 (82)	9 (82)	11 (100	10 (91)	11 (100	11 (100	2 (18)		9.4	2-11 (18-100)
	4 (n=9)	7 (78)	9 (100	9 (100	7 (78)	8 (89)	9 (100	9 (100	9 (100	9 (100	3 (33)		7.9	3-9 (33-100)
	5 (n=2)	2 (100)	2 (100	2 (100	2 (100	2 (100	2 (100	2 (100	2 (100	2 (100	2 (100		2	2-2 (100-100)
	6 (n=1)	1 (100)	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100		1	1-1 100-100)
Roles and Responsibilities		**RR1**	**RR2**	**RR3**	**RR4**	**RR5**	**RR6**	**RR7**	**RR8**	**RR9**	**RR10**		Mean(m)	Range (%)
***ICC-subjects**		**103 (53)**	**144 (74)**	**63 (33)**	**72 (37)**	**59 (30)**	**76 (39)**	**32 (16)**	**11 (6)**	**49 (25)**	**95 (49)**		**70.5**	**11-144 (6-74)**
** Year level	1 (n=11)	7 (64)	100 (91)	3 (27)	3 (27)	1 (9)	3 (27)	0 (0)	0 (0)	1 (9)	7 (64)		3.5	0-10 (0-91)

	2 (n=11)	9 (82)	11 (100	4 (36)	6 (55)	4 (36)	6 (55)	4 (36)	I (9)	5 (45)	7 (64)		5.7	1- 11 (9-100)
	3 (n=11)	10 (91)	11 (100	10 (91)	8 (73)	9 (82)	9 (82)	5 (45)	2 (18)	7 (64)	10 (91)		8.1	2-11 (18-100)
	4 (n=9)	8 (89)	9 (100	8 (89)	7 (78)	8 (89)	7 (78)	6 (67)	3 (33)	7 (78)	9 (100		7.2	3-9 (33-100)
	5 (n=2)	2 (100)	2 (100	1 (50)	2 (100	1 (50)	2 (100	0 (0)	0 (0)	1 (50)	2 (100		1.3	0-2 (0-100)
	6 (n=1)	1 (100)	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100		1	100 (100-100)
***Interprofessional Communication**		**CC1**	**CC2**	**CC3**	**CC4**	**CC5**	**CC6**	**CC7**	**CC8**					
***ICC-subjects**		**110 (56)**	**11 (56)**	**62 (32)**	**130 (67)**	**71 (36)**	**116 (59)**	**76 (39)**	**68 (35)**				**92.9**	**62-130 (32-67)**
**Year level	1 (n=11)	11 (100)	11 (100	1 (9)	11 (100	3 (27)	11 (100	10 (91)	2 (18)				7.5	1-11 (9-100)
	2 (n=11)	7 (64)	8 (73)	5 (45)	10 (91)	5 (45)	9 (82)	4 (36)	5 (45)				6.6	4-10 (36-91)
	3 (n=11)	9 (82)	10 (91)	7 (64)	11 (100	6 (55)	10 (91)	7 64)	7 (64)				8.4	6-11 (55-100)
	4 (n=9)	7 (78)	8 (89)	7 (78)	8 (89)	6 (67)	8 (89)	7 (78)	7 (78)				7.3	6-8 (67-89)
	5 (n=2)	2 (100)	2 (100	2 (100	2 (100	2 (100	2 (100	2 (100	2 (100				2.0	2-2 (100-100
	6 (n=1)	1 (100)	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100				1.0	1-1 (100-100)

* Teams and Teamwork		TT1	TT2	TT3	TT4	TT5	TT6	TT7	TT7	TT9	TT10	TT11		
***ICC-subjects**		**31 (16)**	**77 (40)**	**75 (38)**	**67 (34)**	**78 (40)**	**81 (42)**	**90 (46)**	**89 (46)**	**15 (8)**	**23 (12)**	**85 (44)**	**64.6**	**15-90 (8-46)**
****Year level**	1 (n=11)	3 (27)	1 (9)	1 (9)	1 (9)	2 (18)	2 (18)	1 (9)	3 (27)	0 (0)	1 (9)	2 (18)	1.5	0-3 (0-27)
	2 (n=11)	4 (36)	5 (45)	7 (64)	5 (45)	3 (27)	4 (36)	7 (64)	8 (73)	2 (18)	1 (9)	6 (55)	4.7	1-8 (9-73)
	3 (n=11)	4 (36)	8 (73)	9 (82)	7 (64)	9 (82)	9 (82)	10 (91)	9 (82)	3 (27)	3 (27)	9 (82)	7.4	3-10 (27 – 91)
	4 (n=9)	3(33)	9 (100	7 (78)	7 (78)	8 (89)	8 (89)	8 (89)	8 (89)	2 (22)	3 (33)	8 (89)	6.5	2-9 (22-100)
	5 (n=2)	0 (0)	2 (100	2 (100	2 (100	2 (100	2 (100	2 (100	2 (100	1 (50)	0 (0)	2 (10)	1.5	0-2 (0-100)
	6 (n=1)	0 (0)	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100	1 (100	0 (0)	0 (0)	1 (100	0.7	0-1 (0-100)

***Core-Competencies:** *Number of ICC-subjects incorporating each IPEC sub-competency per core-competency. Not all core competencies have the same number of sub-competencies.* **Year level of study: *The number of professions incorporating IPEC sub-competencies in each year level of study.*

Values and Ethics remained the most represented of the four core-competencies when considering the frequency of the VE sub-competencies incorporated in the ICC-subjects (m=101.2). The core-competency with the lowest representation was Teams and Teamwork (m = 64.6). The Interprofessional Communication core-competency differed from the other core-competencies in that it was relatively well represented in all the CC sub-competencies indicated by the narrow range and high representation in the ICC-subjects (62-130, 32%-67%; m=92.9). The Roles and Responsibilities sub-competency two (RR2) was most frequently represented sub-competency; represented in 144 (74%) of the ICC-subjects and in 91% of the professions in the first-year level of study and in all (100%) professions' year levels from the second-year level of study.

Discussion

Summary of findings

The curriculum map analysis clearly highlighted opportunities for IPECP through identifying both commonalities and gaps between professions' curricula in terms of addressing IPEC core-competencies. The results indicate that uni-professional teaching contributes to the development of the knowledge foundation for IPEC competence, however, lack the element of interprofessional engagement needed to develop the skill and attitude domain experience for graduate level IPEC competence.

During the analysis of the professions' degree programmes, it became clear that professions are already using more than the maximum level of credits (480 credits for 4 years) subsidized by, at this university, the Department of Higher Education, e.g., Radiography has 540 credits for a 4-year programme (Table 1). Professions were thus averse to the addition of a new credit-bearing subject, which will necessitate the professions to apply for re-accreditation from the professions' statutory bodies and university's management. While the number of subjects in each professional programme differs, all eleven professions have ICC-subjects that incorporate existing content that is foundational to developing the IPEC core-competencies (range: 38% to 80% of subjects in a programme). Across professions 195 ICC-subjects were identified. A possible explanation is that all these professions are health sciences and many of the core competencies are relevant to professional behaviour, as well as part of the professional and/or accreditation requirements. Some of the core competencies are aligned with the general philosophy of health sciences.

The IPEC competence foundation in the current curriculum can be leveraged to help students apply what they know already from profession- specific subjects, in an interprofessional context. In developing an integrated IPECP curriculum for all professions from first to final year, we sought to identify the distribution of IPEC core-competencies (figure 1) across the professions and sub-competencies (table 2) longitudinally across each year level of study. The design of the IPECP curriculum could be supported by drawing on the IPEC core- and sub-competencies that already have a knowledge foundation in all professions. It was further imperative to identify IPEC sub-competencies with low frequency that are deemed vital to achieving the competence required of undergraduate health professional students yet were not included in uni-professional teaching. Contrarily, there were some low frequency IPEC sub-competencies excluded from the curriculum as they are competencies that typically only develop in qualified practitioners, as explained in more detail in the analysis of each core competency. These competencies therefore need not be considered during the development of an IPECP curriculum for undergraduate students.

Values and Ethics Core-Competency

Values and Ethics core- competency was the predominant core-competency evident across all professions, incorporated in more than 80% of ICC-subjects per profession. This is an expected result as at the heart of being a health professional, is being able to understand one's own values and those of our patients, respecting diversity and promoting health equity (Interprofessional Education Collaborative, 2016). Ethical practise is essential as evidenced by the existence of points of a separate category of continuous professional development dedicated to ethics and unethical practise can result in legal consequences (Maharaj, 2013). Another possible explanation for why Values and Ethics are so well represented is that it is also evaluated as part of the accreditation of all professions.

The ten Values and Ethics sub-competencies are evident in a mean of 101.2 of the ICC-subjects. When considering the year levels, VE3, VE6 and VE9 are evident in almost all years of study of all professions and serves to develop relationships from a values-based perspective, which can be taught and practiced in isolation within a profession before acting interprofessionally. The development of the skill and attitude domains of most of the VE sub-competencies are dependent on the students' experience during work integrated learning, which in most professions only occurs in the senior years of study, particularly evident in VE2, VE7 and VE8. Values and Ethics, for example VE1 and VE 2, are shown to be incorporated across all years and forms the basis for future years. Koehn and Charles (2019) reported that in their study participants indicated that these competencies were foundational

and a core value. All eleven professions indicate that VE1 is evident in the first-year level, but it is likely that this is more from a theoretically taught perspective, thus creating opportunities to apply this knowledge is important for an IPECP curriculum across the year levels. VE4 and VE5 depend on exposure to interprofessional teams (Busenhart, 2014) in order to develop respect and cooperation, which further supports the development of an IPECP curriculum across the year levels (Filies & Frantz, 2021). The low representation of VE10 is expected due to the criterion of maintaining professional competence which is expected after graduation.

Roles and Responsibilities Core-Competency

The Roles and Responsibilities core-competency was well-incorporated across the professions but the lowest focus on the core-competencies was found in Dietetics (60% of 20 ICC-subjects) and Pharmacy (85% of 20 ICC-subjects). The ten Roles and Responsibilities sub-competencies are evident in a mean of 70.5 of the ICC-subjects. The sub-competencies of RR1, RR2 and RR10 are evident in most of the professions across all year levels. These sub-competencies can be taught on a knowledge level from the first year of study with increased application in the later years. RR3, RR4, RR5, RR6 and RR9 develop more in the senior years as these are more dependent on opportunities for interprofessional clinical engagement. The expectation for competence in RR7 and RR8 is unrealistic at the undergraduate level. The Roles and Responsibilities core-competency develops in the early years of study as professional identity and through the IPECP curriculum development where the dual identity of professional and team member should be cultivated (Khalili & Orchard, 2020). According to the priorities identified by O'Keefe et al., (2017, p.466), "explain interprofessional practice to patients, clients, families and other professionals" similar to RR1 and "describe the areas of practice of other health professions" similar to RR4 are amongst the eight most important competencies to achieve in an interprofessional learning.

Interprofessional Communication Core-Competency

Interprofessional Communication is a competency that requires continued learning and reinforcement throughout all levels of study (Busenhart, 2014). The Interprofessional Communication core-competency was also generally well incorporated across the professions and even though it is more prevalent in first year, has potential to be applied in consecutive years. Interprofessional Communication was the lowest evident of the core-competencies in Radiography (46% of 13 ICC-subjects) and Medicine (74% of 23 ICC-subjects). The eight Interprofessional Communication sub-competencies were evident in a mean of 92.9 of the ICC-subjects. One of the possible reasons why Interprofessional Education is prevalent in first year, is in the first year of study all the professions have English for Health Professionals and Psychology, which likely ensures that CC1, CC2, CC4 and CC6 are evident in the first-year level for all professions. A possible reason for this is that both content and teaching methods, such as group discussion, used contribute to the development of communication skills. Busenhart (2014) also found these sub-competencies appropriate for beginning learners. CC2 and CC3 are also amongst the eight competencies emphasized by O'Keefe et al., (2017 p.466) where the importance of "express professional opinions competently, confidently, and respectfully avoiding discipline specific language" is captured. When considering CC3 and CC7 there is some dependence on the development of the Roles and Responsibilities core-competency, while CC5 and CC8 requires experience of Teams and Teamwork to develop, as students need knowledge on the roles and responsibilities of the different team members (Cerbin-Koczorowska et al., 2019). It is thus important

that the IPECP curriculum is developed in a way that integrates Interprofessional Communication with the Roles and Responsibilities and Teams and Teamwork related learning events.

Teams and Teamwork Core-Competency

The least incorporated in seven of the professions was the Teams and Teamwork core-competency, particularly noted in Occupational therapy (32% of the 22 ICC-subjects). The eleven Teams and Teamwork sub-competencies are evident in a low mean of 64.6 of the ICC-subjects. There is also limited evidence of the Teams and Teamwork sub-competencies in the first-year level across the professions possibly due to the focus on foundational science subjects and the fundamental knowledge and skills of the profession. The foundational knowledge, skills and attitudes needed to develop TT7 can be taught uni-professionally and with dependency on the development of the Roles and Responsibilities core-competency as indicated by being evident in 46% of the ICC-Subjects. The TT8 sub-competency develops from year 1 (27% of professions) and year 2 (73% of professions) through small group learning where the sub-competency focuses on reflection of individual and team performance; a competency that can develop skill uni-professionally to leverage in a new IPECP curriculum. Busenhart (2014) found that only TT1 and TT8 were considered as competencies appropriate for beginners, as supported in this study for TT8. The TT1 sub-competency, "Describe the process of team development and the roles and practices of effective teams", was, however, sparsely evident across the year levels of the professions, despite being a foundational sub-competency. Professions should be made aware of the need to address the knowledge domain of TT1 as part of profession-specific teaching, with focus on the skills and attitudes reflective of TT1 integrated into the new IPECP curriculum from first to final year. Similar essential Teams and Teamwork sub-competencies are TT4, TT6 and TT11, with TT2 having dependence on the Values and Ethics core-competency. The Teams and Teamwork sub-competencies that are not relevant at the undergraduate level are TT9 and TT10.

It is strongly evident that the Teams and Teamwork core-competency was least incorporated during profession-specific teaching in the existing curricula, leaving a competency gap with little to leverage towards the planning of the IPECP curriculum. However, the development of the IPECP curriculum across the year levels holds the potential to address the gap in Teams and Teamwork by shining a spotlight on the essential TT sub-competencies within the uni-profession teaching and during the IPECP year-level learning activities where students do all activities in interprofessional teams.

Implications for the development of an IPECP curriculum

In planning an IPECP curriculum the focus needs to remain on what is different from profession-specific knowledge (O'Keefe et al., 2017) and to demonstrate to lecturers and students, the added value of opportunities to incorporate the skills and attitudes IPECP offers, to profession-specific subjects (Khanna et al., 2021). Therefore, the main intention of the curriculum mapping was to understand what students in different professions are exposed to prior to engagement in IPECP, to provide a framework to support evidence-based decision making on the development of an IPECP curriculum. The curriculum map analyses further point out the learning trajectory of achieving outcomes (Wijngaards-de Meij & Merx, 2018) and this helps in alignments of the IPECP curriculum development with the professions' curricula, to work smarter and not harder by using the content that students engage with in their professions as basis for the IPECP curriculum. Evidence from curriculum map analysis can further contribute to quality assurance during implementation (Langlois, 2016).

Through curriculum map analysis, it is possible to visualize the overlap between different professions' curricula and to establish where IPECP can most effectively be situated. The curriculum map analysis further identified to what extent students from different professions are prepared in their own professions in terms of IPEC sub-competencies as well as the sequence of development of competencies across year levels. It is not possible for an IPECP curriculum to address all IPEC core competencies (Brashers et al., 2019). The IPECP curriculum needs to convey coherence of various curricular elements, for example the gradual increase in competence, as seen in achievement of specific IPEC core-competencies, through the years. The curriculum map analysis could help to prioritise specific sub-competencies for a year level to guide outcomes, formulation of learning objectives, educational activities, and year level themes of IPECP curriculum.

The curriculum map analysis in the current study identified the current profession-specific and multi-professional learning opportunities that could form the basis of interprofessional learning. A multi-professional approach (students brought together to learn in parallel) is at times more efficient and effective than presenting content in an interprofessional manner as parallel learning is less time and resource intensive (Thistlethwaite et al., 2010). At the university subjects such as Anatomy and Physiology are presented in a multi-professional manner, similar to what Barr et al. (2014) found when investigating Anatomy and Physiology integration in Interprofessional Education, and even though most professions included it in their curriculum, these two subjects were not seen by representatives in this study as subjects that could be included in fostering IPEC core-competencies as student mainly learn in a multi-professional approach and subject content do not lean itself to students learning from and about each other. However, Thistlethwaite et al., (2015) reported that specific Interprofessional Communication competencies could be fostered during subjects such as Anatomy (such as CC1, CC4, CC5 and CC6).

Transfer of learning occurs when the connection to earlier experiences is clear to the student resulting in activation of existing knowledge, opening to opportunities to engage with new information, to demonstrate competence and for real world application (Botma et al., 2013). In planning an IPECP curriculum it is therefore important to demonstrate how content from one year level, builds onto the next (Patel Gunaldo et al., 2017), and to ensure to demonstrate a clear link between prior knowledge, new knowledge and the opportunity for developing competence in terms of attitude and skills, through application in patient-centered care (Botma et al., 2013; Frantz & Rhoda, 2017). Through identification of specific core-competencies incorporated on each year level, the planning of IPECP curriculum outcomes and activities can be more accurately and scientifically matched to what students are exposed to in profession-specific teaching.

Limitations

Curriculum maps hosted within the LOOOP platform currently do not map to the IPEC core-competency framework, and it was found that the mapped professional core-competency framework was not directly compatible. While the platform is agile to the addition of other mapping elements the process for this study would have been streamlined if it were a simple matter of creating LOOOP report queries to draw the cross-curricula data. The LOOOP curriculum maps formed the baseline data source but a curriculum and IPECP representatives from each profession was required to assist in extracting the IPEC core-competency data.

Distinguishing between IPEC core-competencies is not straightforward as there is overlap between competencies e.g., ethics is incorporated in all four core-competencies. The formulation of the IPEC

core-competencies is also complex as it includes several aspects (phrases) of which only some part applies, creating a possibility that it may be either included or excluded depending on how the representatives interpreted it. The representatives strived to identify the main intention of the sub-competency when indicating if the sub-competency was addressed in a subject. Therefore, the identification of IPEC core-competencies by the representatives may have unintentionally skewed some results.

Conclusion

The analysis of the curriculum maps of all eleven involved professions recognised that existing undergraduate content and learning experiences could be used as a knowledge foundation on which to harness the development of the skills and attitudes required for developing the IPEC core-competencies for practice. Through the deliberate identification of IPEC core-competencies and sub-competencies, the current study specified where in the existing curricula in terms of year level of study there is commonality across the professions as well as elucidating the gaps where the foundation for essential IPEC sub-competency development is lacking. In doing so, planning an IPECP curriculum across the year levels of study for the eleven professions at this South African university becomes efficient in terms of time use for IPECP curriculum implementation. It further recognises that while there is evidence of IPEC core-competency knowledge development within the current curricula, a dedicated IPECP curriculum to develop skills and attitudes is vital, as uni-professional teaching alone cannot address the full IPEC core-competency achievement. Although the paper reports on the curriculum map analysis of a particular university, because the information in terms of at what year level of study individual IPEC core- and sub-competencies are typically incorporated, the study results could be valuable for planning an integrated and longitudinal programme at other universities when "add-on" IPECP events are insufficient for graduate competency achievement. Health professional degree programs follow a similar curricular structure, making the IPEC competency breakdown presented in this paper the evidence base to improve the feasibility of new curriculum development for IPECP at universities where currently no IPECP is offered.

Curriculum map analysis is a unique approach to fostering interdisciplinary and/or multi-disciplinary intra- and inter-sectoral education. The workplace-ready professional needs to be equipped with the skills to act in the dual role of professional and team member irrespective of profession sector. The authors propose that while IPECP is a critical service optimisation tool within the health sector, there is little priority given to teaching these competencies in other professional degree programs. Curriculum map analysis could be used by curriculum designers and implementers to plan an evidence-based curriculum that can address the gaps and leverage curricular commonalities, to work smarter rather than harder.

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Addendum 1: IPEC competencies and sub-competencies

Code	IPECP core competency
Values and Ethics sub competency	
VE1	Place interests of patients and populations at centre of IP health care delivery and population health programs and policies, with the goal of **promoting health and health equity** across the life span
VE2	Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care
VE3	Embrace cultural **diversity** and individual **differences** that characterize patients, populations and the health team.
VE4	Respect unique cultures, values, roles/responsibilities and expertise of other health professions and the impact of these factors can have on health outcomes.
VE5	Work in cooperation with those who receive care, provide care and others who contribute to or support the delivery of prevention and health services and programmes.
VE6	Develop a trusting relationship with patients, families and other team members
VE7	Demonstrate high standards of ethical conduct and quality of care in contributions to team-base care.
VE8	Manage ethical dilemmas specific to interprofessional patient/population centered care situations
VE9	Act with honesty and integrity in relationships with patients, families, communities and other team members
VE10	Maintain competence in one's own profession appropriate to scope of practice
	Roles and Responsibilities
RR1	Communicate one's roles and responsibilities clearly to patients, families, community members and other professionals.
RR2	Recognize one's limitations in skills, knowledge and abilities
RR3	Engage diverse professionals who complement one's own professional expertise, as well as associated resources, to develop strategies to meet specific health and healthcare needs of patients and populations.
RR4	Explain the roles and responsibilities of other providers and how the team works together to provide care, promote health and prevent disease.

RR5	Use the full scope of knowledge, skills and abilities of professionals from health and other fields to provide care that is safe, timely, efficient, effective and equitable.
RR6	Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.
RR7	Forge independent relationships with other professions within and outside of the health system to improve care and advance learning.
RR8	Engage in continuous professional and interprofessional development to enhance team performance and collaboration.
RR9	Use unique and complimentary abilities of all members of the team to optimize health and patient care.
RR10	Describe how professionals in health and other fields can collaborate and integrate clinical care and public health interventions to optimize population health.
	Interprofessional Communication
CC1	Choose effective communication tools and techniques, including information systems and communication technologies, to facilitate discussions and interactions that enhance team function.
CC2	Communicate information with patients, families, community members and health team members in a form that is understandable, avoiding discipline-specific terminology when possible.
CC3	Express one's own knowledge and opinion to team members involved in patient care and population health improvements with confidence, clarity and respect, working to ensure common understanding of information, treatment, care decisions and population health programs and policies.
CC4	Listen actively and encourage ideas and opinions of other team members.
CC5	Give timely, sensitive, instructive feedback to others about their performance on the team, responding respectfully as a team member to feedback of others.
CC6	Use respectful language appropriate for a given difficult situation, crucial conversation or conflict.
CC7	Recognise how one's uniqueness contributes to effective communication, conflict resolution, and positive interprofessional working relationships.
CC8	Communicate the importance of teamwork in patient-centered care and population health programmes and policies.
	Team and teamwork
TT1	Describe the process of team development and the roles and practices of effective teams.
TT2	Develop consensus on the ethical principles to guide all aspects of teamwork.
TT3	Engage health and other professionals in shared patient-centered and population-focused problem solving.
TT4	Integrate the knowledge and experience of health and other professions to inform health and care decisions, while respecting patient and community values and priorities /preference for care.
TT5	Apply leadership practices that support collaborative practice and team effectiveness.

TT6	Engage self and others to constructively manage disagreements about values, roles, goals and actions that arise among health and other professionals and with patients, families and community members.
TT7	Share accountability with other professions, patients and communities for outcomes relevant to prevention and health care.
TT8	Reflect on individual and team performance for individual as well as team performance improvement.
TT9	Use process improvement to increase effectiveness of interprofessional teamwork and team-based services, programs and policies.
TT10	Use available evidence to inform effective teamwork and team-based practices.
TT11	Perform effectively on teams and in different team roles in a variety of settings

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As mentioned in the introduction to chapter 5, the curriculum map analysis that explored the common topics and work-integrated learning opportunities, were not included in the paper in order to keep the paper concise. The analysis further included information on teaching and assessment methods. The following section therefore presents the results and discussion of the curriculum map analysis data that were

gleaned during the data collection process detailed in paper 4, using the same research methods and informed by the same literature.

5.3 Part 2: IPECP opportunities in the existing curricula

Results that Augment Paper 4

5.3.1 Curriculum Map Analysis of Common Topics

Table 5.1 provides details on the topic categories, topics, number of professions where each topic is included and year levels of study where topics are mainly covered. During the preparation for the analysis of the professions' curriculums, it was noticed that some topics seem to be commonly presented in different professions. The majority of these topics were also aligned to the exit level outcomes for the professions involved, for example "Develop relevant research themes" and "Demonstrate appropriate management skills". Langlois (2016) who did an IPECP curriculum analysis exercise, reported on topics covered by all professions, which informed this section of the data collection instrument. The topics were grouped into five main categories: Service Management, Basic Ethics, Research and Evidence Based Practice, Professionalism, and Health. During the consultations with the representative from each profession, they indicated if the specific topic within each category was taught in their profession. The following table summarizes the analysis:

Table 5.1 Curriculum map analysis of topics and year levels of study

Categories and topics in each	**Number of professions (with %) where topic is included**	**Year level of study and number of professions (%) where topic was <u>mainly covered.</u>** Please note that in calculation it is considered that there are only nine professions with a 4-year degree or longer. Two professions have only 3-year degrees	**Suggested year level of study to include in Interprofessional Teaching**
Category 1: Service management			
1.1 Management e.g., staffing, ordering	10 (91)	4th 7 (78); 3rd 8 (73)	3rd and 4th
1.2. Private practice set-up	8 (73)	4th 5 (56); 3rd 5 (50)	Lower coverage, best in 3rd and 4th
1.3 Documentation e.g., report writing	10 (91)	3rd 10 (91); 4th 8 (89); 2nd 6 (55); 1st 5 (45)	3rd and 4th
1.4 Entrepreneurship	8 (73)	3rd 5 (45); 4th 4 (45)	Lower coverage, best in 3rd and 4th

1.5 Leadership	11 (100)	3rd 9 (81); 4th 6 (67)	3rd and 4th
Category 2. Basic ethics			
Including autonomy, beneficence, non-maleficence, and justice.	11 (100)	3rd 11 (100); 4th 8 (89); 1st & 2nd 9 (81) each	All years, start from 1st year
Category 3. Research			
3.1 Research methods	11 (100)	4th 9 (100); 3rd 10 (91)	3rd and 4th
3.2 Evidence based practice	11 (100)	4th 8 (89); 3rd 9 (82)	3rd and 4th
3.3. Undergraduate research project	11 (100)	4th 9 (100); 3rd 11 (100)	3rd and 4th
Category 4. Professionalism			
4.1 Integrity, compassion, altruism	11 (100)	4th 9 (100)3rd 11 (100); 2nd 10 (91); 1st 9: (82);	Start in 1st, can include all years
4.2 Communication skills in team	11 (100)	1st – 4th : (100)	Start in 1st, can include all years
4.3 Patient / family - centered care	11 (100)	4th 9 (100); 2nd & 3rd 10 (91); 1st 9 (82)	Start in 1st, can include all years
4.4 Communication and building rapport	11 (100)	2nd & 3rd year: (100); 4th 9 (100); 1st 9 (91);	Start in 1st, can include all years
4.5 Patient safety	11 (100)	4th 9 (100); 2nd & 3rd 10(91), 1st 9 (82)	Start in 1st, can include all years
4.6 Assessment skills e.g., clinical signs	11 (100)	3rd & 4th 9 (100) 2nd 8 (73), 1st 7 (64)	Start in 1st, can include all years
4.7 International Classification of Function, Disability and Health (ICF)	4 (36)	4th 3 (33); 4th 3 (33); 2nd & 3rd 3 (27); 1st 2 (18)	Not covered by majority
Category 5. Health			
5.1 Normal development: all ages	6 (54)	2nd 6 (55); 1st &3rd 3 (27) each	low coverage, best in 2nd year
5.2 Social determinants of health	10 (91)	3rd 10 (91), 4th 6 (67), 2nd 7 (64), 1st 4 (36)	Best in 3rd year
5.3 Professional bodies and regulators	11 (100)	3rd 10 (91), 4th 8 (89) 1st 8 (73) 2nd 6 (55)	Best in 3rd and 4th
5.4 Legislation	10 (91)	3rd 10 (91), 4th 8 (89), 1st 7 (64) 2nd 6 (55)	Best in 3rd and 4th
5.5 Community development	8 (73)	3rd 5 (45), 4th 4 (44), 1st 3 (27), 2nd 2 (18)	Not well covered
5.6 Health promotion and adult learning	10 (91)	2nd 9 (82), 4th 7 (78) 1st & 3rd 8 (73) each	Best in 2nd
5.7 Health system e.g., levels of care	11 (100)	2nd 10 (91), 3rd 9 (82), 4th 7 (78), 1st 5 (45)	2nd to final year

Table 5.1 indicates that most topics on the list identified by Langlois (2016) are evident across all professions' curriculums, with category 1 and 3 covered predominantly in

the 3rd and 4th year levels of study, with most of category 4 being introduced at a first-year level of study.

5.3.2 Work-integrated learning opportunities

All eleven professions at SMU participate in work-integrated learning. However, students typically interact with patients mainly in third and fourth year, although 45% (five professions) do have work-integrated learning experiences at all year levels of study.

Only one hospital is used as a work-integrated learning placement by all professions (100%) due to its proximity, the diverse range of patients presenting with a plethora of health care needs and sufficient availability of clinical supervisors. Eight professions (73%) undertake community-based work-integrated learning blocks that include clinic visits and home visits. Clinics in the vicinity of the campus are most often used although, unfortunately, there is not a specific clinic that is used by all 11 professions.

The structure of work-integrated learning differs across the professions, for example, some professions divide the experiences into blocks according to the clinical skills that students need to master at a particular point in the curriculum, while other profession's structure according to diagnostic groups, for example, orthopedic or neurology block. The areas that seem to overlap between two or more professions are that of pediatrics (4, 36%), psychiatry (4, 36 %), and musculo-skeletal conditions (6, 54%). The pediatrics block is conducted at both mainstream schools and schools for Learners with Special Education Needs (LSEN). The three professions (27%) from School of Oral Health Sciences have similar structures for work-integrated learning and use the same work-integrated learning sites, which include the university's oral health centre, the provincial hospital on campus and local clinics. Two professions have an industry block. Two professions have an elective block where students can go to a health facility that is convenient for them and for which they make their own arrangements.

5.3.3 Analysis of teaching methods on LOOOP

The curriculum maps for each profession on the LOOOP platform provide teaching methods that are implemented across all the professions and within each year level of

study. These teaching methods were extracted from all ICC-subjects (identified in paper 4) for each year's level of study. Figure 5.1 illustrates the number of professions that implement these teaching methods for each year's level of study in order to understand the teaching methods that would be familiar or novel to the students when participating in the planned curriculum. The line with markers indicates the total number of professions implementing the teaching method in each year's level of study.

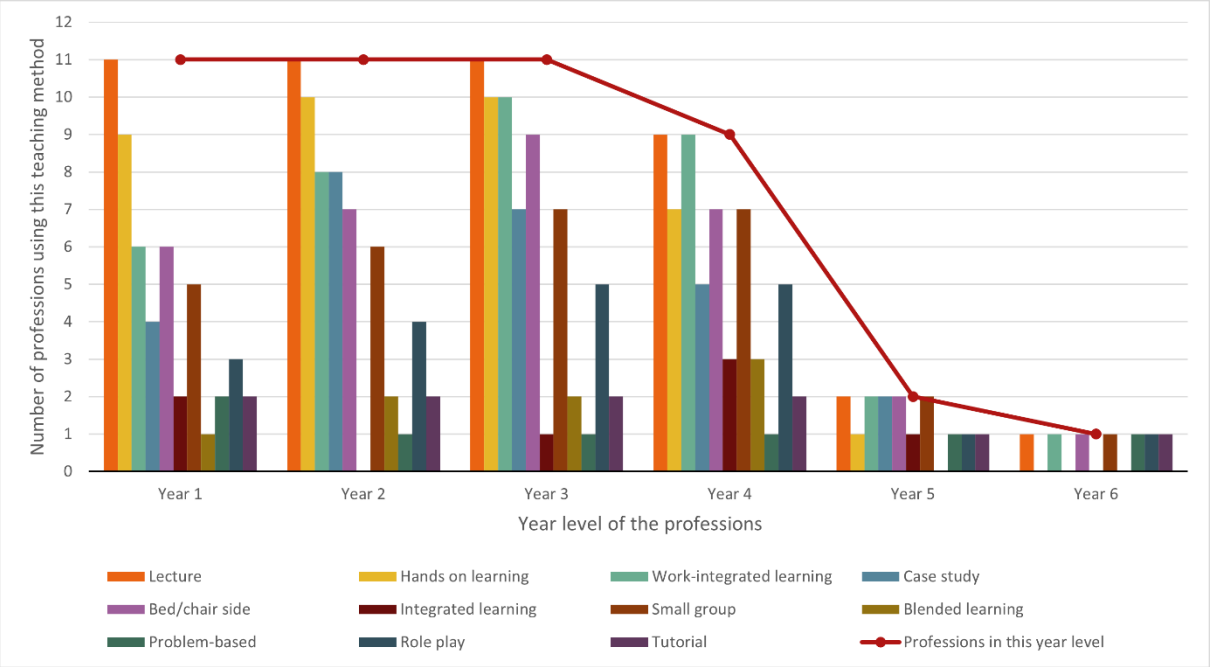


Figure 5.1 The number of professions implementing the teaching method in each year level of study

The teaching methods applied in the ICC-subjects were identified as explained in paper 4). The most common teaching methods across all year levels of study were didactic lectures (all professions at all year levels of study, 100%), lectures combined with hands-on learning (82.2%), work-integrated learning (80.0%), bed or chair side teaching (71.1%); small group learning (62.2%), case study discussions (57.8%) and role play (42.2%). Blended learning (17.8%); integrated learning (15.6%) and problem-based learning (15.6%) were not commonly implemented teaching strategies. When considering the number of professions using a teaching method [number of professions in the year level of study, %], the clinical teaching methods are implemented less in the junior year levels of study with increasing prevalence in the senior year levels of study; such as work-integrated learning: year 1: 4 [11, 36.4%]; year 2: 8 [11, 72.7%]; year 3: 10 [11, 90.1%]; year 4: 9 [9, 100%]) and bed or chair side

teaching (year 1: 6 [11, 54.5%]; year 2: 7 [11, 63.6%]; year 3: 9 [11, 81.8%]; year 4: 7 [9, 77.8%]).

5.3.4 Analysis of Assessment methods on LOOOP

The curriculum maps for each profession on the LOOOP platform provided the assessment methods data similar to that of the teaching methods above. These assessment methods were extracted from all ICC-subjects (identified in paper 4) for each year level of study. Figure 5.2 illustrates the number of professions using each assessment method in each year level of study in order to understand the assessment methods that would be realistic to implement within the IPECP planned curriculum. As with Figure 5.1, the line with markers in Figure 5.2 indicates the total number of professions in each year's level of study.

