



VOLUME 1 of the HEALTH PROFESSIONS EDUCATION book series

Reimagining HEALTH PROFESSIONS EDUCATION

Innovations and insights for the 21st century and beyond

Editors: Jessica Pool,
Anitia Lubbe, Yolande Heymans

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Reimagining

HEALTH PROFESSIONS EDUCATION

Innovations and Insights for the 21st Century and Beyond



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THIS BOOK WAS DOUBLE BLIND PEER-REVIEWED

This book has undergone rigorous double-blind peer-review by independent experts in the field. The peer-review process was conducted in accordance with the publisher's guidelines, and the final decision to publish this book was based on its scholarly merits and relevance to the field.

Peer review declaration

The publisher (AXIOM) endorses the South African National Scholarly Book Publishers Form Best Practice for Peer-Review of Scholarly Books. The manuscripts underwent an evaluation to compare the level of originality with other published works and was subjected to rigorous two-step peer-review before publication by two technical expert reviewers who did not include the volume editors. The reviewers were independent of the publisher editor(s) and author(s). The publisher's shared feedback on the similarity report and the reviewer's inputs with the manuscript editors to improve the manuscript. Where the reviewers recommended revision and improvements, the editors or authors responded adequately to such recommendations.

Research Justification

Health professions education is undergoing a significant transformation as institutions respond to evolving healthcare demands, technological advancements, and growing calls for socially accountable, contextually relevant training. Traditional models of teaching and learning are often insufficient to prepare health professionals for complex, resource-constrained, and rapidly changing healthcare environments, particularly in the Global South. Consequently, there is an urgent need to explore innovative, evidence-informed educational approaches that enhance student engagement, clinical competence, and the formation of professional identity.

Despite growing interest in educational innovation, a persistent gap remains between educational theory and its practical implementation within health professions education. Many programmes continue to rely on conventional pedagogical approaches that may not fully support competency-based education, self-directed learning, or interprofessional collaboration.

This scholarly book publication responds to this need by investigating themes such as curriculum transformation in health professions education, clinical training and work-integrated learning, and technology and the digital future of health professions education. It contributes to the broader discourse on reimagining health professions education to better prepare future health professionals to meet the needs of diverse populations and evolving healthcare systems.

The significance of this research lies in its potential to contribute to the ongoing transformation of health professions education by providing insights into key challenges in the field. The findings will also contribute to the growing body of scholarship on teaching and learning in health professions education, particularly within resource-constrained and contextually diverse settings.

A call for chapters was announced through various channels, such as the Southern African Association of Health Educationalists (SAAHE) and various interfaculty communication platforms. A substantial number of manuscripts

were submitted by local and national scholars. Under the editors' auspices, all manuscripts were scrutinised.

Those manuscripts that adhered to the standards and foci set for publication went through a double-blind peer-review, as well as an authentication process to ensure that the content was not plagiarised. Chapters were also language-edited, and corrections were made by the authors, accompanied by a changelog that was screened by the editors. In cases where a discrepancy in reviewers' outcomes was reported, the chapter was submitted to a scholar of standing in the field to act as an arbiter to make a final decision regarding its merits. All reports are currently stored in the publisher's offices.

The target audience is scholars in health professions education.

This book publication complies with the Department of Higher Education and Training's (DHET) standards for original content, contains more than 50% previously unpublished work, and was cleared of possible plagiarism by using iThenticate, confirming that no part thereof was plagiarised. All ethical standards were observed and upheld during the research, in line with approval granted by the North-West University (NWU) Faculty of Health Sciences and the NWU Registrar/Gatekeeper.

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Editors

Jessica Pool

Centre for Health Professions Education,
Faculty of Health Sciences, North-West University,
Potchefstroom, South Africa

jessica.pool@nwu.ac.za

ORCID: 0000-0002-6839-4419

Prof Jessica Pool is the Director of the Centre for Health Professions Education (CHPE) in the Faculty of Health Sciences at North-West University, South Africa. Her scholarship focuses on health professions education, the Scholarship of Teaching and Learning (SoTL), and curriculum innovation through multilingual and authentic pedagogies. She has been part of a group of lecturers responsible for large interprofessional teaching modules, postgraduate programmes, and international collaborations with institutions such as Georgia State University (USA) and the World Health Organisation (WHO). Prof Pool's research advances inclusive, culturally responsive, and evidence-informed teaching and assessment practices in higher education. She has published widely, delivered invited keynotes and workshops nationally and internationally, and serves as a mentor, reviewer and collaborative researcher across global academic networks. Her work contributes to transforming health professions education through equity, innovation, and scholarly excellence.

Anitia Lubbe

Research Unit Self-Directed Learning,
North-West University, Potchefstroom, South Africa

Anitia.Lubbe@nwu.ac.za

ORCID: 0000-0001-5687-1030

Anitia Lubbe is an Associate Professor at the Centre for Health Professions Education, North-West University, and subprogramme leader for Assessment to support Self-Directed Learning in the Research Unit Self-Directed Learning. Her research spans assessment, assessment literacy, feedback literacy, cooperative learning, and critical thinking, with a growing

focus on the ethical integration of generative AI in higher education assessment. A pragmatist at heart, Anita publishes, presents, and supervises in the domain of self-directed learning across various disciplines, including health professions education. She is passionate about transforming assessment practices to foster student agency.

Yolande Heymans

Centre for Health Professions Education,
Faculty of Health Sciences, North-West University,
Potchefstroom, South Africa

Yolande.Heymans@nwu.ac.za

ORCID: 0000-0003-4459-2266

Yolande Heymans is a Professor in the Centre for Health Professions Education, Faculty of Health Sciences at North-West University, South Africa. Her scholarship focuses on health professions education, the Scholarship of Teaching and Learning (SoTL), and curriculum innovation through multilingual and authentic pedagogies. She has led large interprofessional teaching modules, postgraduate programmes, and international collaborations with institutions such as Georgia State University (USA), the University of Leeds (UK), and the International SoTL Community of Practice. Prof Heymans's research advances inclusive, culturally responsive, and evidence-informed teaching and assessment practices in higher education. She has published widely, delivered invited keynotes and workshops nationally and internationally, and serves as a mentor, reviewer and collaborative researcher across global academic networks. Her work contributes to transforming health professions education through equity, innovation, and scholarly excellence.

Contributors

Lucé Pretorius

School of Psychosocial Health
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
luce.Pretorius@nwu.ac.za
ORCID: 0000-0001-8110-2524

Lucé Pretorius (MSW; PhD) is a senior lecturer in Social Work at North-West University, South Africa, and Subject Group Deputy Leader for the Vanderbijlpark Campus. With a strong background in direct social work practice, her early career focused on child protection, trauma intervention, and high-risk community work. These frontline experiences continue to shape her teaching, research, and advocacy, particularly in preparing future practitioners for emotionally intense and sometimes dangerous environments.

Lucé's current research centres on workplace violence in the health and social service sectors, with a focus on digital and simulation-based training interventions. She leads the *Wellness Wardens* project, which explores practitioner safety, client aggression, and institutional support systems. Her work is grounded in trauma-informed and emotionally intelligent approaches to education and care. She collaborates with national and international partners to advance practitioner wellbeing, and regularly contributes to academic publications, student mentorship, and interdisciplinary research.

Rhea Koch

Centre for Health Professions Education (CHPE)
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
rhea.koch@nwu.ac.za
ORCID: 0000-0003-2398-9475

Rhea Koch holds a BA (Hons) in Psychology and an MA in Sociology. After an extensive career in the private sector, she returned to academia. In 2021, she was appointed as an Academic Developer at North-West University's Potchefstroom Campus, leading a three-year project (2021–2023) to decolonise health sciences curricula within the Centre for Health Professions Education (CHPE) in the Faculty of Health Sciences. Her dedication to this initiative culminated in the completion of her PhD in Health Sciences Education, during which she developed innovative guidelines for decolonising curricula.

In 2024, Rhea transitioned to the role of Academic Programmes Coordinator at NWU's Centre for Higher Education Professional Development (CHEPD) within the Faculty of Education. Alongside her university roles, she founded Axiom Academic Publishers, where she now partners with academics and institutions on a variety of educational and research projects. She remains connected to higher education as an extraordinary researcher for the CHPE, continuing her passion for transformative education and research.

Farhin Delawala

Centre for Health Professions Education (CHPE)
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
rhini.delawala@gmail.com
ORCID: 0000-0002-7985-3684

Dr Farhin Delawala is a South African health professions education specialist with a multidisciplinary background in psychology, education, and qualitative research. She holds a PhD in Health Sciences with a focus on Health Professions Education from North-West University (NWU), where she developed an interprofessional education programme aimed at enhancing collaborative healthcare practice. Dr. Delawala has served as a Postdoctoral Fellow and has contributed postgraduate student and peer reviews, curriculum development, and innovative teaching strategies. Currently working within local government, she remains actively engaged in interprofessional education and collaborative practice across Africa through networks such as AfriPEN. Her research interests include self-directed

learning, interprofessional collaboration, socially accountable education, and digital pedagogy in health sciences. Dr Delawala's work bridges academia, community service, and global health education.

Nombulelo Esme Zenani

School of Nursing Science
Faculty of Health Sciences
North-West University, Mmabatho, South Africa
sunshine.zenani@nwu.ac.za
ORCID: 0000-0001-7397-6707

Ms Nombulelo Esme Zenani is a dynamic nursing scholar, educator, and curriculum innovator whose work connects clinical practice, academic leadership, and global collaboration. She holds a bachelor's degree in nursing, a postgraduate diploma in nursing management, and a master's in nursing education, along with short learning certificates in systematic reviews, leadership, and infection control. She is currently pursuing a PhD at North-West University. Ms Zenani has authored numerous peer-reviewed articles and reviews covering topics such as ICU team resilience, nursing education, interprofessional collaboration, interprofessional education, and simulation-based teaching. She brings both depth and compassion to healthcare education. Her career includes roles as a professional nurse, nurse manager, senior lecturer at North-West University, a CPD programme developer, and a supervisor of Master's in Nursing candidates, all driven by a commitment to equity, excellence, and community engagement. Whether presenting at national or international conferences, leading school-based health initiatives and other community engagements, or shaping national nursing curricula, Ms. Zenani's work demonstrates a strong belief in the power of collaboration, compassion, and context-aware transformation.

Suegnét Scholtz

School of Nursing Science
Faculty of Health Sciences
North-West University, Mmabatho, South Africa
suegnet.scholtz@nwu.ac.za
ORCID: 0000-0002-4316-5257

Dr Suegnèt Scholtz is Deputy Director of the School of Nursing at North-West University (NWU) and a registered professional nurse and midwife with additional qualifications in critical care nursing, health services management and nursing education. With more than 15 years of clinical expertise and over a decade in academia, she has developed a strong profile in advancing interprofessional collaboration in healthcare. Her doctoral research in critical care nursing explored the culture of healthcare teams, leading to a model that enhances constructive behaviour and interaction among professionals. Since 2016, her work has focused on family-centred care for children with neurodevelopmental disorders, emphasising safe, inclusive, and trauma-informed approaches that rely on effective collaboration between healthcare professionals and families. She has presented widely, including at international forums on autism and child health, and contributes to projects such as PRISM, INDeSC, and STARFISH. Beyond research, Dr Scholtz trains professionals in alternative communication strategies as a certified Makaton tutor and facilitates Parent Reality, a national support group for families of children with special needs.

Khumoetsile Shopo

School of Nursing
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
khumo.shopo@nwu.ac.za
ORCID iD: 0000-0001-5940-6222

Dr Khumoetsile Shopo is a deputy director at the School of Nursing, North-West University. She is also a researcher within the NuMIQ research entity at the same institution. She holds a PhD in Nursing Science, with a focus on nursing education, midwifery and cultural competence. She is registered with the South African Nursing Council (SANC) in General Nursing, Psychiatry, Community, Midwifery, Nursing Administration, Nursing Education, and as a Moderator and Assessor.