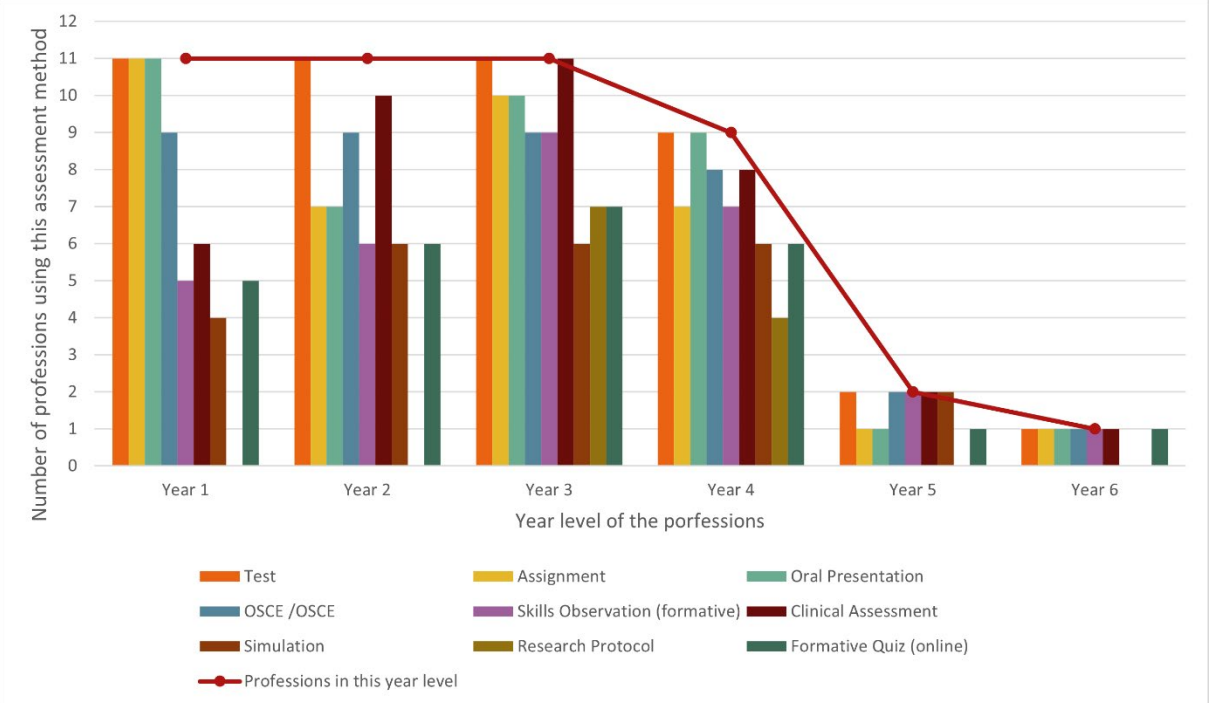


Figure 5.2 The number of professions implementing the assessment method in each year level of study.

The most common assessment methods were summative tests (100%), oral presentations (86.6%), OSCE/OSPE (84.4%), clinical assessment (84.4%) and assignments (82.2%) as an overall percentage of the professions across all the year levels of study. When considering the number of professions using an assessment method [number of professions in the year level of study, %], the OSCE/OSPE assessment method is a measure of students' clinical skills development, it is

implemented across all year levels of study, while the skills observation in year 1: 5 [11, 45.5%] year 2: 6 [11, 54.5%]; year 3: 9 [11, 81.8%]; year 4: 7 [9, 77.8%] and clinical assessment year 1: 6 [11, 54.5%]; year 2: 10 [11, 90.1%]; year 3: 11 [11, 100%]; year 4: 8 [9, 88.9%] increase from the junior to the senior year levels of study. Research protocol is used to evaluate research competence in either year three or four in all professions, presenting a common senior year level point of assessment.

5.4 Discussion

The curriculum map analysis generated information on course content with allocated credits. The information opens up opportunities for investigating the possibilities or re-packaging existing course content and number of allocated credits, to open opportunities and time for IPECP in existing profession-specific curriculums, instead of offering IPECP as a separate subject. During the analysis of the included professions' number of SAQA credits, it became clear that professions are already using more than the minimum level of credits subsidized by the Department of Higher Education, and therefore professions are averse to add an additional credit-bearing module to their professions' curriculum. To add a module may further also require the professions to apply for re-accreditation of such changes from the profession's statutory body, especially with large changes. Such changes could further necessitate modification in exit level outcomes, assessment is affected, and it causes teaching/workload increase. The implication of specific aspects considered in the analysis are subjects, topics, work-integrated learning, teaching methods and assessment methods would each be discussed in more detail

5.4.1 Subjects

Both *Psychology* and *English*, due to their specific subject content, have potential to address core competencies, although on closer inspection may not currently facilitate increased knowledge and skills in IPECP core competencies. The potential for IPECP has not been considered in the conceptualization of these courses. However, with some collaboration between the departments and the IPECP committee it could become an opportunity to contribute to summative assessment in IPECP in the first year.

Research: Basic research methodology is mostly taught in a separate subject, by lecturers from Basic Sciences departments or alternatively by lecturers of the profession. Research and evidence-based practice could potentially be presented interprofessionally, preferably to third- and fourth-year students as students mainly do research in their third and fourth year. Research teaching has potential as an interprofessional education opportunity. It would need additional coordination but could have benefits in terms of addressing more core competencies than if it is offered uni-professionally and a wider variety of topics could be addressed. The curriculum map analysis created awareness of the position of research within the curriculum, through making visible the stepwise development of research knowledge and skills throughout the curriculum (Wijngaards-de Meij & Merx, 2018). All students need to do an undergraduate research project. All professions agreed that although there could be collaborative research projects between students from the different professions, they expressed concern about the different time frames for research allocated on the different professions' timetables. Students do the undergraduate research project mostly in groups with a single supervisor allocated to the group. In some professions the students are allowed to choose a topic while in other professions, topics are allocated to groups.

5.4.2 Topics

The analysis of topics covered in different professions helped to identify gaps that could be addressed in an interprofessional education curriculum. It also indicated common overlaps where there is potential to present topics to more than one profession at the same time. The main advantage of presenting to a variety of professions is that more IPEC competencies could be addressed, such as interprofessional communication and teamwork, depending on how the topics are presented and assessed. Other possible advantages are that it may save time of lecturers, could contribute to students and lecturers becoming more knowledgeable about the unique contribution to aspects that are shared amongst all professions (Wijngaards-de Meij & Merx, 2018), increase collaboration opportunities between professions and expertise of lecturers could receive recognition from colleagues outside their own departments.

The analysis of the specific year level of study where topics are presented could contribute to the decision of the year level most appropriate for targeting inclusion of the topic in IPECP programme. The topic categories *Service management* and

Research are most suitable in third- and fourth-year level of study, while *Basic Ethics, Professionalism* and *Health topics* can be offered from the first year. A topic not included by all professions, but that is important in the IPECP programme to allow students to communicate across professions, is International Classification of Function, Disability and Health (Snyman et al., 2015).

5.4.3 Work-integrated learning

Not all professions refer to work-integrated learning using consistent terminology; some professions refer to 'clinical blocks', while others to 'service learning' or 'fieldwork placement'. In work-integrated learning, there are obvious opportunities for more interprofessional education and acquiring IPEC competencies (Herath et al., 2017; Stutsky & Spence Laschinger, 2014), but it requires more central coordination. Students who go to the same work-integrated learning sites could potentially do projects together, share patients and have shared patient discussions and presentations. In terms of forming relationships there could even be arrangements for students to share the same transport as students at this university are transported by the university to work-integrated learning placement areas. An aim is to develop an IPECP unit such as the one at University of Western Cape, where coordinating function for IPECP as well as logistical support can be provided for incorporating IPECP into all programmes. One suggestion is that the IPECP unit could assist in centrally coordinating community visits amongst the different professions. Most professions' students do one or more of their work- integrated learning blocks in the community setting, for example, at a primary health care clinic. Developing one of these clinics as a model for interprofessional education, where all professions can be trained, such as what exists at University of Stellenbosch and University of Free State is one of the aims of the IPECP core committee.

5.4.4 Teaching methods

A variety of teaching methods are used during uni-professional teaching. The most common was a lecture; not the most suitable method to foster interprofessional education. Lecturers at the university do not all have an education qualification, although the Centre for Teaching and Learning offers opportunities to learn about alternative teaching methods and collaboration opportunities. A wide variety of

teaching methods are used in IPECP (Herath et al., 2017; Richardson, Gersch, Potter, 2012) where the most suitable in interprofessional education is facilitation rather than didactic lecturing, small group teaching through problem-based learning methods.

5.4.5 Assessment methods

Students are exposed to a variety of assessment methods during profession-specific teaching. Assessment methods that students are already familiar with could be used in IPECP, during formative assessment. Common methods would be oral presentation and OSCE's. For work-integrated learning, clinical assessments could be done. Research is evaluated in all professions with writing research protocols and research reports.

5.5 Conclusion

Mapping all included professions curricula revealed information that formed the basis of the SMU-IPECP curriculum. The information from the curriculum mapping not only showed where the IPEC-core competencies were already addressed in professions' curricula, but also showed the main topics, learning and teaching methods and assessments strategies that students are exposed to in their own professions. The identification of the potential in communal subjects opened a window of opportunity for linking these subjects to the IPECP curriculum, to strengthen both the communal subject programme as well as the IPECP curriculum in the sense that through this link students understand the importance of these subjects for future practice.

Chapter 5 provided detailed information of IPEC-core competency basis, subjects, topics, work-integrated learning opportunities, teaching and assessment methods that students are exposed to during profession-specific teaching. This analysis would now be used as the foundation, together with the information gained from the situational analysis in Phase I as an evidence base for the construction on the IPECP curriculum.

Chapter 6 SMU-IPECP curriculum

***"Desire is the key to motivation, but it's the determination and commitment to an unrelenting pursuit of your goal - a commitment to excellence - that will enable you to attain the success you seek."*- Mario Andretti**

6.1 Introduction to SMU-IPECP curriculum

The SMU-IPECP curriculum presented in chapter 6 is the culmination of Phase I and II of the research study. In Phase I, the situational analysis of the logic model, a thorough investigation of literature identified factors that need to be considered when planning an IPECP curriculum. Further, the needs of the specific staff and students at SMU, for which the curriculum was developed, were elicited, analysed and combined with the information obtained from literature. Ultimately this phase focused on exploring factors that need to be considered in the development of an IPECP curriculum. The SMU-IPECP curriculum presented in Chapter 6 is grounded in, and based on, all these factors and aspects of curriculum development uncovered in Phase I. In Phase II, the input and output of the logic model, a curriculum mapping analysis was conducted to look at opportunities and gaps in the respective profession's curricula. This enabled the researcher to design the SMU-IPECP curriculum, embedded in the profession-specific curriculum. Ultimately the profession-specific curriculum and the IPECP curriculum are aligned, in both content and assessment.

The SMU-IPECP curriculum design was guided by the Four-dimensional Curriculum Framework (4DF) developed for IPECP (Moran et al., 2015), as well as Curricular Development Research (CDR), a part of Educational Design Research (van den Akker, 2013). Forero et al., (2022) provided guidelines for curriculum planning. Table 6.1 indicates how the SMU-IPECP curriculum design paid specific attention to each of Forero et al.'s aspects:

Table 6.1 Aspects to consider in curriculum planning

	Aspect to consider (Forero et al.)	**Aspect part of 4DF or CDR**	**Application in SMU-IPECP curriculum**
1	Identify and follow the local and national regulatory processes	4DF	The curriculum is aligned with expectations of regulatory bodies e.g.,

			HPCSA as well as with WHO guiding documents.
2	Start with a multidisciplinary team	4DF	The curriculum was designed with regular input from the university's IPECP core committee as well as student representatives (Face of IPECP), representing all involved professions.
3	Incorporate national standards and international trends.	4DF	The information gathered through the scoping review identified standards such as expectations of accreditation bodies and indicated international trends that were incorporated.
4	Identify the needs in the profession	4DF	A needs survey was conducted at SMU to identify expectations of lecturers and students.
5	Elicit opinions from national and international experts	CDR	National and international experts were involved during the planning of the curriculum as well as in the validation process. The researcher's involvement in AfrIPEN and AfriVIPE forged valuable relationships and enabled her to stay up to date with national and international programs and literature.
6	Incorporate modern adult learning theories and elements of evidence-based education	4DF	The scoping review identified suitable learning theories for IPECP that were incorporated for different learning activities and for different year levels of study. Formatting of the curriculum as well as content inclusion incorporated suggestion from literature in line with evidence-based education.
7	Design for the future, not only for the present	CDR	The curriculum is adaptable with opportunities to make yearly changes for example to case studies.
8	Learn from other programmes	CDR	Involvement in AfriVIPE, AfrIPEN and IPE.Global made it possible to stay abreast of and learn from the latest development in programs in South Africa, Africa, and other countries.
9	Include flexible components	CDR	Each year has some flexible components e.g., specific health issues that are investigated in 2nd year, case studies for 3rd and 4th year as well as topics to be investigated for the ethics project.
10	Incorporate practical components and the possibilities of interdisciplinary learning	4DF	Inter-disciplinary learning is the main focus in all year levels of study of the SMU-IPECP curriculum. The main learning method is active learning with practical components.
11	Be ready for ongoing rounds of revision and refinement	CDR	The curriculum validation process as well as the curriculum workshops, that were presented to lecturers and students, provided opportunities for revision and refinement. During yearly

			preparation for presentation of the programme the IPECP committee decide on changes to the curriculum based on latest literature and feedback from facilitators and students.
12	Be ready for future implementation and renewal	CDR	The validation method provides a template for future re-assessment and renewal. 2023 was seen as a pilot phase, where the curriculum was implemented across all year levels of study. The feedback from implementation will assist in renewal where necessary.
13	Share your experiences	CDR	The curriculum development process was shared during congresses. The SMU-IPECP curriculum will be shared in future national and international congresses and publications.

6.2 Educational theory incorporated in the SMU-IPECP curriculum development.

IPE must involve interactive learning processes and integration of theory into practice (Thistlethwaite, 2015a). An IPECP curriculum benefits the educational growth of health science students and health care beyond that of traditional professional curricula, especially in terms of understanding of contributions of team members and qualitative aspects of care (Birk, 2017). When health care workers strive to provide quality care, they need to work collaboratively (Pollard et al., 2016). Collaboration is in fact an essential element of both education and healthcare service delivery/practice including all health care professionals (Pollard et al., 2016). Thus, according to Pollard et al. preparing students for their collaborative practice requires their understanding of the roles of other professionals and their willingness to continue to learn from each other. Students further need to be open to also learn from service users and carers, to ensure the full benefit of this collaboration is realised.

The development of curriculum used a scaffolded approach to curriculum planning, incorporating information on core-competencies, teaching methods and needs of specific year groups were used (Frantz and Rhoda, 2017). The curricular spider's web for each year (van den Akker, 2013) shows the specific components of the curriculum. Choosing whether to engage a uni-, multi-, or interprofessional learning strategy, lecturers considered both the learning objectives of the curriculum and the learning context, including phases or stages of education, the environment or setting, the

participants, the learning approach, and the material to be presented or taught. Lecturers therefore needed to define learning outcomes and match these with learning activities, to ensure that IPECP demonstrates added value over uni-professional learning to attain the goal of constructive alignment (Thistlethwaite, 2012).

Some lecturers from different professions showed resistance to non-profession-centered activities, such as IPECP events. The resistance to leave the silos where they feel secure and confident, needed to be sensitively and imaginatively managed (Dunston et al., 2018), for example, through presenting students' positive responses to engagement in IPECP. The main advantage of presenting learning opportunities to a variety of professions is that *Interprofessional Communication* and T*eams and Teamwork* were enhanced, thus strengthening IPEC-core-competencies development. Involving students and lecturers from a variety of professions resulted in them all leaving the silos of profession-specific teaching and learning to value opportunities offered by learning with, from and about other professions. Other advantages included decrease of duplication (professions teaching the same content, for example, communication and teamwork), where less time is needed as lecturers can share the collective load. It can also contribute to students and lecturers becoming more knowledgeable about their unique contribution to aspects that are shared amongst all professions, therefore addressing the Roles and Responsibilities sub-competencies (Wijngaards-de Meij & Merx, 2018). When facilitators co-present during IPECP learning opportunities, the results could be an increased collaboration between professions and expertise of lecturers could receive recognition by peers. Lastly, facilitators understanding and first-hand experiencing the benefits of IPECP, may contribute to a decrease in resistance to IPECP.

There are a vast number and variety of education theories and frameworks available for the development of a curriculum, each with specific values, advantages, and limitations. The following are some of the educational theories that guided the SMU-IPECP curriculum:

Interprofessional socialization framework (IPSF) developed by Khalili et al. (2014) theorizes that transformation from a uni-professional to a dual identity (professional and interprofessional) occurs through a three-stage process: 1) breaking down barriers; 2) interprofessional role learning for interprofessional collaboration; and 3) dual identity development. The IPSF was valuable in the proposed curriculum as it

links profession-specific knowledge and skills, with teamwork skills to optimize students' abilities to work collaboratively. The gradual development from uni-professional to dual identity is an important part of the SMU-IPECP curriculum. The top stream of the curriculum is about role development and explains the gradual transition from professional identity to dual identity of professional and team member.

Contact theory (Carpenter and Dickenson, 2016) addresses prejudice between professions, with its focus on how intergroup contact is established. Contact theory was used for the design, delivery, and evaluation of IPECP activities and programmes by providing guidance to help establish the context and conditions for successful intergroup interaction. Contact with students in a small group allows all students freedom to interact and share their expertise with others. Contact theory could create opportunities to address conflict and power. However, Paradis and Whitehead (2018) caution that contact theory is only effective if individuals are not forced into groupwork as this could strengthen and confirm negative stereotyping between professions and ensure group members should have equal status. The contact theory is an important underlying principle that guided the curriculum as IPECP activities mainly occur in small groups with a mix of students from all professions, with ten to twenty students allocated to one or two facilitators.

Situated learning includes community-of-practice, incorporation of aspects of the healthcare context, including meaningful participation of all learners when students learn from each other, as well as in real and simulated work-integrated learning environments, such as through collaborative research projects (Zakrajsek and Schuster, 2018). Situated learning can help staff and students understand the impact of the situation on their learning and their engagement with other team members. Situated learning is mostly applicable for learning in the research and ethics stream where students investigate a real situation through application in second year evidence-based practice, to investigate a community health issue, and in third and fourth year when students do collaborative research. Students share a repertoire of resources during these IPECP events (Barr, 2013).

Adult learning principles assist students assume their responsibilities as interprofessional practitioners. When using adult learning principles, each student is responsible for their own learning and self-awareness helps to bridge the gap between theory and practice. In IPE it is important to emphasize collaborative, reflective and

socially constructed learning during the IPECP events (Barr, 2013). The adult learning principles are applied in both teaching as well as learning methods used in the IPECP curriculum.

Experiential learning developed by Kolb (1970) and used by Poore et al, 2014 in interprofessional education, where students can learn and grow through the experience of teamwork and reflection (Ng et al., 2019). Reflection forms an important part of all year groups and all activities where students are guided to do critical reflection on events, group and own performance (Whalen and Paez, 2019;Wald et al., 2012)

Transformative learning occurs where the impact of the learning has a long-term effect intended to change students' and staff's experience of engagement with patients (Mezirow,1978; Botma, van Rensburg, Coetzee, & Heyns, 2013). Transformative learning guided the selection of themes and learning activities incorporated in a curriculum. Transformative learning was accomplished through complex, thought-provoking case studies that the entire team's input to be resolved.

Problem-based learning (PBL) is a strategy that can teach students to become life-long learners. PBL provides students with a method that they can apply to problem solving when they confront a complex case. Applying the principles of PBL could be used where case studies are relevant for the engagement of a variety of professions to provide person-centered care (Thompson, 2010; Lestari et al., 2019). PBL can be applied in finding solutions for complicated clinical cases, as well when investigating ethical issues as is expected in fourth year. In order to use the full extent of PBL in IPECP, students need to have been exposed to PBL in their own professions, as the limited time in IPECP does not allow them to become competent in the use of the full extent of PBL, for example, going through the 7-jump steps.

Systems theory (Samuriro, 2022) where health care professionals need to be reflective of themselves as part of a system and be able to function and be effective in systems where they are subject to and influenced by the prevailing culture. Students also need to understand health, illness, and dysfunction from a systems theory perspective in order to consider the complexity around health and health maintenance when exploring solutions and intervention strategies. In the SMU-IPECP curriculum, the primary

health care stream prepares students to interrogate the health care system in terms of current constraints and how the health system impacts treatment.

6.3 Curriculum models and frameworks considered for SMU-IPECP curriculum

The variety of curriculum models and frameworks that could be used in the design of an IPECP, curriculum, were considered in developing the SMU-IPECP curriculum, as indicated in Table 6.2. However, there was not a single model that guided all aspects of the curriculum but rather an elective use of components from a variety of models and frameworks was applied.

Table 6.2 Examples of curriculum models and frameworks that could be used in IPECP

Curriculum model/ framework	**Key components**	**Strengths**	**Weakness**	**Aspects incorporated in SMU-IPECP curriculum**
SPICES model (Harden et al., 1984)	**S**tudent-centred **P**roblem- based **I**ntegrated teaching **C**ommunity orientated **E**lective study periods **S**ystematic	Provide framework for planning new curricula Assist in analysing curriculum related questions. Guide decision making about teaching and assessment	Oversimplify: cause-and-effect. Linear model	All aspects other than elective study periods were used. Elective study periods cannot be incorporated into this standard IPECP curriculum at this stage
PRISM model (Moniz et al., 2021, Thomas et al., 2022)	**P**roduct focussed **R**elevant to communities and students Interprofessional **S**horter courses and smaller class sizes **M**ultisite **S**ymbiotic	Symbiotic curriculum with core concept of interprofessionalism. Promote community partnerships. Focus on clinical teaching.	Limited focus on theoretical preparation of students	All aspects were considered, especially in terms of work-integrated learning
Kern curriculum design model (Thomas et al., 2022)	Problem identification General needs assessment Needs assessment of targeted learners Goals and objectives	Guide formation and implementation of curricula. Respect autonomy of adult learners while emphasizing group learning and reflection. Advocate for content that is context	More emphasis on disseminating information needed. No specific reference to IPECP	All aspects were incorporated during the research process. The final evaluation would only be possible after full implementation

	Educational strategies Implementation Evaluation Feedback	based, relevant and meaningful.		
CIPP model (Stufflebeam, 2000)	**C**ontext **I**nputs **P**rocess **P**roducts	Focus on programme improvement, thus not hampered by linear relationships. It focusses on simple and not complex systems theory. Address all phases of the educational programme – planning, implementation and assessment	Linear approach without consideration of student-specific factors e.g., motivation. Thus, focusses on simple systems theory and not complex systems theory.	All four aspects were considered – this is similar to the logic model approach that was used in the research design.
Kirkpatrick's typology of educational outcomes model (Anderson et al., 2016)	Reaction Learning Behaviour Results	Valuable evaluation / taxonomy measuring learning and programme outcomes	Systemic model, outcome focussed, no consideration of variables that may affect learning effectiveness.	All four factors were considered., especially in planning the assessment strategy.
Biggs Presage, Process, Product (Kandlbinder, 2014, Anderson et al., 2016, Kandlbinder, 2013)	**Presage**: student characteristics, teaching context, preparation **Process**: student orientation to/engagement with learning, teaching style and pedagogic content **Product:** outputs, result of intervention	Represent integrated system for positioning eventual outcomes of student learning. Focus on all aspects of learners' experience. Based on complexity theory, presenting an integrated system. Consider stakeholders views across different professional curricula	More appropriate for evaluation as it considers all three aspects of curriculum and not only planning	The three aspects were considered during planning and evaluation of the IPECP curriculum
Three strand model of IPL (Anderson et al., 2016)	Classroom based Patient service based in community. Patient service based in more formal e.g., hospital settings.	Build-up of competencies as student progress. Woven into existing modules within respective Schools and has a place in the curriculum and can be adjusted to different expectations in year levels of study between professions	Focus more on application without consideration of the wider context	All three strands are incorporated in the curriculum. In each year of the IPECP curriculum there are opportunities for IPE (classroom), work-integrated learning (patient

				service) both in community and in hospitals.
Prideaux (Prideaux, 2003)	Planned curriculum (intended) Delivered curriculum (taught) Experienced curriculum (learned)	Identify content, strategies for learning and teaching, assessment of individuals and evaluation of the programme. Results in curriculum maps for students, for teachers, for administrators and for accrediting authorities.	Limited consideration of the context of the curriculum.	For the SMU-IPECP curriculum the main focus was on the planned curriculum. The delivered and experienced curriculum were investigated by analysing students and lecturers' feedback on events and will be monitored further during implementation.
Outcome (competence) based education (Harden, 2007, Morcke et al., 2013)	Identify outcomes that needs to be obtained at the end of the course and plan programme content and assessment accordingly	Focus on knowledge and skills that need to be obtained. Measures effect of education, provide a holistic perspective of the curriculum	Could exclude higher order content for example clinical reasoning with too much focus on acquiring knowledge and skills and less focus on attitudes.	During curriculum mapping there was emphasis on considering specific outcomes in terms of IPEC-competencies and these are incorporated into the spider's web diagrams.
Descriptive model for example situational model, logic model (Kellogg, 2004)	Strengths, Weaknesses, Opportunities and Threats, effect of context on development and learning	All aspects are linked, internal and external context are considered in deciding on appropriate teaching, learning and assessment.	Linear approach without consideration of student specific factors e.g., motivation	Guided the planning of the curriculum development. The logic model specifically guided the planning.
Four-dimensional curriculum framework (4DF) (Moran et al., 2015, Lee et al., 2013, Thistlethwaite, 2015b)	Future healthcare needs Defining and understanding capabilities. Teaching, learning, and assessment Supporting institutional delivery	Reflexive and critical process to develop a new curriculum. Interconnected approach. Link educational practice to health policy, workforce, and professional practice in a coherent and reflexive way	No specific distinction between planned, delivered and experienced curriculum	Important framework that was considered throughout planning. Specifically, it was used in the scoping review analysis and development of design principles. For more detail see 6.4.

6.4 Design of the SMU-IPECP curriculum as guided by the Four-dimensional curriculum framework

A successful IPECP curriculum needs a deliberate design to enable students to achieve the IPEC-core-competencies, integrated into a longitudinal IPECP programme (Health Practice Associate Council, 2019). Moran et al. (2015) developed the Four-dimensional curriculum framework (4DF) in response to a national project to review IPECP curriculums in Australia. The 4DF is not prescriptive but assists educators to develop a curriculum to prepare graduates for present and future healthcare needs. For more detail on the 4 DF please also refer to chapter 3, as the 4DF guided the scoping review analysis. The four dimensions are future healthcare practice needs, understanding capabilities, teaching, learning and assessment methods and institutional support. The influence of the 4DF on the planning of the SMU-IPECP curriculum is summarised according to the four dimensions. Firstly, future health care practice needs: the researcher considered the expectations of accreditation bodies and did a needs survey including all professions in terms of their needs for IPECP. Secondly, in order to define and understand capabilities, the IPEC-competencies for each year group were determined through curriculum mapping analysis to determine specific competencies achievable for each year level of study, thirdly methods of teaching, learning and assessments incorporated the alignment of activities with IPEC core competencies, formative and summative assessment, for example self and peer assessment, portfolio and reflections. And finally, supporting institutional delivery was addressed through the design principles including obtaining buy-in from management and training facilitators.

6.5 Competency-based approach

A competency-based approach (Archibald et al., 2014), in contrast to an outcomes-based approach, considers the achievement of IPECP competencies. The benefits of using a competency-based approach in IPECP is supported by the seminal document of Frenk et al. (2010) that states that curricula need to consider the health problems to be addressed in the specific context, identify the requisite competencies required of graduates and tailor the curriculum to achieve the competencies and assess the achievements and shortfalls (Frenk et al., 2010). In the WHO document (2010) on “Transforming and scaling up health professionals’ education and training” it is

specified that the competency needed by all health professionals is the capacity to collaborate across professional boundaries, where teamwork is increasingly the model of care delivery (WHO, 2013). Academy of Science of South Africa (2018) recommends a hybrid competency-based education model for IPECP that emphasises the process of learning and the achievement of learning outcomes. The SMU-IPECP curriculum is grounded in the development of specific IPEC-competencies for each year level of study (as explained in curriculum mapping paper in chapter 5) that will be assessed formatively in IPECP, as well as summatively in the profession-specific subjects linked to IPECP.

6.6 Educational activities used in IPECP

A variety of IPECP educational activities are described in the literature; however, these needed to be interrogated in terms of their contextual relevance before it could be considered for inclusion in the SMU-IPECP curriculum. The specific contextual factors that were considered included student numbers, different number and combination of professions, different duration (many as short as a day), available resources, infrastructure, and health needs of the country. The outcome of many of the educational activities was only described in the literature as 'students enjoyed the event' (Onadassan & Reeves, 2005). With limited measurement of outcomes, it would be more meaningful if evaluation of learning events could be reported in terms in terms of how it contributed to level of development of knowledge, skills, collaborative competence.

These most common educational activities reported in the literature include small group discussions, patient case analysis, large group lectures, simulation of patient interaction, clinical teaching/patient interaction and reflective exercises (Bainbridge & Wood, 2013; Birk, 2017). More recently blended learning approach, where both synchronous and asynchronous learning activities are presented, are increasingly reported on.

The SMU-IPECP curriculum includes blended learning by having asynchronous learning in the form of webinars posted on the learning management system to prepare students for face-to-face sessions. The SMU-IPECP curriculum further combines a variety of learning activities for each year level of study, to also allow students with different learning styles to benefit from the variety of activities. For each year level of

study there are, for example, educational games that allow students to have fun while mastering learning content (Feldhacker et al., 2021). All year levels of study have to complete reflections on their learning (Wald et al., 2012). Case studies and role plays with simulated patients (Showstark et al., 2022) form an important part of especially the third- and fourth-year curriculum.

6.7 Assessment of learning

'Assessment drives learning' is an important philosophy embraced by educators in medical education (Preston et al., 2020). Educators must identify individual, team, and program outcomes prior to designing curricula and plan how learning would be assessed in terms of individual and team outcomes. It is preferable to use multiple methods of assessment and not only determine students' attitudes to learning (Thistlethwaite, 2015b). Educators should strive to choose evidence-based tools to assess learning (Joyce et al., 2015).

In the SMU-IPECP curriculum, formative assessment forms part of the IPECP curriculum where students received feedback on the skills and knowledge they developed as well as on reflections submitted after each day of participation (Wald et al., 2012). Students' experiences of learning, allowing them to reflect on their learning are elicited through completion of the ICAS questionnaire (Schmitz et al., 2017).

6.8 The proposed SMU-IPECP curriculum

In the following section, the newly developed SMU-IPECP Curriculum will be presented as a whole, and each component explained in more detail. This will be done in three sections: first, an overview of the given of the model the IPECP curriculum in totality through unpacking the diagram that presents the overview. Secondly, a description of the assessment alignment, and thirdly, the spiders' web diagram that summarizes the characteristics of each year level of study.

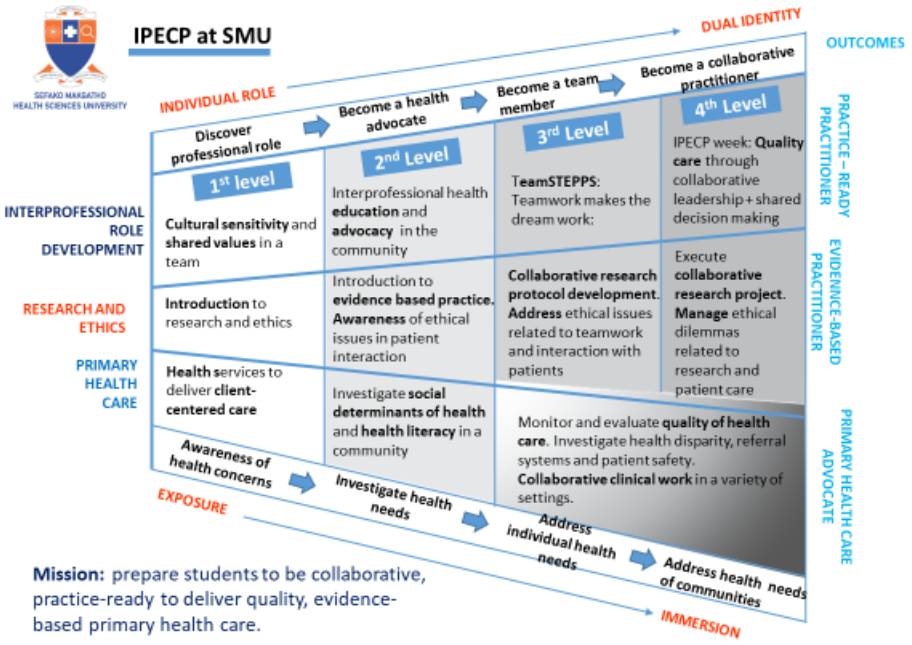


Figure 6.1 Visual overview of the SMU-IPECP curriculum

6.8.1 Overview of the proposed IPECP curriculum.

The mission of the IPECP curriculum**,** as indicated at the left bottom corner of Figure 6.1, is to prepare students to be collaborative, practice-ready to deliver quality, evidence-based primary health care.

The visual portrayal in Figure 6.1 depicts the SMU-IPECP curriculum in three curriculum streams – top, middle and bottom. The top stream shows *interprofessional role developmen*t, the middle stream *research and ethics*, and the bottom stream, *primary health care*.

The curriculum covers four years, each presented as a block, from left to right to reflect how the curriculum builds in complexity from first to fourth year. There is logical sequencing between year levels of study and within a year level of study. Each aspect is deliberately placed, relative to another, to help achieve the outcomes. The outcomes are indicated on the right side of the diagram.

For each year level of study there is an Interprofessional Education part, in other words, what students cover theoretically, as well as an application or Interprofessional Collaboration.

The curriculum includes three streams. These are:

Interprofessional role development (Top):

The path on top of the diagram indicates the development from individual professional role to dual-identity role of professional as well as interprofessional team member. The events create opportunities for interprofessional socialization.

The development builds from year one to four, (indicated in the second line from the top in Figure 6.1), and starts with students discovering their own professional role, then progressing to becoming a health advocate, progressing to becoming a team member, and ultimately, to becoming a collaborative practitioner.

The outcome for this stream is being a practice-ready practitioner who is a qualified health care worker and has the knowledge, attitude, and skills not only of their own profession, but also as collaborative interprofessional team member. The practice-ready practitioner is able to adapt to the demands in the workplace as they are equipped with graduate attributes.

Research and ethics: middle

To improve the quality of health services, all healthcare practitioners need to be research consumers and evidence-based practitioners.

The development builds up from exposure to immersion and eventually to competency. Year one starts with introduction to research and ethics, then in year 2, evidence-based practice. In third- and fourth-year students become aware of ethical dilemmas in patient interaction and teamwork and ethics related to research The outcome of this stream is being an evidence-based practitioner. An evidence-based practitioner can independently find, appraise, and apply the best evidence for collaborative practice, and demonstrate high standards of ethical conduct.

Primary health care: Bottom

Improvement in quality health care means fewer errors, less delays in care delivery, improvement in efficiency, improved health outcomes and lower costs. Decline in

quality of health care has caused the public to lose confidence in the healthcare system in South Africa.

The development of competency is, the same as with research and ethics, from exposure to immersion and eventually to competency, as indicated in the bottom row.

Students learn to apply from year one where they start to be aware of health concerns, then, year two where they investigate health needs; in year three they address individual health needs and in year four, they address health needs of individuals and groups.

The outcome of this stream is being a primary health care advocate who contributes to building safer health care systems, that are more interprofessional, person-centred and community- oriented care.

6.8.2 Themes

In each of the three streams there are themes for each year level of study. These themes emerged from the analysis of IPEC-core-competencies, and the topics already addressed in profession-specific teaching identified in the curriculum map analysis. IPECP creates opportunities to apply knowledge and to learn skills and behaviour to achieve outcomes of the curriculum. The themes for each year level of study are:

Year 1 Interprofessional education and health care diversity in education, research and work-integrated learning.

Year 2 Interprofessional health care to address community concerns through education, research and work-integrated learning.

Year 3 Patient-centered care through collaborative interprofessional education, teamwork and research.

Year 4 Interprofessional collaborative care to improve quality of education, research and health care.

6.8.3 Assessment of year levels of study

The importance of assessment that drives learning needs to be considered. However, assessment could potentially inhibit or distorts students' perception of why it is necessary to engage in collaborative learning as most assessments have focussed on individual achievement of learning outcomes.

The principle of the assessment strategy is that there is a direct link between the profession-specific subjects and IPECP. The IPE component (the in-classroom part) is linked to the management subject in the profession, for example, where the management of a service and the philosophy of the profession is taught. The IPC component (Thistlethwaite et al., 2015) is aligned to the work-integrated learning or work-integrated learning subject where students interact with clients during their profession specific training.