There is a need for a culturally diverse country like South Africa to provide quality healthcare that recognises the diverse cultures. Midwives and nurses need to be culturally competent to provide quality healthcare to

diverse populations. Nurse educators responsible for producing future professionals must also have the requisite knowledge and competencies to achieve the objective of providing culturally congruent care to the diverse populations. Dr Shopo is a member of the Transcultural Nursing Society, an international organisation that aims to enhance the quality of culturally congruent, competent and equitable care, that results in improved health and well-being for people worldwide. Furthermore, she has received NRF Thuthuka funding this year to pursue research in cultural competence. She is actively involved in the postgraduate supervision of students.

Nashua Naicker

Division Health Sciences Education
University of the Free State, Bloemfontein
South Africa

Naickern@ufs.ac.za

ORCID iD: 0000-0001-9226-7797

Dr Naicker is a senior lecturer at the Division of Health Sciences Education (DSHE) at the University of the Free State (UFS). As a qualified optometrist, Dr Naicker has previously served as a clinician, clinical supervisor and lecturer in optometry to undergraduate students. His current responsibilities involve lecturing postgraduate health science students in Health Professions Education (HPE). Dr Naicker obtained his Bachelor and Master of Optometry at the University of Kwazulu-Natal and his PhD in Health Professions Education at the UFS. His current professional trajectory is focused on curricula development and innovative teaching and learning practices for health science educators. Dr Naicker has presented at conferences locally and internationally and is currently involved in research supervision of master's and PhD candidates, research publications, and coordinates the master's programme at the DHSE. By making a career pivot beyond optometry, Dr Naicker aims to promote best practice in higher education and to develop health professional educators with 21st-century attributes to succeed in the evolving landscape of health professions education.

Roy Venketsamy

Early Childhood Education

School of Education University of KwaZulu-Natal

South Africa

venketsamyt@ukzn.ac.za

ORCID iD: 0000-0002-3594-527X

Prof Roy Venketsamy is the Academic Head: Department of Childhood Education at the University of KwaZulu-Natal. He is an ECD specialist with many years of experience in teaching, learning and curriculum development. Prof Roy comes from a strong curriculum background in which he was responsible for the development and training of teachers in the RNCS, NCS and CAPS. His research focus is “Educational transformation in a diverse context through invitational teaching and learning.” He has a keen interest in teacher development with a vision of promoting play pedagogy, lesson study, inclusive education and comprehensive sexuality education. He was responsible for the development and management of CSE scripted lesson plans for South African schools. He has co-authored several book chapters and published numerous articles in national and international journals. He has presented at both national and international conferences in various countries, focusing on educational transformation. He also has numerous years of experience in master’s and PhD supervision. He serves as a peer-reviewer and on the editorial board for several accredited journals internationally. He is passionate about research and supporting emerging academics.

Monica Nkrumah

Holy Family Nursing and Midwifery Training College

Berekum, Bono Region, Ghana

mnkrumah@nmtcberekum.edu.gh or

40533069@myasis-nwu.ac.za

ORCID iD: 0000-0003-1059-3615

Monica Nkrumah is a seasoned nurse and midwife educator with over three decades of professional experience in nursing and midwifery education. She currently serves as the Principal of Holy Family Nursing and Midwifery

Training College, Bereken, a role she has held since 2006. Her academic credentials include an MPhil in Administration in Higher Education, a Master of Arts in Educational Administration, and a Diploma in Health Sciences Education, all from the University of Cape Coast, as well as a BSc in Midwifery from the Catholic University, Freetown. She is a Registered Midwife (RM), a State Registered Nurse (SRN), and a Foundation Fellow of the Ghana College of Nurses and Midwives.

Ms Nkrumah's expertise covers curriculum development, instructional design, and preceptorship training. She has contributed to national initiatives such as psychosocial counselling for HIV/AIDS under the Ghana AIDS Commission and has served on several health and education boards. Her leadership in nursing education, mentorship of emerging professionals, and participation in international conferences reflects her commitment to advancing healthcare education in Ghana. Her insights into collaborative learning and retention strategies in anatomy and physiology stem from both administrative leadership and extensive instructional experience.

Christmal Dela Christmals

Centre for Health Professions Education CHPE
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
christmal.christmals@nwu.ac.za
ORCID iD: 0000-0003-1811-0008

Professor Christmal Dela Christmals is an all-round academic with distinctions in teaching and learning (North-West University Team Teaching Award and National University Teaching Award recipient), a National Research Foundation (NRF)-rated researcher and an outstanding academic in community engagement. Prof Christmals has produced more than forty-three (43) high-quality journal publications, five book chapters and many conference and policy documents. He has supervised several postgraduates, including 10 PhD graduates. Prof Christmals is a distinguished community engagement scholar who has engaged with global health professions education (HPE) and policy actors, producing several HPE policies for Africa. He previously served on the World Health Organization's Curriculum

Development Advisory Group (CDAG) contributing to the development of a prototype competency-based curriculum for ten health professions in Africa. Prof Christmals is the principal investigator in the WHO Network of Partner Institutions Project that developed the Africa Health Professions Education Quality Standards.

Alhassan Sibdow Abukari

Department of Maternal and Child Health
School of Nursing & Midwifery
University of Ghana, Legon Accra, Ghana
Wisconsin International University College, Accra, Ghana
alhassan.sibdow@wiuc-ghana.edu.gh
ORCID iD: 0000-0002-7530-6501

Dr Alhassan Sibdow Abukari is a nurse scientist at the University of Ghana with over 18 years of experience in clinical practice, nursing education, and research. He holds a PhD in Nursing with specialisation in paediatric and neonatal critical care from the University of the Witwatersrand. His research focuses on maternal and child health, perinatal epidemiology, infectious disease control, and nursing education. He applies mixed-methods approaches to address health system challenges and has contributed to the development of family-centred care models and evidence-based interventions. He has supervised postgraduate research, engaged in international consultancy, including the World Health Organization, and contributed extensively to the peer-reviewed literature in nursing and public health.

Cornelia Schreck

School of Human Movement Sciences
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
cornelia.schreck@nwu.ac.za
ORCID iD: 0000-0002-7805-0855

Dr Cornelia Schreck is a Senior Lecturer in the School of Human Movement Sciences at North-West University (NWU). She focuses on the Scholarship

of Teaching and Learning (SoTL), experiential learning, and curriculum innovation. Her research emphasises the development of graduate attributes and employability skills, and she has published widely in both national and international journals. Dr. Schreck has been recognised with multiple teaching awards, including the NWU Team Teaching Award and the prestigious Teaching Advancement in Universities (TAU) Fellowship. She supervises postgraduate students and actively contributes to international collaborations that strengthen teaching and learning practices in higher education.

Lydia Owusu

Nursing Department

Kwame Nkrumah University of Science and Technology (KNUST)

Ghana

lydiaowusu7@yahoo.com

ORCID iD: 0000-0003-3194-2749

Dr Lydia Boampong Owusu is a Senior Lecturer at the Department of Public Health Nursing, School of Nursing and Midwifery, Kwame Nkrumah University of Science and Technology (KNUST), Ghana. She is also the Clinical Coordinator for the School of Nursing and Midwifery at KNUST. She holds a PhD in Health Sciences with a focus on nursing science from the North-West University, South Africa. Dr Owusu has more than 15 years of clinical experience and expertise in newborn care. She has been involved in the training of healthcare workers in newborn care across Ghana. Her research focuses on evidence-based nursing and midwifery practice in maternal and child health, emphasising the use of research in clinical practice.

Nicholin Scheepers

School of Nursing Science

Faculty of Health Sciences, North-West University

Potchefstroom, South Africa

Nicholin.ScheepersMajokweni@nwu.ac.za

ORCID iD: 0000-0001-6952-7060

Professor Nicholin Scheepers is an Associate Professor in the School of Nursing Sciences at North-West University, South Africa. She holds a PhD in Nursing and has extensive experience in clinical education, health workforce development, nurse outcomes and preceptorship. Her research focuses on support strategies to facilitate the transition of early-career health professionals into independent practice, with a particular emphasis on developing supportive frameworks and preceptorship models in resource-constrained settings. Prof Scheepers has led several projects on preceptorship training and is committed to improving the quality of work-integrated learning in South African healthcare institutions. Her current work includes the development of a conceptual framework to bridge the theory-practice gap for newly graduated nurses, and the development of preceptorship training for qualified health professionals, contributing to sustainable professional development and improved patient outcomes.

Immaculate Sabelile Tenza

NuMIQ, Nursing

Faculty of Health Science, North-West University

Potchefstroom, South Africa

sabelile.tenza@nwu.ac.za

ORCID: 0000-0003-0286-9183

Professor Sabelile Tenza holds a PhD in Public Health from the University of the Witwatersrand. Currently, she is an Associate Professor for Patient Safety and Quality in Healthcare at North-West University, a NuMIQ research entity in South Africa. Prof Tenza is passionate about empowering healthcare providers through knowledge formation and its effective use in healthcare to improve quality and safety. Her expertise lies in policy implementation, quality improvement and patient safety. She has led several research projects on quality and safety, both nationally and internationally, with strong advocacy for best practices in clinical care and patient experiences. One of Prof Tenza's recently published book chapters is entitled "The South African Health System" in Johnson & Stoskopf's Comparative Health Systems: A Global Perspective. She is a member of the North-West University HREC and an editor for PLOS ONE and the International Journal for Quality in Healthcare (IJHC).

Abbreviations and acronyms

ABBREVIATION	FULL TERM
AC	Abstract Conceptualisation
ADDIE	Analysis, Design, Development, Implementation and Evaluation
AE	Active Experimentation
AI	Artificial Intelligence
ANSA	Academy of Nursing South Africa
AR	Augmented Reality
AV	Audiovisual
BCC	Blind Copy
CALD	Culturally and Linguistically Diverse
CASP	Critical Appraisal Skills Programme
CBE	Competency-Based Education
CDTL	Centre for Development of Teaching and Learning
CE	Concrete Experience
CHPE	Centre for Health Professions Education
CIHC	Canadian Interprofessional Health Collaborative
CPD	Continuous Professional Development
DHET	Department of Higher Education and Training
EBP	Evidence-Based Practice
E-DELPHI	Electronic Delphi
EFA	Exploratory Factor Analysis
ELT	Experiential Learning Theory
FGD	Focus Group Discussions
FUNDISA	Forum of University Nursing Deans of South Africa

GEN AI	Generative AI
GHS	Ghana Health Service
GMNCE	Global Multicultural Nursing Competency Enhancement
HED	Higher Education
HEI	Higher Education Institutions
HFS	High Fidelity Simulation
HPCSA	Health Professions Council of South Africa
HPED	Health Professions Education
HREC	Health Research Ethics Committee
I	Intervention
ICC	Intraclass Correlation Coefficient
ICCS-SF	Interpersonal Communication Competence Scale
ICU	Intensive Care Units
IEPS	Interdisciplinary Education Perception Scale
ILC	Interprofessional Learning Continuum
IMMERSE	Integrated Multi-Disciplinary Model of Education in Rural Settings
IOT	Internet of Things
IP	Interprofessional
IPC	Interprofessional Collaboration
IPCP	Interprofessional Collaborative Practice
IPE	Interprofessional Education
IPEC	Interprofessional Education Collaborative
IPECP	Interprofessional Education and Collaborative Practice
IPGW	Interprofessional Group Work
IPL	Interprofessional Learning
IPTI	Pre-interprofessional Team Immersion

IPTW	Interprofessional Team Ward
ISAP	Index to South African Periodicals
ISVS	Interprofessional Socialisation and Valuing Scale
IUSIR	Indiana University Simulation Integration Rubric
KMO	Kaiser–Meyer–Olkin Measure
LMIC	Low- and Middle-Income Countries
LMS	Learning Management Systems
MMAT	Mixed Methods Appraisal Tool
MR	Mixed Reality
NEIS	Nursing Education Institutions
NWP	North West Province
NWU	North-West University
NWU-HREC	North-West University Health Research Ethics Committee
O	Outcome
OR	Operating Room
ORTAS	Operating Room Teamwork Assessment Scale
OSCE	Objective Structured Clinical Examination
OT	Occupational Therapy
P	Population
PI	Principal Investigator
POPIA	Protection of Personal Information Act
PQM	Programme Qualification Mix
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSI	Problem-solving Skills Scale
PT	Physical Therapy
RAS	Research Assistants

RIPLS	Readiness for Interprofessional Learning Scale
RN	Registered Nurses
RO	Reflective Observation
RU	Research Utilisation
SA	South Africa
SAAHE	Southern African Association of Health Educationalists
SANC	South African Nursing Council
SDL	Self-Directed Learning
SOTL	Scholarship of Teaching and Learning
SSCL	Satisfaction and Self-Confidence in Learning
SW	Social Work
TAM	Technology Acceptance Model
TBS	The Burn Suites
TEAMSTEPPS	Team Strategies and Tools to Enhance Performance and Patient Safety
TPOT	Team Performance Observation Tool
TSAQ	Team Self-Assessment Questionnaire
TSET	Transcultural Self-Efficacy Tool
UFS	University of the Free State
UJ	University of Johannesburg
UKZN	University of KwaZulu-Natal
UL	University of Limpopo
USA	United States of America
VR	Virtual Reality
WHO	World Health Organisation
WPR	‘What’s the Problem Represented to Be?’