The IPECP section is 16 hours per semester and the students are evaluated formatively during these interactions, for example, they receive peer feedback on their role-play sessions according to a rubric that assesses achievement of IPEC-competencies. However, summative marks are allocated in the profession-specific subjects where each profession, at their own discretion, assesses IPECP, for example, in management and in work-integrated learning subjects. The IPECP core committee and curriculum representatives for each profession have decided that marks for IPECP content should contribute at least 15% of the marks of the subject, to ensure that students can see the importance of IPECP participation. The profession-specific subject linked to the IPE part can, for example, ask questions related to the content applied in IPECP; for example, team skills or cultural diversity, in tests and exams whereas in work-integrated learning, collaboration with team members could be specifically assessed. The benefit of this system is that only the profession's lecturers have the knowledge to evaluate if the students interpret what they learned in IPECP correctly for their own profession. It further ensures that IPECP does not remain only a theoretical contribution in the sense that lecturers who do clinical supervision expect students to apply what they learned during work-integrated learning blocks where they interact with members from the interprofessional team. Lecturers can also use some of the aspects of the IPECP programme, for example, the marked reflections to contribute to the evaluation in the profession-specific subject or expect students to

complete the ICF form that they learned about in IPECP for their individual patients for marks for clinical performance. The three communal subjects (subjects included in all profession's curricula) address some of the IPEC-core-competencies through the content and method of presentation. Students need to apply what they learned as part of the IPECP curriculum, for example communication skills that can then contribute to the assignments that they do for the communal subjects. For example, students learn about the research process in the communal subject, they then do collaborative research projects that are summatively evaluated in their profession's research subject as well as the theory that is evaluated in the research methodology course.

Figure 6.2 represents the link between IPE and IPC and where it is summatively evaluated in profession-specific and communal subjects.

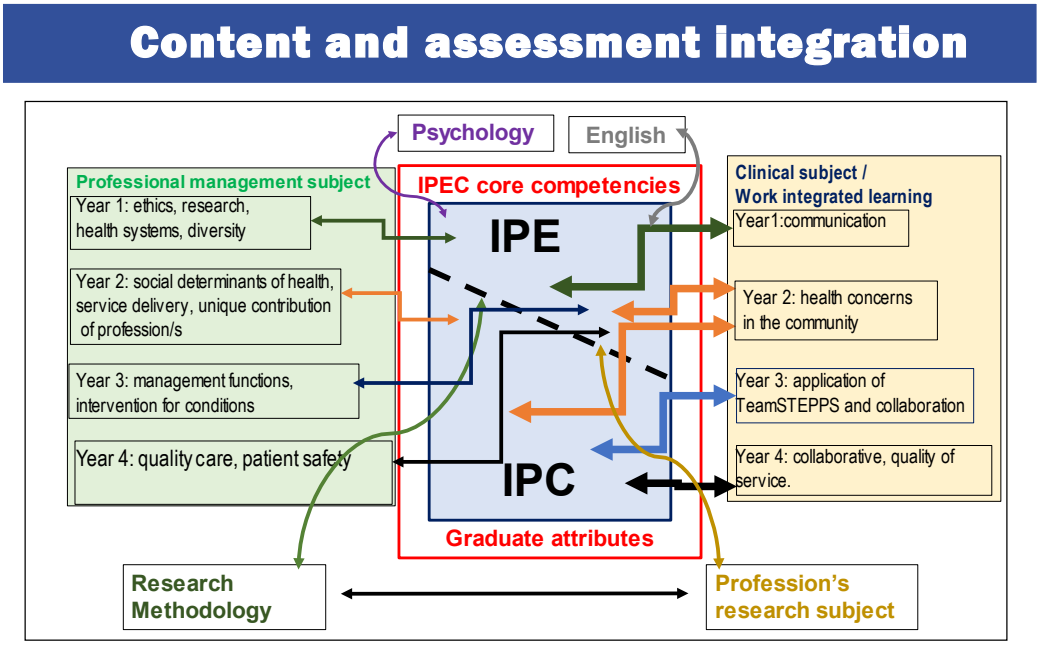


Figure 6.2: IPECP content and assessment integration

6.8.4 Curriculum per year level of study

Characteristics of IPECP curriculum: Spider's web diagrams

The characteristics of the curriculum are presented in the form of a spider's web (see Fig 6.3) to demonstrate both the interconnectedness and effect that each aspect has on the rest, but also shows the fragility of the connections. For each year the rationale for that year depends on the main theme for the year.

There are ten components that were considered in the detailed planning of each year level of study. There are overlaps between year levels of study, but each year level of study also has an individual rationale. Figure 6.3 below shows the overall components. The overlaps are seen in principles that apply across year levels of study, for example, the formative assessment that occurs during IPECP activities and the summative assessment that forms part of the profession-specific subjects' marks. The aims and objectives for each year level of study was determined through the curriculum map analysis section of the study, that determined the most important IPEC-core-competency that needed to be addressed for each year level of study. The content for year 1 and year 2 is divided between the two semesters, with specific but related content planned for each semester, based on the theme of the year and linked to the specific IPEC-core-competency that is addressed in the year level of study. The facilitator role, grouping and location are important but are more or less similar across year levels of study. For each event two facilitators are required for each group of 20 to 25 students. Each profession needs to allocate one facilitator for every ten students who participate in the IPECP events. The suggestion is that all lecturers responsible for work-integrated learning supervision are trained as facilitators to ensure that there is a carry-over between IPE and IPC. Most of the IPECP curriculum needs to be face-to-face as students first need to get to know each other and build relationships before they can effectively engage online. The reason for allocating only 16 hours per semester in the initial programme is because that entails a minor change to the curriculum and not an adjustment that requires re-accreditation or that adds SAQA credits to the already full curriculums. Materials and resources are similar for each year level of study with a main obstacle being the number of available venues for small group learning. The learning activities for each year differ according to the theme and activities.

Figure 6.3 explains the overall curriculum components. For each year the spider's web diagram explains the application.

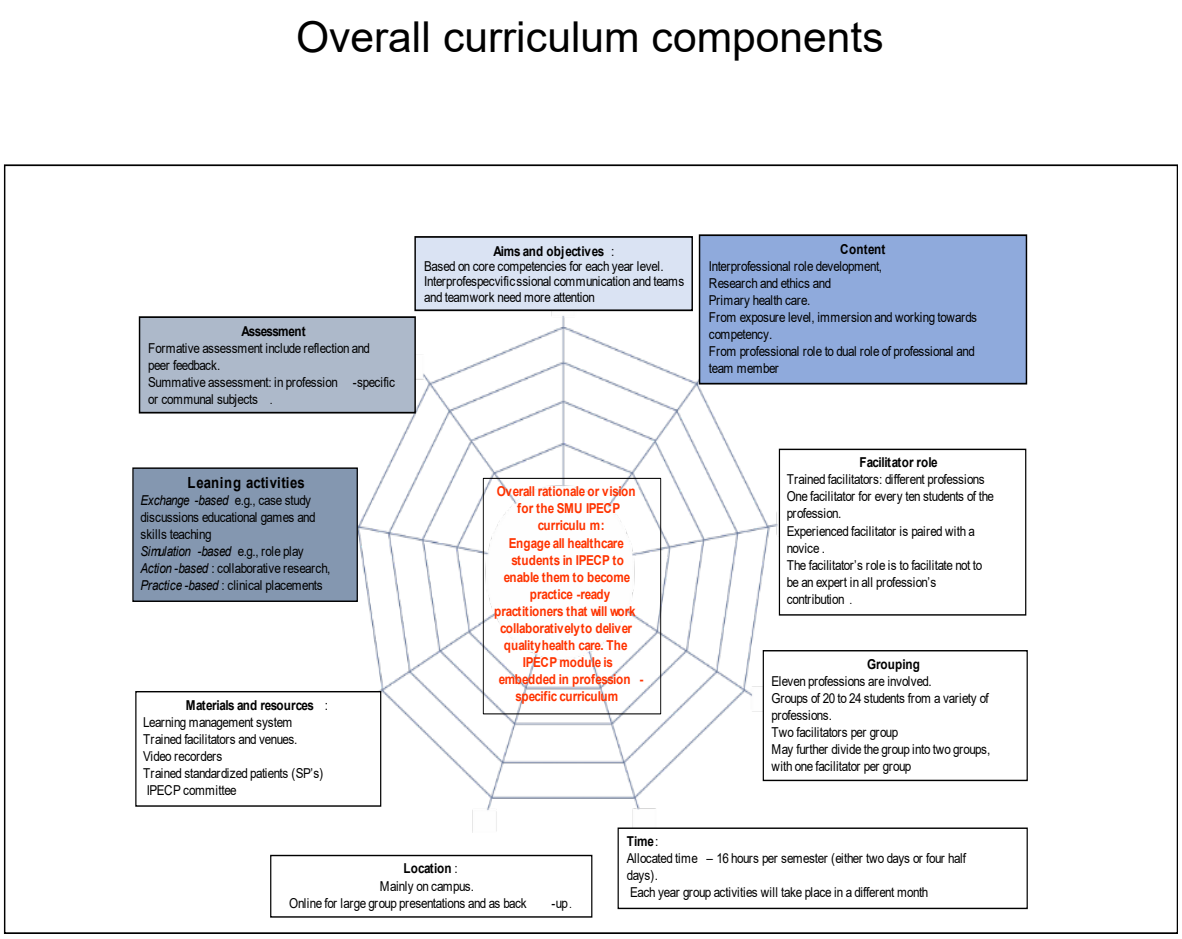


Figure 6.3 Diagrammatic/Graphic summary of curriculum components

Year 1

Rationale for year 1

Year 1 is planned around the general knowledge, attitudes and skills of a health worker that forms the basis of interaction with patients and team members (see Figure 6.4). Students are inducted into this interprofessional programme on arrival at the university in semester 1. It provides an opportunity to get to know students from other professions and build relationships with students from other professions, to prevent students from learning only in their own professional silos (Tong et al., 2020). In semester 2, when students understand their own professions better, they return to their interprofessional groups and now teach students from other professions about their profession. Together the students look at the health care team and the health care system in order to understand their profession's contribution to improving health care.

Components of proposed first year IPECP curriculum

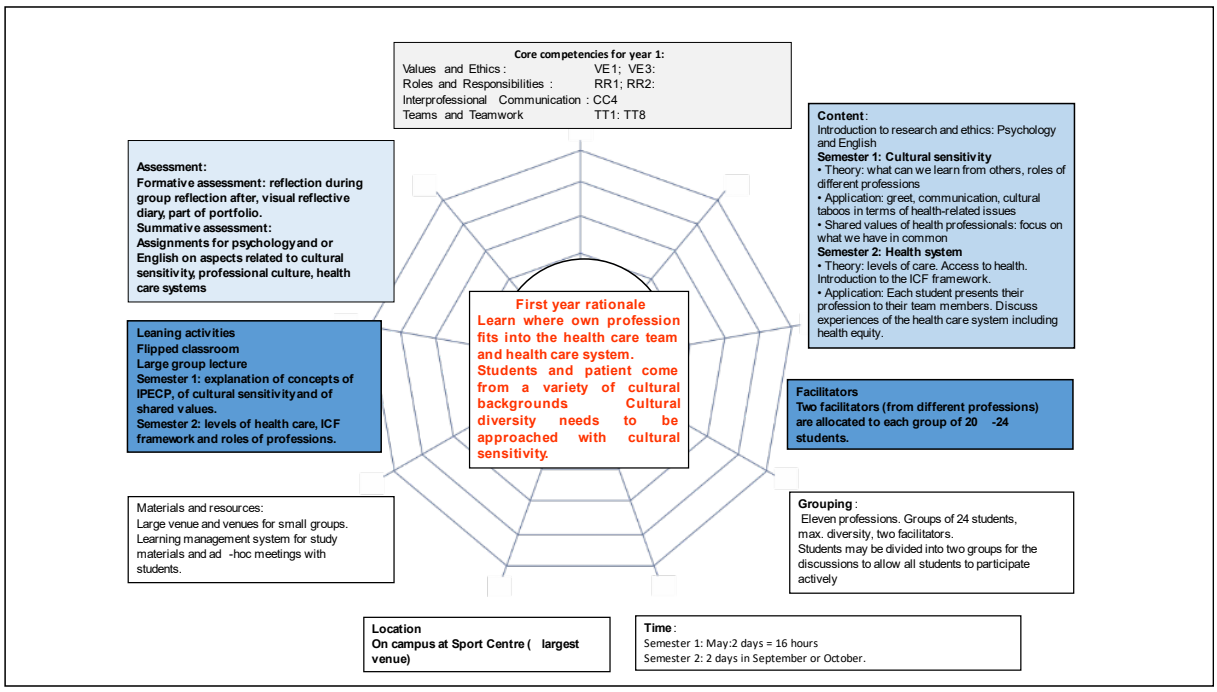


Figure 6.4 Components of proposed first year IPECP curriculum

Year 2

Rationale for second year curriculum

In year 2, students get an opportunity to explore with and develop their identity as a health care worker (see Figure 6.5). In the first semester student explore health challenges in a community. The students then need to search for evidence to address the challenge. They continue to develop their professional identity in conjunction with their identity as a member of the health care team, while working in small groups with students from other professions to develop a presentation for the health challenge in the community. In the groups, students learn with, from and about other professions and learn to clarify their own role and contribution to the specific health challenge. This topic may even be carried further as a research topic in third and fourth year.

Components of proposed second year IPECP curriculum

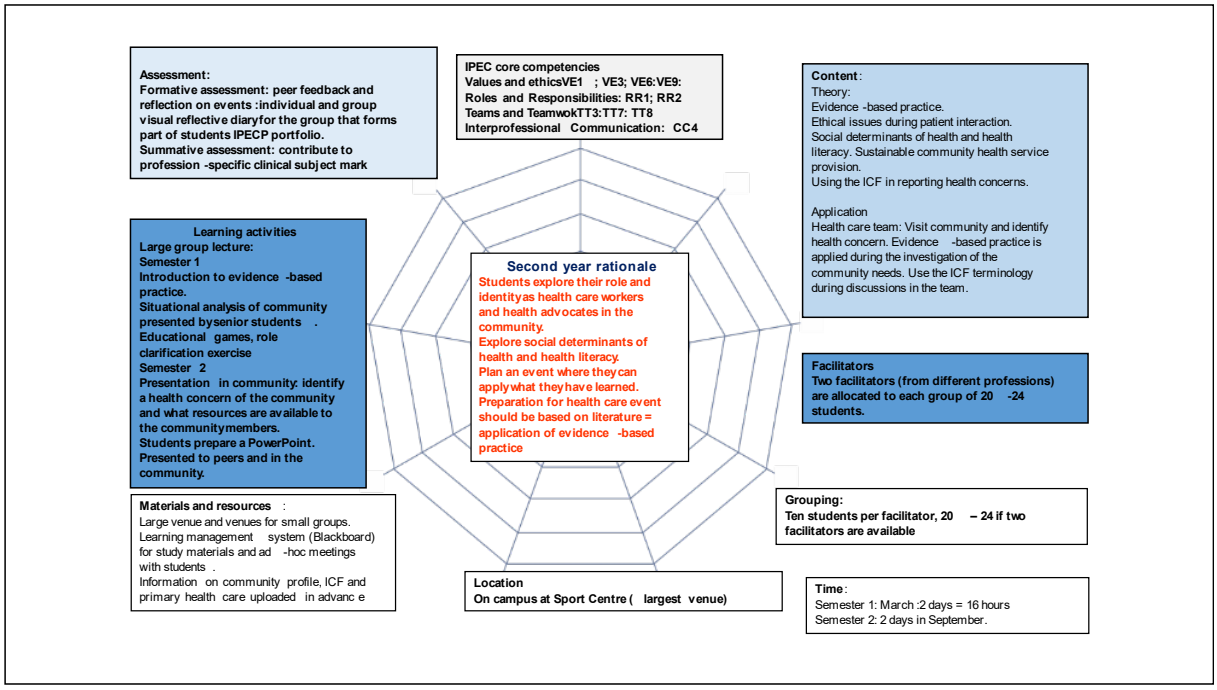


Figure 6.5 Components of proposed second year IPECP curriculum

Year 3

Rationale for 3rd year curriculum

In third year, many professions' students do work-integrated learning. Students focus on intervention for individual clients, but these assessments are often completed in interprofessional teams, and it is therefore essential that teamwork is developed during this level (see Figure 6.6). The TeamSTEPPS programme is an evidence-based programme and aims to improve teamwork and communication skills in healthcare which is intended to lead to improved patient outcomes (King, 2008). The programme provides valuable material to teach students team skills that they can apply during their work in a team but also in their own profession (Williams et al., 2020) . In this activity, students have an opportunity to plan for discharge of a fictional patient, and to focus on the unique contribution that they bring to the team. In the second semester, students need to apply what they learned in the first semester session during collaborative teamwork in work-integrated learning.

Components of proposed third year IPECP curriculum

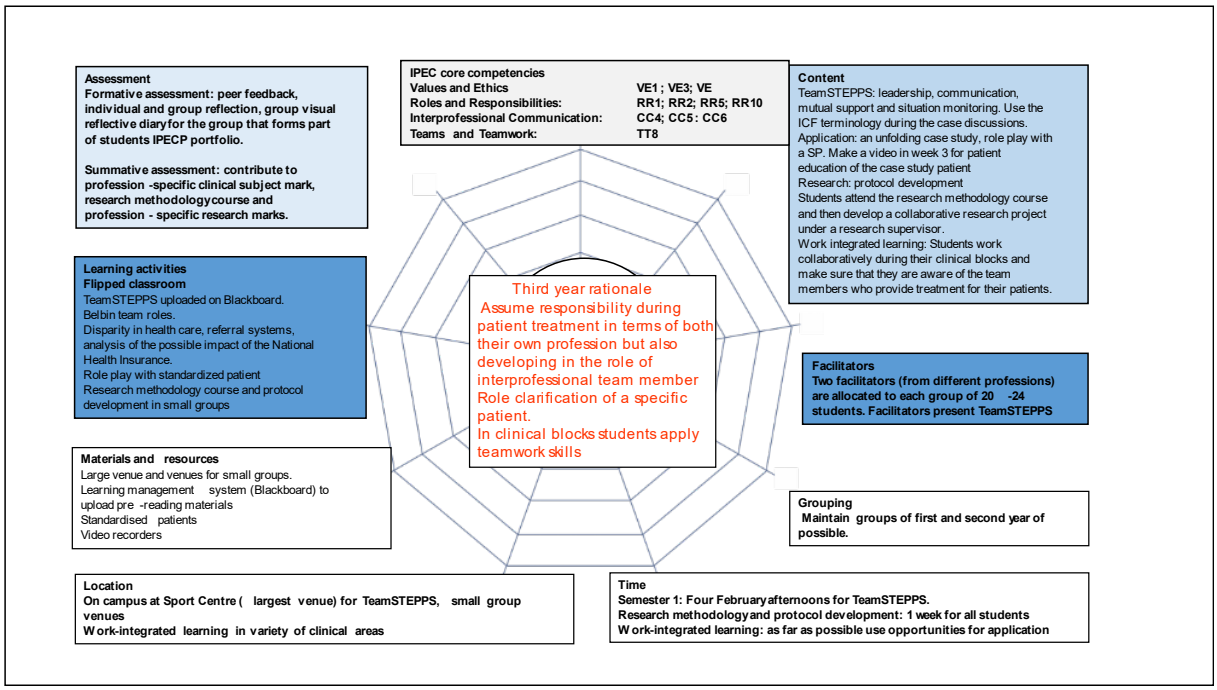


Figure 6.6 Components of proposed third year IPECP curriculum

Year 4: final year

Rationale for final year programme

Students are in their final year of undergraduate training and are preparing to contribute to the health care system by addressing ethical issues and treating complicated cases (see Figure 6.7). In the first semester, students participate in an IPECP week to prepare them to work collaboratively in a variety of settings. A common occurrence in interprofessional groups is power struggles that cause conflict (Paradis and Whitehead, 2018; Appelbaum et al., 2020) and the intensive one-week programme provides opportunities for students to learn how to deal effectively with conflict. There is also an emphasis on relationship building for effective service provision (Grace, 2021). The longitudinal nature of the planned curriculum will expose students to opportunities to practise conflict resolution skills. Through engagement in both simulated case studies and applying what they learnt in work-integrated learning, students develop confidence in interacting with a variety of team members and learning with, from, and about other professions.

Components of proposed fourth year IPECP curriculum

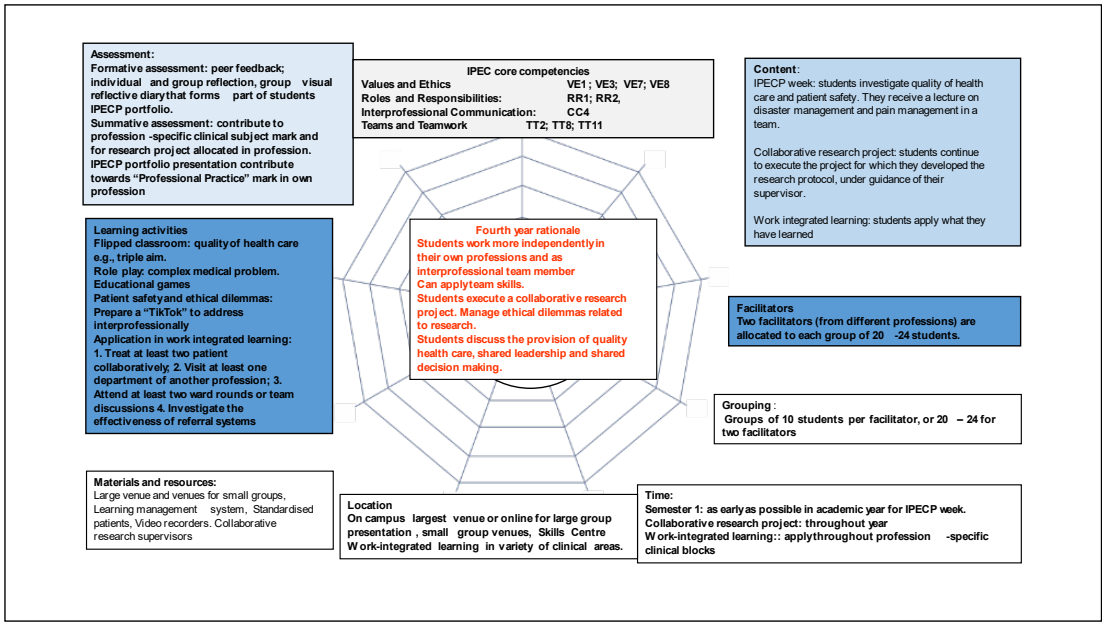


Figure 6.7 Components of proposed fourth year IPECP curriculum

Please note:

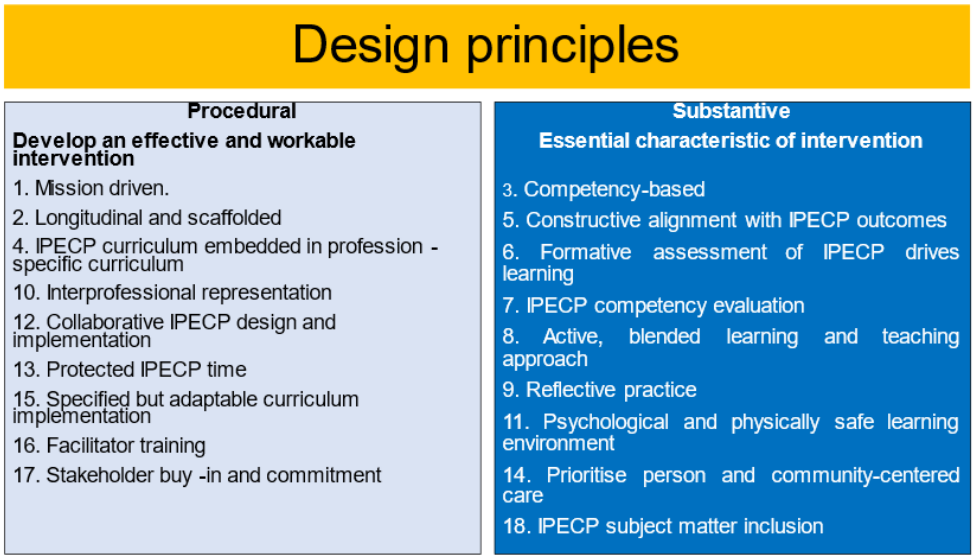
The exposure to IPECP from first to final year provides opportunities for students to build both their profession-specific competencies in terms of defining and applying their roles in different case studies as well as dual identity building where they have opportunities to develop their team members competencies.

6.8.5 Design principles

The design principles are a set of procedures and conditions for successful dissemination and implementation of the curriculum (van den Akker, 2013). The design principles are based on theory that was already established in previous phases of the research as well as reflections during each cycle of proposed curriculum development. Design principles include what would make the curriculum function. The design principles guided the development of the SMU-IPECP curriculum planning as well as the implementation.

After the formulation of tentative design principles, the design principles went through iterative cycles of refinement. Initially the research supervisors looked at the content and formulation, and external and internal panellists gave quantitative and qualitative feedback in a modified Delphi approach. The principles were refined after each cycle of feedback. Lastly, the design principles were classified under procedural and substantive design principles, as can be seen in Table 6.3. During the modified-Delphi, with three cycles, the feedback was that all design principles are appropriate as indicated by a median above 80 for all principles. The design principles with lower level of agreement, that is a difference in interquartile range of more than 5 between external and internal panellists and with a median below 80, were put forward for a further round of validation. More information on the validation of design principles is included in the next chapter, chapter 7.

Table 6.3 Classification of design principles



For the final list of design principles: please see Validation of Design principles paper for the final comprehensive list.

6.9 Discussion of curriculum development

The development of this tailormade SMU-IPECP curriculum was based on the results of the scoping review, the critical reflection and reflexivity as guided by the Brookfield lenses (Pitout et al., 2019) and the result of the curriculum maps analysis. The result is an evidence-informed curriculum.

Although the researcher initially set out to plan a module for final year students, the results of the situational analysis made it clear that a longitudinal curriculum is required based on a scaffolded approach. The need for incorporating all year levels of study resulted in a thorough curriculum map analysis of the eleven professions that participate in the IPECP programme, to identify where the IPEC-core-competencies required of a new graduate could best be addressed in each year level of study. For more information, please refer to chapter 5.

Initially a separate IPECP subject was envisaged, to ensure that IPECP could be prominent in the curricula of all professions. However, the results of the curriculum map analysis provided evidence that specific components in the profession-specific curriculum could be linked directly to the IPECP curriculum. An integrated IPECP curriculum was developed with assessment that is done formatively during the IPECP events but summatively in the profession-specific subjects.

The analysis of topics, learning and teaching methods and assessment strategies identified through the curriculum map analysis guided the development of the themes and streams of the SMU-IPECP curriculum. In developing the specific content for each year and in each stream the IPEC-core-competencies required for each year level of study guided the selection of suitable educational activities. The educational theory of IPECP guided the selection of teaching methods for example, small group teaching, trained facilitator-led interactions and reflection. The duration of engagement in IPECP was guided by the need to not increase the allocated SAQA credits further, which would need re-accreditation of all involved professions and would make it too time consuming for the involved lecturers and students.

For each year level of study students need to apply what they have learned during the IPE events during work-integrated learning in their own profession's work-integrated learning and for this they would be summatively evaluated. This creates a direct link between theory and practice.

The design principles went through a validation process where external and internal panellists evaluated and approved the final list of principles. The design principles are valuable not only to the SMU-IPECP curriculum implementers but also for other institutions which are embarking on the process of establishing their own curriculum.

6.10 Conclusion

Chapter 6 began with an explanation of curriculum literature in terms of aspects to consider in planning a curriculum. Educational theory that guided the curriculum was discussed including curriculum models, the four-dimensional curriculum framework and the reasons for the decision of a competency-based approach. The types of educational activities and assessment of learning theory were described. The educational theory guided the design of the proposed SMU-IPECP curriculum.

The SMU-IPECP curriculum before validation is presented and explained. The curriculum overview, as well as the planning for each year level in the form of spiderweb diagrams, are presented to explain the detail of the curriculum. The chapter ends with the design principles that form the theoretical yield of the SMU-IPECP curriculum.

Chapter 7 will continue to explain how the proposed curriculum and design principles were further refined through a validation process, prior to implementation.

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Chapter 7 Curriculum validation

“When the water starts boiling it is foolish to turn off the heat.” – Nelson Mandela

7.1 Introduction to chapter 7

Chapter 7 reports on Phase III of the research, the validation of the curriculum. Chapter 7 builds on the proposed IPECP curriculum that was developed and presented in chapter 6. Chapter 7 contains two papers that are in final draft format – these are paper 5 for the validation of the curriculum and paper 6 for the validation of design principles. The two papers share some similarities, but both have unique features. Paper 5 is the only paper that contains the actual curriculum. The curriculum is presented in a very concise overview, for the purpose of explaining the product that is validated.

Finding a suitable method for pre-implementation validation was challenging. However, the method described in educational design research, specifically curriculum development research, provided a valuable method (van den Akker, 2013). Not only did it provide a method for validation, but through the research process the curriculum was refined, and valuable theoretical principles that guided the development and could guide the implementation were formulated. The papers discussed the entire process of validation in more detail.

7.2 Introduction to paper 5

Phase III: Outcomes section of the logic model, deals with the validation of the IPECP curriculum. Chapter 6 provided the explanation of the SMU-IPECP curriculum, which was presented to an expert panel to validate the structure and content the curriculum against the four criteria of relevance, consistency, practicality and effectiveness as suggested by Van den Akker (van den Akker, 2013) and is presented in Paper 5.

Pitout, H; Barnard-Ashton, P; Adams, F, SHJ du Toit (2023). Validating a proposed Interprofessional Education and Collaborative Practice curriculum. *Journal of Interprofessional Care.*

Final pre-submission draft for submission to Journal of Interprofessional Care

Title

Validating a proposed Interprofessional Education and Collaborative Practice

Authors

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Abstract

Verifying the validity of an interprofessional education and collaborative practice (IPECP) curriculum before implementation is uncommon. A thorough empirical investigation, applying the four cycles of educational design research were foundational to this proposed IPECP curriculum. The four criteria of relevance, consistency, practicality and effectiveness, were implemented to assess and improve validity of the curriculum. External and internal IPECP participants provided quantitative input of the four criteria on a visual analog scale (0-100), and qualitative comments to suggest improvements to the proposed curriculum. Descriptive statistics and deductive thematic analysis were respectively used for quantitative and qualitative data analysis. Panellists lauded the proposed curriculum. Relevance elicited strong agreement and consensus (m=99, IQR=6.75), with a lower rating of and consensus of practicality (m=85.5, IQR=25.75). The consistency and effectiveness, rated across year levels of study and streams, indicated in rating and consensus, an increase across year levels of study from first to final year. Of the streams, the proposed Research and Ethics stream had the lowest rating and consensus. The qualitative findings highlighted the strengths and opportunities (i.e., the embedded and integrated IPECP into a profession-specific curriculum) and weaknesses and threats (i.e., insufficiency of resources). Curriculum validation prior to implementation illuminated concerns requiring refinement which strengthened the proposed curriculum.

Key words: interprofessional education and collaborative practice curriculum diagram, curriculum design research; curriculum validation; curriculum refinement, relevance, prior implementation.

Introduction

Interprofessional Education and Collaborative Practice (IPECP) is a beneficial, yet demanding approach to develop the knowledge and skills of undergraduate students to be interprofessional practice-ready healthcare graduates (Gilbert et al., 2010). Although the World Health Organisation and profession's accreditation bodies expect IPECP as part of health professional curricula, there is not uniformity in implementation across countries and across universities (Thistlethwaite, 2015c). One explanation for this variation in implementation is that there can be no universally accepted curriculum for IPECP, because a curriculum needs to be contextually relevant or tailored to the needs of the institution (Pitout et al., 2022). The absence of a formal contextually relevant curriculum amplifies the challenges experienced in implementation, such as buy-in from role players, finding time in already crowded profession-specific curricula, decisions on what professions to include in learning activities and the appropriate selection and presentation of content for a specific year level of study of students (Birk, 2017). Recent development of IPECP curricula have resulted in a myriad of papers advising on factors that influence IPECP curriculum development, content that should be included and information on curriculum design (Pitout et al., 2022). The papers mainly originated from countries in the Global North such as Australia, Canada, United Kingdom and United States of America. Applicability of these curricula needs to be cautiously considered in countries in the Global South such as African contexts, due to the specific health care system needs for IPECP and limited access to resources required for application. In addition, for planners and developers of IPECP curricula, the challenge remains how to incorporate the available evidence into curricula that would meet the needs of all the involved role-players and still remains contextually relevant.

Curriculum planning and development could address different levels, namely supra (international), macro (National Planning Commission), meso (institution) and micro (classroom) levels (Priestley et al., 2021). Van Akker (2013) classifies curriculums according to the presented or intended curriculum format (planned, formally written), the implemented format (perceived/operational) or the attained format (experiential/ learned). Most literature on curriculum validation focus on validating curricula after curriculum implementation, that is the attained curriculum. However, this paper reports on the proposed IPECP curriculum, that can be classified as an intended curriculum, that addresses the meso and micro levels.

Curriculum feedback and evaluation is one of the six steps of the curriculum development process (Thomas et al., 2022). Feedback on curriculum development forms part of a long, cyclical process of design, evaluation and re-design, involving a variety of stakeholders (van den Akker, 2013). Newly developed curricula are usually evaluated but not necessarily validated as part of the development process.

Usually, curriculum validation is a step that happens only after curriculum implementation. However, this paper explains how validation prior to implementation yields valuable formative feedback e.g., identify areas that need to be improved as well as practical suggestions of how the curriculum can be improved. A secondary benefit of the curriculum validation process is that it may enhance faculty motivation, influence attitudes and contribute to dissemination of results of curriculum development (Thomas et al., 2022). Van den Akker cautions that it is imperative that in the curriculum validation, methodological rigor is balanced with feasibility, as the lower the expenditure of time and energy for collecting and analyzing ambiguous data, the bigger the chances are that the results will influence the development process (van den Akker, 2013).

Educational design research is a methodology proposed to develop research-based solutions for problems in education (Plomp, 2013). The specific sub-section of educational design research that deals with curriculums, is called Curriculum Development Research, as it explains a suitable method for validation of the proposed IPECP curriculum (van den Akker, 2013). Curriculum development research supports decision making in curriculum development, i.e., research-based development (van den Akker, 2013) (McKenney & Reeves, 2021). The formative evaluation is one of the steps in curricular design, that consists of iterative design cycles and development before initial implementation in a limited number of contexts (van den Akker, 2013). Each cycle consists of analysis, design, evaluation and revision. The phases of curricular development research fitted well with how the proposed curriculum was developed and validated. The first step, the analysis, necessitates a preliminary investigation, as was done through Phase I of the study with the scoping review, focus groups and needs assessment. In the second step, the prototype (proposed curriculum) was developed through considering the results of Phase I and through incorporating the results of a curriculum mapping analysis. The last step is the revision phase, which in part was done through the validation, and will be continued after implementation of the curriculum.

The specific university in South Africa for whom the IPECP curriculum was designed, offered undergraduate programs for eleven different health care professions, who are grouped together in four Schools. Included professions are Occupational Therapy (OT), Physiotherapy(Lazarus et al.), Speech Language Pathology and Audiology (SLPA), Human Nutrition and Dietetics (Diet), Nursing, Medicine, Radiography Dentistry, Oral Hygiene, Dental Therapy and Pharmacy. Students and staff of these professions are from diverse cultures, professions, ages, genders and prior exposure to health concerns. Four-year undergraduate degrees are predominant, but there are also two professions with a three-year degree, one with a five-year and one with a six-year degree. Before commencement of the IPECP programme, each profession's education occurred in a professional silo.

Scope of proposed IPECP curriculum and intended evaluation.

The proposed curriculum spans four years and includes three streams, namely interprofessional role development, research and ethics, as well as Primary Health Care (PHC) (see Figure 1). The streams progress from an individualist professional role to development of a dual identity as professional and interprofessional team member (Khalili and Orchard, 2020). This progression evolves from initial exposure to a level of immersion and competency (Charles et al., 2010); (van Diggele et al., 2020). The outcomes for each stream are respectively interprofessional practice-ready practitioner (for interprofessional role development), evidence-based practitioner (for research and ethics) and collaborative primary health care advocate (for PHC). The years and streams are built on constructive alignment of outcomes that is achieving IPEC-core-competencies (Interprofessional Education Collaborative, 2016a), teaching and assessment (Kandlbinder, 2014)

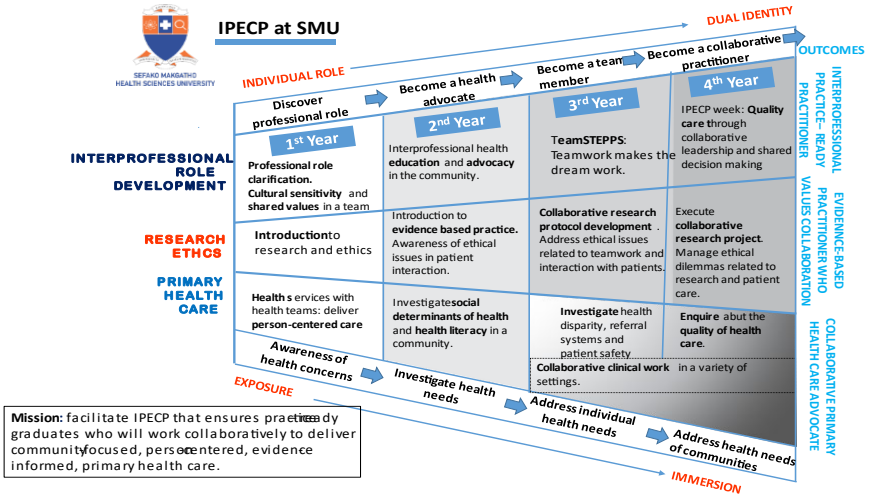

Figure 1: IPECP curriculum diagram

The assessment of the curriculum aligns the IPECP curriculum for each year with profession-specific subjects. During IPECP sessions facilitators provide formative feedback, however, summative assessments will occur in profession-specific subjects where students need to apply what they have learned, for example during work-integrated-learning.

Other than just the overview of the planned curriculum the researchers also specified the application in terms of components of the curriculum. According to van den Akker (2015), in each curriculum ten components need to be considered during planning including Rationale or Vision, Aims and Objectives, Content. Learning Activities, Teacher Role, Materials and Resources, Grouping, Location, Time and lastly Assessment. These components are presented in the form of spider's web diagrams for each year level of study, that demonstrates the interconnectedness, balance and consistency between these components. The spiders' web diagrams are not included in the paper but are available on request. The detailed content would be collaboratively developed by the presenters to ensure that it is relevant for all professions and to encourage putative autonomy (Priestley et al., 2021). As part of the curriculum development, process design principles were developed. Please note that the design principle development and validation are presented in a separate paper.

The research questions addressed in this paper were: *Is the proposed curriculum valid in terms of relevance, practicality, consistency and effectiveness and how can the curriculum be further improved?* The aim of the study was to validate the proposed IPECP curriculum by presenting the curriculum to both external and internal panellists

to obtain their input. The objectives were to elicit panellists' qualitative feedback and quantitative rating on the proposed curriculum in terms of validity. Provide suggestions for improvement and identify strengths and opportunities that can overcome weaknesses and threats.

Method

The research design is a convergent-parallel mixed methods approach where both qualitative and quantitative data were collected simultaneously (Creswell, 2014). The research method used was based on curriculum development research, an aspect of education design research (Van den Akker, 2006; McKenney & Reeves, 2020). The method is cyclical where each cycle evaluates the four criteria of relevance (content validity), consistency (construct validity), practicality and effectiveness (Nieveen and Folmer, 2013). The development of an IPECP curriculum was part of the primary investigators PhD study. Figure 1 shows the validation process from development of the proposed curriculum, the four cycles of refinement of the proposed curriculum leading to an implementation-ready curriculum.

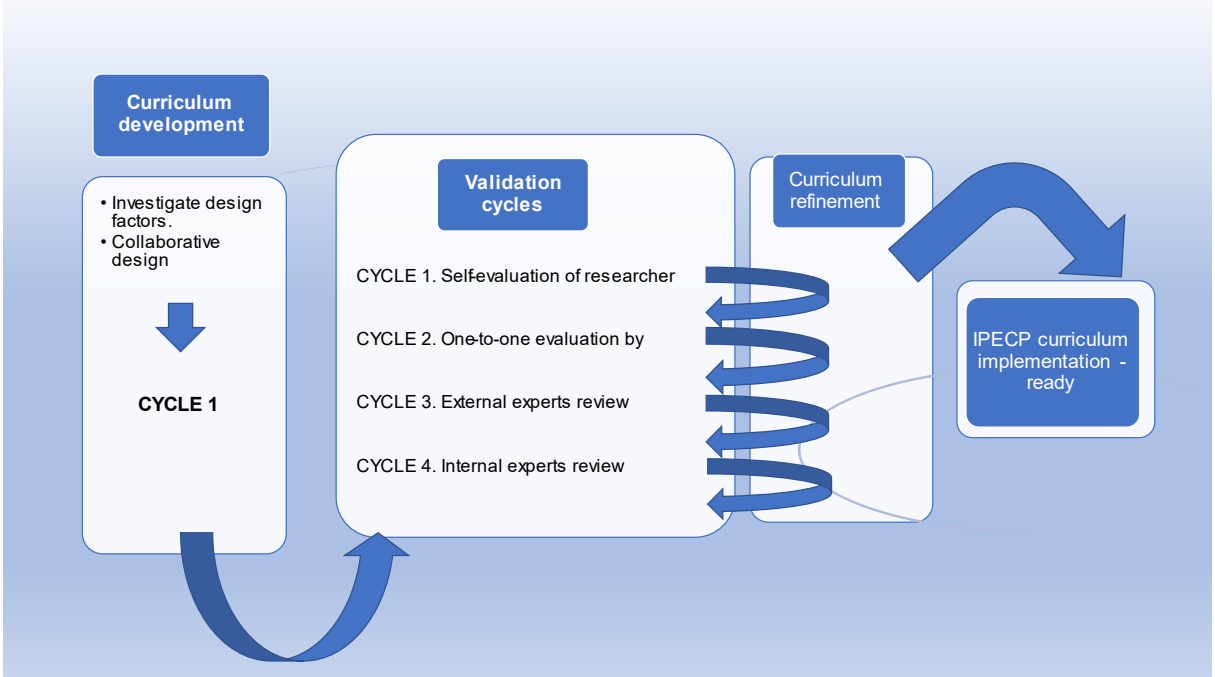

Figure 1: Curriculum design and validation process

Participant selection and sampling: purposive sampling was used to recruit internal and external panellists who met the inclusion criteria. The inclusion criteria for external panellists were that they had to be involved in either AfrIPEN (African Interprofessional Education Network as Board Member and therefore peer-recognised contributor to Interprofessional Education in Africa) or part of AfriVIPE (African Virtual Interprofessional Education network), experts from Africa and other countries with a special interest in developing international virtual interprofessional learning opportunities for undergraduate students. The external panellists further needed three or more years of experience in developing interprofessional education. The inclusion criteria for internal panellists were that they are part of the IPECP committee at the university and representative of their specific professions, in terms of either IPECP or curriculum development or both and have been part of the curriculum mapping of the IPECP competencies in their profession. The internal panellists also had more than two years' experience of IPECP involvement. Panellists who met the inclusion criteria were invited via e-mail to a once-off online event. The panellists who indicated that they were available to participate, were sent a detailed explanation of the proposed curriculum in advance of the online meeting. The external and internal panellists together formed the expert panel.

Data collection: a researcher-developed REDCap questionnaire was used to collect data. The questionnaire included three sections: a demographic information section, a section with quantitative rating on a 100-point Visual Analogue Scale (VAS) of each of the four criteria: relevance, consistency, practicality and effectiveness as well as a qualitative explanation of the quantitative rating of each section, indicating shortcomings, suggested improvements and strengths of the curriculum. A section with additional open-ended questions asked about overall barriers and enablers of the proposed curriculum.

Data was collected in three online sessions, session 1 and 2 with external panellists and session 3 with internal panellists. Session 1 acted as a pilot session, to improve interval validity and trustworthiness of the data gathering process. In each session, the curriculum was presented by the primary researcher, in the form of a 60-minutes PowerPoint presentation. After the formal presentation participants had the opportunity to pose clarifying questions and make suggestions, before completing the REDCap questionnaire. After each session, in line with the research method, the presentation, and where necessary content, were improved in terms of clarifying information

contained in panellists' questions and suggestions for changes. The proposed IPECP curriculum was thus refined after each cycle.

Data analysis: The demographic data was analysed descriptively. The quantitative data were analysed using descriptive statistics. The median, indicating the agreement of panellists, and interquartile ranges indicating the variation in consensus between panellists were first combined and then analysed separately for external and internal panellists. A deductive, thematic analysis of qualitative data identified themes related to overall strengths, weaknesses, opportunities and threats (SWOT) of the curriculum and deductive analysis of comments under the four criteria were completed. The thematic analysis followed a six-step process, namely becoming familiar with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the findings (Kiger and Varpio, 2020).

Ethical principles: For quantitative data face-validity of the REDCap questionnaire was established by the researcher supervisors interrogating the questionnaire and content validity was ensured by using the educational design research criteria. Reliability of data analysis was obtained through using the REDCap data analysis tool. Bias was minimized through triangulation of quantitative and qualitative data. For qualitative data trustworthiness in relation to credibility, transferability, confirmability and reflexivity were observed (Shenton, 2004). *Credibility* was promoted by frequent debriefing sessions between the research team and the triangulation between qualitative and quantitative data. *Transferability* was ensured by dense description of the research process. *Confirmability* was addressed by triangulation between data collected from both external and internal panellists, and from both qualitative and quantitative data. Researcher *reflexivity* encouraged constant and systematic awareness of personal background and viewpoints. The researcher consciously considered bracketing throughout the process of data analysis.

Results

Demographic information of participants

Data was collected in three sessions of a total number of 23 panellists. In session 1, 11 external experts and session 2, 12 internal panellists. The age, gender, professional field, years of experience, country are captured in table 1. The panellists came from a

wide range of countries and professions. Of note is that 83.33% of internal participants had less than 5 years' experience related to IPECP.

Table 1: Demographics of participants

Session	Number of panellists (N=24)	Age	Gender	Professional field (number)	Years of experience	Country (number)
1	11	27 - 72	10 Females 1 Male	SLPA (2), Nursing (3); Clinical Associate (1), OT (1), PT (1) Public Health (1), Bio kineticist (1) IPECP researcher (1)	0-2 (0; 0%) 3-5 (4; 36.4%) 6-8 (2; 18.2%) >9 (5; 45.5%)	SA (6) USA (3) Rwanda (1) Zimbabwe (1)
2	12	29-62	11 Female 1 Male	PT (3), OT (1), SLPA (3), Medicine (1), Dentistry (1) Dental Therapy (1) Pharmacy (1), Diet (1)	0-2 (4; 33.3%) 3-5 (6; 50%) 6-8 (1; 8.3%) >9 (1; 8.3%)	SA (12) All working at SMU

Criteria for validation

The four criteria for validation of a curriculum according to curriculum development research are relevance, consistency, practicality and effectiveness (Van den Akker et al., 2006, van den Akker, 2013). The following results were obtained in the quantitative rating of the criteria when external and internal panellists inputs were combined. The

graph on the left distinguishes between ratings of internal and external panellists and the graph on the right combines the results. Panellists rated each aspect on a Visual Analogue Scale (VAS) of 0 – 100. A high median (above 90) indicates that the panellists rated the curriculum as meeting the criteria. Interquartile range (IQR) of more than 25 was interpreted as indicative of concern / disagreement as it indicated a low level of consensus. An IQR of between 20 and 25 meant moderate consensus and IQR of below 20 was indicative of consensus amongst panellists. Qualitative data is presented for each of the criteria after the presentation of quantitative data to provide additional explanation of quantitative data. Data triangulation of data to increase trustworthiness of the validation process.

1. **Relevance** or content validity: Within this section participants had to rate the relevance of the content included in the proposed curricula and whether, in their opinion the IPECP curriculum content is deemed to be in accordance with current IPECP literature.

1.1 Quantitative data

Participants rated the curriculum content as highly relevant, with the collective median rating on the VAS scale of 99, with similar ratings between the external panellists (m = 100) and the internal panellists (m = 99). The overall interquartile range (IQR) is 7 (external=5.5, internal=7.3), indicating a high level of agreement between participants.

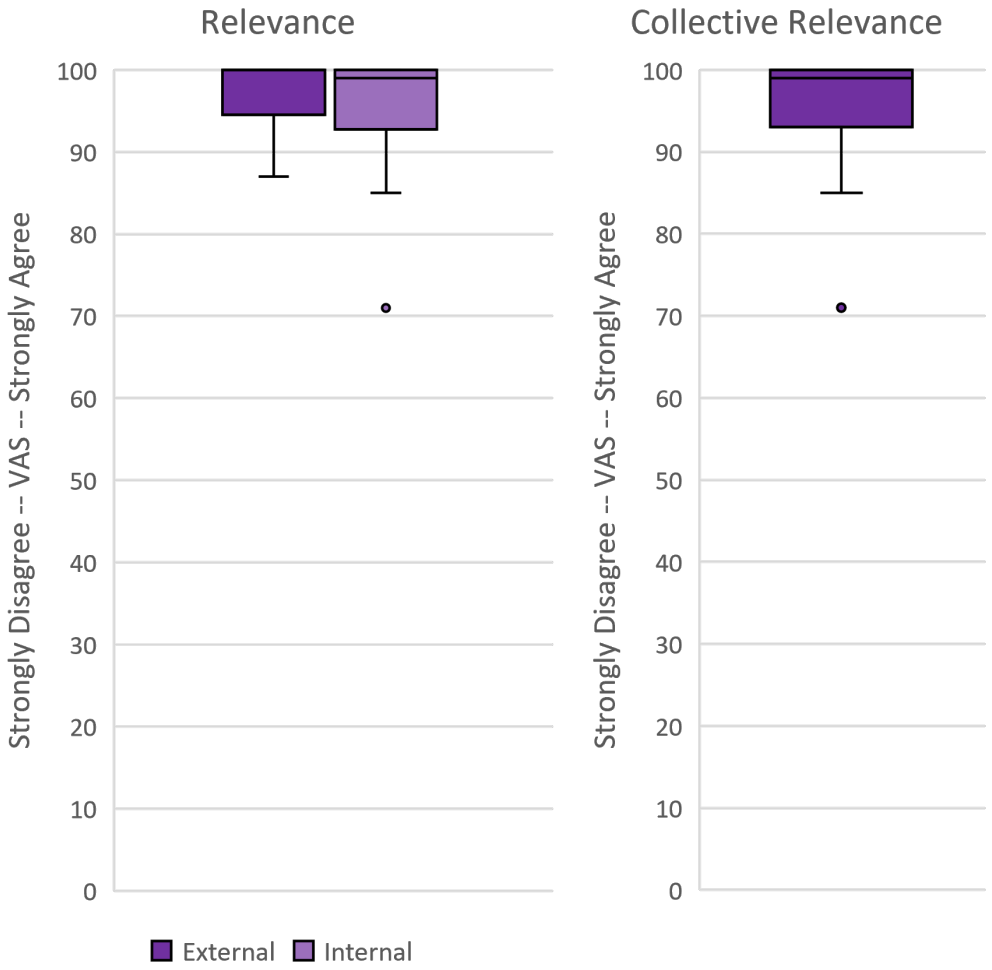

Figure 2 Relevance of the curriculum

1.2 Qualitative data

Overall, the panellists indicated that the curriculum is relevant. The external panellists' specific comments about relevance included that the themes are relevant for the South African context and to incorporate many professions, provides ample opportunities for students to learn from one another. The curriculum was valued as

> "…an essential project that will have international benefit to health care". [external panellist]

The internal panellists agreed that the conceptual curriculum is very relevant, reflects all core- competencies and provides.

> "ample opportunity for students to interact with this model of service delivery and team interaction".

The outliers under relevance suggested that group dynamics, buy-in from lecturers and variety of facilitators' skills level, are aspects that could cause constraints and needs to be planned for.

2. Practicality refers to the envisaged feasibility and user-friendliness of the curriculum. The intervention is expected to be usable in the settings for which it has been designed and developed.

2.1 Quantitative data

The practicality rating varied between the external panellists (m=91) and a lower rating by internal panellists (m=82.5), as can be seen in figure 3. The panellists collectively rated the practicality at a median of 86, indicating a moderate level of practicality – the lowest rating of the four criteria. The overall IQR was 25.5, indicating moderate consensus of the panellists (IQR = 16.5), with the greatest dispersion of consensus coming from internal panellists (IQR = 31.5).

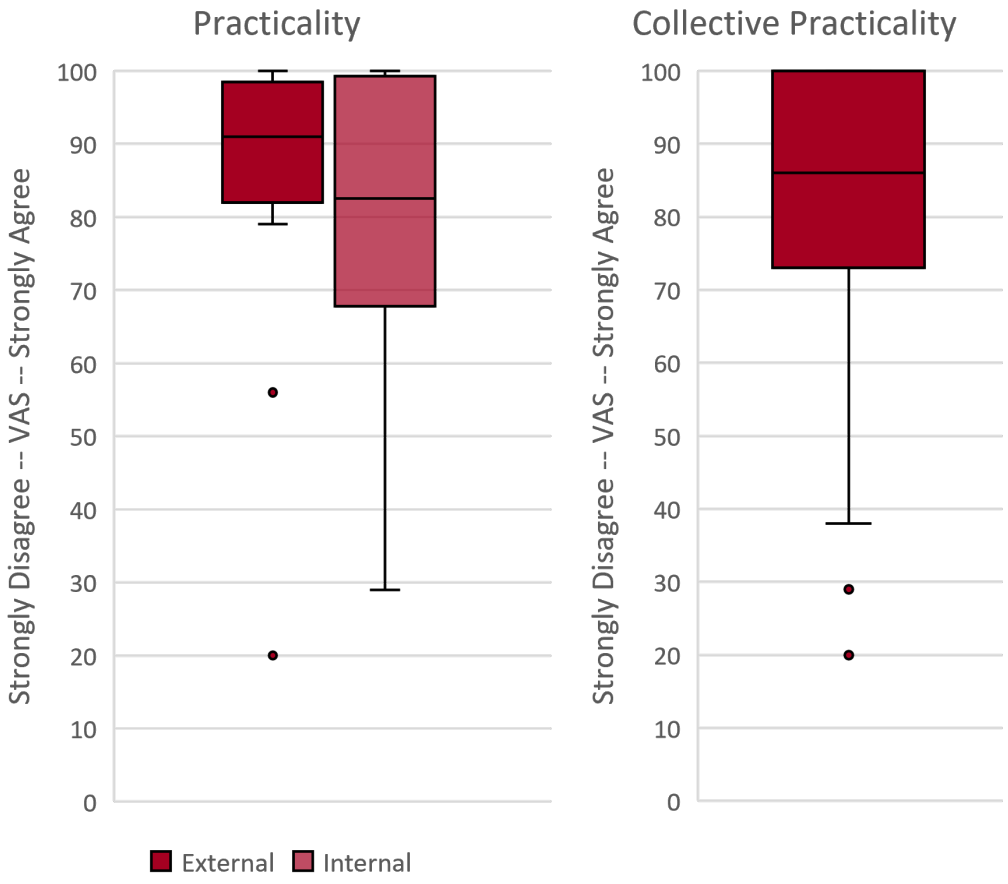

Figure 3 practicality of the curriculum

2.2 Qualitative data

External panellists commented that the curriculum is adaptable and highly practical, even for implementation at similar universities. Specific aspects that contributed to practicality were ring-fenced time, asynchronous use of videos, inclusion of Standardised patients and community mapping. Internal panellists viewed the curriculum as user-friendly, practical and manageable with the buy-in from management. The curriculum is clearly linked to the reality of professions and can be done concurrently with the profession-specific curriculum e.g., in work-integrated learning. Through the inclusion of overlapping modules across professions the curriculum saves time, human resources and the need for physical lecturing space. A critique of the curriculum is the limited time. Criticism included that the explanation did not clarify the integration of IPECP in the different professions' teaching and how the impact would be measured.

3. Consistency or the construct validity of the curriculum referred to the logical design of the curriculum. The consistency was rated across year levels of study and across the three streams of the proposed curriculum, that is interprofessional role development, values and ethics and primary health care.

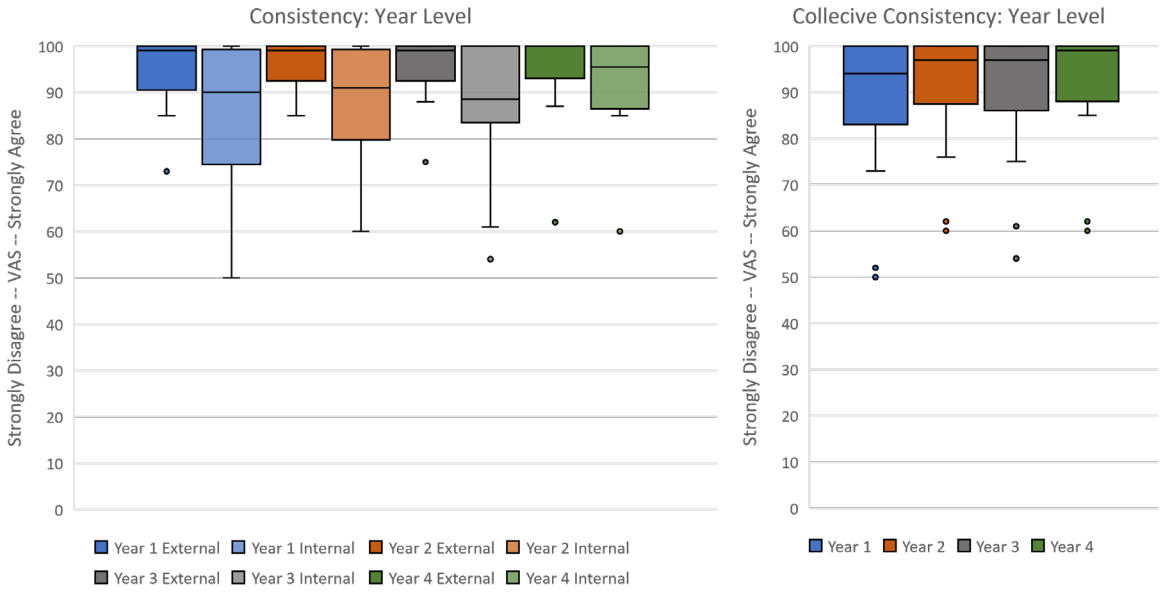

Figure 4 consistency across four-year levels of study

3.1.1 Quantitative data: consistency across year levels of study

The panellists rated the collective consistency across year levels of study as high, especially with the third and fourth year. Figure 4 indicates that year 4 achieved the

highest level of consistency with a collective median of 99 (external m=100, internal m=95.5), followed by both year 3 (external m=99; internal m=88.5), and 2 with 97 (external 99; internal 88.5) and year 1 with 94 (external m=99; internal m=90). Consensus varied with collective IQR of 12 for year 4 (external IQR=7; internal IQR=13.5), 14 for year 3 (external IQR=7; internal IQR=13.5), 12.3 for year 2 (external IQR7.5; internal IQR=19.5) and the lowest for year 1 with collective IQR of 17 (external IQR=9.5; internal IQR=24.75). Only moderate consensus was reached amongst internal panellists. The proposed fourth year's programme, the level in the curriculum which is the most similar to the one that has already been implemented, obtained the best ratings.

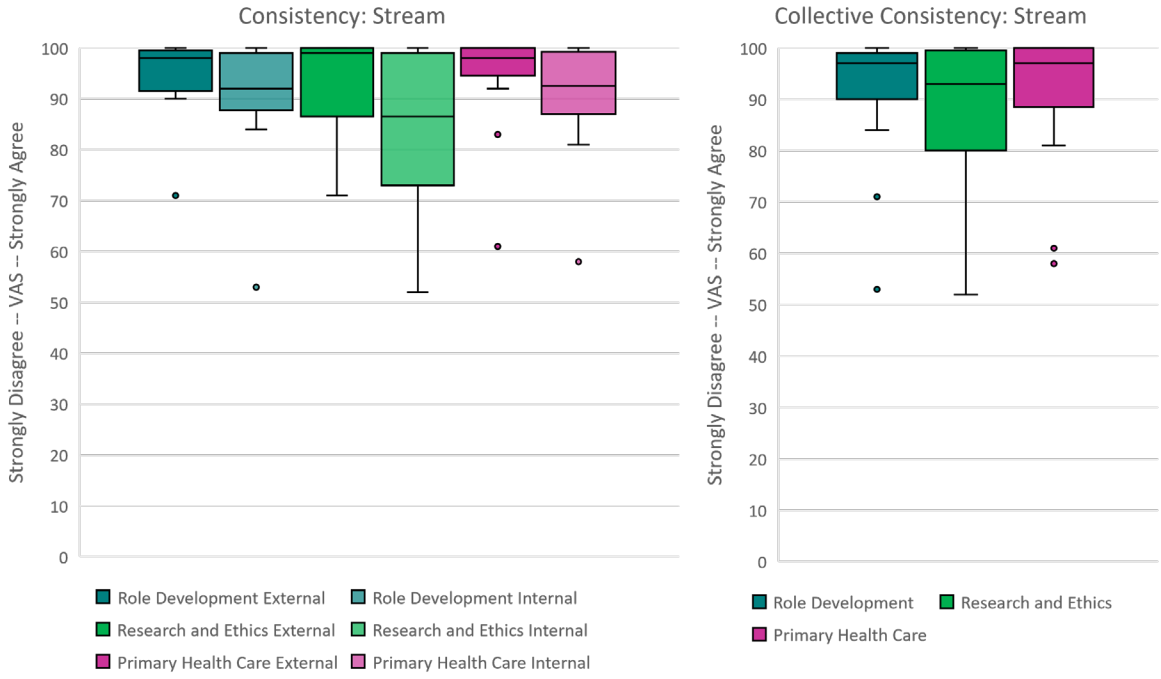

Figure 5 consistency across three streams

3.1.2 Quantitative data: consistency across streams

The three streams were compared. Even though the median differed between the three streams all three streams had a high collective median indicating that the panellists rated all three streams as meeting the criteria for meaningfulness. Figure 5 indicates the collective median for interprofessional role development was 97 (external m=89, internal m=92); research and ethics collective mean was 93 (external m=99, internal m=86.5) and PHC collective mean 95 (external m=98, internal m=92.5), The lowest rating was from internal panellists for the research stream. The collective IQR indicated high consensus for interprofessional role development was 9 (external IQR =8, internal

IQR = 11.25) and PHC with collective IQR of 11.5 (external IQR = 8, internal IQR = 12.25). There was lower consensus, however still within the range of acceptable consensus for Research and Ethics with the collective IQR of 19.75 (external IQR = 13.5, internal IQR = 26).

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3.2 Qualitative data regarding consistency across streams

External panellists indicated that there is an appropriate progression of expectations and outcomes built in an organic or logical way, using a scaffolded approach over four years. The build-up from uni-professional to interprofessional competence as well as including research and work-integrated learning adds usefulness and consistency. The students' collection of evidence over the years provided a mechanism to monitor their growth. In analysis of the quantitative data, some panellists, those who can be seen as outliers in the graphs, responses were analysed. These panellists expressed concern about the research stream indicating that undergraduate research is already fraught with challenges, and adding an expectation for collaborative research may be too aspirational at this stage. There was also concern about the logical flow across various years requiring continued evaluation when the curriculum is implemented.

4. **Effectiveness** refers to the curriculums' ability to achieve the desired IPECP outcomes for each academic year level of study and in each of the three streams.

4.1.1 Quantitative data of year levels of study

Participants rated the IPECP curriculum across year levels of study as meeting the criteria to achieve the desired IPECP outcomes, however there were differing levels of consensus over the years with the lowest consensus at year 1. A high collective median was achieved, especially with the third and fourth year. Figure 6 indicates that year 4 achieved the highest level of effectiveness with a collective median of 96, where the external panellists (m=94) rated lower than the internal panellists (m= 97.5). *The year 3* (external m=94; internal m=92) was collectively lower, but this is the only rating where the internal allocated a higher rating than the external panellists. Year 2 with median of 96 (external m = 99; internal m= 85.5) had a higher rating than year 1 and 3 and overall, the same rating as fourth year, however, the external panellists allocated the highest rating all of years to year 3, where the internal panellists gave both year 2

and year 1 the same low rating. Year 1 with 92 (external m=93; internal m=85.5) external rating and a similar low rating from internal as year 2. Consensus varied with for collective moderate consensus (IQR = 17.5) for year 4 (external IQR=11.5; internal IQR=24.25) indicating consensus from external panellists and moderate consensus from internal panellists, 19 for year 3 also indicating moderate overall consensus (external IQR=14.5 = consensus; internal IQR=21.75 = not consensus. The collective consensus for year 2 was a concern at 28, (external IQR =20.5= moderate consensus; internal IQR=33.5=not consensus). The lowest collective consensus of 36 was in year 1 (external IQR=28 =not consensus; internal IQR=40.5 = not consensus). Figure 6 shows a progressive increase in effectiveness from year 1 to year 4.

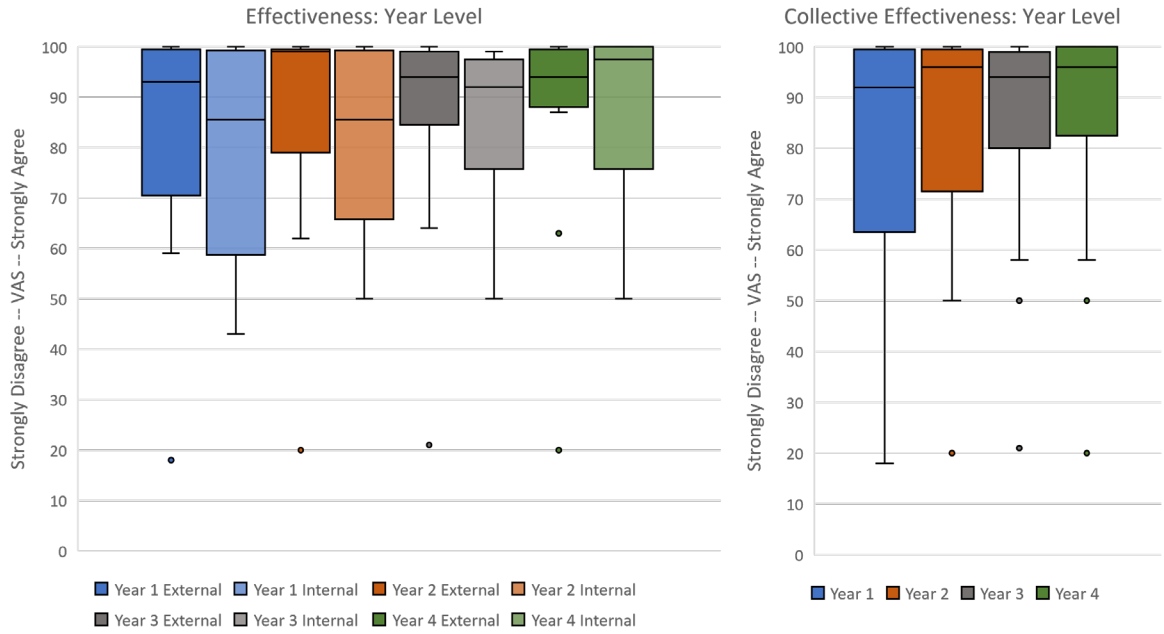

Figure 6 Effectiveness of four-year levels of study

4.1.2 Quantitative date of effectiveness of streams

The three streams including interprofessional role development, research and ethics and Primary Health Care (PHC) were compared. Even though the median differed between the three streams, all three streams had a high collective median indicating that the panellists rated all three streams as meeting the criteria to achieve the desired IPECP outcomes. Figure 5 indicates the collective median for interprofessional role development was 99 (external m=94, internal m=90); research and ethics collective mean was 90 (external m=99, internal m=84.5) and PHC collective mean 91 (external

m=92, internal m=89.5), The lowest rating was from internal panellists for the research stream. The collective IQR indicated high consensus for interprofessional role development was 14.5 (external IQR =4.5, internal IQR = 25.75), indicating disagreement of internal panellists. Primary Health Care with collective IQR of 20.5 indicating moderate consensus (external IQR = 17 =consensus, internal IQR = 20.5). The lowest consensus, however, is still within the range of moderate consensus for Research and Ethics. The effectiveness across streams had better ratings and consensus than across year levels of study indicating a need to pay attention to how the curriculum is addressed especially in year one and two.

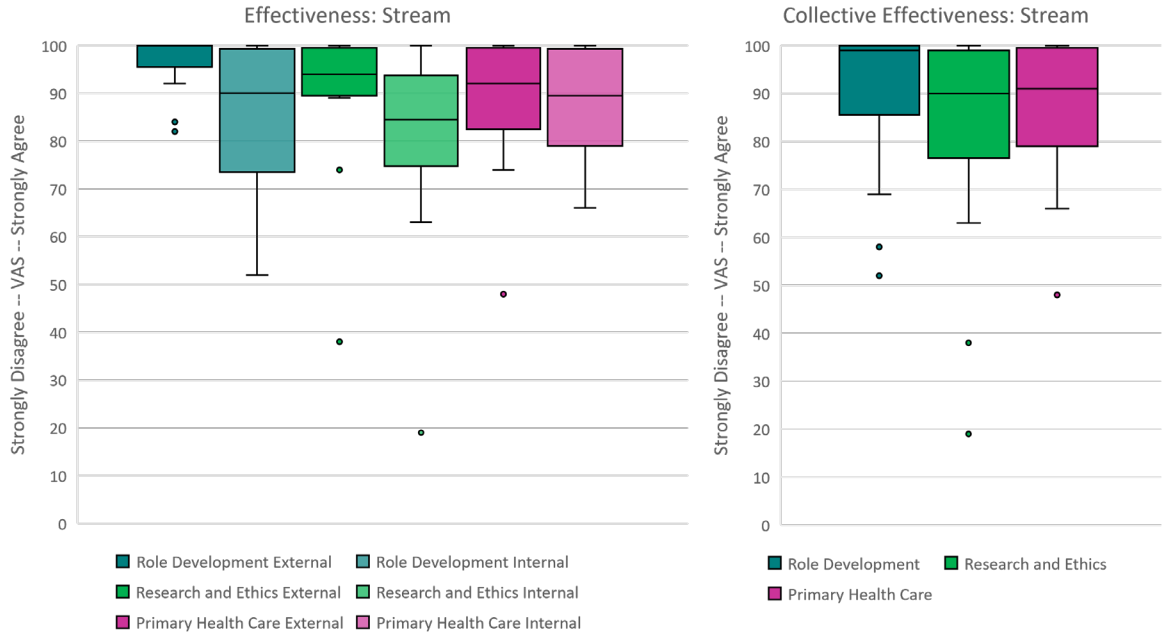

Figure 7 Effectiveness of streams

4.2 Qualitative data about effectiveness of streams

External panellists approved the connection and alignment between years and the obvious link to IPEC-competencies. The progress of students across the years was logical and achievable:

> "As it starts in the first year, each year provides foundation for the next phase, and students are not bombarded in one year, and required to achieve competencies in one year".

Examples of effective activities highlighted by the panellists were cultural competence in first year, and in second year, mentorship or coaching of second years by senior students. Year 1 and 2, however, were the year levels of study that achieved the lowest level of consensus. The proposed fourth year's programme, where there was best consensus of the four years, is also the level in the curriculum which is the most similar to the one that has already been implemented. The internal panellists warned that it is difficult to say whether or not the curriculum will be effective prior to implementation, indicating that on paper the programme could appear effective but may be ineffective on implementation. The outlier's criticism was that the focus should be on advancing IPECP rather than on using PHC. The explanation of the measurement of the effectiveness of IPECP was not clear.

Strengths, weaknesses, opportunities and threats (SWOT) of the proposed curriculum.

External and internal panellists provided feedback on the proposed curriculum for each category of validation as presented already, but also for overall curriculum in terms of SWOT analysis. Table 2 presents a summary of thematic analysis of categories adding direct quotes from panellists to elucidate explanations.

Table 2: Strengths, weaknesses, opportunities and threats of the proposed curriculum

Strengths	**Weaknesses**
• Embedded and integrated design. • Scaffolded approach. • Builds on achievement of core-competencies. • Inclusion of relevant themes and variety of learning activities. • Logical diagram presentation of the curriculum to make it user-friendly. • Role of students in curriculum implementation.	• Insufficient time allocation for IPECP. • Valid and reliable assessment and evaluation. • Research stream implementation. • Preparation of facilitators • Inclusion of theoretical content related to themes

Opportunities	Threats
• Provides an adaptable framework that makes it relevant for other institutions. • Collaborative research opportunities. • Linked to faculty development and performance management system. • Establishments of an IPECP unit	• Resource constraints e.g., time and human resources. • Requires continuous efforts to ensure buy-in. • Lack of formal management and support structure to implement curriculum.

Strengths

Embedded and integrated design: Participants commended the IPECP curriculum for being integrated into existing structures and not being presented as a separate module. The proposed curriculum integrated more than just knowledge, the concepts of education, research as well as service delivery were also integrated. Participants appreciated how profession-specific topics were integrated into application in the IPECP curriculum. The embedded and integrated design allowed the simultaneous application of IPECP while doing work-integrated learning.