Foreword

Prof Linda Du Plessis, Senior Deputy Vice-Chancellor, Teaching and Learning, North-West University, Potchefstroom, South Africa

This publication was conceived with the purpose of advancing a rigorous and scholarly approach to teaching and learning in the health professions. It emerges from the scholarly vision of the Centre for Health Professions Education (CHPE) at the North-West University (NWU), which remains steadfast in its commitment to advancing health professions education through rigorous research, innovative pedagogy, and evidence-informed practice. The preparation of competent, compassionate, and adaptable practitioners demands more than tradition or intuition, it requires evidence, critical reflection, and educational innovation.

It is with pride and a sense of purpose that North-West University participates in this publication, *Reimagining Health Professions Education: Innovations and Insights for the 21st Century and Beyond*, Volume 1 of the Health Professions Education Book Series. The peer-reviewed chapters included in this inaugural volume represent high-quality, contextually grounded, and forward-thinking scholarship that speaks to local realities while resonating with global debates.

A unifying thread across this volume is the reimagining of how we prepare health professionals for complex, uncertain, and rapidly evolving healthcare environments. The chapters explore authentic pedagogy and digital creativity, simulation-based training for workplace violence, peer evaluation in interprofessional learning, and the nuanced relationship between stress and teamwork. The findings highlight the importance of continuous professional development for intensive care teams, cultural competence in nursing, and digitally mediated procedural skills training in optometry.

Collectively, these chapters challenge traditional silos and foreground interprofessional collaboration, resilience, cultural responsiveness, digital innovation, and evidence-based practice as cornerstones of contemporary health professions education. Educators are challenged to move beyond

technical competence to embrace professional identity formation, ethical practice, and contextually responsive care.

This volume is more than a compilation of research; it is an invitation to educators, researchers, policymakers, and practitioners to engage in sustained dialogue and collaborative action. As healthcare systems worldwide confront unprecedented demands, the future of health professions education depends on our willingness to innovate thoughtfully and inclusively. May this book inspire continued scholarship and transformative practices in the years ahead.

CHAPTER 1

INTEGRATING AUTHENTIC PEDAGOGY AND DIGITAL CREATIVITY TO SUPPORT HEALTH SCIENCE STUDENTS IN THE DEVELOPMENT OF SELF-DIRECTED, INTERPROFESSIONAL INDIVIDUALS

¹. A Lubbe / ². J Pool / ³. Y Heymans

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¹. Research Unit Self-Directed Learning
North-West University, Potchefstroom, South Africa
Anitia.Lubbe@nwu.ac.za
ORCID: 0000-0001-5687-1030

². Centre for Health Professions Education
Faculty of Health Sciences, North-West University,
Potchefstroom, South Africa
jessica.pool@nwu.ac.za
ORCID: 0000-0002-6839-4419

³. Centre for Health Professions Education
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
Yolande.Heymans@nwu.ac.za
ORCID: 0000-0003-4459-2266

Abstract

Global trends in higher education (HEd) focus on the development of lifelong learning skills for a complex world and on cross-disciplinary expertise. This necessitates reconceptualising curricula to adopt a more authentic, student-centred approach to teaching, learning, and assessment, promoting the development of not only graduate attributes but also lifelong, self-directed learning (SDL) skills. According to the literature, the development of SDL skills is best promoted through authentic learning settings (Goldman et al., 2009; Jennings, 2007; Taylor & Hamdy, 2013). Within the health sciences domain, authentic learning reflects professional practice and means that students should be able to collaborate within an interprofessional team (Van Woezik et al., 2021). Due to the significant transformation in the current workplace, part of the authenticity of teaching, learning, and assessment practices within HEd should include the development of much-needed digital competencies. Utilising such digital competencies through the use of “digital tools and technologies to explore creative ideas and new ways of displaying ideas, research, or work” is known as digital creativity (University of York, 2019, p. 1). However, the literature on the affordances of authentic pedagogy (teaching, learning, and assessment), including digital creativity, in supporting the development of health sciences students as self-directed, interprofessional individuals is scant. This qualitative study examined the benefits of integrating authentic pedagogy and digital creativity in developing health sciences students as self-directed, interprofessional individuals. Interprofessional collaboration; digital tools as enablers of creativity and collaboration; real-world application of knowledge; development of key self-directed learning skills; and barriers to engagement emerged as the major themes. The findings demonstrate that when students are immersed in meaningful, complex, and collaborative tasks, they do not merely acquire disciplinary knowledge or technical skills. Rather, they engage in processes of professional becoming that encompass cognitive, relational, and intrapersonal dimensions of learning.

Keywords: authentic pedagogy, digital creativity, self-directed learning, interprofessional education

1 Introduction and background

“If we teach today’s students as we taught yesterday’s, we rob them of tomorrow.” (Dewey, 1915, p. 167)

HEd is tasked with delivering a knowledgeable and skilful workforce that has the attributes and competencies to succeed in an increasingly diverse and globalised environment (Altbach et al., 2009; Goulart et al., 2022). HEd is not only aimed at promoting critical thinking skills (Barnett, 2015; UNESCO, 2021) but also provides opportunities for collaborative learning, sharing skills and values, as well as developing communication skills and greater autonomy (Van Woezik et al., 2021). Educators in HEd are called upon to adapt their pedagogy to address workplace needs and to foster the development of responsible members of society (Jacobs, 2015; Suyo-Vega et al., 2024). Within the domain of Health Professions Education (HPed), HEd institutions bear the responsibility of guiding students to reflect on global responsibilities, uphold legal, moral, and ethical principles in their actions, and recognise the broader implications of these considerations for their future careers as healthcare professionals. According to Patel-Junankar (2018), learner-centred pedagogy is at the heart of teaching and learning for health sciences in the 21st century. Hence, authentic pedagogy assumes a pivotal role in fostering authenticity in HPed (Jakubik, 2022; Lombardi, 2007). Now more than ever, due to the half-life of information, specifically within the current technological advancements (Bearman et al., 2023; Marshall et al., 2024; Sarun et al., 2026), “teamwork, interprofessional learning, and reflection” should be the focus for authentic learning (Pawlina & Drake, 2016, p. 6). By integrating these skills into the educational process, HEd actively contributes to the formation of authentic and responsible citizens capable of addressing and solving global challenges. To this end, authentic pedagogy emerges as a powerful vehicle (Falkner & Stålbrandt, 2023).

Authentic pedagogy refers to exposing students to diverse perspectives and encouraging them to consider multiple viewpoints. Authentic pedagogy is grounded in constructivist learning theories, prioritising real-world relevance, higher-order thinking, and collaborative engagement (Koehler &

Mishra, 2005). By mirroring professional practices, authentic pedagogies equip students to transfer academic knowledge to practical contexts. In turn, this facilitates a broader understanding of global issues and emphasises the need for collaborative, responsible solutions (Carmichael, 2015). Authentic pedagogies emphasise the need for students to learn and demonstrate the ability to apply knowledge and skills in real-world contexts. As more educators in HEd value authentic standards and assessments, resources are needed to help faculty develop these pedagogical strategies (Watagodakumbura, 2013). Educators in HEd should adapt their pedagogy to address workplace needs and call for responsible members of society. In this context, authentic pedagogy can serve as a vehicle to encourage learners to develop open-minded thinking throughout the learning process and to offer authentic, unique, and creative solutions to problems (Anderson, 2019; Watagodakumbura, 2013). Key strategies include cooperative, problem-based, and inquiry-based learning; technology-enhanced collaboration; authentic assessment; and the use of digital tools for creative output. These methods not only improve academic performance and motivation but also prepare learners for the demands of a rapidly evolving, interdisciplinary workforce (Johnson & Johnson, 2018; McLachlan & Tippet, 2023; Janse van Rensburg, Coetzee & Schmulian, 2022).

The literature underscores the clear benefit of integrating authentic pedagogies with technologies to adequately equip students for the demands of the contemporary professional world (Bizami et al., 2023; Raynault et al., 2023; Yang & Goh, 2022). In the digital age, a re-evaluation of teaching, learning, and assessment becomes imperative, aligning these elements with real-world considerations. This adjustment not only responds to the evolving landscape but also supports the cultivation of students' 21st-century skills, encompassing communication and collaboration, creativity, innovation, and technological proficiency (Redecker et al., 2012). Raynault et al. (2023) advocate for a more seamless integration of authentic pedagogies with technology to better prepare students for their future careers. This integration encompasses a diverse range of pedagogies that cater to varied needs, facilitating effective student learning, and connecting

learning to practical, relevant contexts to foster deeper understanding and application of knowledge, skills, and attributes (Lison, 2020).

Digital creativity expands the scope of authentic pedagogy by integrating technology to foster collaboration and innovation, thereby enhancing the learning experience. Blogs, wikis, and collaborative platforms (e.g., Padlet) enable reflective practices, critical thinking, and group dynamics (Birt et al., 2018; Henriksen, 2026). The most basic definition of digital creativity is that it encompasses “all forms of creativity driven by digital technologies” (Lee & Chen, 2015, p. 12). According to Shao et al. (2022), digital creativity is a form of creativity and involves using technology to explore, create, and communicate ideas in innovative ways (Liu, Lee & Huang, 2023). Integrating digital tools such as e-learning platforms, virtual simulations, gamification, and collaborative digital environments enhances creative thinking, engagement, and cross-disciplinary collaboration. This is particularly impactful when combined with authentic cross-disciplinary collaboration, assessment, and collaborative projects. The use of digital tools, however, is not without its challenges. Barriers to the successful implementation thereof include unequal access to technology, varying digital literacy among educators and students, and the need for ongoing professional development (Aflalo, 2024). This is specifically important with the emergence of generative artificial intelligence. Therefore, effective integration requires institutional support, scaffolding, and a focus on both technological and pedagogical competencies (Artacho et al., 2020; Henriksen, 2026).

Whilst the ability to recognise new opportunities, generate creative ideas, adjust nimbly to changing circumstances, and use one's imagination to tackle challenging problems are all considered traits of creativity (Puccio, 2017), creativity is also a key characteristic of a self-directed learner (Guglielmino, 1977). The process by which people take the initiative, either with or without assistance from others, to diagnose their own learning needs, set learning goals, identify the relevant resources they need to learn, select and apply suitable learning strategies, and assess their learning outcomes, is known as SDL (Knowles, 1975). Self-directed learning has become an important focus of HEd, also specifically in health sciences

(Taylor et al., 2023). In interprofessional contexts, SDL requires students to balance individual contributions with collaborative problem-solving, fostering critical skills such as time management and adaptability. Self-directed learning is fostered through pedagogies that emphasise learner autonomy, goal-setting, reflection, and feedback.