> "This [curriculum] can be implemented concurrently with already outlined practicums with emphasis on IPECP" *internal panellists.*

Scaffolded approach: The proposed curriculum was based on topics included in profession-specific subjects, thereby using information and resources that are readily available. Further there were overt links between what is taught at a specific year level of study in a profession and what was expected in IPECP and in work-integrated learning. This constructive alignment created opportunities for professions to include IPECP content in summative evaluation in the profession, where marks would be associated with the application of knowledge gained in IPECP. The different year levels of study each had a specific theme that guided the selection of content for the specific year level of study and made scaffolding obvious because year levels of study and streams build across the curriculum both vertically and horizontally.

> “The consistency as it was presented is well considered such as role development is clear and very well thought through, to progress logically and realistically through the different years of study [internal panellist].

The streams follow a logical progression and are logical and interlinked.

Builds on achievement of core-competencies: The panellists appreciated how core-competencies at specific year levels of study, build on the expectations and outcomes of students’ progress, align with activity selection and form the basis of assessment. An interesting remark was that assessment linked to competencies could have wider implication, than just feedback to students on their progress:

> “formative evaluation in academic communal spaces using the IPEC-Core-Competencies contribute to standardize and form a basis for communication of future research results”. [external panellist]

The incorporation of all core-competencies in the curriculum is important, for example providing students opportunities to practice resolving communication challenges with clients/patients, supervisors, and on intra and inter-professional levels. All IPECP activities require teamwork as students do the majority of activities in small groups with a trained facilitator. Two of the core-competencies in the streams clearly demonstrated the gradual growth in terms of students’ role development, referred to as

> “it shows the increasing maturity of students in their specific professional identity” [external panellist]

The IPECP curriculum clearly demonstrates how students develop bot their uni-professional identity and identity as collaborative ready team members.

Inclusion of relevant themes and variety of learning activities: Cultural sensitivity, as theme for Year 1, was considered relevant. During cultural sensitivity training students are sensitized to the benefits and challenges of diversity – an integral part of IPECP.

> “I particularly enjoyed the cultural sensitivity section in the first year. In a country like ours, it is important to discuss how different religions, cultures and races manage and view health, disease and the management thereof– an aspect seen as especially important for health care students embarking on a career as a health care practitioner”. [internal panellist]

The curriculum addresses the achievement of graduate attributes including communication and collaboration. The importance of communication across all levels and the importance of addressing communication barriers is adequately incorporated in the proposed curriculum. The use of case studies and inclusion of standardised patients were valued as it was seen to create an

> "authentic simulation as an opportunity to practice in a safe environment'. [external panellist]

The structure and format of the curriculum make it easy to follow: The schematic depiction of the curriculum was specifically highlighted as a component that assisted staff and students to understand the curriculum, because it was logically and professionally presented.

> "….concise overview and expectations for each year's programme, … with clear descriptions and pathways and easy to follow in the real-world" [external panellist].

A specific aspect that resonated with panellists is the explanation of time allocated in the curriculum:

> "The ring-fenced approach is practical because it is very difficult to accommodate everyone based on their different timetables and other logistics". [internal panellist]

Role of students on curriculum implementation: the curriculum allows students to assume leadership roles and contribute to facilitation of learning:

> Having students serve in the role of a champion or mentor is powerful and meaningful". [external panellist]

Opportunities

Provides an adaptable framework that makes it relevant for adaptation at other institutions: The curriculum was designed with the context, opportunities and challenges of a specific university in mind, however, the curriculum is based on literature and refined through reflection on and benchmarking with national and international IPECP programmes. The panellists pointed out that the proposed curriculum,

"although developed for a very specific context, provided an adaptable framework to apply at other universities".

The curriculum was seen as a possible 'blue-print', yet adoption into practice might require more work as the activities need to be context-specific.

Collaborative research opportunities. The curriculum not only presents opportunities for collaborative undergraduate research teaching and development of collaborative research projects but creates momentum and stimulation for facilitators to engage in collaborative research on aspects of curriculum implementation.

Faculty development: Inclusion of IPECP in the strategic plans of the university and therefore in the performance management, leverage support and make it possible for lecturers to receive training in facilitation and develop their prowess through post-graduate IPECP courses.

Establishment of an IPECP unit: the increasing needs in terms of creating collaborative engagement on work-integrated learning spotlighted the need for an IPECP unit, that could coordinate learning activities.

Weaknesses

The qualitative analysis identified six weaknesses in the proposed curriculum that needed further exploration.

Time allocation: Multiple concerns were identified related to time allocation. All profession-specific curriculums are already overloaded, and professions are hesitant to allow students to spend time on non-profession specific activities. Contrary, the panel saw the weakness as not sufficient time allocation (only 16 hours) allowed to enable achieve core-competency outcomes.

Assessments: A valid concern of the panellists was that a curriculum that is "noncredit bearing makes it not easily enforced and that implementation is not guaranteed". The use and design of suitable rubrics that could satisfy all professions for summative mark allocation need to be collaboratively developed.

Research stream: Including a research stream as part of the curriculum was considered as too ambitious by the panellists. Careful attention needs to be paid to buy-in for this concept as panellists expressed concerns:

> “Undergraduate research has been challenging within departments, and realistically I do not see that we will be able to pull it off”. [internal panellist]

Panellists suggested a more gradual incorporation, with initially a few lecturers trying it out.

Preparation of facilitators: The success of the IPECP curriculum depends on enough trained and enthusiastic facilitators, for which management buy-in and support is needed.

> “Ongoing investment is needed by facilitators to update IPE knowledge and skills”.

Theoretical content related to themes: Another weakness identified is the lack of overt mention of frameworks that guided themes in the curriculum.

Profession-specific exceptions: Seventy three percent of the professions (eight of the eleven). do a four-year degree and that is why the proposed curriculum is presented over four years. Panellists queried how professions who have a three-year, five-year and six-year degree will be accommodated.

Threats

Panellists identified three types of threats to the successful implementation of the curriculum.

Resource constraints, for example time: the importance of integrating the curriculum into existing structures was stressed, to avoid the perception that IPECP creates an increased workload for students and academics. Panellists’ legitimate concerns were that:

> “overfull profession-specific curricula and extracurricular activities, intensify time constraints”. [internal panellist]

Continuous buy-in: buy-in for IPECP is not a given but require constant attention through marketing, development of champions and providing recognition for additional efforts:

> “IPE is often deemed as an add-on in health professions education” [external panellist]

Involvement of the whole university is suggested.

> “Please get all the schools involved, so that the entire university can kick-start this beautiful idea. This [IPECP] should be mandatory for all students if it is to be taken seriously by other academics out there. Students must not have a choice but to do this, as long as they are registered students”. [internal panellist].

Lack of formal management and support structure to implement curriculum: Not having an IPECP unit and dedicated staff to implement the IPECP curriculum was identified as a threat that hopefully could be converted into an opportunity in future.

> “the need for an IPECP unit is not formally recognised, nor supported yet by an appointed IPECP committee to drive implementation”. [internal panellist].

Recommendations for changes from panellists

Analysis of the recommendations for changes were classified under four themes: *changed presentation, changed the curriculum, addressed through design principles* and *inappropriate in context to adopt recommendations*. The *change of presentation* helped to clarify the explanation of the curriculum. The *changes to the curriculum* helped to refine the curriculum. The *design principles* helped to clarify the reasons for inclusion or exclusion of aspects. *Inappropriate in context to adopt recommendations* may be relevant to consider when the curriculum would be used by other universities.

Changed presentation: Comments from external panellists helped to improve the curriculum presentation. Since the curriculum was new, it had to be presented to a variety of audiences, and the improved explanation contributed to the curriculum end-product.

Changed the curriculum: The addition of an assessment diagram contributed to refining the reasoning around and explanation of the rationale for allocating marks in profession-specific subjects where the profession’s lecturers could ensure the quality and appropriateness of students’ application of knowledge – an aspect of that facilitators from other professions are not able to do. Changes to the naming of themes, by adding IPECP, improved the explanation of the intention of each year level of study.

Need for design principles that provide the rationale for implementation: The questions related to aspects of the curriculum confirmed the importance of well formulated design principles, to provide the rationale for implementation.

Inappropriate in context to adopt recommendations: the importance of context-specific curriculum was confirmed by comments from external panellists that suggested use of resources that are not available at the university.

Discussion

The paper reports on the validation of the proposed IPECP curriculum through eliciting feedback from external and internal panellists on the proposed IPECP curriculum to contribute to the curriculum's transparency and plausibility (van den Akker, 2013). Thirteen external panellists and thirteen internal panellists, from different professions, ages, genders and countries interrogated the proposed curriculum and provided valuable input in terms of the validity categories as well as the SWOT analysis to contribute to the refinement of the curriculum. External panellists, as part of curriculum stakeholders, could provide valuable input on the relevance of the curriculum in this evaluation phase (Matković et al., 2014). The internal panellists in the study had less experience because the IPECP programme at the university is relatively new, starting only in 2019.

Finding a suitable method to use for validation of a proposed curriculum was challenging. Nevertheless, the method described in this study, that is curriculum development research (van den Akker, 2013), yielded unanticipated positive results. The method not only evaluated the validity from a theoretical perspective but also provided a cyclical approach to elicit input on the prototype: the proposed IPECP curriculum, in terms of how it could be integrated into practice (Plomp, 2013, McKenney and Reeves, 2021). Embedded in the research method is the development of design principles, that will be reported in another paper (van den Akker, 2013).

Validation prior to implementation is a crucial step that's usually left out of curriculum development (Thomas et al., 2022). The value of prior validation lies in creating a product that is easily received by the implementers (McKenney and Brand-Gruwel, 2018); (Armstrong et al., 2022). Including lecturers in the development and validation process can improve buy-in and ownership which can contribute to successful implementation. One of the main premises of curriculum development research is that it supports and informs decision making in curriculum development (van den Akker, 2013). The recommendations from the panel were incorporated to improve the IPECP curriculum. During the validation process, meaningful suggestions on improving the curriculum is more productive than standardization of methods to collect and analyze

data (van den Akker, 2013) and this is why quantitative data on the four validation categories were supported by and strengthened with qualitative descriptions and suggestions.

Through the identification of strengths, weaknesses, opportunities and threats (SWOT analysis), prior to implementation, the researcher received objective feedback from the panellists that guided the needed changes. The SWOT analysis indicated components of the proposed curriculum that panellists deemed appropriate and that did not need to be adjusted (strengths and opportunities) and that could help to overcome weaknesses and threats. The weaknesses and threats helped the researcher to identify aspects that should be either modified, refined or where additional plans need to be put in place to limit their negative impact on the implementation of the curriculum.

Thomas et al., (2022) emphasized that implementers of the curriculum need to be able to understand the curriculum in a way that both ensures the compliance to the process and elicit their support for this curriculum (Thomas et al., 2022). Presenting the curriculum to internal panellists provided an opportunity for them to become familiar with the curriculum and as they are representatives of the IPECP and curriculum committees they contribute to implementation of the curriculum. Another advantage of validation prior to implementation is the establishment of an evaluation tool to measure the curriculum again after implementation, to compare the proposed with the implemented curricula (van den Akker, 2013). The pre and post evaluation is often a neglected part of curriculum implementation. The changes made between the proposed and implemented curricula could guide other developers and researchers in terms of aspects that needs to be considered in development and implementation. Students can also be asked to evaluate the implemented curriculum as their lived experience of curriculum implementation will be valuable in deciding how to modify their curriculum, going forward.

The validation process provided opportunities to explain the diagram of the proposed curriculum across year levels of study. The explanation demonstrated how aspects of the curriculum fits into the overall curriculum for example for senior year levels of study, how foundational information in year 1 and 2, will make it easier to add additional layers of understanding. It highlighted the importance of spending more time with first- and second-year facilitators who are new implementers of the programme.

The internal panellists are in touch with the context, understand students' limitations and challenges and could appreciate the benefits of IPECP from how students embrace IPECP during work-integrated learning. The IPECP events, previously offered in final year as an event-based curriculum, is in the proposed curriculum replaced by an integrated longitudinal curriculum instead of an add-on event for final years. The internal panellists were able to see the value of the build-up from first to final year. The internal panellists may be influenced by their concern about their own professional teaching.

The four criteria for validation of a curriculum that is relevance (content validity), consistency (construct validity), practicality and effectiveness were all deemed appropriate. Relevance is the most prominent characteristic of the initial planning, where research was used. The curriculum is based on IPECP and curriculum development literature, the situational analysis eliciting input from internal stakeholders and a curriculum analysis mapping of existing opportunities to develop IPEC-core-competencies and communal topics. The panellists rated both relevance and consistency as appropriate. Both practicality and effectiveness of the proposed curriculum were rated as moderately appropriate. Only moderate appropriateness rating could be explained by the expected and actual practicality that may differ, as practicality and effectiveness can only be sufficiently evaluated after implementation. Comparing effectiveness and consistency indicated that the consistency and effectiveness ratings showed an upward trajectory, possibly as the third and fourth year have to, and extent been implemented in the pilot phase and internal panellists were more familiar with it. The streams for effectiveness and consistency showed similar trends with the research stream achieving the lowest consensus. The recommendations and changes made as a result, the use of design principles and feedback elicited on the pilot phase of implementation, would contribute to further improvement of the practicality and effectiveness.

The strengths and opportunities of the proposed IPECP curriculum as identified by the panellists would support a sound foundation for implementation and could help to overcome some of the weaknesses and threats. These strengths were confirmed by the positive quantitative results. Inclusion of opportunities to stimulate research contributes to a curriculum that addresses all three pillars of expectations at university level, that is research, service delivery and education. The scaffolded approach (May

& Silva-Fletcher, 2015) was incorporated in the way that the curriculum builds up from level 1 to 4.

The identified weaknesses and threats confirmed the importance of considering the intended context in planning. Availability of resources such as community developers and coordinators and health educators that can advise on content will influence curriculum development. Contrary, feedback related to it being unrealistic to include eleven professions, eleven professions were successfully involved in the past. Additionally concerns expressed by internal panellists cautioned that not all participants thought that the suggested changes to the existing curricula were possible. This highlighted the importance of preparing all role players in all involved professions for implementation of the four-year proposed curriculum, including all lecturers, clinicians, managers (Milot et al., 2015) and students.(Reeves et al., 2013), because as in all IPECP programmes buy-in from role players is essential.

Limitations

The limitations of the study lie in the focus on a curriculum of one particular university, that may be different in context from other universities who are in the process of developing an IPECP curriculum. Although limited to one university, the external group assisted in creating general principles to apply for overall IPECP curriculum development.

The internal and external groups who validated the curriculum were not homogeneous. The external group is not familiar with the specific context of the university for which the curriculum was planned yet had a more global view on curriculums at other universities and other programmes. The internal panellists have experienced and contributed to the development of the programme to a varied extent, contrary, may have biases, preconceived ideas and expectations due to their involvement. The internal panellists are also viewing the curriculum from the perspective of knowing where previous activities have gone wrong and can link it to the practical component of aspects that can influence the success of the programme. The diversity of the group, however, had more advantages than disadvantages as it provided input from multiple viewpoints.

Presenting the curriculum as an online presentation with a limited time-period of two hours, may have reduced the opportunity for the panellists to ask questions on aspects

that they did not understand e.g., some new concepts like the research being introduced across the years and the Primary Health. To overcome this limitation the proposed curriculum was sent to panellists before the presentation.

No clear formula was available in literature for validating a proposed curriculum prior to implementation. Only once the curriculum has been implemented across all the years, could the overall effect be measured.

Conclusion

The key implications of the study are that using curricular development research to validate a proposed IPECP curriculum can elicit important guidance from objective participants, that could contribute to implementation-ready curriculum. Presenting the proposed curriculum to internal panellists contributes to buy-in as it creates an opportunity for their critical engagement with the different aspects of the curriculum. The curriculum validation emphasized the complexity of the curriculum as a multi-dimensional endeavor that needs to consider a variety of aspects in terms of content, resources and commitment from various stakeholders to be context specific.

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7.3 Introduction to paper 6

The design principles are a set of procedures and conditions for successful dissemination and implementation. Design principles are based on the theory that was already established as well as reflections during each cycle of the proposed curriculum development. Design principles clarify what would make the curriculum function. The researcher developed the design principles, based on the elements that were identified in Phase I and II of the study. The design principles are important as they not only guide the implementation of the SMU-IPECP curriculum but could also guide the planning of curricula at other institutions.

Pitout, H; Barnard-Ashton, P; Adams, F, SHJ du Toit (2023). Validating design principles of a proposed Interprofessional Education and Collaborative Practice curriculum – Modified Delphi process. Journal of Interprofessional Care

Design Principles to Enable IPECP Curriculum Implementation: a Modified Delphi Study

Final draft before submission to Journal of Interprofessional Education

Abstract

Introduction Procedural and substantive design principles provided both practical application and theoretical reasoning for the implementation of an IPECP curriculum. The validation and consensus process helped to refine the tentative design principles to a set of well-formulated, comprehensive, and implementable principles.

Methods The IPECP curriculum and design principles were developed using Curriculum Development Research. A Modified Delphi technique was used with panellists in three rounds who rated and rephrased the tentative design principles created through earlier stages of IPECP curriculum development. The panellists were requested to add additional design principles if needed. Round 1 had 11 external panellists who rated and made suggestions for rephrasing. The suggestions were implemented before Round 3. Round 2 had 12 internal panellists who rated and made suggestions on the rephrased design principles. After comparing the results of Round 1 and 2, the design principles with least consensus were returned in Round 3, to the entire expert panel.

Results All 17of the initial design principles, were rated appropriate (median above 80) with an interquartile range that indicated consensus (less than 20 difference). Only one design principle was added. For eleven of the design principles in Round 1 and 2, the median difference between external and internal panellists was more than 5, and for only two of these there was a difference in interquartile range of more than 15 indicating a lower level of agreement. The eleven principles, including the one added

design principle, was send again to the entire expert panel, for Round 3. All eleven principles achieved acceptance in Round 3 with a median of above 92. The final 18 design principles were separated into procedural and substantive design principles. Four procedural design principles and six substantive design principles were sent to Round 3.

Discussion Developing design principles yielded not only practical advice for implementation in the context for which an IPECP curriculum is designed but also supplies valuable theoretical knowledge that can be applied in similar situations, to plan and implement an IPECP curriculum. Validation of design principles by expert's prior implementation through a Modified Delhi study, circumvented problems that may only have become evident during implementation.

Conclusion

The consensus and validation of the 18 design principles for an IPECP curriculum yielded both substantive and procedural principles that could be used by curriculum designers at other institutions as well as guidance for implementers of the curriculum at the university for which it was designed.

Introduction

Interprofessional Education and Collaborative Practice (IPECP) curricula needs to be contextualized to optimally prepare students to be collaborative-ready when they qualify (World Health, 2013). Both exposure to interprofessional education (IPE) in class, where students can learn with, from and about each other, as well as opportunities for collaborative practice, where they can work with other students and professionals to plan and implement comprehensive health care needs to be included (Gilbert et al., 2010). Planning IPECP curricula needs incorporation of a variety of factors, including procedural and substantive considerations (van den Akker, 2013). The Four-dimensional Curriculum framework, developed for IPECP, suggest categorizes of factors into identifying future health care practice needs, defining and understanding interprofessional capabilities, methods of teaching, learning and assessment and lastly, supporting institutional delivery (Moran et al., 2015). Consideration of these factors resulted in an IPECP curriculum tailored to the needs of the specific university (Pitout et al., 2022).

The health sciences university for which the proposed IPECP curriculum was developed, offers undergraduate and post graduate curricula for eleven health care professions, in four schools. The School of Health Care Sciences include students of five professions, which include occupational therapy, physiotherapy, human nutrition and dietetics, speech language pathology and audiology and nursing are included. The School of Pharmacy only train pharmacy students. While the School of Medicine includes medicine and radiography students. The School of Oral Health Care includes dentistry, oral hygiene, and dental therapy students. The IPECP curriculum spanning four years, was developed as part of the first authors PhD study. There are approximately 650 students who engages in IPECP in each of the four years of the IPECP curriculum that is now in the pilot phase of implementation. The IPECP curriculum is presented as an integrated curriculum, not a separate module. Formative

assessment occurs during the 16-hours per semester IPECP programme. The IPECP curriculum has direct connections to the profession-specific curriculum of all eleven involved profession, where specific IPECP competencies addressed in that year level are summatively assessed in profession-specific subjects, such as work integrated learning. All accreditation bodies for the involved professions expect students to engage in interprofessional education during undergraduate training. The proposed IPECP curriculum and the validation process of the curriculum is presented in another paper.

Throughout the research process to develop the IPECP curriculum, the researchers systematically reflected on the theoretical and practical considerations and produced design principles to guide the development of the curriculum. Design principles captured the rationale of why and how certain factors should be incorporated in the IPECP curriculum thus making explicit, the implicit design decisions (Plomp, 2013). Design principles can further be defined as heuristic statements that provide guidance on how to implement and disseminate innovative and relevant intervention, diagnose problems that need to be addressed, provides scientific research certainties or theoretical statements (Plomp, 2013). These principles, even more than the IPECP curriculum that is developed for the specific context, provided the scientific output of the research process (Plomp, 2013, van den Akker, 2013 #410, van den Akker, 2013). In addition, design principles generalised theory that could be applied not only in the context for which it was developed, but could also be applicable in other settings (Edelson, 2006) therefore these principles are considered as a living part of the design process and can help the curriculum implementers to make decisions (van den Akker, 2013) The set of design principles therefore adds to the theoretical basis of curriculum development by suggesting principles that other universities could consider and adapt when they design a curriculum that fits their own context.

There are two main types of design principles namely procedural design principles that are characteristics of the design approach (the implementation of the curriculum) and substantive design principles, characteristics of the design or intervention (or content) itself (Plomp, 2013). Design principles therefore assist implementers in applying the most appropriate procedural and substantive knowledge for design, development, and implementation of the curriculum. Design principles in itself, cannot guarantee successful curriculum implementation, however, it produces theoretical recommendations and practical guidelines that could guide stakeholders' understanding and implementation (Edelson, 2006, van den Akker, 2013).

The research design used in this project was the educational design research, specifically curriculum development research, which provided a suitable and structured method for not only the development of the proposed curriculum and design principles, but also for its validation (van den Akker, 2013). The research process of educational design research consists of iterative cycles of analysis and exploration, design and construction, evaluation and reflection leading to maturing intervention and theoretical understanding which enable implementation and spread (McKenney and Reeves, 2021). During the analysis stage existing literature was analysed by interrogating, discussing, and exploring the emerging findings (Veletsianos et al., 2022), before the collaborative design and construction of the proposed IPECP curriculum (Vesper et al., 2015). The IPECP curriculum was analysed through expert appraisal by 23

participants, and tentative design principles were formulated (van den Akker, 2013) as part of validation prior to implementation.

Validating and refining a curriculum and design principles prior to curriculum implementation, is a pro-active approach that save time through identification of problems that may potentially, without the input of objective panellists, have only become evident after implementation (Plomp, 2013). The validation process added to improving the preparation, supported the implementation and contributed to quality improvement (Hollander et al., 2002). The formative evaluation and validation of the proposed IPECP curriculum and design principles by panellists addressed several aims. The objectives included to gain insight into the quality of the IPECP curriculum and the design principles before implementation of the curriculum, to consider the potential and key characteristics of the IPECP curriculum, to provide suggestions to improve on the weak points, to improve to a high-quality final deliverable, to sharpen the underlying tentative design principles towards an elaborate set of design principles and finally, to provide input on the validity of the proposed curriculum and design principles (van den Akker, 2013). A future objective and added advantage that could be realised through the formative evaluation process is that it provides a method through which implementation can be monitored (Vesper et al., 2015).

The purpose of the study was to generate credible, trustworthy, and plausible design principles for the planned IPECP curriculum by consensus of panellists who have experience in IPECP and/or contextual knowledge of the university. The aims were firstly to elicit panellists; quantitative feedback on the suitability of the proposed design principles in terms of the strengths, shortcomings, and suggestions to improve the design principles. The second objective was to elicit input on the appropriateness of and need for each of the design principles and to suggest how the design principles could be rephrased where necessary.

Methods

Research method: The tentative design principles were presented to panellists and refined to a set of comprehensive design principles through a modified Delphi method over three rounds. A modified Delphi, instead of a traditional Delphi, was used as the tentative design principles were informed by previous phases of the IPECP curriculum design and development study. The modified Delphi used in the current study was similar to what Joyner & Smith, 2015 used for curriculum design, where literature was used to design options presented in Round 1, the results of Round 1 was then used to make changes and then presented it to the panel in Round 2. The advantages of using a Delphi study, according to (Avella, 2016) includes obtaining consensus and incorporating various panellists' perspectives. The Delphi technique is flexible, cost effective and simple, allows interprofessional panellists to share knowledge to broaden the knowledge base and generate new ideas (Hsu and Sandford, 2007). The anonymity and confidentiality of the Delphi study technique further allows for freedom of expression of diverse ideas (Hsu and Sandford, 2007). The disadvantages of the Delphi method could include researcher bias in selection of a panel and reformulation of design principles between rounds.

In the current study the Modified Delphi was combined with educational design research. Educational design research, specifically Curriculum Development

Research provides a flexible, cyclical approach to analysis (exploration), design (construction) and evaluation (reflection), yielding both the knowledge or theoretical insight and practical solutions or intervention outputs, in authentic practical settings, together with stakeholders (McKenney and Reeves, 2021). The IPECP curriculum was designed and validated using the educational design research process, where the four criteria of reliability, practicality, consistency, and feasibility were interrogated by an external and internal academic panel.

Participants: The Delphi study participants does not have to be representative but should rather be knowledgeable, offer a broad range of perspectives and be willing to participate until completion of the project (Avella, 2016). The number of panel members are usually 10 or more and one, two or three panel compositions can be included (Avella, 2016). The inclusion criteria for panel members in the current study were as follows:

- External panellists (Round 1):
    - Involvement in either AfrIPEN (African Interprofessional Education Network) as Board Member and therefore peer-recognised contributor to Interprofessional Education in Africa or members of AfriVIPE (African Virtual Interprofessional Education network), that consist of panellists from Africa and other countries with a special interest in developing international learning opportunities for undergraduate students.
    - Three or more years of experience in developing interprofessional education.
- Internal panellists (Round 2):
    - Members of the IPECP committee at the university.
    - Responsible for either IPECP or curriculum development or both within their professional course.
    - Participated in the curriculum mapping of the IPECP competencies in their profession.

The panellists were recruited via e-mail invitation that included an explanation of the research purpose, research process and expectations for participation should they consent. All consenting panellists were included in their respective panels for Round 1 and 2, and all panellists who took part in this first two rounds were invited to take part in Round 3.

Data collection process: In Round 1 the external panellists were invited to a once-off, 90-minute online event where the proposed IPECP curriculum and the 17 tentative design principles were introduced. An overview document was sent to the panellists a week in advance of the online meeting, which provided comprehensive preparation material to the panellists. The external panellists joined the meeting which followed the agenda:

Table 1: Agenda for Round 1 online event

TIME ALLOCATION	**AGENDA**
10 MINUTES	Brief introduction and acknowledgement that while they were not anonymous for the meeting, their responses were collected in the online survey and would remain confidential.

50 MINUTES	Presentation of the planned IPECP curriculum. Presentation of the 17 tentative design principles.
15 MINUTES	Questions and clarification of the data collection instrument and aspects of the IPECP curriculum and design principles that were not clear from the presentation.
15 MINUTES	Rating and commenting on the 17 tentative design principles with the option to add additional design principles.

The results of Round 1 were analysed and the 17 design principles was modified accordingly. Round 2 followed the same process and agenda but with the internal panel. One design principle was suggested in Round 1 and thus 18 modified design principles were presented in Round 2.

Round 3 consisted of all panellists who agreed to participate in a further round. There was no meeting as all panellists were familiar with the IPECP curriculum and the concept including design principles in the curriculum. Only design principles that did not meet the acceptance criteria were modified based on the Round 2 feedback and formed the design principles list for Round 3. Round 3 panellists received an electronic link to the survey instrument for completion within a 2-week period.

Data collection instrument: The researcher developed-REDCap questionnaire (Harris et al., 2019, Harris et al., 2009) contained the informed consent letter and form, an electronic acknowledgement of consent and nine demographic questions. The instrument presented the list of proposed design principles, each to be rated on a Visual Analog Scale (VAS). The VAS blinded the panellist to the numerical value of their response but showed a possible range from “Strongly Disagree/Unsuitable” to “Strongly Agree/Suitable”, where the blinded scale produced a rating range of 0 to 100. Panellists were asked to comment on their rating and the relevance of each design principle with the option to suggest rephrasing of each design principle. At the end of the questionnaire participants could suggest additional design principles. The structure of the data collection instrument remained the same for all three rounds, but design principles were rephrased between rounds as indicated by the results of the previous round. The REDCap questionnaire for Round 3 contained only the design principles that had not achieved the criteria for acceptance.

Curriculum Design Cycles: This study was conducted within a larger curriculum design study. The first cycle of the curriculum design, started with the researcher, who developed the proposed curriculum as a protype, with accompanying tentative design principles. The tentative design principles justified the inclusion of specific aspects in the curriculum. In the second cycle, the research supervisors gave input on clarity, appeal and obvious errors and comments, according to both the four criteria (relevance, practicality, feasibility, and consistency) of the design principles. In Cycle 3 external panellists formed a diverse participant group for Round 1 of the modified Delphi and rated the design principles and suggested rephrasing of and the option to add design principles. Before Round 2, changes were made to improve the design principles, following the suggestions of external panellists. In Cycle 4, the internal homogenous panel of the university academics for whom the curriculum was designed participated in Round 2 of the modified Delphi, to rate and suggest rephrasing of the

design principles. Figure 1 explains the integration of the cycles of educational design research with Delphi rounds.

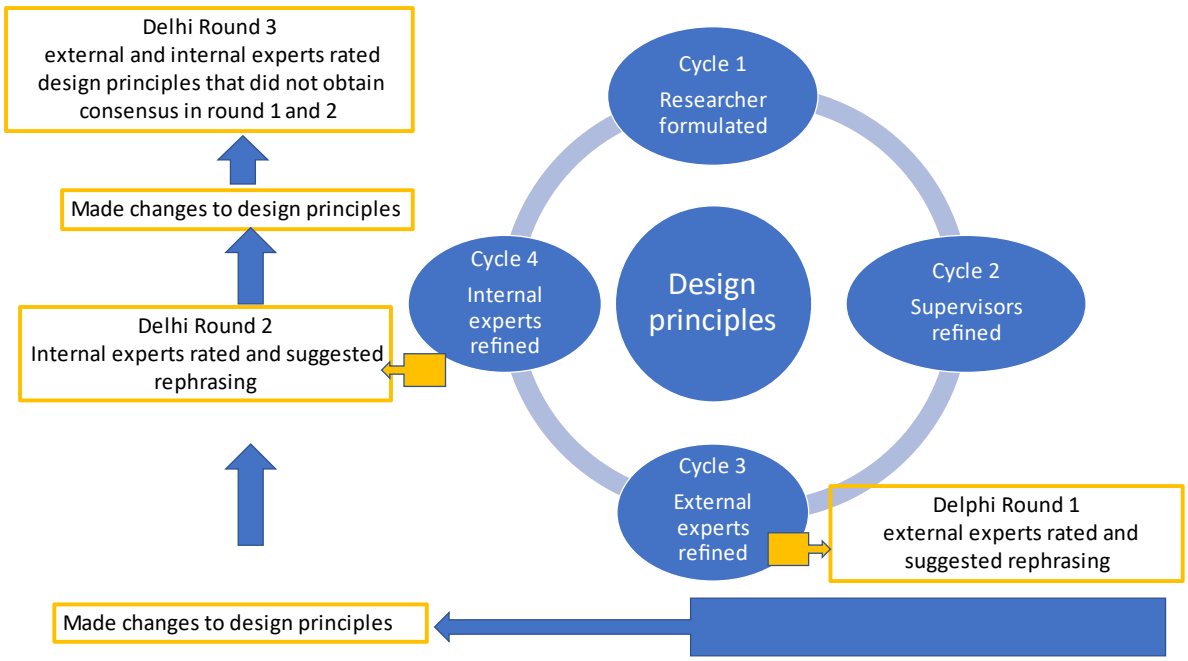


Figure 1: Integration of cycles of educational design research with Delphi rounds

Data analysis: The data from the VAS for all design principles in all rounds were analysed using univariate analysis for central tendency as the median of the rating and the measure of dispersion as the inter-quartile range (IQR) (Hsu and Sandford, 2007). A high median score for a design principle shows convergence of opinion towards strong agreement/suitability of each design principle for acceptance into the curriculum. The threshold for strong agreement/suitability was set at a median score of ≥90. A large dispersion of scores could indicate a lack of consensus between panellists, and thus an IQR<15 was applied to indicate a high consensus among the panellists. The panellist comments and suggested rephrasing was considered when modifying design principles between the rounds and in development of the final list of design principles for the IPECP curriculum.

Ethical considerations: Ethical approval for the research was granted by University of the Witwatersrand. Permission for data collection was obtained from the university where the data was collected. Each participant gave informed consent. Panellists recognised that their participation was not anonymous as they were present in the online meetings for Round 1 and 2. Each panellist submitted responses on the data collection instrument electronically (blinded from peer responses) and anonymised using panellist codes to substitute any personal identification indicators.

Validity and reliability: To increase the validity of findings the research was based in an explicit conceptual framework by doing a thorough literature search in advance. The congruent study design employed a chain of reasoning that is transparent and tight and has strong links to previous research and theory. Triangulation of data sources such as literature and previous phases of the research increased the reliability and

internal validity. The context is described in full including a description of the situation and the design decisions in order for other researchers to be able to replicate the study and this description added to the ecological validity of findings. The Delphi research method ensured phases of member checking (Van den Akker et al., 2006).

Results

1. Demographic information of panellists

Data was collected in three rounds of a total number of 23 panellists. A diverse panel of 11 external panellists participated in Round 1, while a more homogenous panel of 12 internal panellists participated in Round 2. Of the panellists in Round 1 and 2, 16 participated in the Round 3 panel. The age, professional field, years of experience and country are presented in table 1. The panellists yield from diverse preprofessional fields, and the external panellists represent four countries. Of note is that 83.33% of internal panellists had less than 5 years' experience related to IPECP.

Table 2: Demographics of panellists

Round	Number of Panellists (N=23)	Age	Professional field (number, %)	Years of experience (n; %)	Country (n; %)
1	n=11	27 - 72	Occupational Therapy (1, 9.1%), Physiotherapy (1, 9.1%), Speech Language Pathology and Audiology (2, 18.2%), Nursing (3, 27.3%), Public Health (1, 9.1%), Clinical Associate / Physician Assistant (1, 9.1%), Bio kineticist (1, 9.1%), IPECP Researcher (1, 9.1%)	0-2 (0; 0%) 3-5 (4; 36.4%) 6-8 (2; 18.2%) >9 (5; 45.5%)	South Africa (6; 54.5%) USA (3; 27.3%) Rwanda (1; 9.1%) Zimbabwe (1; 9.1%)
2	n=12	29-62	Occupational therapy (1, 8.3%), Physiotherapy (3, 25.0%), Dietician (1, 8.3%), Speech Language Pathology and Audiology (3, 25.0%), Pharmacy (1, 8.3%), Dentistry (1, 8.3%), Dental Therapy (1, 8.3%), Pathologist (1, 8.3%)	0-2 (4; 33.3%) 3-5 (6; 50%) 6-8 (1; 8.3%) >9 (1; 8.3%)	South Africa (12; 100%) All working at SMU
3	n=16	27 - 72	Occupational therapy (1, 6.3%), Physiotherapy (2, 12.5%), Dietician (1, 6.3%), Speech Language Pathology and Audiology (5, 31.3%), Nursing (2, 12.5%), Public Health (1, 6.3%), Clinical Associate /	0-2 (4; 25.0%) 3-5 (5; 31.3%) 6-8 (2; 12.5%) >9 (5; 31.3%)	South Africa (11; 68.75) USA (3; 18.75%) Zimbabwe (1, 6.25%) Rwanda (1, 6.25%)

			Physician Assistant (1, 6.3%), Dental Therapy (1, 6.3%), IPECP Researcher (1, 6.3%), Health Professions Education (Nursing background) (1, 6.3%)		

2. *Design principles accepted through Round 1 and 2 consensus*

All design principles were presented for rating and comment in Round 1 (external panellists) and while many met the criteria for agreement, there were suggestions of ways to improve the design principles. The Round 2 (internal panellists) rated and commented on the Round 2 versions of all design principles that integrated the input from Round 1. Both the external and internal panels were in high consensus (IQR<15) and strongly agree/supported (median≥90) that the eight design principles presented in Table 1, were suitable for implementing the planned curriculum, these design principles were accepted and were thus not put forward for further review.

Table 2: The design principles (DP) that were strongly supported with high agreement in round 1 and 2

Design Principle	**External Panel Median (IQR)**	**Internal Panel Median (IQR)**
DP1: Mission driven	100 (9.5)	90.5 (8.5)
DP2: Longitudinal and scaffolded	98 (13.5)	92.5 (12.75)
DP9: Reflective practice	100 (13)	93.5 (12.25)
DP12: Collaborative IPECP design and application	99 (7.5)	96 (14)
DP14: Prioritised patient and community-centered care	99 (9)	91.5 (11.25)
DP15: Specified but adaptable curriculum implementation	98 (9.5)	97 (11.5)
DP16: Facilitator training	99 (10.5)	97 (6.5)
DP17: Stakeholders buy-in and commitment	100 (2)	98 (12.5)

3. *Design principles not meeting the thresholds in Round 1 but accepted after Round 2*

There were three design principles (DP) (DP7: IPECP competency evaluation, DP10: Interprofessional representation and DP13: Protected IPECP time) that either presented with a median below 90 (showing agreement/support but not strong agreement/support) or a greater than 15 IQR indicating lower agreement among the external panellist of these design principles. As with all the design principles, these three were modified based on the external panel inputs prior to circulating to the internal panel. As indicated in figure X1, the internal panel indicated high consensus in their strong agreement/support of these three design principles' suitability towards the implementation of the planned IPECP curriculum.

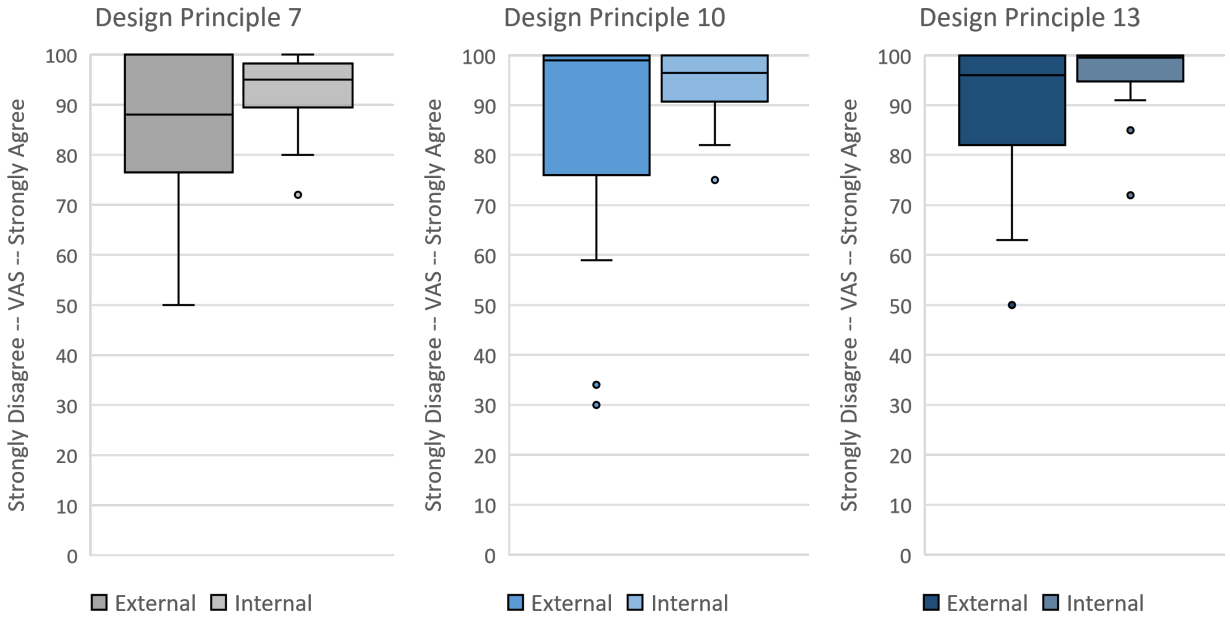


Figure 2: The median and IQR of ratings for DP7, DP10, DP13 by the external and internal panels

4. *Collective rating of accepted design principles after round 2.*

When combining the external and internal panel's ratings of the eleven design principles as seen in figure 2, strong support (medians ≥ 90) and high consensus (IQR <15) was retained, supporting the position that these design principles were accepted at the end of round 2 and not put forward to round 3.

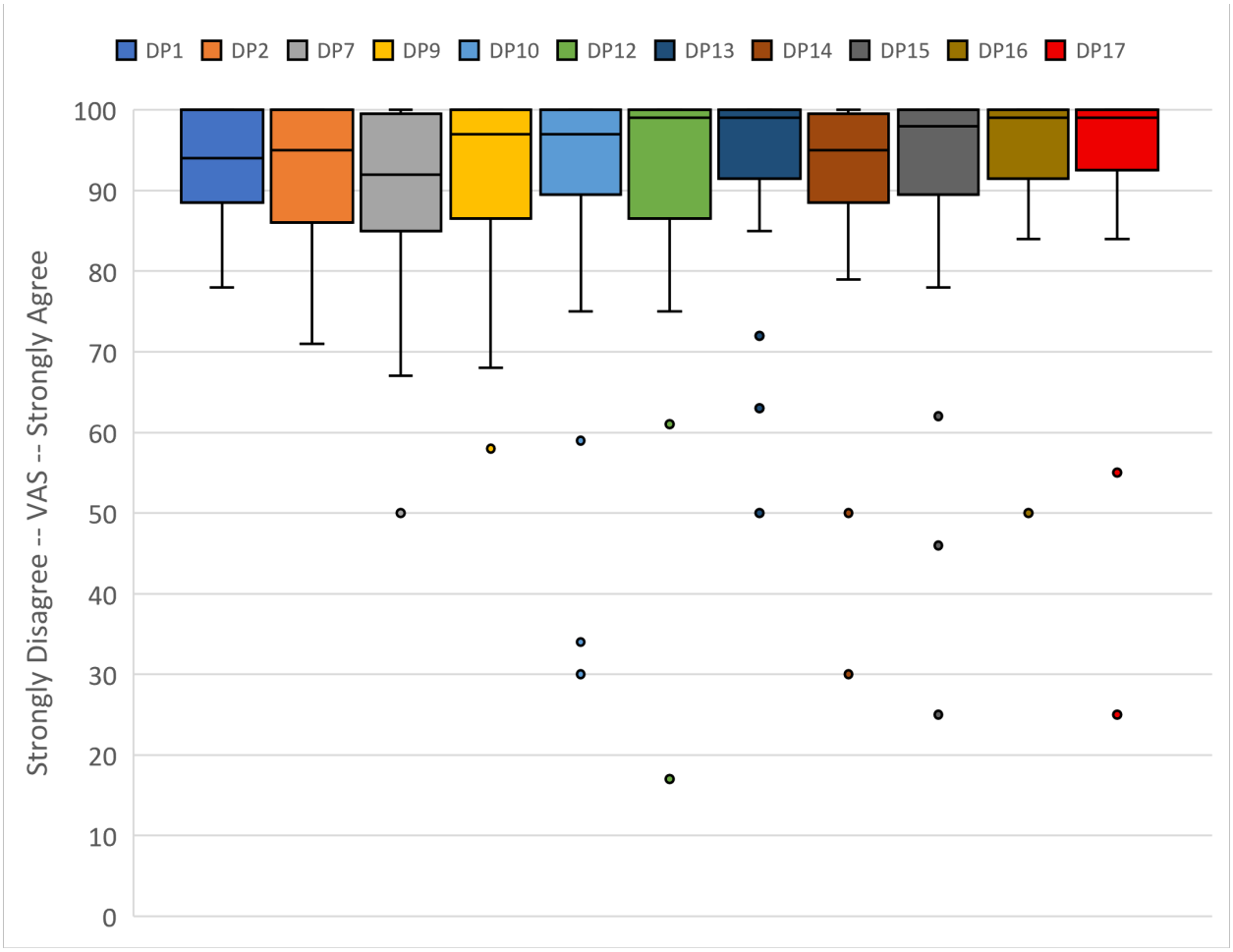


Figure 3: the median and IQR of eleven design principles collective ratings of round 1 and 2

5. *Design principles not meeting the thresholds after round 2.*

Only six of the design principles did not meet the thresholds of strong agreement/support or high consensus in round 2 are presented in figure 3. While DP5, DP8 and DP11 met the thresholds after round 1, the suggested rephrasing and comments by the external panellists prompted modification of these design principles and thus required presentation to the combined panel.

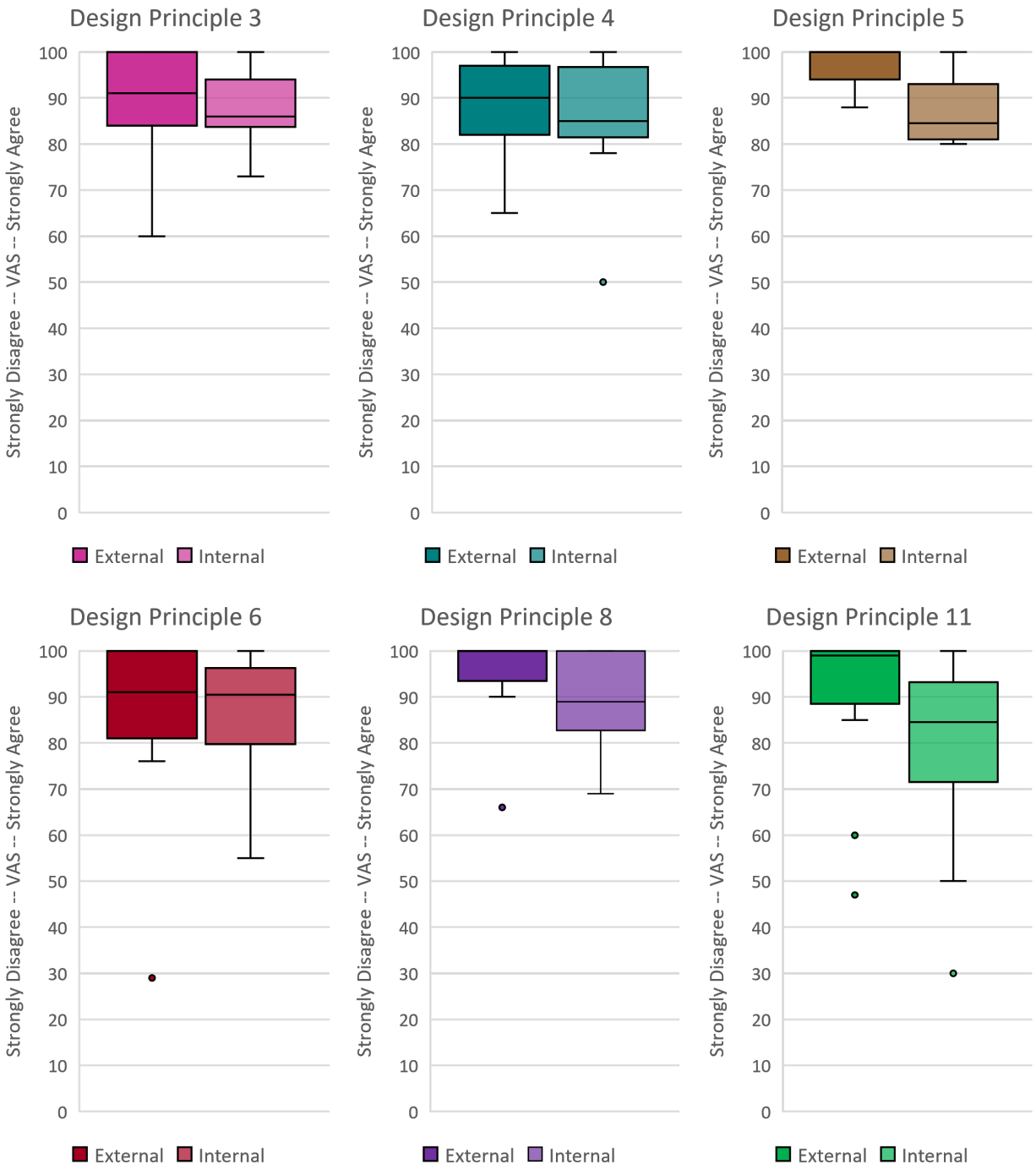


Figure 4: The median and IQR of six design principles comparing the external and internal panels.

6. *Design principles collective rating after round 2 compared to round 3 panel*

The round 1 panel suggested the inclusion of design principle 18 which was presented to the round 2 panel and the included in the round 3 panel as it did not meet the thresholds for acceptance. Figure 4 presents the ratings for DP18 and the comparison of the collective ratings of round 1 and 2 for the design principles not meeting the thresholds and the final ratings after the round 3 panel. Of note is that all design principles achieved a median score ≥97 except for DP4 (m=92.5). While the IQR's for DP3 (m=99, IQR=23) and DP11 (m=98, IQR=21.75) did not meet the threshold for consensus the high median scores indicate >50% of panellists rated these design

principles at ≥99 and ≥98 respectively. While DP4 met the threshold for strong agreement/suitability it persisted with a low consensus (IQR= 29.75).

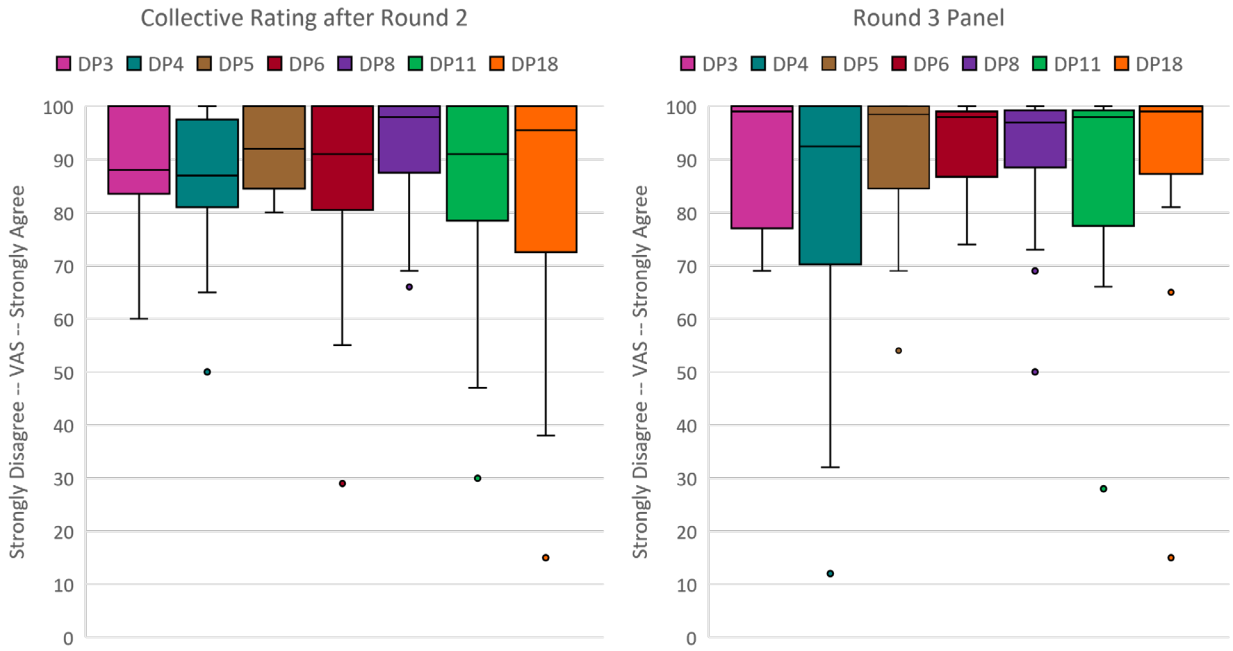
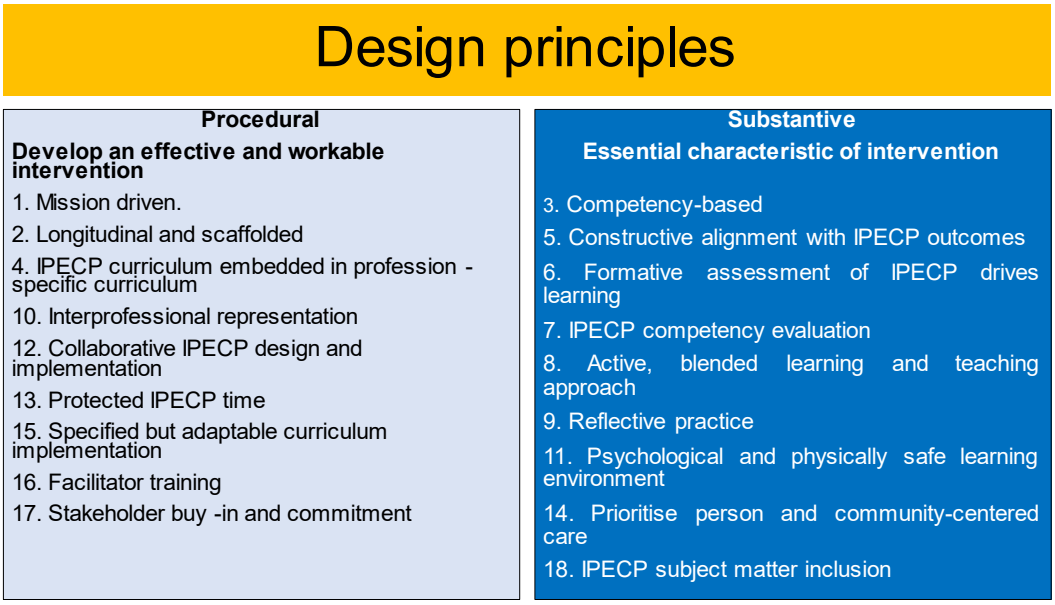


Figure 5: Collective rating after round 2 of DP's not meeting threshold and ratings of round 3 panel

For both the external and internal panellists, the explanation of the qualitative information provided by panellists of the outliers were checked to ensure that the main concern of the participant was addressed; for example, where panellists suggested adding a vital word to the principle. For most of the outliers the panellist did not offer an alternative phrasing. One expert suggested that some of the design principles are general curriculum principles for health care professionals and did not think that it needs to be included e.g., embedded, constructive alignment, safe learning environment and prioritize health needs of the community. However, as the participant then also indicated that it is important to include these as the curriculum development knowledge of the persons who uses the design principles might vary. The design principles are also specific to the needs to the IPECP curriculum of this university and therefore more than just a general curriculum design principle.

After the 18 design principles were finalised, the intention of the design principles was analysed in terms of being procedural or substantive. Equal numbers, nine each of procedural and substantive design principles were found. Table 3 indicates how the 18 principles were allocated. The number next to the design principle indicates the original number allocated to the principle and only the main premise of the design principle is indicated in figure 5. For full detail of the design principles please refer to addendum 1.

Table 3: Allocation of design principles under procedural and substantive



Discussion

External and internal panellists rated the design principles. The ratings of internal panellists were in general lower than the rating of external panellists. A possible reason could be that in general the internal panellists had less experience of IPECP in settings other than the university for whom the curriculum is designed, and as a whole also had fewer years of experience.

Developing and validating design principles through a process based on Curriculum Development Research design, a component of educational design research, in combination with a Modified Delphi method, resulted in a set of well-articulated and comprehensive design principles. The tentative design principles developed by the researcher based on previous phases of the research study, were refined through four phases, and validated in three rounds of Modified Delphi. The resulting eighteen design principles included both procedural design principles that can guide implementation as well as substantive design principles that are related to understanding the theoretical value.

Nieveen and Folmer (2013) highlighted the value and purpose of comprehensive design principles from an educational design research perspective for different stakeholders of the curriculum specifically for researchers, educational designers, implementers, and policy makers. The value for researchers, is adding to the knowledge base, for educational designers to see how the principles can be applied in similar settings, for the future implementers who have information on how to apply the interventions and for policy makers as it provides research-based decisions to solve complex educational problems. The set of design principles reported on in this paper added to the knowledge base of IPECP curriculum development and implementation. It can be a guideline not only for the university for whom the curriculum was designed, but it can also serve as a guideline for other researchers and educational designers who could apply it at other universities where IPECP curricula are introduced. For

future implementers of the curriculum for the university as well as implementers of IPECP at other institutions the design principles can provide guidance. The design principles could also be useful for policy makers such as the accreditors of professions as well as different levels of management e.g., on a national, provincial or district level as it not only states the principle, but it also explains the specific application.

Integrating the Modified Delphi method with the stages of the educational design research strengthened the process and made the curriculum and design principles a high-quality deliverable. The Modified Delphi involved three rounds that were done concurrently with stage 3 (round 1) and stage four (round 2) and concluded after stage four in round 3. The original REDCap questionnaire that was designed for the stages were modified in terms of the design principles for stage 4 (round 2) however, keeping some of the questions the same saved time and added to validity of the findings across the stages. Using an online presentation which provided an opportunity where panellists could ask questions contributed to clarification of content but minimized the influence of panellists on one another, while the REDCap questionnaire ensured the anonymity and confidentiality of panellists' responses. The REDCap data analysis function eased the data analysis process especially in terms its ability to timeously analyse each round and functionality of comparing information between rounds.

The overall agreement of the expert panel with all design principles and the fact that only one design principle was added, attest to the value of design principles developed through reflection on previous stages of the research process. The theoretical yield of this set of design principles is that it strengthens the knowledge base of IPECP and would enable implementers to understand the multi-dimensional aspects of the curriculum that is wider than only content. The procedural design principles confirms that especially for IPECP, effective and workable intervention needs consideration and not only the substantive design principles that refers to the content. Attention needs to be paid to both types of design principles during planning to ensure the success of the curriculum implementation.

Conclusion

The eighteen developed and validated design principles can enhance planning and implementing a four-year undergraduate IPECP curriculum. Using Curriculum Development research, a part of educational design research, helped to not only validate but also to refine the curriculum and design principles prior implementation. This crucial step that is often omitted by curriculum planners helped in eliminating problems that could have hampered buy-in of stakeholders. The Modified Delphi technique that was used in combination with the phases of the curriculum development research, helped through the iterative rounds to refine the initial design principles. These procedural and substantive design principles for an IPECP curriculum could yield valuable contribution to the knowledge base of IPECP, that can be applied to educational settings similar to the university for which the curriculum and design principles were developed. Using Design Based Research and Curriculum Development Research provides a valuable method of validation prior to implementation that could be used in other curriculum planning studies.

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Addendum A: Final list of design principles

Design principles

Please note: Design principles in bold are the design principles that were send for round 3.

1. MISSION DRIVEN: The IPECP outcomes should be derived from the overall university mission and provides the foundation of the community-focused IPECP curriculum.
2. LONGITUDINAL AND SCAFFOLDED: The undergraduate IPECP curriculum should be a longitudinal, scaffolded programme, that continuously builds IPECP competence and dual identity transformation, within and across all years of undergraduate study.
3. **COMPETENCY-BASED: The IPECP curriculum should support a competency-based design to address year- specific IPECP core competencies (Values and Ethics; Roles and Responsibilities; Interprofessional Communication and Teams and Teamwork) identified through profession-related curriculum mapping.**
4. **IPECP CURRICULUM EMBEDDED IN PROFESSION-SPECIFIC CURRICULUM: The IPECP curriculum should be aligned with profession-specific content, timing and topics for each year level, to ensure compatibility and increase acceptance by the university community. The topics covered in profession-specific teaching, form the basis on which the IPECP application is built.**
5. **CONSTRUCTIVE ALIGNMENT WITH IPECP OUTCOMES: There should be constructive alignment between the teaching and learning activities and assessment to demonstrate the achievement of the cognitive, affective and psychomotor intended learning outcomes.**
6. **FORMATIVE ASSESSEMENT OF IPECP DRIVES LEARNING: Assessments need to focus on participation in diverse professional teams, and should be continuous, to stimulate students' engagement and learning, and monitor the development of IPECP-ready attributes.**
7. **IPECP COMPETENCY EVALUATION: Individual students' IPECP competency should be assessed summatively through application in communal and or profession-specific subjects by subject lecturers, using a rubric designed to evaluate if the IPECP competencies were met and to reduce bias. Research and theory development contribute further to**

ascertain if the curriculum succeeds in improving students' IPECP competencies.

8. **ACTIVE, BLENDED LEARNING AND TEACHING APPROACH: Active engagement in learning and teaching in a variety of environments, using a variety of methods, to accommodate students learning styles. Methods should include facilitated small group learning and teaching and could be during action-based (e.g., case-based learning, collaborative research projects), exchange-based (e.g., educational games, case discussions, online discussion forums), simulation based (role play) and practice-based (work related assignments and clinical work) learning opportunities.**
9. REFLECTIVE PRACTICE: All IPECP learning activities should require students to self-reflect, using a guided or structured reflection tool as part of a cumulative reflective journal. Through reinforcing and encouraging reflection of learning, students learn to find their own further learning needs and develop critical thinking and deep learning and life-long learning habits.
10. **INTERPROFESSIONAL REPRESENTATION: The IPECP curriculum brings students, from as many professions as possible, together for specific periods of their study to learn with, from and about each other where their learning in groups is collaborative, as equals, experiential, reflective and applied.**
11. **PSYCHOLOGICAL AND PHYSICALLY SAFE LEARNING ENVIRONMENT: Interprofessional education (IPE) first expose students to simulated teamwork in a safe environment where confidence is built, before exposure to authentic learning situations when providing supervised collaborative care (IPC) during work integrated learning (clinical work), in a variety of clinical settings.**
12. **COLLABORATIVE IPECP DESIGN AND IMPLEMENTATION: Students and lecturers who have experienced both their profession-specific curriculum as well as the IPECP curriculum, and are cognisant of accreditation bodies expectations, should provide input in the planning, development, and implementation of the IPECP curriculum.**
13. **PROTECTED IPECP TIME: Time allocated to IPECP should be intentionally timetabled, coordinated, synchronized, and protected through ringfencing across the profession-specific timetables, to allow all professions' students to be included.**
14. PRIORITISES PATIENT AND COMMUNINITY CENTERED CARE: The IPECP curriculum should be regularly evaluated, updated and aligned to prioritise the health care needs as determined by the community that it serves. The curriculum should be functional and responsive to the community's needs, through the inclusion of input and reflective feedback from community stakeholders.
15. SPECIFIED BUT ADAPTABLE CURRICULM IMPLEMENTATION: The theme for each year and topics for each semester should guide the learning activities and content. The deliberate positioning of each theme and topic, facilitate students' achievement of the intended learning outcome. However, the implementation should not be prescriptive and can be adapted by the

presenters of the specific year level, to ensure that the curriculum remains relevant and meet the needs of the involved professions.

16. FACILITATOR TRAINING: The curriculum needs IPECP facilitators who are trained and representative of the involved professions to allow for student cohesiveness, role modelling of IPECP and to ensure that the outcomes of the curriculum are met. Facilitators benefit from further professional development and annual interprofessional training to develop and strengthen expertise.
17. STAKEHOLDER BUY-IN AND COMMITMENT: Buy-in and commitment from all stakeholders are important to ensure access to resources that each stakeholder contributes. Resources include financial (for example for transport, training, marketing), human (trained facilitators, commitment from management, access to community staff such as Non-Governmental Organisations), logistical (ringfenced, synchronised time, venues for large and small groups, access to learning management system, skills centre, standardised patients for role play).
18. **IPECP SUBJECT MATTER INCLUSION: Valid IPECP subject matter should be integrated in IPECP and profession-specific subjects throughout the development, implementation, and evaluation of the curriculum.**

7.4 Conclusion of chapter 7

The validation process, using the curricular developmental research method helped the researcher to further refine the SMU-IPECP curriculum and the design principles. The qualitative and quantitative input of external and internal panellists was valuable as it confirmed that the application of results in the previous steps in the research process was interpreted correctly.

The next chapter, chapter 8, presents the integrated discussion and conclusion of the thesis. Chapter 7 ended with a validated, refined curriculum.

Chapter 8 Discussion and conclusion

"I have fought the good fight, I have finished the course, I have kept the faith."

Apostle Paul (2 Timothy 4:7)

8.1 Introduction

Chapter 8 is the final chapter of this thesis and contains the discussion, strengths and limitations, suggestions for further research and final conclusion. Lewis et al. (2021) describes the integrated discussion chapter as being different in breadth and depth from the discussion chapter in a traditional thesis. The advantage of an integrated discussion is that a higher-level construct, assessment, and clarification of the thesis findings could be achieved. Chapter 8, therefore, synthesises the information contained in the preceding chapters and illuminates how each contributed to address the aim of the thesis.

The thesis is presented in a divided block format. This format includes both paper-based chapters as well as chapter in the traditional format. The chapters not in paper format were the curriculum chapter and the validation chapter. Chapter 1 provided the introduction. Chapter 2 explained the theoretical foundation and included the first paper. Chapters 3, 4 and 5 were paper-based chapters. Chapter 6 explained the SMU-IPECP curriculum development and the actual SMU-IPEP curriculum. Chapter 7 presented the validation of the curriculum and design principles. This then culminated in this chapter, chapter 8.

The overall aim of this study was to develop an IPECP curriculum for health sciences students at SMU.

Overview of phases

The study was conducted in three phases. In Phase I, the *situational analysis (conceptualisation),* the aim was to explore factors that needed to be considered in the development of an IPECP curriculum. The information obtained in Phase I was used to inform Phase II. In Phase II*, Input and output* (development), the aim was to develop an IPECP curriculum suitable for undergraduate students. The structure and content, using the Four-Dimensional Curriculum Development Framework, guided the analysis of papers by considering the learning outcomes, learning opportunities and

assessment in line with core-competencies for IPECP. Phase II informed phase III. In Phase III, the curriculum and design principles were validated by panellists in terms of relevance, consistency, practicality, and effectiveness.

Each phase of the research is presented in terms of aim, objective, research methods, papers that contributed, results, and limitations. Between each phase the impact of the phase and how it impacted the final curriculum is highlighted.

8.2 Contribution of phases to the development of an IPECP curriculum

8.2.1 Protocol development phase: presented in chapter 2

Aim: to develop a framework to guide the study

Contribution: The study protocol was published in the form of a paper.

Paper title "Use of the logic model to develop and implement an interprofessional module for undergraduate healthcare students at a University in South Africa: a study protocol".

Contribution: The logic model whose development was attributed to the Kellogg Foundation, provided a framework that was used throughout the study to guide the phases of data collection. The researcher envisaged that the logic model would create a framework that mapped the logical progression of the study through the three phases which were the Situational analysis, Inputs and Outputs (SMU-IPECP curriculum) and the Outcome (IPECP curriculum validation). The logic model made clear that appropriate stakeholders' input was required throughout the planning, design and analysis as their input contributed to knowledge generation. (Kellogg, 2004).

Conclusion: The logic model provided a valuable tool to explain the curriculum development process to stakeholders.

Impact of phases on the curriculum

The logic model clarified the data that needed to be collected in consecutive phases. In Phase I, the situational analysis required data on the current situation and the needs of the stakeholders. In Phase II, data was required about the envisaged curriculum content. In Phase III, only the short-term outcome was evaluated. The data on feedback pre-implementation were required. The envisaged advantage of using the logic model was achieved in designing the curriculum, with the data collected in each phase informing the required data in the next phase.

8.2.2 Phase I: Presented in chapter 3 and 4

A. Aim: to explore factors that need to be considered in the development of an IPECP curriculum, through a situational analysis.

To achieve Aim A, there were three objectives.

> *A1. Objective 1: to map and summarise the research evidence of factors that affect planning of an undergraduate IPECP curriculum through a scoping review.*

The scoping review was completed and presented as Paper 2.

Paper title: Factors to consider in planning a tailored undergraduate interprofessional education and collaborative practice curriculum: a scoping review.

Aim of the paper was to identify teaching and learning factors unique to learning settings to plan a tailored IPECP curriculum.

Study design: Johanna Briggs Institute Scoping Review method was used to search published, peer-reviewed, research papers that looked at curriculums and not only single events. The four-dimensional curriculum framework was used to analyse the literature.

Contribution of the scoping review to the SMU-IPECP curriculum: the analysis of literature according to the four-dimensional curriculum development framework (Moran et al., 2015) yielded information on the dynamic interaction between the four

dimensions that need to be considered, and provided valuable information that informed the SMU-IPECP curriculum. The four dimensions are respectively: professions' future healthcare needs, expected capabilities, teaching, learning and assessment methods, and the value of institutional support. For dimension one, government policies, it became clear that developed countries as mandated by their national policies on IPECP, had better buy-in and were advanced in implementing IPECP (Alinier et al., 2014; Steketee et al., 2014). Without such national Policy, it is important to look at policies that do support IPECP, such as the expectations of accreditation bodies for students to be exposed to IPECP. The challenge is that the different accreditation bodies' expectations differ, requiring a strategic plan for accreditors in formulating IPECP expectations (Academy of Science of South Africa, 2018). In South Africa and other African countries, the policies of IPECP are emergent. The curriculum considered mainly the National Health Act, 2003 (Act No. 61 of 2003), Primary Health Care Re-engineering Policy Framework, the ASSAf document on 'Reconceptualising health professions education'. IPECP related documents of the World Health Organisation (WHO, 2010; World Health, 2013) influenced the planning of the curriculum and guide the use of terminology that is globally acceptable. The second dimension to be considered is capabilities. Although a variety of competency frameworks are available (Thistlethwaite et al., 2014; Filies & Frantz, 2022), the SMU-IPECP curriculum incorporated the IPEC-core-competencies framework (Interprofessional Education Collaborative, 2016a). The third dimension refers to teaching, learning and assessment strategies. Even though there are many different strategies available in the literature, ensuring relevance to practice is important (O'Keefe et al., 2017; Rhoda, Waggie, Filies, & Frantz, 2016). The fourth dimension, support from management resources, for example, staff members to facilitate small groups is important to ensure access to resources (Milot et al., 2015). Insufficient resources and the effect of poverty and workforce shortages influenced content that need to be included in the curriculum (Botma, 2019; Jacobs et al., 2020; Freire Filho et al., 2022).

Limitations of the scoping review: the review was completed in the first phase of the study and since then a lot of new literature has become available. The researcher therefore strategically consulted more recent literature in the consecutive articles/papers she prepared. To ensure rigour, only peer reviewed publications were included in the literature review, but this meant very few South African and African

publications met the inclusion criteria. However, interaction with representatives from other South African and African universities at conferences and engagement in AfrIPEN, ensured the researcher was updated on the *status quo* at other universities and contributed to planning of the SMU-IPEC curriculum.

> *A2. Explore current contextual factors to consider at SMU that could affect planning of an undergraduate IPECP curriculum.*
>
> *A3. Establish needs and expectations of the SMU stakeholders in terms of the factors that affect planning of an undergraduate IPECP curriculum.*

Objectives A2 and A3 are presented together as the two objectives were addressed together. Objectives A2 and A3 were addressed in paper 3.

Paper under review: Perspectives of collaborative interprofessional curriculum evolvement at a South African University: a qualitative reflection.

Study design: A mixed method, embedded study design was used to synthesise factors that influence IPECP curriculum planning. Qualitative data were collected during focus groups with students and focus groups with staff. Feedback on events and a university wide Needs Survey provided quantitative data. The data were then combined through critical reflexivity and critical reflection, using Brookfield's lenses.

Contribution of the paper to the SMU-IPECP curriculum: Contextual factors (A2) that need to be considered are that the IPECP curriculum should cater for students destined to serve under-resourced communities (Africa et al., 2022). To make the SMU-IPEC curriculum contextually relevant, it is vital to collaborate with lecturers with authentic knowledge and experience as well as the students, many of whom live in the same community. The stakeholder needs (A3) were that the IPECP curriculum needs to be authentic and address not only the health needs of the population served by the students during work-integrated learning, but also needs to be designed with input from all stakeholders. The importance of the cultivation of the value-base for collaborative practice to obtain more buy-in were an important need of stakeholders but is also recognised globally (Khalili et al., 2019). For collaborative practice to be embraced by newly qualified health practitioners, IPECP needs to be integrated from first to final year, be authentic in addressing real community needs as part of the primary health care approach. An integrated, longitudinal curriculum is required, that scaffolds the

development of the dual identity of the uni-professional and of the interprofessional team member (Khalili et al., 2021). Recognition of the importance of affordances and challenges inherent in teamwork should shape the interactions that form part of the exposure of students to deal with diversity that is encountered both during their training and further in their career

Limitations: The target of the exploration of factors was the SMU experience. Students and staff's relatively limited exposure to IPECP, as it was mainly based on events at SMU, resulted in outcomes that are not expected to be generalisable. The project's focus was therefore limited to the perspectives of its participants. As the study focussed on the experiences at the specific university not all aspects may be of value to other universities.