Interprofessional education (IPE) is a cornerstone of health sciences education, preparing students to collaborate effectively across disciplines in complex healthcare settings (WHO, 2010). As healthcare grows increasingly interdisciplinary, educators face the challenge of fostering teamwork and individual autonomy. Self-directed learning has emerged as a vital competency for healthcare professionals, enabling them to adapt to evolving knowledge and practices (Van Woezik et al., 2021). Interprofessional education entails two or more professions learning about, from and with each other, enabling a “collaborative practice-ready health workforce” (WHO, 2010). Interprofessional education benefits from authentic, technology-enhanced approaches that bring together students from diverse backgrounds to solve real-world problems collaboratively (Aldriwesh et al., 2022; Fung et al., 2025).

Although there has been a shift toward more authentic pedagogies in the health sciences domain, research on combining digital tools with authentic approaches is scarce. The use of traditional (lecturer-centred) teaching, learning and assessment strategies may not fully capture the complexities of skills required for real-world scenarios, the workplace, and/or society. Health sciences students need to be exposed to authentic learning environments which require expert thinking and complex communication. Since the current generation of health sciences students has been raised in a rapidly evolving digital environment, they may view teaching, learning and assessment differently than health sciences educators. Furthermore, the complexity of the healthcare landscape necessitates that healthcare students be supported in becoming self-directed learners able to adapt to an ever-changing environment. This raises the question of the use of authentic pedagogy and digital creativity in health sciences education to prepare graduates who are work-ready, responsible members of society, and able to further their learning to adapt to change.

2 Problem statement and aim

Authentic pedagogy, emphasising real-world application and collaborative problem-solving, aligns with the goals of IPE. The literature suggests that authentic learning environments are the most effective way to foster the development of SDL skills (Goldman et al., 2009; Jennings, 2007; Taylor et al., 2023). Authentic learning in the context of health sciences is to enable students to work as members of an interprofessional team by reflecting on each other's professional experiences (Gilbert et al., 2010; Van Woezik et al., 2021; WHO, 2010). Owing to the profound changes in the modern workplace, developing critical digital competencies should be a component of authentic teaching, learning, and assessment approaches in HEd (Janse van Rensburg et al., 2022). There is, however, a scarcity of research on the benefits of digital creativity and authentic pedagogy (teaching, learning, and assessment) in developing health sciences students into self-directed, interprofessional individuals – autonomous, collaborative, and equipped with creative problem-solving skills for complex, real-world contexts.

The purpose of the qualitative study [NWU-00070-24-A1] is to explore the affordances of authentic pedagogy and digital creativity towards the development of health sciences students as self-directed, interprofessional individuals. The objective of this chapter is to discuss health sciences students' perceptions of authentic pedagogy, including digital technologies, in relation to their development as self-directed, interprofessional individuals.

3 Research design and methodology

This research study is anchored in a constructivist-interpretivist paradigm. This study focuses on examining, exploring, and understanding undergraduate health sciences students' perceived experience of how authentic pedagogy fosters self-directed, interprofessional individuals. When engaging in authentic learning activities, students get the opportunity to interact as social beings, and many constructed realities exist because of students knowing, being and doing that is moulded by previous lived experiences and their interactions with others (McMillan & Schumacher,

2006). We sought to capture, understand, and describe undergraduate health sciences students' perceptions and feelings regarding their involvement in authentic pedagogy to foster their self-directedness and interprofessional identity.

This qualitative study employed interpretive description, as this research method is more suitable for health sciences education research in finding practical solutions to problems faced by researchers in HPED, and for generating reliable and meaningful knowledge (Teodoro et al., 2018). Teodoro et al. (2018) further argue that interpretive description enables researchers to explore and gain insight into participants' unique perceptions, subjective beliefs, perspectives, and lived experiences on matters related to the world of health. The empirical research in this study entailed asking students, once they had submitted their final interprofessional group work (IPGW) assignment (i.e., their website), to complete a reflective activity. The reflection activity consisted of an introductory paragraph and eight open-ended questions. The online reflection was housed on QuestionPro, a cloud-based survey and research platform (QuestionPro, 2024). Students had six days to complete the reflection, and could do so at a time and place that best suited them.

The population for this study consisted of undergraduate health sciences students enrolled in a specific module (WVGW) at the three campuses of a South African higher education institution ($n = 1,553$). The researchers employed non-probability sampling, with the primary method being all-inclusive voluntary sampling. A total of 1,137 students provided voluntary informed consent to participate in this study. However, since analysing all 1,137 responses can be wasteful and impractical (Sharma et al., 2024), the researchers randomly selected a 10% sample ($n = 113$) for analysis. This was done in Microsoft Excel using the =RAND() sorting method. Data saturation was reached after analysing 46 participants' open-ended reflective questions.

As part of the WVGW module outcomes, students must work in an interprofessional group comprising members from various health and social care disciplines to complete learning activities. These IPGW activities form

part of the formal curriculum, fall within the notional hours of the module, and participating in the IPGW activities is part of the module's pass requirements. Participating in the IPGW activities is therefore compulsory. The WVGW students worked in interprofessional groups of 5 to design a wellness clinic website using Google Suite. Students had to apply the theory, select appropriate media, and present information in a digital, creative way to convey health-related information effectively. The IPGW commenced early in the second semester and concluded with a final assignment (the website). One component of this final assignment was a reflective questionnaire that prompted students to reflect on their learning experience through their involvement in IPGW. The reflection was completed anonymously. It is essential to note that although all students were requested to complete the reflection activity as it forms part of the IPGW teaching and learning activities, they had the option, after being fully informed, to either consent to or withhold consent for their anonymised reflection to be used for research purposes. Providing consent was entirely voluntary, and the researchers used only the anonymised reflections of students who gave informed consent. The reflection activity comprised eight open-ended reflective questions and was designed to be completed within 20 minutes.

Before research commenced, ethics approval was obtained from the relevant Research Ethics Committee of the Faculty of Health Sciences at the HEd institution where the study took place.

The reflection activity consisted of eight open-ended questions; however, only the data from the following four questions are included in the analysis for the purpose of this chapter:

- Looking back on the IPGW activities you did, how did the IPGW activities require you to apply your knowledge and skills to a new situation or environment, namely, working with students from another discipline or disciplines to design a wellness clinic website?
- What aspects of the IPGW activities were most valuable to you? Please motivate your answer.

- What (if anything) did you gain from participating in the IPGW activities?
- How did you experience the interprofessional collaboration where you had the opportunity to engage with and learn from students from other disciplines? Please elaborate on your answer.

Data analysis only started after the semester ended. The data-analysis software ATLAS.ti Version 25 was used, and Tesch's (1990) approach to data analysis guided the data analysis process. During data analysis, the following steps, as described by Creswell and Clark (2018), were followed: Preparing the data, exploring the data, analysing the data, representing the data analysis, and interpreting the results.

The accuracy and credibility of the findings were maintained throughout the research process (Creswell & Clark, 2018). The researchers ensured the accuracy and credibility of this research's findings by using a guiding research question and by assessing the validity and reliability of the data sources (Creswell & Clark, 2018; Poggenpoel & Myburgh, 2004; Shenton, 2004). Although the purpose of qualitative research is not to generalise, transferability (the ability to apply the findings in a similar environment) was ensured by providing a rich description of the participants, the data-generating methods and instruments, as well as the data analysis and findings (Poggenpoel & Myburgh, 2004; Shenton, 2004). The target population and participants were described in a manner that clearly outlined the study's context, without compromising anonymity and confidentiality. The research methods applied and the data analysis were well documented and described, providing sufficient information to replicate the study. Dependability was ensured through a clear and appropriate research process, as well as proof of consistency in data collection and analysis (Shenton, 2004). The researchers focused on leaving a clear audit trail and analysing data until saturation was reached. Confirmability was of special concern, as the researchers were also the lecturers in the WVGW module. Taking on this dual role could have influenced objectivity (Shenton, 2004; Tobin & Begley, 2004). Team research helped mitigate excessive subjectivity, and the investigators remained

mindful of maintaining objectivity throughout the data analysis. Although the researchers worked collaboratively with the Research Support Member (RSM), willing participants were fully informed in advance of the lecturers' roles as researchers in this study.

Inductive thematic analysis using ATLAS.ti identified recurring themes, highlighting how students perceived the value of authentic pedagogy and digital tools in fostering SDL.

The ethical principles of respect for participants, justice, and beneficence were upheld during the research. Respect was ensured through the maintenance of privacy and confidentiality. Justice was ensured by treating participants fairly in the recruitment and contact processes.

4 Results and discussion

This qualitative investigation explored the affordances of authentic pedagogy and digital creativity for the development of self-directed, interprofessional individuals within an online IPGW context. Students from diverse health sciences disciplines, languages, races, and campuses collaborated in online groups to design a wellness clinic website using Google Suite. The task required integrating disciplinary perspectives, collaborating on content creation, and producing multilingual blog posts in English and two other official languages of the HEd institution where the study took place. Four open-ended questions elicited students' reflections on their learning experiences (see §4). For reporting purposes, the researchers used three identifiers, namely response number, report timestamp, and question number (e.g., Student 46, 24 August 2024, Q1). However, none of the identifiers can be linked to any specific student and are therefore anonymous.

Five interrelated themes emerged: (1) Interprofessional collaboration, (2) Digital tools as enablers of creativity and collaboration, (3) Real-world application of knowledge, (4) Development of key self-directed learning (SDL) skills, and (5) Barriers to engagement. Together, these themes illuminate how authentic pedagogy and digitally mediated learning

environments can cultivate not only disciplinary understanding but also professional identity, relational competence, and learner agency. The findings are interpreted through the lenses of authentic learning (Herrington et al., 2014), self-directed learning (Knowles, 1975; Garrison, 1997), and cooperative learning (Johnson & Johnson, 1999, 2018). These frameworks provide a coherent theoretical scaffold for understanding how students' experiences reflect deeper processes of becoming self-directed, collaborative professionals in complex, technology-rich environments.

4.1 Theme 1: Interprofessional collaboration

A dominant theme across student responses was the transformative potential of interprofessional collaboration. Students consistently reported that the IPGW activities enhanced their communication skills, largely because they were required to navigate diverse perspectives, opinions, and ways of thinking. Working with peers from different health sciences disciplines, languages, and campuses created a space in which students had to articulate ideas clearly, listen attentively, and negotiate meaning.

'Working with students from other disciplines exposed you to different ways of thinking and problem solving.' (Student 2, 24 August 2024, Q1)

'The most valuable aspects of the IPGW activities were collaboration and interdisciplinary learning. Working alongside students from different disciplines enriched my understanding and provided diverse perspectives, which enhanced the overall quality.' (Student 3, 24 August 2024, Q2)

These experiences resonate strongly with the principles of cooperative learning, particularly positive interdependence and promotive interaction (Johnson & Johnson, 1999; 2018). The task design required students to rely on one another's disciplinary expertise to construct a coherent and meaningful website. Learning was therefore not an individual endeavour but a shared experience in which progress and success depended on collective effort.

Students indicated that collaboration broadened their perspectives and helped them recognise the value of group work. Many noted that they gained insight into what other health professions entail, which enhanced their understanding of how different disciplines contribute to holistic patient care.

'The most valuable aspect of the IPGW activities was learning to collaborate with students from different disciplines. This allowed me to broaden my perspective, especially when combining my mental health knowledge with their expertise in treatment, rehabilitation, and physical health, leading to a more holistic approach to wellness.'
(Student 13, 24 August 2024, Q2)

This aligns with interprofessional education literature, which emphasises that learning with, from, and about others is foundational to effective collaborative practice (WHO, 2010; Van Woezik et al., 2021). Importantly, students did not merely acquire abstract knowledge of other professions; they engaged in situated, task-oriented collaboration that mirrored real-world interprofessional dynamics.

The diversity within groups was widely valued. Students reported that working across disciplines fostered patience, empathy, and respect for others' viewpoints. Several students reflected on how they became more tolerant and sympathetic toward peers whose backgrounds, communication styles, or disciplinary logics differed from their own.