Impact of Phase I on the curriculum

The situational analysis created the foundation for the SMU-IPECP curriculum in terms of factors to consider in the development. Phase 1 identified some factors that directly impact the curriculum as well as some factors that required further exploration in Phase 2.

Factors that directly influenced the curriculum: In dimension 1: 'specific future health care needs of the involved professions', meant that for SMU, students need to be familiar with primary health care. The SMU-IPECP curriculum therefore includes a specific primary health care stream.

Factors that required further exploration included the importance of a competency framework. In Phase II, where the IPEC-core-competency framework was used in the curriculum analysis. The third dimension revealed the need to identify appropriate learning, teaching and assessment methods. Phase II, through the curriculum mapping, identified the use of learning, teaching and assessment strategies while the curriculum development literature needed to be used to explore suitable learning and assessment strategies to be included in the SMU-IPECP curriculum were further addressed in Phase II. Lastly, dimension 4, emphasised the importance of management buy-in to ensure that resources for the curriculum are made available. The design principles, that were part of Phase III, included this specific aspect.

8.2.3 Phase II: presented in chapters 5 and 6

Chapter 5: Curriculum

B. Aim: To develop the IPECP curriculum structure and content for undergraduate students using the Four-Dimensional Curriculum Development Framework

Objectives:

To achieve Aim B, there were three objectives. All three objectives were addressed through a curriculum map analysis of the 11 professions' curricula.

B1. Objective 1: To develop learning outcomes for each year level of study, based on the specific IPEC-core-competencies for each year.

B2. Objective 2: To develop suitable content, learning opportunities and an assessment plan to achieve learning outcomes for each year level of study.

B3. Objective 3: To suggest assessment, evaluation, and feedback protocols for the ongoing quality assurance of the IPECP curriculum.

The curriculum map analysis was written up in paper 4.

Submitted Paper title: Work smarter not harder: curriculum map analysis of Interprofessional Education Collaboration core-competencies across curricula.

Contribution of the paper to the SMU-IPECP curriculum: The curriculum mapping and analysis provides a framework to support evidence-based decision making on the development of an IPECP curriculum and can contribute to quality assurance during implementation (Bath et al., 2004). The IPECP curriculum needs to convey coherence of various curricular elements, for example, the gradual increase in competence, as seen in achievement of specific competencies, through the years. At the same time, the IPECP curriculum needs to demonstrate to lecturers and students, the added value of opportunities to incorporate the skills and attitudes IPECP offers in profession-specific subjects (Khanna et al., 2021). The development of skills and attitudes could not be accomplished in profession-specific teaching alone, because the focus in profession-specific teaching may be more on knowledge with limited opportunity for development of interprofessional skills and attitude. The curriculum analysis clearly highlighted opportunities for IPECP through identifying both overlaps and gaps

between professions' curricula in terms of addressing IPEC core competencies. The use of competencies to drive curricular planning has several advantages, including use of a common language, clarity, opening dialogue between professions, collaboration between educators, accountability, creates a guide for assessment, informing interprofessional learning, and ensuring relevance to practice (O'Keefe et al., 2017; Rhoda et al., 2016). Through mapping the IPEC-competencies against the subjects offered in the different professions, the focus was on identifying, what Barr (2002) refers to as common, as well as collaborative competencies, rather than the equally important complementary competencies included in profession-specific teaching, where the unique contributions of professions are taught. The overlap in IPEC-competencies addressed already in profession-specific and communal subjects, identified the specific competencies that are addressed at a specific year level of study to identify the sequence across year levels of study. The analysis provides evidence that Teams and Teamwork are not addressed during profession-specific teaching and needs additional emphasis in planning the IPECP programme. The teamwork competency can be broken down into team/collective orientation, shared mental models, mutual trust, and closed-loop communication. Mohammed et al., (2021); Busenhart (2014); Koehn and Charles (2019) report on the development of IPEC-competencies from beginning learners, for example junior students, to more advanced skills, rather expected after graduation. In comparing the competencies addressed in first year in the current study, there was almost complete overlap with the results found by Busenhart (2014) in terms of IPEC-core-competencies that apply to beginning learners. The identification confirms the year level of study where each competency should be emphasized and could thus contribute to the formulation of learning objectives, to establish educational activities and contribute to the development of themes throughout the IPECP curriculum. The curriculum mapping identified the current profession-specific and multi-professional learning opportunities that could form the basis of interprofessional learning. By combining the curriculum analysis information, how the available multi-level information offers the potential to guide the formulation of the IPECP curriculum was identified, in terms of more specific focus of different year levels of study. A scaffolding approach to curriculum planning, incorporating information on IPEC-core-competencies of specific year groups were used (Frantz & Rhoda, 2017; Masava et al., 2022).

Limitations: All the information that was yielded by the curriculum map analysis was not included in the related paper. Important information that influenced the development of the SMU-IPECP curriculum that was not included relates to the information on the topics, teaching methods and assessment methods, but this was included in an additional curriculum chapter, chapter 6. Distinguishing between IPEC-core-competencies is not straightforward as there is overlap between competencies for example ethics is incorporated in all four core-competencies. The formulation of the IPEC-core-competencies is also complex as it includes several aspects (phrases) where only a part applies, creating the possibility that it may be either included or excluded, depending on how the representatives interpreted it. The representatives strived to identify the main intention of the sub-competency when indicating if the sub-competency was addressed in a subject. Therefore, the identification of IPEC-core-competencies by the representatives may have unintentionally skewed some results.

Information in curriculum mapping chapter, but not included in the curriculum mapping paper

Contribution to the SMU-IPECP curriculum: Information on topics, teaching methods and assessment methods used in the teaching of profession-specific subjects identified opportunities that could be applied in the SMU-IPECP curriculum. The identification of overlap in topics identified common topics that could be taught in an interprofessional manner in future to save time and at the same time IPEC - competencies can be addressed. The specific topics most common in a year level of study helped the researcher to include such topics, that were already being taught on a knowledge level during profession-specific teaching, as foundation for the SMU-IPECP curriculum. In IPECP, students would have opportunity to acquire skills and it could shape their attitude. The teaching and assessment methods that were used in profession-specific teaching, indicated methods with which students and lecturers are familiar and where novel teaching and assessment methods, if used, would require additional preparation of facilitators.

Limitations: not all professions included all topics in their courses. However, overlaps could be identified.

Chapter 6: Curriculum development:

Objectives addressed: B2 and B3

The proposed curriculum was developed based on the information gained from Phase I, the curriculum map analysis and the information on curriculum analysis. The IPEC-competencies guided the curriculum. A competency-based approach according to Archibald et al. (2014), in contrast to an outcomes-based approach, considers the achievement of IPECP competencies. The benefits of using a competency-based approach in IPECP is supported by the seminal document of Frenk et al. (2010) that states that curricula need to consider the health problems to be addressed in the specific context, identify the requisite competencies required of graduates and tailor the curriculum to achieve the competencies and assess the achievements and shortfalls (Frenk et al., 2010).

Impact of Phase II on the curriculum

Phase II contributed to identification of core competency categories. The Phase identified the IPEC core competencies that are essential and that are not already part of the knowledge base in profession-specific teaching. Through identification of gaps and overlaps between professions, common topics that could be incorporated into the curriculum were identified. The results of the curriculum map analysis led to the proposed IPECP curriculum. The IPECP curriculum focusses on the important core-competencies as well as primary health care, which were identified as important in Phase II.

8.2.4 Phase III: validation of the curriculum: presented in chapter 7

Phase III Outcomes (evaluation): Expert evaluation of the validity of the newly developed curriculum

C Aim: To establish the validity of the newly developed curriculum

Objectives:

C1. To investigate the validity of the curriculum in terms of relevance, consistency, practicality, and effectiveness.

C2. To develop and validate the design principles that could guide further development and implementation of the IPECP curriculum.

The results of validation of the curriculum and design principles are written up in two draft papers

Paper titles:

1. Validating a proposed Interprofessional Education and Collaborative Practice curriculum – a curriculum design process

2. Validating design principles of a proposed Interprofessional Education and Collaborative Practice curriculum – Modified Delphi process

Contribution of the papers to the SMU-IPECP curriculum: the specific context where the curriculum needs to be implemented, especially in terms of the availability of resources, affects the planning and evaluating a curriculum. Building relationships with internal and external role players is important. Relationships and contact could create opportunities for receiving input into the curriculum. Input from external role players helps to align the curriculum with local, national and international standards and expectations. Internal role players could help with keeping curriculum planners accountable. Novel research methods can enrich data collection and analysis. During the curriculum validation, external participants specifically indicated that the SMU-IPECP curriculum resonates with them, and it can with some adaptation be applied to their context. A validation method for pre-implementation used in this research has not been encountered in any IPECP literature. This study's curricular development research not only addressed the validation of the proposed curriculum, but through this method the SMU-IPECP curriculum was strengthened and refined, resulting in a curriculum that was ready to be piloted and where possible teething problems could be addressed prior to implementation. The curricular development research method also assisted in the development and validation of design principles. Establishing design principles enabled this research study to not only produce a curriculum suitable for SMU, but produced a theoretical yield of the curriculum that can assist similar institutions to develop their unique curriculum. The curriculum validation paper and the design principles validation papers are still in draft format. Initially the plan was to write only one validation paper. The first paper presents the results of the curriculum validation. The second paper will address the design principles development and validation.

Limitations: the validation process was pre-implementation. The validation is, therefore, based on participants' prior experiences, rather than on the actual experience of the curriculum implementation. Not all internal participants had more than two years' experience of IPECP, and only had SMU exposure to base their opinions on.

Impact of Phase III on the curriculum

The validation process helped to refine the proposed curriculum to a product that was ready for pilot implementation. The design principles provided a theoretical contribution to the field of IPECP.

8.3 Overall strengths of the IPECP curriculum

8.3.1 Initiated from grass-roots level

The researcher initiated the IPECP programme at the university from grass-root level through a bottom-up approach, with gradual increased buy-in from management, lecturers, and students. This contributed to the authenticity of the SMU-IPECP curriculum as it was initiated and created from bottom-up, in conjunction with staff and students at the SMU. It was not imposed from management level, but rather was initiated from the identification of a real need.

8.3.2 Tailored to the context

The strength of the SMU-IPECP curriculum is that it is tailored for the specific context of SMU and is evidence-based. The integrated IPECP curriculum is competence based (based on achieving IPEC-core-competencies), longitudinal (from year level 1 to 4), scaffolded (building on previously obtained competencies) and addresses the needs of all eleven health care professions at the university. The SMU-IPECP curriculum was developed through inputs from the community-of-practice, including the IPECP-core committee and students who engaged in a pilot study of the final and third year programme. Students and staff can recognise it as a "for us, by us" curriculum that incorporated their expectations and suggestions. The IPECP curriculum provides ample opportunities for integration into work-integrated learning. More than 50 per cent of the professions do work-integrated learning activities across all study years.

8.3.3 Extracted important factors that need to be considered when planning a curriculum

The situational analysis in Phase I, contributed to the body of knowledge of specific factors that explicitly influence individual institutions planning of an IPECP curriculum. Identification of specific factors resulted in design guidelines that could help universities to tailor a curriculum for the particular university's needs. Much of the literature available on curriculum planning is from countries, such as the USA, Canada, United Kingdom, and Australia, with health systems and resources that are significantly different from African, and especially South African realities (Delawala et al., 2023). Inevitably, curricula that are suitable in these countries cannot, without significant tailoring, be applied locally in South Africa and perhaps in Africa as a whole. The yield of this situational analysis was especially significant in terms of condensing the myriad of literature from developed and developing countries, into specific factors that influence the planning of a curriculum.

8.3.4 Created a curriculum for Africa

The limited availability of IPECP curricula, specifically designed for an African context, impairs universities' ability to incorporate IPECP into undergraduate curricula. The SMU-IPECP curriculum was specifically planned to address the health needs of the local population, an under-resourced community. During the curriculum validation, external participants specifically indicated that the SMU-IPECP curriculum resonates with them, and with some adaptation it would be transferable to apply in their context. The SMU-IPECP curriculum may therefore be useful as a point of departure, to initiate development of curricula for other African universities. The contribution of such IPECP curricula could contribute to strengthen healthcare education and practice in IPECP in South Africa and other African countries. The adaptation of curricula to tailor it to the specific context could be guided by the specific factors identified in the scoping review, for example, considerations of future health care needs. The design principles developed as part of the SMU-IPECP curriculum could guide development and implementation of the curricula in similar institutions.

8.3.5 Uniqueness of research methods

Brookfield's lenses (Brookfield, 2017) of reflection, used to report on the wide range of data gathered in the situational analysis, proven to be a valuable research methodology, not encountered in other IPECP literature. This methodology was used to synthesise information regarding factors that influence IPECP curriculum development from several lenses, including critical reflexivity by the researcher, illuminating lecturers' perspectives, students' perspectives, and perspectives from the literature. It allowed the researcher to make meaning of both qualitative and quantitative data, through an embedded mixed method. The use of Brookfield's lenses, where literature findings were supported or refuted based on first-hand experience, made the IPECP curriculum exposure more authentic for all participants. Due to this critical reflexivity, the direction of the curriculum changed from a final year programme to the planning of a longitudinal, integrated curriculum that spans four years. Brookfield's lenses have been used successfully in educational research, (Barnard-Ashton et al., 2017). Critical reflexivity in combination with critical reflection enriched the analysis, similar to what is reported by Yao et al. (2022).

Another novel research method was the alternative use of curriculum mapping. The researcher's approach to curriculum mapping brought in a unique angle, not found in other research studies. Most IPECP literature reports on how the IPEC-core-competencies can be used in planning IPECP events (Brashers et al., 2019). Other curriculum mapping papers only considered either topics (Langlois, 2016) or year levels of study (Busenhart, 2014). However, the researcher used a different approach by investigating where year level of study, subject, and topics in the current profession-specific curricula, IPEC-core-competencies are already incorporated. Results from this curriculum map analysis were then used to establish the foundation for an integrated IPECP curriculum that is aligned with what students are taught in their respective professions. The SMU-IPECP curriculum is unique in terms of the alignment between profession-specific subjects and the IPECP programme, in both teaching and assessment. Assessment in the SMU-IPECP curriculum occurs formatively during IPECP events, but the summative evaluation is incorporated into profession-specific

subjects. IPECP could therefore be presented as integrated into profession-specific curricula, instead of offering it as a separate module where students do not see the relevance of IPECP for their own profession. The integrated nature of the SMU-IPECP curriculum is a unique method of presenting IPECP.

8.3.6 Design principles as theoretical contribution

In validating the design principles, a unique research method was used where the curriculum development research stages (van den Akker, 2013), were combined with a modified Delphi technique (Koehn & Charles, 2019). A panel of panellists reached consensus on the eighteen design principles which included both procedural and substantive design principles. Combining the two research strategies allowed the researcher to use the strengths of both methods. The curriculum development research allowed for the cyclical stages of development of the proposed curriculum and accompanying design principles, resulting in an end-product that was ready to present to the panellists. The modified Delphi then contributed to obtaining consensus of the expert panel on a set of design principles, which although based on literature, have not been exposed to scrutiny by experienced IPECP and curriculum practitioners.

8.3.7 Contextually relevant curriculum

The SMU-IPECP curriculum was developed for a university that serves an under-resourced community. Some of SMU students and staff are from these communities. Their input helped to plan a curriculum with authentic learning opportunities to address the needs of the community. Such authentic learning opportunities prepare graduates to deliver services that affect the quality of health care in South Africa, where encountering under-resourced communities are common. To address the needs of all communities, with a focus on under-resourced communities, the SMU-IPECP curriculum has a specific stream that addresses primary health care where students start to interrogate the effect of the health care system on services, as early as first year. The SMU-IPECP curriculum therefore not only incorporates the policies of the health system but also addresses the future health care needs of the population.

8.3.8 Comprehensive, integrated, evidence-based curriculum

Many universities offer once-off IPECP events, or short term IPECP exposure. Initially the researcher also set out to develop an IPECP module for final year students only. However, through engagement with students and staff and through examining the literature, the researcher observed that IPECP should be presented as part of a longitudinal program that starts from the first year and ends in the final year (Academy of Science of South Africa, 2018) . The longitudinal programme has the advantage of fostering students' skills and assists them to develop the dual identity of team member and professional. The SMU-IPECP curriculum prepares graduates who are collaborative ready when entering the workforce, as they have been exposed to IPECP from entering until exiting the university. The SMU-IPECP curriculum is further geared to address several of the graduate attributes, including collaborative team member, communicator and ability to contribute to evidence-based practice and research. Incorporation of aspects related to graduate attributes into the IPECP curriculum is an advantage to producing graduates that can, through reflection and life-long learning, contribute significantly to improve conditions in the workplace and society.

8.3.9 Alternative implementation strategy

Through this research project unique strategies were developed that could change the implementation of IPECP curricula. One of the common challenges for IPECP is the time available to engage in IPECP in overfull curricula (Barnard-Ashton et al., 2017). The SMU-IPECP curriculum addresses this through two specific strategies. The first is by overtly integrating the IPECP events with the profession-specific curricula in terms of both content and assessment. The second is to advocate for ring-fenced time in the curriculum where students can engage in IPECP and where other components of the profession-specific curricula would not hinder students from all professions to engage. The ring-fenced time was negotiated through management of the university and the different professions. This allowed all professions to participate in the IPECP programme. Only 16 hours per semester, for each year group of each profession was requested as a starting point, for students to develop skills and attitudes towards teamwork, that cannot be taught during their uni-professional curricula. Revision of the number of hours may be required after implementation of the curriculum, when evaluation will be done, to see if students have achieved the IPEC-core-competencies.

8.4 Implications of research output of the study

The research output of this study has implications for the following four domains: education, practice, leadership, and policy. The main contributions of the research to each of the domains are offered in an integrated description.

8.4.1 Education

Students' engagement in IPE events in class (such as case study discussions and role play with simulated patients), prior to expecting of them to be able to collaborate with other students and professional in work-integrated learning settings, assisted students to become more confident in and hone their own knowledge and skills. The use of standardised patients helps students to develop a shared mental model on how collaborative care can be done even if it is not yet done at clinical sites where students do work-integrated learning. This was especially evident in terms of identifying their unique contributions related to patient specific intervention(s) as part of role clarification and assuming responsibilities. The curriculum is based on the IPEC-core-competencies, ensuring that all four main Core Competencies are addressed. These competencies are Values and Ethics, Teams and Teamwork, Roles and Responsibilities and Interprofessional Communication.

Even though the curriculum mapping identified profession-specific teaching of the IPECP core-competencies as being incorporated in profession-specific subjects, without interprofessional engagement, students are not in a position to develop the interprofessional skills and attitudes to ensure that they are collaborative practice-ready when they graduate. Skills and attitudes in especially interprofessional teamwork and interprofessional communication need to be developed while interacting with students and staff from other professions.

The IPECP curriculum, especially the facilitator preparation, contributes to updating lecturers' teaching skill repertoire and provides opportunities for staff development. Lecturers have the opportunity to showcase their excellence in teaching and to mentor new facilitators, during co-facilitation. IPECP further sensitises facilitators to expect, when supervising their professions' students during work-integrated learning, that students apply what they have learned in IPE, during patient intervention(s). Facilitators from a variety of professions work collaboratively to develop and apply

authentic case studies that allow all professions to elaborate and illuminate their unique contribution, in preparation for application in practice.

8.4.2 Practice

The IPECP curriculum fosters an appreciation of the value and contribution of different professions and the importance of collaborative care planning. This preparation should impact and ultimately improve the quality of health care these graduates deliver.

Facilitators and students can actively explore additional work-integrated learning opportunities where students can work collaboratively, with the emphasis on person-centred care and shared decision making. These additional learning opportunities could be further incorporated in the curriculum to strengthen it further.

As a result of students' interaction with practising clinicians, the clinicians should become increasingly aware of the emphasis that is placed on collaborative decision making. The students could then showcase collaborative decision-making during placements at clinical sites to ensure that clinicians ultimately are more open to collaborative care. The guidance of clinical role models, who physically portray good examples of how to plan collaborative care of patients, needs to be fostered by clinical facilitators during SMU-IPECP curriculum implementation.

8.4.3 Leadership

Several opportunities to develop leadership and to practice leadership skills are incorporated in the SMU-IPECP curriculum. One of the aspects that students learnt in third year, as part of the TeamSTEPPS programme, is leadership. For students, their participation during learning events provided them with an opportunity of how they could act as a team leader and that, depending on the specific case/context, different professions could assume the leadership role at different times during a patient's treatment.

Many leadership opportunities exist in the IPEC programme. Some students could act as the "Face of IPECP", where students were trained to be co-facilitators and to give input into marketing of IPECP. Students could also volunteer and received coaching, to be master of ceremony and timekeepers during presentations in the programme and this prepared them for future academic events.

Lecturers from different professions assumed leadership positions where they took responsibility for either their entire profession or for their profession in a specific year level of study. This helped to create a leadership structure of which the IPECP core committee was the most prominent. The IPECP core-committee consisted of representatives from each profession and together they planned and implemented the programme for the different year levels of study. The researcher similarly played an important role in leadership of the IPECP programme as well as in representing the university at national and international level, which contributed to the development of her own leadership skills.

8.4.4 Research

The researcher/PhD candidate showcased scholarship in education research by disseminating findings form her study on various platforms. These include presentations of aspects of this research at several national and international congresses. The researcher motivated the IPECP core committee to collaborate with her, in presenting aspects of the IPECP programme, which motivated them to do additional research. The researcher thus leads by example and ensured that the research and the specific curriculum was presented at international congresses. The IPECP curriculum phases of development were also presented at the university research days over the past four years. Several research papers were drafted and submitted for publication, and two were published.

8.4.5 Policy

National and international health and education policies influenced the development of the SMU-IPECP curriculum as awareness of health policies, was one of the main findings of the scoping review.

The researcher presented the Phase I of the research at an HPCSA congress in 2019. The intention of the presentation was to raise awareness of the information in the ASSAf document in terms of the need to establish a multi-stakeholder, national working group to lead strategic planning of IPECP and encouraging professional boards to develop uniform guidelines for inclusion of IPECP in expectations for accreditation.

During the research period, SMU adopted a policy to include IPECP as one of the university's key performance areas (KPA) and key performance indicators (KPI's). As

a result of this policy, IPECP was added to the individual staff members' performance management contracts. This overt buy-in from management, contributes to management, staff and students' engagement in IPECP events. It is envisioned that such, and similar, policies could result in the establishment of an official IPECP unit at the university in the near future. It also helps in ensuring that resources are allocated to IPECP and, hopefully, in future this could result in the establishment of an IPECP unit for the university.

8.5 Limitations of the study

A limitation of the study is that the interprofessional education (IPE) part is more prominently addressed in the recording of results from student and staff feedback, than the interprofessional collaborative practice (IPC). One reason for this limitation is the relative new programme, where buy-in cannot be forced and the IPE part needs to proceed IPC. The programme has up to now only been piloted as short events in third and final year.

The study only looked at a curriculum to fit the needs of the staff and students at SMU, a university that mainly serves under-resourced communities. The curriculum may therefore not be suitable for other universities. However, the design principles could guide implementation at other universities

Students and staff had limited experience of IPECP at the time of data collection and the majority's only experience was what was offered in events for third and final years. This may have limited their vision of what IPECP could achieve. There are staff members who have been exposed to IPECP at other universities and they provided valuable input to counteract this limitation. External participants, who could provide a wider perspective on IPECP, also provided input into the validation of the curriculum, and that counteracted to some extent this limitation.

8.6 Way forward

Suggestions for further research include evaluation of the implementation of the SMU-IPEC curriculum. A participatory action research study is suggested. More research is required on the creation of a platform for community based IPECP. A community-based platform, for example, a mobile clinic that can be used with interprofessional

groups as students could become a model for how IPECP could be applied in different settings. The planning for such a service would require a thorough investigation where similar situations in South Africa, such as at University of Stellenbosch (Ukwanda project), University of Bloemfontein (Trompsburg) and University of Pretoria (Daspoort Clinic). Further research on the effect of changes in health care policies in the country, on IPECP and teamwork, is encouraged, for example, implementation of the National Health Insurance. An IPECP unit is one of the dreams of the IPECP core committee. Further research is needed on the benefits and constraints that an IPECP unit would have on the SMU-IPECP curriculum.

8.7 Final conclusion

The thesis describes a journey from initial conceptualisation of a module for final year students, to the final validation of a unique, longitudinal SMU-IPECP curriculum for all years of undergraduate study that has the potential to influence health care delivered by SMU graduates.

The thesis culminated in a validated SMU-IPECP curriculum that is currently in a pilot phase of implementation at SMU. The SMU-IPECP curriculum is available as a starting point for other universities who want to initiate an IPECP curriculum at their facility or who would like to incorporate some of the aspects of the evidence that informed the SMU curriculum, using the design principles, to tailor make it for their university.

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Appendices

Appendix A: Ethical Clearance Certificates | Human Research Ethics Committee (Medical)

Certificate No: M171145

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Ms Susara Pitout et al

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M171145

NAME: (Principal Investigator)	Ms Susara Pitout et al
DEPARTMENT:	Occupational Therapy Sefako Makgatho Health Sciences University
PROJECT TITLE:	Development of an interprofessional education and collaborative practice module for final year health science students at Sefako Makgatho Health Sciences University
DATE CONSIDERED:	24/11/2017
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Fasloen Adams and Prof Daleen Casteleijn
APPROVED BY:	Prof C Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	30/04/2018

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 301, Third floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in November and will therefore be due in the month of November each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature _____ Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix B: Example of consent forms

Informed Consent Form - General

Contact Details of Researcher: Hanlie Pitout, Occupational Therapist, Tel 012 5214019 or Hanlie.Pitout@smu.ac.za
Contact Details of Research Ethics Committee administrator and chair for the reporting of complaints or problems: Zanele Ndlovu, Wits Research Office, 0117171234 or zanele.ndlovu@wits.ac.za

I hereby confirm that I have been informed by the researcher, Hanlie Pitout, about the nature, conduct benefits and risks of the study entitled: Development of an interprofessional education and collaborative practice module for final year health science students at Sefako Makgatho University

I have also received, read and understood the information in the participant information sheet regarding this study. I am aware that the data from the study will be processed into a thesis and could be disseminated in other forms.

I am aware that due to the nature of the research process no claim to confidentially can be made. I hereby give consent that my contribution to and participation in all aspects of the study can be used by the researcher for research related purposes. I am aware that the information that I provide may be used in future studies.

I may, at any stage, without prejudice, withdraw my consent and participation in the study. I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

I understand that although the study foresees no danger of such occurrence, I cannot hold the University of the Witwatersrand and the researcher responsible for any damages, injuries or discomforts incurred and undertake to treat all fellow participants with respect and consideration.

Participant:

_____

Printed name Signature Place Date and Time

I, Hanlie Pitout, herewith confirm that the above participant has been fully informed about the nature, conduct and risk of the above study.
The Researcher:

_____

Printed name Signature Place Date and Time

Example of IPECP information sheet and consent form: quantitative data

IPECP INFORMATION SHEET: QUANTITATIVE DATA: NEEDS ANALYSIS

Study title:
Development of an interprofessional education and collaborative practice module for final year health science students at Sefako Makgatho Health Sciences University.

Dear colleagues and students

Introduction:
I, Hanlie Pitout, am doing research to develop an interprofessional education and collaborative practice module for SMU's final year health sciences students. As you know research is just the process to learn the answer to a question. In this study we want to find out from you what you see as the strengths, weaknesses, opportunities and threats that we should consider when we develop this module. The study is part of the principal investigator, Mrs. Hanlie Pitout's PhD study.

Invitation to participate: We would like to invite you to take part in our research study in order to strive towards making our university a benchmark institution providing holistic health sciences education that meets the health needs of the individual, the family, the community and the population.

What is involved in the study: the study uses a multistage mixed method sequential design. As participant in the quantitative part of the study you would be asked to complete a needs assessment questionnaire compiled by Interprofessional Education Community of Practice after running focus groups. The staff and third year students of SMU will be asked to complete these questionnaires. The type of questions will include what you see as the needs of the workforce for your profession that could be addressed through interprofessional education.

Risks: there is no specific risk in participating in the research.

Benefits: there is no financial benefits to your participation. Your contribution will however benefit SMU in terms of addressing the need for more interprofessional education and collaborative practice resulting in improved patient centered care.

The questionnaire will contain specific information on how you need to complete questions and how and where you need to submit the completed questionnaire. The results will be published in a paper, but no mention will be made of names of participants

Participation is voluntary: refusal to participate will involve no penalty. You may discontinue participation at any time without any negative consequences for yourself.

Confidentiality: Efforts will be made to keep personal information confidential. Absolute confidentiality cannot be guaranteed. Personal information may be disclosed if required by law. Organizations that may inspect and/or copy our research records for quality assurance and data analysis include groups such as the Research Ethics Committee. If results are published, it may lead to individual / cohort identification.

Contact details of researcher/s – for further information you are welcome to contact Mrs. Hanlie Pitout 012 521 4019 or Hanlie.Pitout@smu.ac.za / reporting of study related adverse events Zanele Ndlovu, Wits Research Office, 0117171234 or zanele.ndlovu@wits.ac.za

INFORMED CONSENT SHEET QUANTITATIVE DATA: NEEDS ANALYSIS

I _____ understand what is required of me if I participate in the research entitled ‘Development of an interprofessional education and collaborative practice module for final year health science students at Sefako Makgatho Health Sciences University’ and agree to participate.

Name _____

Signature _____

World Federation of Occupational Therapy

LEAVING THE SILOS: INTERPROFESSIONAL EDUCATION AND COLLABORATIVE PRACTICE (IPECP) AT A HEALTH SCIENCES UNIVERSITY IN SOUTH AFRICA

SJS Pitout | Department of Occupational Therapy | School Of Health Care Sciences
Sefako Makgatho Health Sciences University, Pretoria, South Africa

INTRODUCTION



Students in Health Science Education are customarily trained in their own disciplines, termed silos, with limited interaction with students from other disciplines. An Interprofessional Education module was presented to senior students from occupational therapy, physiotherapy, human nutrition, nursing and medicine. The TeamStepps™ programme focusing on leadership, situation monitoring, mutual support and communication was adapted to the needs of the University and presented by facilitators from these disciplines in order to improve students' ability to make an impact in the world of work.

OBJECTIVES

To explore the perceptions of healthcare students and their facilitators regarding teamwork skills in an Interprofessional education module.

METHOD

A mixed method study was conducted. Qualitative data were collected through students' written reflections and quantitative data were collected through completion of the "The Readiness for Interprofessional Learning questionnaire". Both sets of data gathering were conducted prior to and following the module. The module consisted of five sessions in which simulated clinical scenarios were introduced to practice aspects of teamwork. Simulated Patients were used to enhance authenticity during the role play sessions.

RESULTS

Participants perceived the Inter-professional education learning experience as positive, gained understanding of the team's functioning and the importance of applying teamwork skills. Students requested more opportunities for interprofessional learning. The facilitators gained valuable insight regarding the improvement of simulation and their facilitation skills.

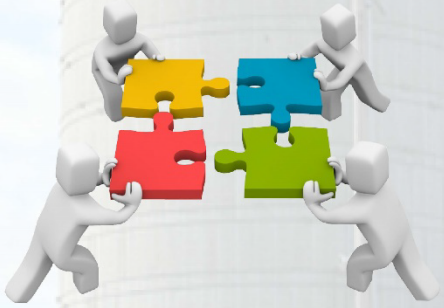
Hurdles

Facilitators

The facilitators' training was done in one day. This was not sufficient to fully prepare them for the week. Where facilitators were unsure of themselves and their role students became unsure and it affected the students participation in the activities.

Departments

Some departments scheduled additional activities for their students during this week. It made it challenging for the students to focus on Interprofessional Education and Collaborative Practice (IPECP).



Quantitative data

Readiness for Interprofessional Learning Questionnaire

Before the interprofessional education sessions students were not aware of the importance and roles of the different professions. After the sessions students were more aware of their own roles as well as the roles of students from other professions.

Reflections

Both written and verbal reflections were requested at the end of each session. The reflections provided feedback to the facilitators on what students have learned through the sessions. The students reflections were marked using the REFLECT rubric generating a mark. The feedback helped students to develop reflection skills and this was evident in their marks for reflections improving over the duration of IPECP.

Qualitative data: Students' verbatim comments

- "Realised that more of the things students learn are not taught by lecturers."
- "Thank you for the opportunity, I am a changed someone."
- "This programme should be kept all the time. It is what we need for the better SA Healthcare"
- "Continue to the next generation to also teach students that patients are the main purpose of us being here"
- "Spread the course throughout the year to keep it in the mind and heart of students"
- "Continue with this programme – it will change the way we perceive things in the work place".
- "The only change I need is that they must make us do this more often. They can make the whole January IPECP month".
- "Rather show us practically by enforcing interprofessional ward rounds in the hospital."
- "Include the programme in the school calendar".
- "One negative aspect I can think of is why has the programme only started this year? Previous graduates has missed out on a great opportunity to learn."
- "I learned from the role play the depth of the professions duty to a patient."
- "Kindly make this programme a subject where we can adopt the habit of working together as professionals."

Qualitative data: Facilitators comments

- " The programme certainly helped the students to overcome barriers between the professions and encouraged good communication". "Need to improve students confidence to work with other professions before qualification."
- "Working with different professions is challenging"
- " It benefitted me as I learnt new things that I didn't know"
- "Need more intensive training prior to training of students"
- "Like to share experiences of teamwork with students"
- "Correct way to treat patients" "global trend"
- "Need to be open to the process and remind yourself that you do not need to know everything – that you will learn as you go. Remember IPE is about the students and you are there to benefit them and they are relying on your commitment"

RECOMMENDATIONS

The IPECP week was only an introduction into team work and learning more from other professions. Students need to be encouraged to practice what they have learned during clinical work.

There need to be more opportunities in other years as well in order for students to develop skills in working with other professions from as early as first year. The LOOOP curriculum mapping system will be used in future to identify opportunities.

It would be valuable to have video material of where there is good teamwork in clinical settings where our students do their clinical blocks to serve as positive examples of what should happen. This will be especially valuable in the students' preparation for the role play which takes place during the IPECP week.

Through IPECP important skills and role clarification can be practised and explored in a non-threatening environment. The use of standardised patients and the Skills Centre is especially valuable in this regard.

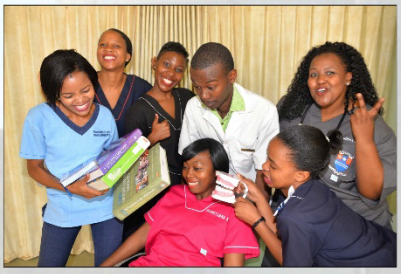
The TeamSTEPPS™ programme provide valuable introduction and information about teamwork.

CONCLUSION

Interprofessional education should be introduced into the various professions' curricula to benefit healthcare students and facilitators. Important skills and role clarification can be practised and explored in a non-threatening environment.

Take Home Message

- IPECP helps healthcare students to be "workplace" ready in terms of acknowledging each others roles and preparing them for teamwork. Students need the opportunity to experience teamwork first hand in a safe environment.
- Offering IPECP requires detailed preparation of facilitators because facilitating IPECP differs from small group teaching in a specific profession.
- Students welcome the opportunity to learn with, from and about each other. Even though students study and live together they do not know what other students roles and competencies are.



The Face of IPE - Final year student representatives

PLANNING OF AN INTERPROFESSIONAL EDUCATION CURRICULUM: PERSPECTIVES FROM UNDERGRADUATE STUDENTS AS STAKEHOLDERS

SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

Pitout, H; Du Toit, S; Adams, F
Department of Occupational Therapy, School of Health Care Sciences, Sefako Makgatho Health Sciences University

INTRODUCTION:

- Final year undergraduate students can give valuable input for planners and
- Elicit feedback from stakeholders to guide the planning process for creating the formal curriculum.





METHOD:

- Qualitative descriptive study explored students views.
- Ethically approved by University of the Witwatersrand ethics committee (M171145).
- Three focus groups were conducted, with a total number of 20 participants
- Three different schools,
- Occupational Therapy, Speech Language Pathology and Audiology, Physiotherapy, Human Nutrition, Nursing, Pharmacy, Radiology and Medicine.
- The focus groups were transcribed verbatim and coded inductively. Thematic analysis revealed three main themes.