'It [IPGW] required me to be patient with my teammates, to use my communication skills. To be sympathetic to understand one's situation.' (Student 26, 24 August 2024, Q1)

Such reflections echo the social and relational dimensions of learning that authentic pedagogy foregrounds. Authentic tasks situate learning within complex social contexts, requiring students to grapple with ambiguity, difference, and interdependence (Herrington et al., 2014). In this study, diversity was not an incidental feature but a deliberate pedagogical resource that appeared to deepen learning and professional identity formation.

Beyond cognitive gains, students highlighted affective and identity-related outcomes. They reported developing friendships, confidence, leadership skills, and a sense of belonging through their collaborative engagements.

'It [IPGW] made me more confident in myself to work in a group.'
(Student 27, 24 August 2024, Q3)

'New connections and friendships, management and leadership skills...' (Student 41, 24 August 2024, Q3)

These outcomes extend the notion of learning beyond skill acquisition to include relational and intrapersonal growth. From an SDL perspective, such developments are significant. Knowles (1975) conceptualised SDL as a disposition characterised by autonomy, confidence, and readiness to engage in learning. The emergence of confidence and leadership within collaborative contexts suggests that students were not only learning about interprofessional work but were also becoming more agentic learners within it.

In this sense, interprofessional collaboration served both as a means and an outcome of learning. It enabled knowledge construction while simultaneously cultivating professional dispositions aligned with health professions practice.

4.2 Theme 2: Digital tools as enablers of creativity and collaboration

A second prominent theme concerned the role of digital tools in enabling creativity and collaboration. Students reported that the IPGW activities required them to integrate technological skills in ways that pushed them beyond familiar practices. Using Google Suite for collaborative website development required experimentation, problem-solving, and creative decision-making.

'It [IPGW] challenged my creative thinking on designing the website.'
(Student 25, 24 August 2024, Q1)

Rather than perceiving technology as merely instrumental, students experienced it as generative. Many noted that the complexities of working with digital tools sparked new ideas and stimulated creative thinking.

'It [IPGW] required me to be creative and think out of the box.'
(Student 39, 24 August 2024, Q1)

This reflects the affordances of digital environments to support design-oriented learning, where students are producers of knowledge artefacts rather than passive consumers. The overwhelming majority of students identified the creation of the wellness clinic website as the most valuable aspect of the IPGW. They attributed this value to several interrelated factors: the transferability of digital skills, opportunities for creativity, the application of disciplinary knowledge, and the translation of the blog posts into multiple languages.

'The website was the most valuable to me, because it taught me to adapt, work with others and communicate better online, and I learned new skills like how to create a website and how to present myself well online, which I can use in my own practice one day.'
(Student 18, 24 August 2024, Q2)

From an authentic learning perspective, the task embodied key design principles: it was complex and connected to real-world practices (Herrington et al., 2014). Designing a wellness clinic website mirrored professional activities such as health communication, patient education, and interdisciplinary consultation. The requirement to address a health topic from multiple disciplinary perspectives further reinforced the task's authenticity.

The multilingual component added an additional layer of complexity and cultural responsiveness. Students had to consider audience, meaning, and accessibility across linguistic contexts, thereby engaging in forms of knowledge translation that are central to health professions practice. Students also reported significant gains in technical competence. Learning

to use collaborative digital platforms, manage shared documents, and design web-based content was perceived as a valuable outcome in its own right. The following quote is pertinent:

'It [IPGW] also taught me how to design a site I never knew how to do before IPGW [activity] 2.' (Student 15, 24 August 2024, Q1)

These findings align with emerging scholarship on digital creativity, which highlights how technology can expand students' expressive repertoires and support innovative knowledge construction (Henriksen, 2026). Importantly, digital tools did not replace collaboration; they mediated it. The shared digital workspace became a site of negotiation, feedback, and co-construction, reinforcing the cooperative learning principle of group processing (Johnson & Johnson, 1999; 2018).

From an SDL perspective, the technological demands of the task required students to take responsibility for their own learning. They had to seek resources, experiment with unfamiliar tools, and troubleshoot problems collaboratively. Such experiences reflect Garrison's (1997) conception of SDL as comprising self-management, self-monitoring, and motivation. In this context, technology functioned as a catalyst for learner agency rather than a barrier.

4.3 Theme 3: Real-world application of knowledge

Students consistently framed the IPGW activities as preparation for real-world practice. The wellness clinic website was perceived not merely as an academic exercise, but as a task that mirrored authentic professional demands. Students described how the activity enabled them to apply theoretical knowledge in ways that felt purposeful and relevant to their future careers.

'The IPGW activities helped me to see the thought process and expertise of students in different fields in to better understand what awaits me in the future when I work with professionals from other professions. I applied all I learned in my module and my communication module to work on this project, and I also learned

much in the practical environment instead of just theory.’ (Student 24, 24 August 2024, Q1)

This perception is central to authentic learning, which argues that learning is most powerful when tasks resemble the complexity, ambiguity, and situated nature of real-life practice (Anderson, 2019; Herrington et al., 2014). By requiring students to collaboratively design a digital artefact that integrated multiple disciplinary perspectives, the IPGW task positioned students as emerging professionals rather than passive recipients of content. Students further indicated that their engagement in diverse interprofessional groups fostered respect and awareness of other professions and disciplines. They came to appreciate not only what other disciplines do, but why those contributions matter in addressing complex health challenges.

‘New-found knowledge and respect for other professions.’ (Student 1, 24 August 2024, Q1)

‘I’ve broadened my perspective, as I have expanded my understanding of different fields in Health Sciences.’ (Student 2, 24 August 2024, Q1)

These reflections align with the goals of IPE, which aim to prepare students for collaborative practice through meaningful engagement across professional boundaries (Barr et al., 2005; Reeves et al., 2016; WHO, 2010). Importantly, students did not merely learn about interprofessionalism; they experienced it through shared problem-solving and co-construction. Many students described the IPGW as rewarding because it supported both professional and personal development. The learning experience extended beyond disciplinary competence to include identity formation, confidence, and interpersonal growth.

‘I found it [IPGW] to be a rewarding experience. I was able to pick up new viewpoints and methods from interacting with students from other disciplines, which increased my comprehension of how several disciplines work together to achieve a common goal. Additionally, it required me to modify my way of thinking and speak clearly, which

helped in my professional and personal development.’ (Student 5, 24 August 2024, Q4)

From an SDL perspective, such experiences contribute to the development of students who are not only knowledgeable but also reflective, adaptable, and motivated to continue learning. Guglielmino (1977) emphasised that self-directed learners are characterised by a readiness to learn in response to real-life demands. The perceived authenticity of the IPGW tasks appeared to activate this readiness by making learning feel consequential and meaningful.

4.4 Theme 4: Development of key self-directed learning skills

A fourth theme relates to the development of core SDL capabilities. Students reported improved accountability, time management, and problem-solving skills. Working in diverse groups required them to take responsibility for their contributions, meet deadlines, and coordinate efforts across schedules and campuses.

‘A sense of accountability and time management.’ (Student 31, 24 August 2024, Q3)

Students also noted that exposure to varied perspectives enhanced their problem-solving abilities. Differences in disciplinary thinking and personal approaches compelled them to reconsider assumptions, negotiate solutions, and integrate multiple viewpoints.

‘I gained better communication skills and better problem-solving skills. I can solve conflicts in a righteous way. I learned to be able to listen and respect one’s opinion.’ (Student 26, 24 August 2024, Q3)

‘Working with students from various disciplines challenged me to adapt my problem-solving and communication because each person contributed distinct viewpoints and areas of expertise.’ (Student 5, 24 August 2024, Q1)

These experiences reflect Garrison’s (1997) model of SDL, which conceptualises self-direction as a dynamic interplay between self-

management, self-monitoring, and motivation. The IPGW environment required students to manage their learning processes while remaining responsive to the group's needs. Furthermore, peer feedback emerged as a particularly valued dimension of learning. Students indicated that feedback from group members contributed meaningfully to their understanding and improvement. They also highlighted the importance of asking for and offering help.

*'Feedback from my peers [was the most valuable aspect of IPGW].'
(Student 36, 24 August 2024, Q2)*

*'I learned the importance of working with others and asking for help
when needed.'* (Student 30, 24 August 2024, Q3)

Such practices align closely with cooperative learning principles, especially individual accountability and group processing (Johnson & Johnson, 2018). Learning was not confined to lecturer–student interactions; it was distributed across the group through dialogue, critique, and mutual support. From an SDL standpoint, the ability to seek, interpret, and use feedback is a foundational competence (Guglielmino, 1977; Knowles, 1975). These findings suggest that the IPGW created conditions in which students could rehearse the behaviours of self-directed learners (i.e., monitoring their progress, identifying gaps, and mobilising social resources) to support learning. Notably, students also associated these processes with growth in confidence and leadership.

*'I've gained confidence, now I'm not afraid of sharing my ideas no
matter what.'* (Student 44, 24 August 2024, Q3)

These intrapersonal outcomes are not marginal; they are central to SDL. Learners who lack confidence or a sense of agency are unlikely to take ownership of their learning. The IPGW context thus functioned as a developmental space in which students could experiment with responsibility, voice, and initiative within a supportive collective.

4.5 Theme 5: Barriers to engagement

While the overall tone of student responses was positive, participants also articulated meaningful challenges. A lack of communication and the perceived arrogance of some group members were cited as sources of frustration, leading to reduced cooperation.

'Sometimes it [IPGW] was fun, sometimes not, in most times it was frustrating as there was a lack of communication and arrogance.'
(Student 22, 24 August 2024, Q4)

Students described the IPGW as difficult and, at times, stressful – particularly when they or their peers lacked basic social or collaborative skills. For some, this was their first sustained experience of group work in an online environment.

'It [IPGW] was a very difficult experience, and stressful, as working with people is the most stressful thing in the world due to a lack of communication.' (Student 31, 24 August 2024, Q4)

These barriers are neither unexpected nor undesirable. Cooperative learning theory emphasises that effective collaboration requires explicit development of social skills and structured opportunities for group processing (Johnson & Johnson, 2018). Similarly, authentic learning acknowledges that complex, real-world tasks are inherently challenging and may initially provoke uncertainty and discomfort (Herrington et al., 2014). Such tensions can be productive. Struggle, when adequately supported, can prompt learners to reflect, adapt, and assume greater responsibility for managing both tasks and relationships. The reported difficulties underscore the importance of scaffolded authenticity by designing challenging learning experiences that provide guidance in communication, conflict management, and online collaboration. Rather than undermining the value of IPGW, these barriers highlight the developmental nature of becoming a self-directed, interprofessional individual.

4.6 Synthesising students' overall experiences

When invited to reflect on their overall IPGW experience, students overwhelmingly offered affirmative responses. Many acknowledged that the process was difficult initially, yet ultimately described it as “good,” “beautiful,” and “worth it.”

‘I had a good experience, because I got new views and opinions from others on different topics, and I learned how I can contribute to a wellness clinic in the future. It was fun stepping outside of my comfort zone.’ (Student 18, 24 August 2024, Q4)

Students also characterised the experience as transformative, noting that it fostered a sense of belonging through strong collaboration.

‘I worked well with my teammates, and they brought a sense of belonging.’ (Student 32, 24 August 2024, Q4)

‘The interprofessional collaboration during IPGW activities was a transformative experience. Engaging with students from various disciplines allowed me to see challenges and solutions from different perspectives.’ (Student 3, 24 August 2024, Q4)

Others emphasised the privilege of learning from different disciplines, describing the experience as amazing, enriching, eye-opening, and rewarding.

‘The experience was amazing, getting to know how other people think.’ (Student 26, 24 August 2024, Q4)

These reflections tie the preceding themes together. They integrate cognitive, relational, and affective dimensions of learning into a coherent narrative of becoming. Students did not merely acquire skills; they experienced shifts in how they saw themselves and others. Belonging is particularly relevant in this regard. Contemporary scholarship increasingly recognises belonging as foundational to engagement, persistence, and identity development in higher education (de Beer et al., 2009; du Toit-Brits, 2022). Within the IPGW context, belonging emerged not from homogeneity but from working through difference. Diversity became a source of

connection rather than division. Such outcomes resonate with the core aim of authentic pedagogy: to situate students within meaningful communities of practice where knowledge, identity, and agency co-evolve. They also directly support the development of SDL skills. Students who experience themselves as capable contributors within a collective are more likely to assume responsibility for their ongoing learning.

5 Conclusion

This chapter set out to explore the affordances of authentic pedagogy and digital creativity for the development of self-directed, interprofessional individuals within an online interprofessional group work (IPGW) context. The findings demonstrate that when students are immersed in meaningful, complex, and collaborative tasks – such as the co-construction of a wellness clinic website – they do not merely acquire disciplinary knowledge or technical skills. Rather, they engage in processes of professional becoming that encompass cognitive, relational, and intrapersonal dimensions of learning.

Across the five themes, a coherent pattern emerged. Authentic tasks grounded in real-world relevance fostered engagement, purpose, and readiness to learn. Cooperative structures created conditions for interdependence, dialogue, and shared responsibility. Digital tools extended students' creative and collaborative capacities, enabling them to produce knowledge artefacts that transcended traditional academic outputs. Within this environment, students enacted the core behaviours of self-directed learners: planning and managing their work, seeking and using feedback, negotiating meaning with others, and adapting in response to challenge.

Crucially, learning extended beyond competence. Students described growth in confidence, leadership, empathy, and a sense of belonging. Many experienced the IPGW as transformative – initially difficult yet ultimately enriching and rewarding. These affective and identity-oriented outcomes are not peripheral; they are foundational to the development of health professionals who are capable of learning with, from, and about others in complex, uncertain contexts.

The challenges students reported (i.e., communication breakdowns, frustration, and stress) underscore that becoming self-directed and interprofessional is a developmental process. Such capacities are cultivated through experience, tension, and guided practice. This highlights the importance of scaffolded authenticity: designing learning environments that are demanding and real, while intentionally supporting the social, emotional, and regulatory dimensions of collaboration.

Taken together, the findings suggest that IPGW, when authentic and enabled through digital creativity, offers more than an instructional strategy. It constitutes a pedagogical space in which students rehearse the dispositions, practices, and identities required for work in the health professions. In doing so, it positions HEd not merely as a site of knowledge transmission, but as a formative arena for developing self-directed, relationally competent professionals prepared for lifelong learning in an interdependent world.

6 Limitations and recommendations

6.1 Broader implications

This study contributes to the Scholarship of Teaching and Learning (SoTL) by illustrating the practical interplay between authentic pedagogy, digital creativity, and SDL in interprofessional contexts. It also underscores the need to carefully integrate digital tools to address barriers in group dynamics and equity. This research provides actionable insights for designing effective interprofessional education programmes by bridging theory and practice.

6.2 Implications for practice

To enhance the effectiveness of authentic pedagogy and digital creativity in fostering SDL, the following recommendations are proposed:

- Institution-wide structured digital and artificial intelligence literacy training to provide introductory workshops on using digital tools like Google Suite and generative artificial intelligence tools. This could

provide equitable access to technology resources, helping to mitigate disparities.

- Facilitation of equitable group dynamics by incorporating peer evaluation earlier in the module/programme to promote balanced contributions, and supporting students to recognise and use feedback to improve their learning.
- Curriculum design enhancements, including the alignment of IPGW activities with established SDL and IPE frameworks (e.g., Grow's SDL model or relevant competency frameworks). Integrating explicit reflective prompts to deepen critical thinking and metacognition could also be considered.

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CHAPTER 2

PREPARING HEALTH PROFESSIONALS FOR WORKPLACE VIOLENCE: A SYSTEMATIC REVIEW OF DIGITAL SIMULATION-BASED TRAINING INTERVENTIONS

L Pretorius

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School of Psychosocial Health
Faculty of Health Sciences, North-West University,
Potchefstroom, South Africa
Luce.Pretorius@nwu.ac.za
ORCID: 0000-0001-8110-2524

Abstract

Workplace violence is a critical concern in healthcare and social service education, particularly for students placed in emotionally demanding and high-risk clinical environments. Despite growing awareness, most curricula prioritise technical and procedural competence while neglecting the emotional and interpersonal skills required to navigate violent encounters. This chapter provides a systematic review of digital simulation-based training interventions, examining how they prepare undergraduate healthcare students for workplace violence through competencies such as de-escalation, emotional regulation, and situational confidence.

A systematic review of 19 studies published between 2019 and 2025 was conducted using a multi-phase search strategy across PubMed, Scopus, EBSCOhost, Google Scholar, and WorldCat. The review focused on digital simulation-based interventions for undergraduate healthcare students, including virtual reality and gamified learning environments. Findings are presented thematically and organised around three core areas: the design features of simulation-based interventions, reported educational and psychosocial outcomes, and the underlying pedagogical assumptions shaping preparedness for workplace violence.

Digital simulation-based education was found to enhance student confidence and perceived preparedness but also revealed significant limitations. Most interventions relied on self-report data, lacked long-term follow-up, and insufficiently engaged with student identity and equity, including gendered, racialised, and socially situated factors influencing exposure to workplace violence, learning processes, and emotional complexity. To address these gaps, the chapter introduces the concept of affective fidelity to foreground the importance of emotional realism in simulation design and evaluation. It offers a synthesis of current evidence and provides direction for more inclusive, context-aware pedagogical approaches to workplace violence preparedness in health professions education.

Keywords: workplace violence, simulation-based education, emotional regulation, virtual reality, de-escalation, artificial intelligence

1 Introduction and background

Workplace violence refers to any incident in which a healthcare or social service professional is subjected to physical, verbal, non-verbal, or sexual abuse, threatened, or assaulted while performing their professional duties (Boyle & Wallis, 2016). Violence of this kind is not confined to a single role or setting – it occurs in hospitals, clinics, community health centres, and the homes of patients (Arnetz et al., 2015; Kessi et al., 2021; Veronesi et al., 2023). Whether a paramedic responds to an emergency call, a nurse manages a ward, or a social worker enters a volatile family dispute, such encounters reflect a shared risk across healthcare professions. Physicians, clinical psychologists, and allied health practitioners are similarly exposed to intimidation, physical assault, and emotional or sexual harassment in the course of patient care (Pretorius & Herbst, 2022). While workplace violence can include violence from multiple sources, this chapter focuses primarily on client-initiated aggression as the most common form encountered in clinical training and the focus of most simulation interventions.

Across regions, the stories converge, but so does a troubling sense of inevitability. A nurse in South Asia is shoved while explaining discharge instructions – just one of the 61.9% of nurses and 47.6% of physicians in the region who experienced workplace violence in a single year (Bhusal et al., 2023). Globally, between 30% and 80% of health and social care professionals report similar experiences (El Ghaziri et al., 2014; İçbay & Şevik, 2024; Kessi et al., 2021; Li et al., 2022; Njaka et al., 2020; Olusegun, 2022; Wang et al., 2022). These are not outliers; they are increasingly characteristic of the environments into which healthcare students are socialised. When violence becomes routine, so too does the expectation that future professionals will learn to endure it in silence.

As workplace violence becomes normalised within clinical training environments, students do not encounter these experiences in the same way. How violence is perceived, endured, reported, or managed is shaped by socially situated factors that influence vulnerability, power, and emotional labour during training. In this chapter, identity is understood as

the constellation of characteristics – such as gender, race, ethnicity, professional role, and prior exposure to trauma – that shape how students encounter and respond to workplace violence (Zhu et al., 2022). Social identity further highlights how group membership structures power relations and interactional dynamics within clinical settings (Bochatay et al., 2019). Equity, in turn, refers not to uniform training experiences, but to whether educational interventions adequately account for differential risk, emotional burden, and learning needs across diverse student groups (Smith et al., 2017). These concepts provide an interpretive frame for examining how simulation-based training may differentially prepare students for workplace violence.

Workplace violence during clinical training is a documented concern for students in the healthcare professions across diverse settings. In Israel, more than half of nursing and medical students report verbal abuse during placements, with physical assault rates ranging from 5% to 64% across disciplines (Kwok et al., 2012; Warshawski, 2021). In the UK, 52% of physiotherapy students have encountered violent or aggressive behaviour (Stubbs et al., 2011), and a large-scale study found that 81% of nursing students have experienced non-physical aggression, 56% physical aggression, and 40% sexual harassment during clinical training (Hallett et al., 2021). Despite these figures, most incidents go unreported – only one-third of non-physical and half of physical aggression cases are formally disclosed – and students often lack sufficient training or confidence to respond effectively. In one UK study, 94% of physiotherapy students felt unprepared to manage workplace aggression (Dafny et al., 2024; Stubbs et al., 2011).

On the African continent, students placed in mental health, emergency, and community settings similarly report encountering client aggression and traumatic experiences without adequate support (Graj et al., 2019). In Ghana, psychology and nursing students describe frequent hostility during clinical training contributing to anxiety, emotional withdrawal, and disengagement from learning (Amoo et al., 2021; Galvin et al., 2015). These effects are often compounded by limited field supervision and the absence of formal debriefing processes (Booth & O'Connor, 2019). In Ethiopia, paramedicine and midwifery students noted that emotional competencies

are rarely included in formal curricula, pointing to a broader misalignment between education and the realities of clinical practice (Kibwana et al., 2017). Exposure to workplace violence has been linked to reduced confidence, higher dropout rates, and long-term disengagement from the healthcare profession (Galvin et al., 2015). These early impacts reflect broader patterns of stress and burnout that continue into professional practice, particularly in under-resourced settings where more than 40% of work-related illness in the healthcare sector is attributed to stress-related conditions (Labour, 2018).

Despite evidence of student exposure to workplace violence during clinical training, conventional healthcare education curricula prioritise clinical reasoning, procedural safety, and technical competence (Brentnall et al., 2022; Elvén et al., 2023). While foundational, these competencies do not adequately prepare students for the interpersonal and emotional demands of managing conflict or responding to aggression in real-world settings. Skills such as emotional regulation, de-escalation and decision-making under pressure are critical to safe and ethical care (Lavelle et al., 2024; Zavala et al., 2017). However, these skills are rarely taught, practised, or assessed as core competencies (Cleak et al., 2020; Finley & Levenson, 2017; Martins et al., 2020; Mokoena-de Beer et al., 2024). Higher Education Institutions may lack the time, pedagogical training, or institutional mandate to integrate more reflective and interactive approaches, particularly in rural or high-risk placements where exposure to violence is common.

In response, some institutions have introduced digital simulation tools into healthcare education. These tools create opportunities for students to practise emotional regulation, communication and decision-making in controlled, yet realistic environments (Ndawo, 2021). In one scenario, a student might engage with a computer-generated character designed to mimic a distressed patient (Darwish, 2025; Talbot et al., 2012). In such cases, the student must respond to the tone, hesitation, or escalating behaviour of the virtual agent. In another, they may navigate a branching dialogue in a gamified simulation, where each choice shapes the outcome and reveals consequences in real time (Christopoulos & Mystakidis, 2023). A third student might put on a virtual reality headset and find themselves inside a

fully immersive emergency room, required to de-escalate a volatile situation while monitoring both their clinical and emotional responses (Bhowmik, 2024). Some of these tools follow scripted sequences; others use artificial intelligence (AI) to adapt dynamically to the student's decisions and behaviour (Bacon et al., 2017; Bosse et al., 2016; Hughes & Ingraham, 2016).

The educational value of these tools is yet to be comprehensively evaluated. Early studies suggest that digital simulation-based approaches may reduce anxiety, increase confidence, and improve emotional readiness for clinical practice (Holland et al., 2017; Rohde et al., 2024). However, the evidence specific to workplace violence preparedness remains limited. Few studies focus on preparing students to manage client aggression or workplace violence, and their long-term integration into competency-based training is rarely assessed.