RESEARCH AIM:
to identify students' needs and to explore their experiences of the pilot programme.

RESEARCH QUESTION:
What are students' needs and expectations of an interprofessional education curriculum?

FINDINGS AND DISCUSSION

Theme 1: Students as co-designers and enablers

Students' expectations
- use of latest technology,
- activities for learning to be enjoyable and fun;
- appreciate receiving external benefits,
- equality between professions;
- programmes' logistics, including funding, should be in place.

Shared ownership:
Input in the programmes' content and assist with the presentation

Co-designers:
- compared profession specific with IPECP
- suggested prerequisites to IPECP e.g. knowledge of scope of practice and patient exposure

Appreciation of other role players:
- obtaining recognition to facilitate buy-in
- collect evidence of the effect;
- create an environment where application is possible and expected.

Theme 2: Aligning IPECP outcomes and teaching methods

Attaining core competencies that would be applicable to all students:
- engage in health dialogue with other team members and with clients;
- role clarification and define the scope of practice
- development and refining of communication skills;
- ethical dilemmas during teamwork.

IPECP as a formal accredited curriculum:
- Credit-bearing part of the curriculum;
- Requirement in profession-specific clinical subjects;
- Assessment and feedback to show mastering of content;
- programme to start in first year and gradually build up to final year,
- IPE programme scheduled early in final academic year prior clinical blocks;

Curriculum content:
include new content; exposure to complex case studies and role play.

Teaching methods:
- role models
- exposure to whole team
- value of small group teaching

Theme 3: Enhancing students' motivation by considering their attitudes and experiences that could impactIPECP programme participation

Negative attitudes and experiences:
- resistance from staff not involved in the programme due to fear of the unknown;
- not wanting students to initiate changes
- differences in social awareness and expectations
- friction in small groups due to diversity however
- IPECP opportunities to address negative emotions.

Positive attitudes and emotions:
- benefits of joined responsibility during collaboration
- equal, receiving respect, recognition and gaining understanding;
- confidence generated by displaying their unique contribution to the patient's treatment;
- opportunity for students to become proud of their professions' contribution
- able to advocate for their patients and own profession.

DISCUSSION

- Students' input contribute to the design of an evidence-informed curriculum that will meet students' needs
- facilitate increased ownership by students.
- comparing profession-specific to IPECP curriculum, students identified gaps in their own professions' curriculums,
- suggested ways to ensure better alignment between profession specific courses and IPECP
- identified prerequisites of profession specific preparation for IPECP.
- buy-in depended on students appreciation of the value of IPECP
- influenced by the overt buy-in displayed by staff, both academic and clinical, as well as by management.
- Students appreciated the use of technology and virtual learning opportunities.

TAKE HOME MESSAGE:

Students, who experienced not only the entire profession-specific but also the IPE programme, provided a **unique view and supplied concrete examples of operationalizing** curriculum guidelines found in literature.

REFERENCES

Available on request. Please feel free to contact the first author if you have any questions or suggestions.
Hantie.Pitout@smu.ac.za

Factors that guide the planning of an interprofessional education and collaborative practice curriculum – a scoping review

Hanlie Pitout[1], Sanetta du Toit[2], Fasloen Adams[3]
1. Sefako Makgatho Health Sciences University (SMU), Pretoria, South Africa 2. University of Sydney, Australia 3. University of Witwatersrand, Johannesburg, South Africa

SUMMARY

The scoping review on planning a context-specific IPECP curriculum is presented. The aim was to obtain an overview of available literature as part of the situational analysis. The literature mainly originated in the global north. To ensure that the curriculum meets the needs of a specific context e.g. for a Health Sciences University in South Africa, some recommendations are offered, based on the Four Dimensional Curriculum Framework. The future healthcare needs; defining and understanding capabilities; teaching, learning and assessment strategies as well as support from the institution needs consideration.

INTRODUCTION / BACKGROUND

SMU trains mainly Healthcare Professionals. Ten professions currently participate in IPECP involving 800 final year students. No official structure is in place to plan and implement the IPECP programme. The WHO "Framework for Action on IPECP" refers to the need to contextualise the curriculum based on existing resources and local needs taking onto account the culture, geography, history and challenges (WHO, 2010).

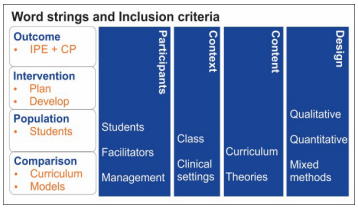
METHODS

The Joanna Briggs method for scoping reviews was used.

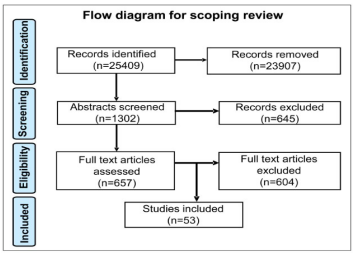
Stage 1: Identifying the research question

What is known, from published , peer reviewed literature about the factors that influence the planning of an IPECP curriculum module ?

Stage 2: Identifying relevant studies



Stage 3: Study selection



Stage 4: Charting the data

Main concept (IPE/IPECP/IPC; research design, frequency, participants and year level, country and context.

Stage 5: Results

Basic quantitative analysis of included articles and descriptive statistics. Inductive qualitative thematic analysis using the Four Dimensional Curriculum Framework (Lee et al., 2013) guided the analysis of factors: barriers and enablers .

RESULTS

Quantitative analysis
The 53 included studies made use of a variety of research designs. A range (from 2 – 10), and combinations of professions and study levels, from first to final year students, were found. Ninety eight percent of studies were conducted in the global north including in Australia, United States of America and Canada.

Qualitative analysis:
An inductive approach was used to establish factors that influence the planning of the curriculum. A variety of barriers and facilitators were found. The Four Dimensional Curriculum Framework was used to group factors under different headings. After describing the themes identified under each of the four dimensions nine recommendations were formulated for curriculum planners. These recommendations were presented to an IPECP community of practice for input on the accuracy and appropriateness.

Recommendation 1
Be cognisant of both health and education policies that guide IPECP at international, national and local levels.

Recommendation 2
Establish the health work force needs of the included professions.

Recommendation 3
Use the available core competency frameworks to define the outcomes of the IPECP programme.

Recommendation 4
Consider the existing professional curriculums and integrate IPECP into these curriculums.

Recommendation 5
Provide opportunities where students can practice interprofessional skills under guidance of clinicians, solving realistic real-world patient problems.

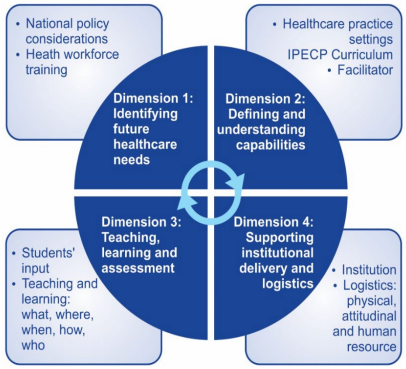
Recommendation 6
Identify and train facilitators who are enthusiastic, who can make students' involvement enjoyable and meaningful and thus ensure a positive attitude to teamwork.

Recommendation 7
Elicit students' input in the planning, considering both internal and external factors that influence students' participation.

Recommendation 8
Present a tailor-made rather than generic course including didactic session, simulation and clinical application.

Recommendation 9
Obtain buy-in from institutional management to assist in overcoming logistical barriers.

Four Dimensional Curriculum Framework



CONCLUSION

A scoping review can identify empirical evidence that could guide planning. Each IPECP curriculum needs to be tailor-made for the specific institution. The findings of the scoping review could be used by other researchers, the community of practice and policy-makers to guide planning of the curriculum. Knowledge of international, national and local policies needs consideration. The support of institutional

IMPLICATIONS / TAKE AWAY MESSAGE

Empirical evidence of factors to consider when planning the curriculum forms part of the situational analysis. The Four Dimensional Curriculum Framework shows the importance of considering the influence of individual dimensions, but also its interconnectedness, to guide planning . The recommendations may contribute to a holistic planning approach.

ACKNOWLEDGEMENTS / FUNDING

This forms part of a PhD study funded by PhD grant Sefako Makgatho University
I would like to acknowledge and thank the research team members for their help and support in the process of the scoping review.

REFERENCES

Available on request. Hanlie.Pitout@smu .ac.za
management is vital to overcome logistical barriers such as time tabling, physical and human resource requirements as well as attitudinal barriers. The core competencies for IPECP area available in literature and can guide the teaching methods and content. Input from students in the curriculum contributes to the success.

Factors that guide the planning of an interprofessional education and collaborative practice curriculum – a scoping review

Authors: Hanlie Pitout[1], Sanetta du Toit[2], Fasloen Adams[3]

1. Sefako Makgatho Health Sciences University (SMU), Pretoria, South Africa 2. University of Sydney, Australia 3. University of Witwatersrand, Johannesburg, South Africa

Summary

The scoping review on planning a context-specific IPECP curriculum is presented. The aim was to obtain literature on planning a curriculum as part of the situational analysis. The literature of this scoping review mainly originated in the global north. To ensure that the curriculum meets the needs of a specific context e.g. for a university in Africa, some recommendations are offered based on the Four Dimensional Curriculum Framework. Planning a context specific curriculum needs careful consideration of future healthcare needs; defining and understanding capabilities; teaching, learning and assessment strategies as well as support from the institution.

Introduction / Background

SMU trains mainly Healthcare Professionals. Ten professions currently participate in IPECP involving approximately 800 final year students. No official structure is in place to plan and implement the IPECP programme.. Important literature to consider in planning a context specific curriculum is the WHO "Framework for Action on IPECP" (WHO, 2010) that constitutes a call for action to integrate IPECP as an integral part of education and service of all health workers in preparation for a collaborative-practice ready health workforce (Gilbert et al., 2010). The IPECP curriculum needs to be contextualised based on existing resources and local needs taking into account the culture, geography, history and challenges (WHO, 2010).

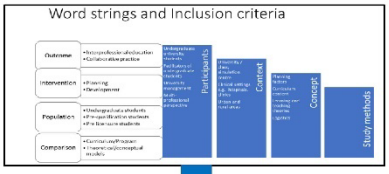
Methods

The Joanna Briggs method for scoping reviews was used.

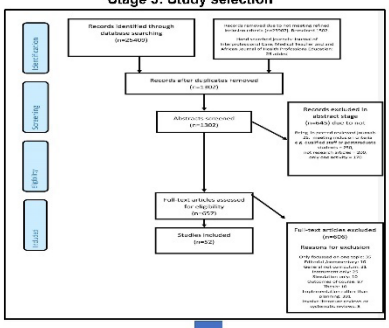
Stage 1: Identifying the research question

What is known, from the published, peer reviewed literature about the factors that influence the planning of an IPECP curriculum module?

Stage 2: Identifying relevant studies



Stage 3: Study selection



Stage 4: Charting the data

Author names and year	Name of article	Main concept (IPE, IPECP or CP)	Name of journal	Research approach and method	Frequency Longitudinal (L); twice (T)or once off (1x)	Participants and year level	Country and Context

Stage 5: Results collating, summarising and reporting

Basic analysis of included articles with deductive method and descriptive statistics. Inductive qualitative thematic analysis directed by the Four Dimensional Curriculum Framework (Lee et al., 2013) guided the analysis of factors: barriers and enablers.

Results

A variety of research designs were used, including qualitative (n = 21), quantitative (n = 19) and mixed methods (n = 12) studies. A range (from 2 – 10), and combinations of professions and study levels from first to final year students, were found. Nursing, Medicine and Occupational Therapy were the professions most often included. Ninety eight percent of studies were conducted in the global north including Australia, United States of America and Canada.

Factors that influence the planning of the curriculum were grouped using the Four Dimensional Curriculum Framework. The Framework offers an interconnected approach that link educational practice to health policy, workforce and professional practice in a coherent and reflexive way.

Recommendations, for each of the four dimensions are outlined.

Recommendation 1
Be cognisant of both health and education policies that guide IPECP at international, national and local levels.

Recommendation 2
Establish the health work force needs of the included professions. For instance specific clinical situations where the profession renders services to ensure that the included IPECP activities are authentic and reflect practice needs.

Recommendation 3
Use the available core competency frameworks to define the outcomes of the IPECP programme and thus guide the activities, teaching methods and assessment methods.

Recommendation 4
Consider the existing professional curriculums and integrate IPECP into the curriculums of the involved professions' for all year levels of study, to ensure buy-in and accountability.

Recommendation 5
Provide opportunities where students can practice interprofessional skills under guidance of clinicians, solving realistic real-world patient problems in different healthcare practice settings.

Recommendation 6
Identify and train facilitators, both academics and clinicians who are enthusiastic, who can make students' involvement enjoyable and meaningful and thus ensure a positive attitude towards future interprofessional collaboration.

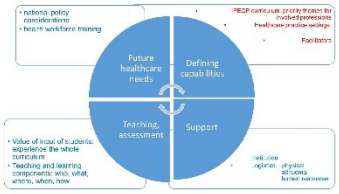
Recommendation 7
Elicit students' input in the planning, considering both internal and external factors that influence students' participation.

Recommendation 8
Present a tailor-made rather than generic course including didactic session, simulation and clinical application to facilitate the dual identity development of students as professional and interprofessional team members.

Recommendation 9
Obtain buy-in from institutional management to assist in overcoming logistical barriers such as financing, timetabling and organisation.

Results

Four Dimensional Curriculum Framework



Conclusion

A scoping review can identify empirical evidence that could guide planning. Limited research is available that specifically address planning of a curriculum for the African context. Each IPECP curriculum needs to be tailor-made for the specific institution to prepare students for collaborative practice in the context where they will work after qualification. The findings of the scoping review could be used by other researchers, the community of practice and policy-makers to guide planning of the curriculum.

Implications / Take away message

Empirical evidence of factors to consider when planning the curriculum forms part of the situational analysis. The available evidence is presented in the form of a Four Dimensional Curriculum Framework to indicate the importance of considering the influence of individual dimensions, but also the interconnectedness, to guide planning. The recommendations may contribute holistic approach and to avoiding unnecessary and unforeseen implementation challenges.

Questions I would like audience to respond to

NB This forms part of the last stage of the scoping review i.e. consultation with stakeholders.
Do the recommendations resonate with you?
Would other curriculum planners be able to use the recommendations to help to plan a suitable curriculum for the needs of the context?
Would you like to add or delete any of these recommendations for planning?

Acknowledgements / Funding

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I would like to acknowledge and thank the research team members for their help and support in the process of the scoping review.

References

Available on request

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Appendix D: Turnitin Report

Pitout PhD

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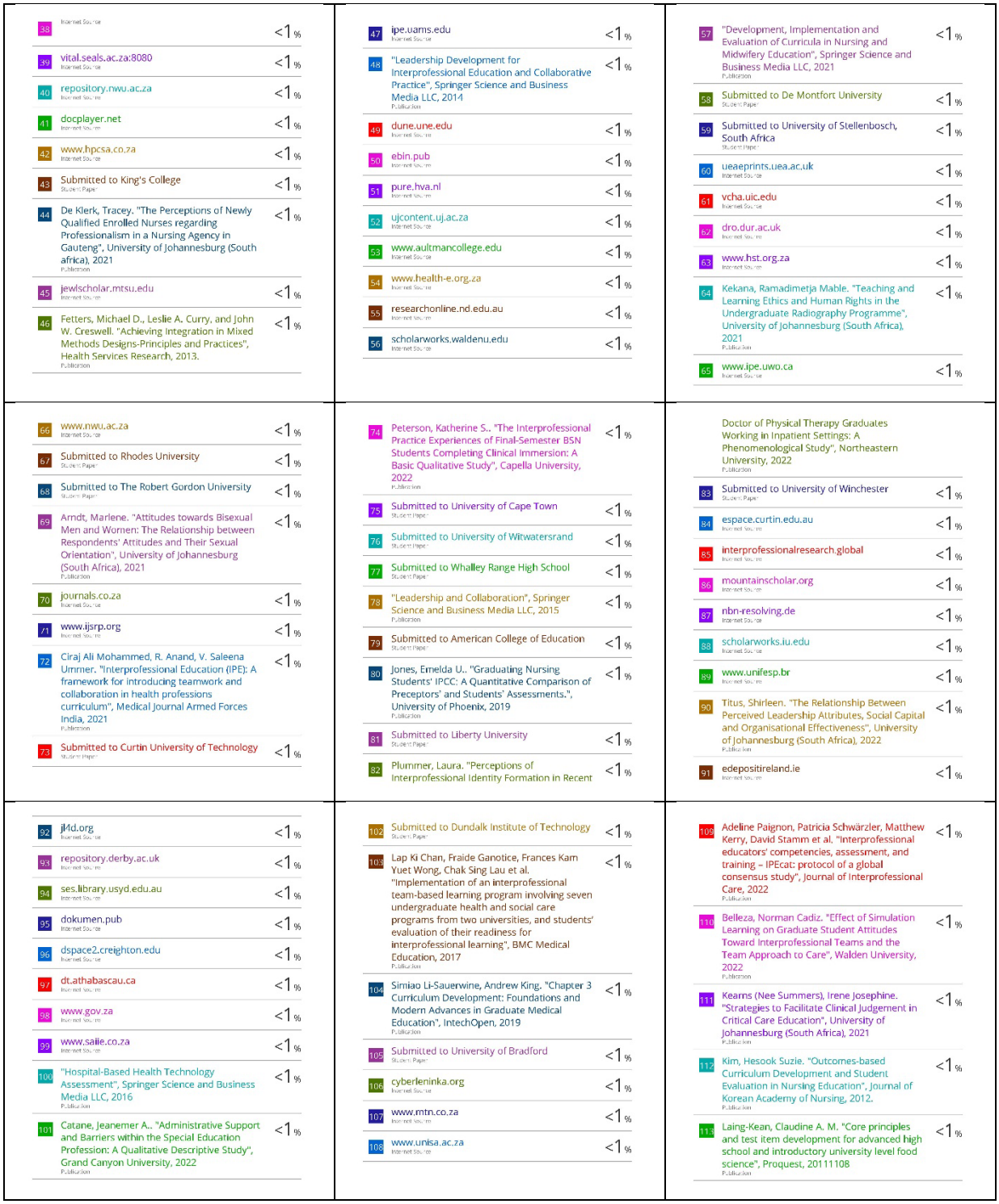
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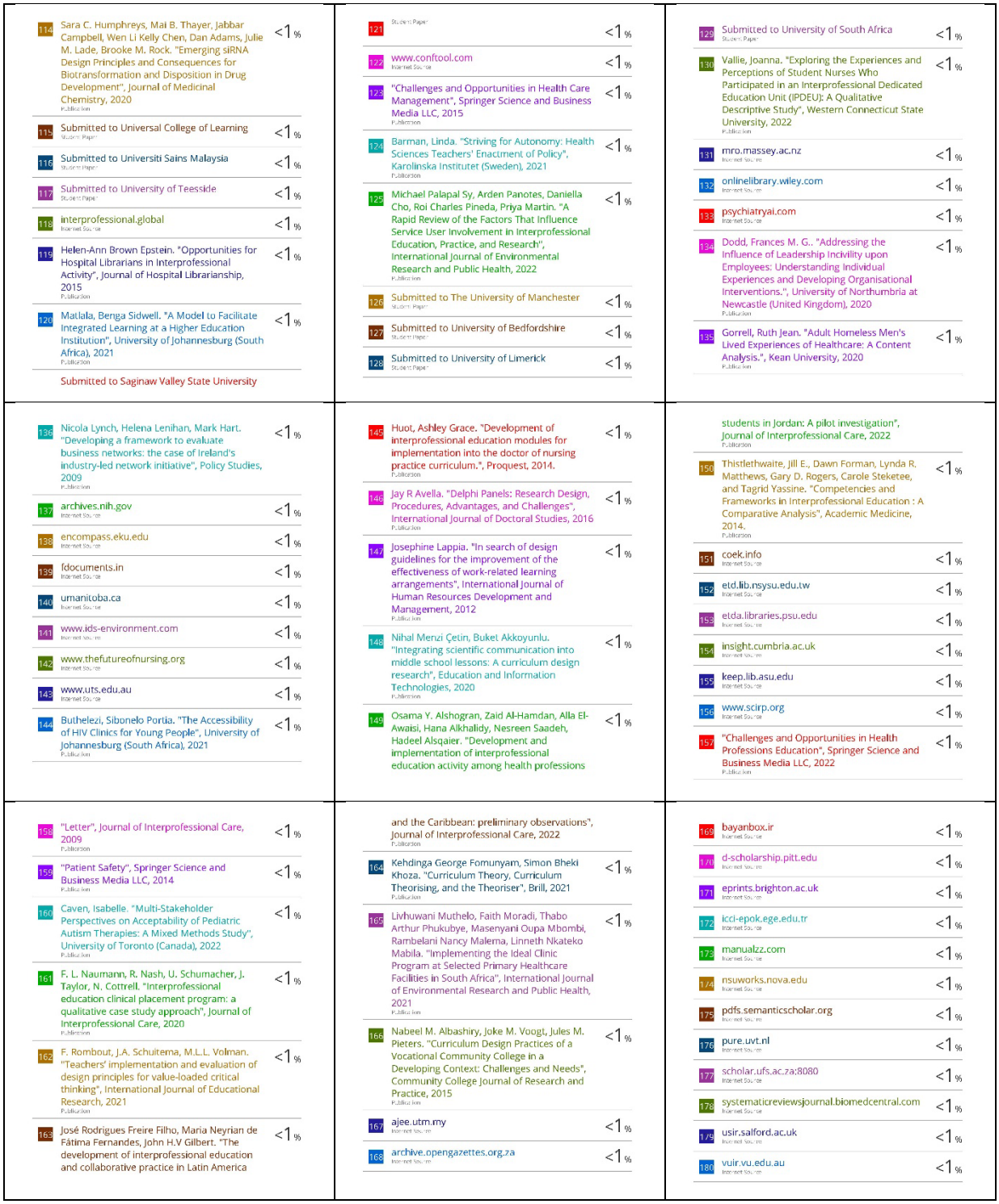
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Appendix E: IPEC Core Competency List

IPEC CORE COMPETENCY LIST

Interprofessional Education Collaborative. (2016). Core competencies for interprofessional collaborative practice: 2016 update. Washington, DC:

(Interprofessional Education Collaborative, 2016b)

Code	IPECP core competency
Values and ethics sub competency	
VE1	Place interests of patients and populations at center of IP health care delivery and population health programs and policies, with the goal of **promoting health and health equity** across the life span
VE2	Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care
VE3	Embrace cultural **diversity** and individual **differences** that characterize patients, populations and the health team.
VE4	Respect unique cultures, values, roles/responsibilities and expertise of other health professions and the impact of these factors can have on health outcomes.
VE5	Work in cooperation with those who receive care, provide care and others who contribute to or support the delivery of prevention and health services and programmes.
VE6	Develop a trusting relationship with patients, families and other team members
VE7	Demonstrate high standards of ethical conduct and quality of care in contributions to team-based care.
VE8	Manage ethical dilemmas specific to interprofessional patient/population centered care situations
VE9	Act with honesty and integrity in relationships with patients, families, communities and other team members
VE10	Maintain competence in one's own profession appropriate to scope of practice
	Roles and responsibilities
RR1	Communicate one's roles and responsibilities clearly to patients, families, community members and other professionals.
RR2	Recognize one's limitations in skills, knowledge and abilities
RR3	Engage diverse professionals who complement one's own professional expertise, as well as associated resources, to develop strategies to meet specific health and healthcare needs of patients and populations.
RR4	Explain the roles and responsibilities of other providers and how the team works together to provide care, promote health and prevent disease.
RR5	Use the full scope of knowledge, skills and abilities of professionals from health and other fields to provide care that is safe, timely, efficient, effective and equitable.
RR6	Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.

RR7	Forge independent relationships with other professions within and outside of the health system to improve care and advance learning.
RR8	Engage in continuous professional and interprofessional development to enhance team performance and collaboration.
RR9	Use unique and complimentary abilities of all members of the team to optimize health and patient care.
RR10	Describe how professionals in health and other fields can collaborate and integrate clinical care and public health interventions to optimize population health.
	Interprofessional communication
CC1	Choose effective communication tools and techniques, including information systems and communication technologies, to facilitate discussions and interactions that enhance team function.
CC2	Communicate information with patients, families, community members and health team members in a form that is understandable, avoiding discipline-specific terminology when possible.
CC3	Express one's own knowledge and opinion to team members involved in patient care and population health improvements with confidence, clarity and respect, working to ensure common understanding of information, treatment, care decisions and population health programs and policies.
CC4	Listen actively and encourage ideas and opinions of other team members.
CC5	Give timely, sensitive, instructive feedback to others about their performance on the team, responding respectfully as a team member to feedback of others.
CC6	Use respectful language appropriate for a given difficult situation, crucial conversation or conflict.
CC7	Recognise how one's uniqueness contributes to effective communication, conflict resolution, and positive interprofessional working relationships.
CC8	Communicate the importance of teamwork in patient-centered care and population health programmes and policies.
	Team and teamwork
TT1	Describe the process of team development and the roles and practices of effective teams.
TT2	Develop consensus on the ethical principles to guide all aspects of teamwork.
TT3	Engage health and other professionals in shared patient-centered and population-focused problem solving.
TT4	Integrate the knowledge and experience of health and other professions to inform health and care decisions, while respecting patient and community values and priorities /preference for care.
TT5	Apply leadership practices that support collaborative practice and team effectiveness.
TT6	Engage self and others to constructively manage disagreements about values, roles, goals and actions that arise among health and other professionals and with patients, families and community members.
TT7	Share accountability with other professions, patients and communities for outcomes relevant to prevention and health care.

TT8	Reflect on individual and team performance for individual as well as team performance improvement.
TT9	Use process improvement to increase effectiveness of interprofessional teamwork and team-based services, programs and policies.
TT10	Use available evidence to inform effective teamwork and team-based practices.
TT11	Perform effectively on teams and in different team roles in a variety of settings

Appendix F: Needs Survey

IPECP questionnaire staff and final year students

Please complete the survey below.

Thank you!

Development of an interprofessional education and collaborative practice (IPECP) module for final year health sciences students at Sefako Makgatho Health Sciences University (SMU).

IPECP needs survey for students and lecturers

Dear participant

We kindly invite you to take part in the online IPECP needs survey, to obtain input from the wider SMU community, to guide strategic planning for IPECP. Please assist us by taking 20 - 20 minutes to complete the questionnaire. Your honest opinion, comments and experiences are very valuable to this study. Senior students as well as acadmic staff are invited to participate in this study, regardless whether you were involved in 2021 IPECP week.

Informed consent form

What is involved in the study: As participant in the quantitative part of the study, you would be asked to complete an online IPECP needs survey, compiled by Interprofessional Education (IPECP) Community of Practice, after running focus groups and considering the results of a scoping review. The aim of this survey is to find out from you if you agree with the aspects that we identified as important to consider during the planning of IPECP at SMU.

Risks: there is no specific risk in participating in the research.

Benefits: there is no financial benefit to your participation. Your contribution will however benefit SMU in terms of addressing the need for more interprofessional education and collaborative practice (IPECP) resulting in improved patient-centered care.

The questionnaire contains specific information on how you need to complete questions. The results will be published in an article but no mention will be made of names of participants

Confidentiality: Efforts will be made to keep personal information confidential. Absolute confidentiality cannot be guaranteed. Personal information may be disclosed if required by law. Organizations that may inspect and/or copy our research records for quality assurance and data analysis include groups such as the Research Ethics Committee. If results are published, it may lead to individual / cohort identification. Ethical approval of the study was obtained from University of Witwatersrand (M171145) and permission from SMUREC (R14/49).

For further information you are welcome to contact Mrs. Hanlie Pitout 012 521 4019 or Hanlie.Pitout@smu.ac.za / reporting of study related adverse events Zanele Ndolvu, Wits

Research Office, 0117171234 or zanele.ndlovu@wits.ac.za

By completing this online needs survey, I confirm that I am over the age of 18 years, and consent to participate in this study. I have read and understood all the above information provided, and understand that once the survey is submitted, I will no longer be able to withdraw since responses cannot be linked back to me. I participate knowing that my answers will remain confidential, and that my identity will not be revealed. I am also aware that the information from this survey may be used for research publication and presentation.'

- ○ Yes
- ○ No

Please answer all the questions by clicking on all blocks that you want to select. There are no right or wrong answers please answer as honestly as you can.
Please complete your personal details below. The information would be used in the research to describe the characteristics of the staff and students who completed the questionnaire. All identifying information were remove in line with the POPI Act.

i. Date of completing the form Y-M-D

ii. Age in years

iii. Race

iv. Gender

v. Profession/ department
* must provide value

vi. Current position
* must provide value

The following questions relate to the current IPECP programme. Each question has multiple answers. Select all answers that you agree with by clicking on the answer,

A. Planning: At this stage IPECP mainly targets senior students, The section addresses students, staff and management's involvement in planning. Please select all answers you agree with.

A 1. Best/most appropriate year level to of students to be involved in IPECP

- ☐ a. Include first year level

	☐ b. Include all year levels, not only in final year ☐ c. Only senior/final year students ☐ d. Only first and final year students ☐ e. Other
A 2. The planning committee for IPECP should comprise of	☐ a. Student representatives ☐ b. Lecturer representatives for each profession ☐ c. Management ☐ d. Other:
A 3. Marketing, to create awareness of the IPECP programme, should involve	☐ a. Students at SMU ☐ b. Staff at SMU ☐ c. SMU management ☐ d. No marketing is required ☐ e. Other:
A 4. Awareness of IPECP programmes offered at other universities	☐ a. Students want to know and compare what happens at other universities ☐ b. Staff want to know and benchmark against what happens at other universities ☐ c. I do not see a need to be aware
B. Content and IPECP core competencies: refer to the specific outcomes and skills that needs to be taught in an IPECP programme. Please select all answers that you agree with.	
B 1. Content to be covered in the current IPECP programme	☐ a. The content included should be aligned with the IPECP outcomes (e.g. role clarification, ethics, teamwork, health dialogue). ☐ b. Content covered in IPECP should preferably be new i.e. not already covered in a profession specific course. ☐ c. Activities need to include fun e.g. educational games. ☐ d. I am not aware of the content ☐ e. Additional content should be added

B 2. Four core competencies covered in the IPECP programme i.e. role clarification, team work, ethics and communication.

B 2. 1. Clarification of roles and responsibilities

- ☐ a. IPECP provides opportunities to do role clarification in specific case studies.
- ☐ b. Students get to know and understand their own scope of practice compared to scope of practice and responsibilities of other professions.
- ☐ c. Not aware if it is included

B 2. 2. Interprofessional communication (health dialogue)

- ☐ a. IPECP improves health dialogue through opportunities to discuss terminology.
- ☐ b. Students have opportunities to practice to communicate with patients, their families/carers, and other health professionals.
- ☐ c. Not aware if is included

B 2. 3. Teams and teamwork

- ☐ a. Students have opportunities to practice collaboratively and to apply what they have learned during IPE, during patient treatment.
- ☐ b. Students have opportunities for patient discussions with team members during clinical work e.g. wardrounds.
- ☐ c. Not aware if opportunities exists.
- ☐ d. Lecturers at SMU emphasize teamwork, collaboration and patient-centered care to students.

B 2. 4. Ethical issues in team work

- ☐ a. Students become aware of how a team approach can solve ethical dilemmas.
- ☐ b. Students are able to identify when team members do not adhere to ethical practice through situation monitoring.
- ☐ c. Not sure if students are aware of ethical issues in teamwork.

C. Teaching and learning strategies: Teaching and learning methods that enhance learning in IPECP should include. Please select all answers that you agree with.

C 1 a. Virtual or online learning	☐ The availability of virtual learning opportunities enhances IPECP. ☐ SMU's E-learning support during online learning is sufficient to ensure success. ☐ Facilitators use the latest technology for online learning e.g. Blackboard. ☐ IPECP cannot be done virtually/online i.e. it should only be done face-to-face.
C 1 b. Blended learning including both online educational materials and opportunities for interaction online and face-to-face teaching	☐ In IPECP opportunities for both face-to-face and online learning is preferable to only face-to-face learning. ☐ Students use blended learning opportunities e.g. accessing information on Blackboard in preparation for learning. ☐ Blended learning is not suitable for IPECP.
C 1 c. Case studies with role play sessions using trained Simulated patients (SP)	☐ The role of my profession was clear and important (overt). ☐ Interacting with the SPs allowed students to practice skills in a safe environment ☐ Students do not need to practice role play - they should rather immediately be exposed to real patients.
C 1 d. Group teaching with one facilitator for approximately 10 students, from a variety of different professions	☐ Students learn effectively from each other in a small group ☐ Students value individual feedback from facilitators on their performance in a team. ☐ Small group teaching is a waste of resources.
C 1 e. Large group teaching: where all students from all professions with their facilitators attend.	☐ Large group teaching during IPECP e.g. pain management and International Classification of Function, disability and Health (ICF), is effective to explain important concepts. ☐ Large group teaching is not effective during IPECP.
Assessment of learning in IPECP. Please indicate your opinion on the type of assessment/s that needs to be used. Please tick on all answers that you agree with.	

C 2. Effective methods of assessment of learning in IPECP is by

- ☐ completing daily reflections
- ☐ submitting a portfolio of evidence of learning, including completed ICF forms
- ☐ including IPECP as criteria for clinical performance in my profession
- ☐ ensuring assessments of IPECP reflect team skills and not individual skills only e.g. allocate marks for project presentation.
- ☐ profession specific assignments and tests as with other subjects are effective
- ☐ 6. Other

Facilitators in IPECP are lecturers responsible to teach IPECP. Lecturers from all professions involved in IPECP teach students from a variety of professions, not only students from their own profession.

C 3. Facilitators (lecturers who teach IPECP)

- ☐ a. Facilitators should be self-identified, rather than forced to be involved.
- ☐ b. Facilitators need training to have adequate knowledge and skills to facilitate IPECP small groups.
- ☐ c. There is no need for IPECP facilitator preparation.

Facilitators: Other important characteristics for a facilitator are

Formal curriculum for IPECP: currently IPECP is not presented as part of all professions compulsory subjects and is not credit-bearing. It is suggested to move to a formal, compulsory, longitudinal curriculum.

C 4. Reasons for having a formal curriculum for IPECP

- ☐ Staff members would be more involved.
- ☐ Students would take IPECP seriously if IPECP contribute to marks.
- ☐ There is no need for a formal IPECP curriculum - it should continue to be non-compulsory.

D. Environment/ context. SMU is a unique university with its own culture, values and opportunities. Please select all answers that you agree with.

D 1. The IPECP programme should aspire to

- ☐ a. be well-organized with adequate arrangements (of the programme, reading material, and preparation of staff and students to engage in the programme).

- [ ] b. contribute to the culture of the university as one of working together
- [ ] c. be evidence-based e.g. utilizing undergraduate research projects, to monitor the effect of the IPECP programme

D 2. Diversity of role players (e.g. variety of professions, cultural groups, year groups that participate together)

- [ ] is an advantage in terms of creating opportunities to learn from each other.
- [ ] only professions from the same school should participate in IPECP week
- [ ] is a disadvantage as it creates conflict which inhibits learning

An IPECP unit for SMU with dedicated staff could improve the IPECP programme through e.g. coordination of shared clinical placement activities, fostering collaborative learning opportunities between professions, stimulating interprofessional team work and research

D 3. A dedicated IPECP unit for SMU

- [ ] is needed
- [ ] The current method of running IPECP as a voluntary initiative by some staff members is sufficient.

Please answer the following open-ended questions. Feel free to add additional comments in this section:

a. What do you like most about the current IPECP programme and why?

b. What do you like least about the current IPECP programme and why?

c, What new knowledge, skills and attitudes should in your opinion form part of the IPECP programme where students learn with, from and about each other, to be able to collaborate in health care setting?

d. Please add any other comments or suggestions about what you think need to be considered in planning the IPECP programme in terms of strengths, weaknesses, opportunities and threats.

Thank you for sharing your opinions on IPECP with us. Your contribution is valued and appreciated. Information would be used during the Strategic and Curriculum Planning Workshop. A summary of the research project, once completed, can be made available to you at your request. Please email this request to the researcher Hanlie.Pitout@smu.ac.za or phone 012 521 4019. Results of the research project will be submitted to a peer-reviewed journal for publication.

Submit