2 Problem statement and aim

Despite early signs of promise that digital simulation-based tools may enhance students' confidence and emotional readiness for managing workplace violence in clinical practice, significant gaps remain in understanding how these tools are designed, implemented, and evaluated for this purpose. Although workplace violence is increasingly recognised as a critical concern in healthcare and social service sectors, students in clinical training continue to encounter aggression without adequate preparation. Existing curricula prioritise technical and procedural competencies but often fail to equip students with the emotional and interpersonal skills required to navigate high-stress or violent encounters. This leaves students vulnerable – not only to harm, but to emotional withdrawal, disengagement from learning, and eventual burnout. While digital and AI-driven simulations present a promising strategy to address this gap, current research remains fragmented. There is little consolidated evidence on how these tools are used to develop core competencies such as de-escalation and emotional regulation, particularly in low-resource settings where exposure to violence is often most acute.

This chapter critically examines how digital and AI-supported simulations are used to prepare undergraduate healthcare professionals for client aggression and workplace violence. Drawing on 19 international studies, it explores how simulation-based interventions engage competencies such as emotional regulation, de-escalation, and situational confidence – confidence in one’s ability to respond effectively during escalating encounters (Ezell, 2021). No studies meeting the inclusion criteria were identified from South Africa or other low-income contexts; as such, this review draws exclusively on international studies.

This scope was necessary to capture the most current evidence on digital and AI-supported simulations, while recognising that the absence of local studies reflects a significant gap that warrants further research. The systematic review also critically examines the design and pedagogical focus of these tools, highlighting wide variation in how they were delivered (e.g., virtual reality, gamification, screen-based modules) and how their outcomes were evaluated (e.g., self-report, OSCEs, follow-up assessments). Finally, it considers the challenges of applying these approaches in under-resourced contexts, where access to high-tech infrastructure may be limited and student exposure to violence disproportionately high. The aim of the study is therefore to provide a systematic review of digital simulation-based training interventions, examining how they prepare undergraduate healthcare professionals for workplace violence through the development of competencies such as de-escalation, emotional regulation, and situational confidence.

3 Research design and methodology

This study used a theory-informed systematic review design with thematic synthesis to examine how digital simulation-based interventions prepare undergraduate healthcare students for workplace violence. This approach allows for the integration of empirical findings with conceptual and pedagogical analysis (Huang & Schmidt, 2022). PRISMA 2020 reporting standards (Page et al., 2021) were used to ensure transparent reporting of search, screening, and selection processes. This design was selected for its

ability to enable transparent inclusion criteria, multi-level screening, and theory-informed synthesis across diverse intervention types and settings (Kirk et al., 2015). Unlike scoping or narrative reviews, it supports replicable methods and deeper pedagogical analysis of outcomes such as de-escalation, emotional regulation, and simulation-based learning design.

3.1 Search strategy

The search process followed a multi-phase, theory-aligned model, refined in collaboration with a research librarian. Five databases were searched: PubMed, Scopus, EBSCOhost including Academic Search Premier and CINAHL, and WorldCat. Google Scholar was used as a supplementary search tool to identify additional or hard-to-index studies not retrieved through traditional databases. These were selected to represent a balance between clinical, educational, and interdisciplinary research. The search was conducted through an iterative, staged process designed to ensure both breadth and precision:

- Phase 1: An exploratory Boolean search tested conceptual combinations to gauge platform responsiveness.
- Phase 2: Platform-specific syntax was applied to develop structured strings, adapted to each database's indexing system.
- Phase 3: Thematic clusters were searched (e.g., simulation + violence, AI + de-escalation, VR + coping), using terms extracted from abstracts and disciplinary taxonomies.

All search strings were documented per platform, and the final database exports were consolidated for screening, in line with established guidance for systematic review search strategies (Booth et al., 2016).

3.2 Inclusion and exclusion criteria

Studies were eligible for inclusion if they:

- Targeted undergraduate or student-level healthcare professionals (e.g., nursing, medicine, social work, psychology, occupational therapy (OT), physical therapy (PT))

- Evaluated a digital, simulation-based, or AI-driven educational intervention
- Addressed training related to workplace violence, emotional regulation, de-escalation, or coping
- Were published between 2019 and 2025

While the primary focus was undergraduate/student populations, studies involving clinical preceptors or broader healthcare worker samples were retained where the intervention was explicitly designed for training contexts relevant to student preparedness or where outcomes were reported in ways directly transferable to student training.

Studies were excluded if they focused solely on in-service healthcare professionals, lacked digital/simulation components, or did not address violence or related emotional competencies. Although the criteria did not exclude South African or low- and middle-income country (LMIC)-based studies, no eligible studies from these contexts were identified during screening. Consequently, all included studies were international, a gap that is further discussed as a limitation.

3.3 Screening and selection

Search results from the selected platforms were compiled into a master database and filtered by relevance and publication year (2019–2025), resulting in 382 unique records. These were imported into Rayyan, a web-based tool designed to facilitate collaborative screening in systematic reviews (Ouzzani et al., 2016). Rayyan’s automatic deduplication removed 24 duplicates, yielding 358 titles and abstracts for screening.

Two reviewers independently screened all records against the predefined inclusion criteria. Discrepancies were resolved through discussion, and exclusion reasons were tagged in Rayyan to ensure transparency and auditability. Cohen’s kappa coefficient ($\kappa = 0.83$) was calculated, indicating substantial interrater agreement (McHugh, 2012). Full-text articles were retrieved for all studies marked as “included” or “maybe” and were subjected to a second round of double review. After full-text screening, 19

studies met the final inclusion criteria. These articles were critically appraised using the Mixed Methods Appraisal Tool (MMAT), version 2018 (Hong et al., 2018). Each study was evaluated independently by both reviewers, with any disagreements resolved through dialogue.

The majority of the studies (n = 16) met four or more MMAT criteria, reflecting high methodological quality. These appraisals informed the interpretation of findings, particularly in weighing evidence strength across intervention types and professional disciplines. Figure 2.1 summarises the number of records identified, screened, excluded, and included, as per the PRISMA 2020 flow diagram (Page et al., 2021).

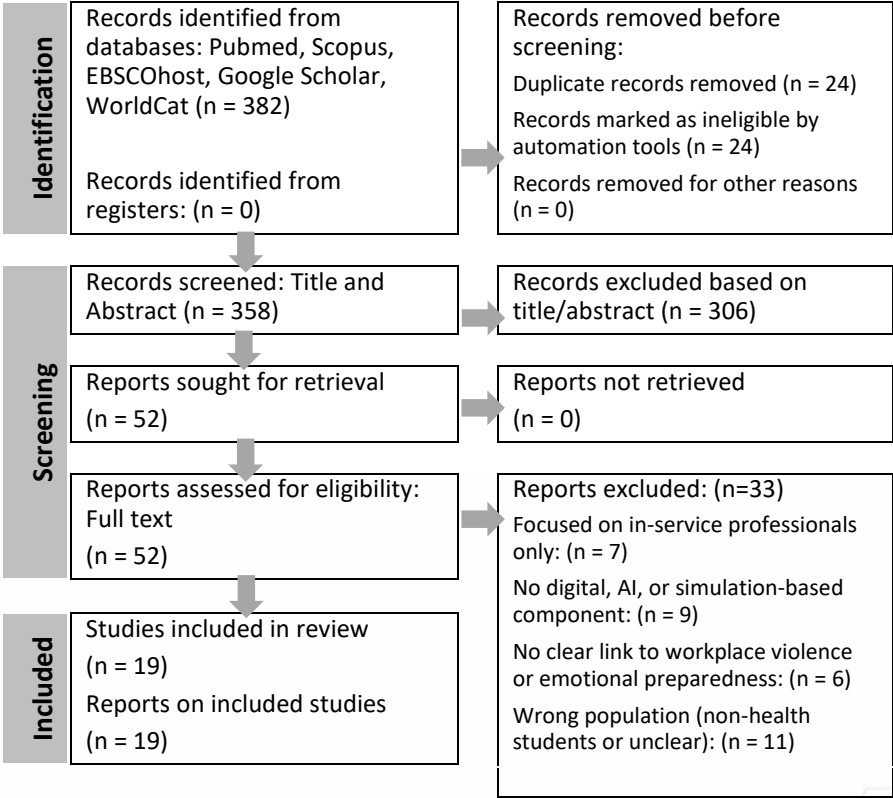


Figure 2.1: PRISMA flow diagram

3.4 Data extraction and thematic synthesis

Following full-text inclusion, key information was extracted from each included study using a structured Excel template developed specifically for this review. Extraction fields included bibliographic details, study context, intervention characteristics, targeted outcomes, pedagogical strategies, evaluation methods, and key findings. This approach ensured consistency and comparability across studies (Gough et al., 2017).

A thematic synthesis was conducted following Thomas and Harden (2008), informed by Braun and Clarke's (2006, 2020, 2021) guidance on theme development. Inductive coding was used to identify patterns across studies, with themes developed iteratively and refined for conceptual coherence.

Coding was conducted manually in Excel. Two reviewers independently reviewed all codes and thematic categories, resolving discrepancies through collaborative discussion. This process enhanced transparency and analytic rigour in line with best practices for qualitative evidence synthesis (Thomas & Harden, 2008).

3.5 Ethical considerations

This study received ethics clearance from the North-West University Health Research Ethics Committee (HREC), reference number NWU-00201-25-A1. As a systematic review of publicly available secondary data, there was no direct contact with human participants, and no new data were generated.

In an effort to uphold the ethical standards for secondary research, accuracy, transparency, and accountability received particular attention throughout all methodological processes (Page, 2021). The search strategy, inclusion criteria, screening decisions, and data extraction procedures were fully documented (Gough et al., 2017). Independent reviewer screening and collaborative resolution of discrepancies further supported the integrity and auditability of the review process (Page, 2021).

4 Findings

The findings are presented in two parts: first, a descriptive overview of the included studies, covering participant groups, simulation types, study designs, and reported outcomes; followed by a thematic presentation of findings organised around three core areas: (1) simulation formats and design, (2) emotional engagement and reflection, and (3) skill-building and readiness.

4.1 Overview of included studies

This section summarises the scope and characteristics of the 19 included studies. Table 2.1 details each study's country of origin, participant types, simulation formats, study designs, and primary outcome measures.

Table 2.1: Included studies

No	Title of study	Date	Country of origin	Study design	Participants	Simulation tool type	Primary outcome
1	Virtual reality training to reduce workplace violence in healthcare	2025	USA	Narrative review	Nursing; healthcare workers	VR/AR platforms	Improved confidence, emotional regulation, skills acquisition
2	Evaluating an aggression management education that incorporated virtual reality: Pre-post pilot study with nursing students	2025	Australia	Pre/post pilot study	Healthcare	VR	Improved confidence and attitudes toward aggression; no change in empathy or mental health literacy; high participant engagement and perceived usefulness of debriefing.
3	A quantitative study teaching de-escalation with virtual reality simulation to associate nursing students: Measuring effectiveness, learning, and confidence	2025	USA	Quasi-experimental, pre/post	Nursing	SimX VR software	Improved learning, confidence, effectiveness perception

4	Using virtual simulation to teach substance use screening and brief intervention skills across the health professions: Examining training outcomes among an interprofessional graduate student sample	2025	USA	Mixed methods, pre/post	Interprofessional (social work, therapy, nursing, psychology, etc.)	Virtual simulation (Kognito)	Improved SBIRT preparedness, confidence, collaboration
5	Creation of a novel virtual reality simulation to Increase Nursing Skills in Management of Workplace Violence	2025	USA	Quantitative	Nursing	VR simulation	Improvements in WPV recognition, de-escalation, and post-incident coping
6	Exploring the effectiveness of different “escape room simulation teaching” methods on clinical preceptors’ knowledge and skills in judging and handling violent situations in the healthcare profession	2025	Taiwan	Double-blind RCT, pre/post	Multidisciplinary (clinical preceptors)	Gamified: escape room (physical and online)	Improved knowledge, efficacy, satisfaction (esp. physical escape room)
7	Effect of theme game-based learning on psychiatric violence risk assessment and response knowledge, skills, and self-confidence of nursing	2025	China	RCT with pre/post	Nursing	Theme game-based learning	Improved skills, confidence, and management ability

	students: A randomised controlled trial						
8	Comparison of learning outcomes between virtual simulation experiments and offline scenario-based learning for early intervention in psychiatric violence among undergraduate nursing students	2025	China	RCT with standardised tools	Nursing	Virtual simulation (Unity3D)	Improved knowledge retention, OSCE, reduced cognitive load
9	Educating a new generation of nurses about workplace violence using an innovative virtual simulation module	2024	USA	Quasi-experimental, pre/post	Nursing	Screen-based simulation	Improved knowledge
10	The role of virtual simulation in de-escalating a patient demonstrating escalating behaviour	2024	Canada	Quantitative pre/post	Nursing	Screen-based virtual simulation	Improved confidence, perceived de-escalation success
11	The use of virtual reality for student training on bias and microaggressions	2024	USA	Mixed methods	Occupational therapy	Immersive VR	Improved empathy, awareness, and preparedness
12	Immersive virtual reality aggression and violence management education	2024	Australia	Pre/post/follow-up	Nursing	Immersive VR	Improved confidence sustained over time

	for nursing students: A pre-test, post-test, follow-up evaluation			quantitative			
13	An online escape room-based lesson plan to teach new nurses violence de-escalation skills	2023	Taiwan	Pre/post/follow-up quantitative	Nursing	Online escape room	Improved knowledge, confidence, satisfaction
14	Learning to manage de-escalation through simulation: An exploratory study	2023	Australia	Exploratory qualitative	Nursing	Standardised-patient simulation	Improved emotional readiness, preparedness
15	CaregiVR: Building self-efficacy in dementia care through immersive education	2023	Canada	RCT with mixed methods	Nursing	Immersive VR	Improved self-efficacy, safe practice, empathy
16	The role of virtual simulation in undergraduate nursing students' confidence when de-escalating a patient demonstrating escalating behaviour	2022	Canada	Pre/post quantitative	Nursing	Web-based virtual simulation	Improved confidence, knowledge
17	A virtual, simulated code white for undergraduate nursing students	2022	Canada	RCT with mixed methods	Nursing	Scenario-based simulation (screen)	Realism rated high, gaps remained

18	Computerised clinical training simulations with virtual clients abusing alcohol: Initial feasibility, acceptability, and effectiveness	2021	USA	Pre/post mixed methods	Social work	AI-enhanced computer-based simulation	Improved self-efficacy, preparedness
19	A virtual counselling application using artificial intelligence for communication skills training in nursing education: Development study	2019	Singapore	Mixed methods	Nursing	AI-powered virtual avatars	Improved self-efficacy, attitudes

This review included 19 studies published between 2019 and 2025. The majority were conducted in high-income countries, with the United States contributing seven (n = 7), followed by Canada (n=4) and Australia (n = 3). Taiwan and China were represented by two studies each (n = 4), and one study came from Singapore (n=1). None were set in low-income contexts.

Across the included studies, nursing students formed the most common participant group (n = 15). Participants ranged from vocational to undergraduate levels. Several studies also included interprofessional cohorts (n = 2), bringing in students from social work, psychology, counselling (n = 1), occupational therapy, and rehabilitation (n = 1). While the professional mix varied, all studies maintained an educational focus on healthcare or health-related disciplines.

Simulation modalities varied: immersive virtual reality was used in six studies; screen-based or web-based simulations in six; escape-room-style gamified formats in three; AI-enhanced modules in two; and standardised patient simulations in one. Four studies integrated more than one delivery method. Modes of delivery included in-person lab-based sessions (n = 6), online-only formats (n=9), and hybrid approaches (n = 4). Thirteen simulations were delivered as standalone modules; six were embedded within broader curricula or orientation programmes.

Study designs were predominantly quasi-experimental (n = 6), pre-post (n = 8), or mixed methods (n = 6). Outcome data were most frequently collected via self-report tools measuring learner confidence, knowledge, preparedness, or affective change (n = 16). Three studies used structured assessment approaches such as OSCEs or observation tools. Only three studies included follow-up beyond immediate post-intervention, typically spanning several weeks.

While methodological quality varied, most studies (n = 17) reported ethics approval and provided sufficient intervention descriptions. Common limitations included overreliance on self-reporting (n = 16), lack of standardised outcome measures (n = 15), and minimal engagement with equity, identity, or broader structural contexts (e.g., absence of

disaggregated analysis, culturally situated scenarios, or equity-focused learning outcomes) (n = 17).

4.2 Thematic findings

Three thematic domains were identified to address the study's objective of understanding how simulation-based interventions prepare students for workplace violence: (1) simulation formats and design; (2) emotional engagement and reflection; and (3) skills-building and readiness. These themes were developed through the thematic synthesis of included studies (Clay et al., 2025; Conrad et al., 2024; Johnson et al., 2024; Power et al., 2023; Zhao et al., 2025; Zhu et al., 2025). Each theme reflects recurrent patterns while also illustrating variation across settings, technologies, and assessment strategies. Together, these domains illustrate how simulation-based interventions contribute to preparing undergraduate healthcare students for workplace violence.

4.2.1 Theme 1: Simulation formats and design

Theme 1 captures the range of simulation formats and instructional designs used across studies. Interventions included high-immersion VR simulations (Clay et al., 2025; Johnson et al., 2024; Lim et al., 2025; Tobias et al., 2024), AI-supported or computerised simulations with branching decision pathways (Shorey et al., 2019; Smith et al., 2021), gamified escape-room formats (Hsu et al., 2023; Wu et al., 2025), screen-based role-plays and virtual scenarios (Power et al., 2023; Stephen et al., 2022), and asynchronous or web-based modules (Brandau & Lloyd, 2024).

The technological format influenced student experience. In-person VR laboratory simulations were more frequently associated with higher perceived realism, immersion and situational intensity (Clay et al., 2025; Johnson et al., 2024; Tobias et al., 2024). By contrast, remote or screen-based simulations offered greater accessibility and flexibility but were reported to provide less embodied interpersonal engagement (Brandau & Lloyd, 2024; Power et al., 2023). Gamification formats such as escape rooms were associated with increased engagement, teamwork, and motivation (Hsu et al., 2023; Wu et al., 2025), although these studies also noted that

time pressure and game mechanics could shift attention away from deeper emotional processing.

Instructional design features shaped reported outcomes. Studies that incorporated structured debriefing, collaborative problem-solving tasks, and explicit performance criteria or checklists were more likely to report improvements in student confidence and perceived skill (Conrad et al., 2024; Johnson et al., 2024; Zhao et al., 2025). However, across the reviewed literature, there was no consistent framework guiding simulation duration, sequencing, or fidelity. Several studies explicitly described adapting simulation formats to institutional constraints, including the use of lower-tech or resource-light approaches (Brandau & Lloyd, 2024; Power et al., 2023).

4.2.2 *Theme 2: Emotional engagement and reflection*

This theme reflects how simulation supported emotional and relational learning. Across multiple studies, students reported experiencing stress, anxiety, uncertainty, and heightened emotional arousal during high-intensity violence or aggression scenarios (Clay et al., 2025; Conrad et al., 2024; Johnson et al., 2024; Lim et al., 2025). At the same time, simulations were frequently perceived as psychologically safe, where students could make mistakes without real-world consequences (Power et al., 2023; Stephen et al., 2022).

Debriefing emerged as a critical mechanism for emotional processing. Studies that incorporated facilitated debriefing sessions reported that these discussions supported reflection, emotional regulation, and meaning making following challenging scenarios (Conrad et al., 2024; Johnson et al., 2024; Stephen et al., 2022). Simulations explicitly focused on empathy, bias, microaggressions, or dementia-related aggression were particularly likely to prompt relational insight and perspective-taking (Hamed et al., 2024; Vogelsang, 2023). In contrast, studies that reported minimal or absent debriefing noted lingering emotional discomfort or unresolved reactions among some participants (Lim et al., 2025; Power et al., 2023).

Despite frequent references to emotional intensity, few studies formally prioritised affective outcomes in their evaluation designs. Emotional engagement was most often captured through general self-report questionnaires or open-ended feedback rather than validated affective or trauma-informed measures (Clay et al., 2025; Conrad et al., 2024; Johnson et al., 2024). Some participants described emotional fatigue or a lack of emotional closure following simulations, particularly when scenarios were highly immersive but debriefing time was limited (Lim et al., 2025; Power et al., 2023).

These findings point to the importance of affective fidelity in simulation design, a concept referring to the extent to which simulations authentically engage emotional and relational dimensions of care. While several studies demonstrated high technical or visual fidelity (Clay et al., 2025; Tobias et al., 2024), far fewer explicitly addressed emotional containment, psychological safety, or the sustained processing of affective responses.

4.2.3 Theme 3: Skills-building and readiness

Theme 3 consolidates findings related to learner outcomes associated with managing workplace violence. Across studies, participants reported improvements in de-escalation strategies, communication skills, situational awareness, and clinical reasoning following simulation-based interventions (Conrad et al., 2024; Johnson et al., 2024; Zhao et al., 2025; Zhu et al., 2025). These outcomes were most assessed using pre-post self-report surveys, confidence or self-efficacy scales, and, less frequently, structured performance assessments such as OSCE-style evaluations (Johnson et al., 2024; Stephen et al., 2022).

Interventions using active role-play, branching pathways, and real-time feedback yielded stronger reported learning gains (Power et al., 2023; Smith et al., 2021; Zhao et al., 2025). However, only a small number of studies included follow-up assessments to examine skills retention beyond the immediate post-intervention period (Johnson et al., 2024; Lim et al., 2025). Emotional and cognitive learning outcomes were typically measured separately, with limited integration between technical skill acquisition and emotional regulation.

Some studies reported demographic variation in outcomes. Differences in post-intervention confidence by gender or race were observed in a small subset of studies, although these findings were not consistently explored or theorised (Zhao et al., 2025; Zhu et al., 2025). Importantly, few interventions explicitly incorporated equity, social identity, or structural competence into their design or evaluation frameworks.

While most participants reported feeling more prepared following simulation training, several studies noted discrepancies between increased self-reported confidence and objectively measured performance, suggesting that perceived readiness did not always align with demonstrated competence (Conrad et al., 2024; Johnson et al., 2024).

5 Discussion of findings

These three thematic domains identified in this review highlight both the promise and the limitations of simulation-based interventions for preparing students for workplace violence. To interpret these patterns more deeply, the discussion that follows examines how preparedness is constructed, prioritised, and evaluated within the reviewed literature.

5.1 Constructing Preparedness: Dominant Frames and Discourses

Simulation-based training for workplace violence functions not only as a pedagogical strategy, but also as a mechanism through which professional norms and expectations are reinforced. Across the reviewed studies, preparedness was most commonly constructed in terms of individual competence, emotional regulation, and procedural execution, rather than as a collective, organisational, or structural responsibility (Clay et al., 2025; Conrad et al., 2024; Zhao et al., 2025). It functions as a discursive tool that may shape how students understand professional identity, competence, and the nature of violence itself. Drawing on institutional discourse theory (Shore & Wright, 1997) and Bacchi's (2016) 'What's the Problem Represented to Be?' (WPR) framework, this review is attentive to how

simulation-based interventions may frame preparedness, emotional regulation, and authority in high-risk encounters.

Although the studies employed a wide range of simulation modalities, they were overwhelmingly situated within nursing education. Most interventions focused on bedside clinical encounters and inpatient care settings (Conrad et al., 2024; Johnson et al., 2024; Tobias et al., 2024), with only limited inclusion of interprofessional or social work cohorts (Patton et al., 2025; Smith et al., 2021). This disciplinary concentration shapes how workplace violence is conceptualised, privileging clinical management and interpersonal technique over scenarios more common in community-based, psychiatric, or social service contexts.

Across the reviewed studies, workplace violence was typically represented as an expected feature of care work – something to be managed through individual composure, communication skills, and situational awareness (Clay et al., 2025; Johnson et al., 2024; Zhao et al., 2025). Preparedness was operationalised through self-reported gains in confidence, self-efficacy, and perceived competence, rather than through sustained behavioural or relational outcomes (Conrad et al., 2024; Lim et al., 2025; Zhu et al., 2025).

Emotional responses like fear, distress, and uncertainty were acknowledged descriptively across several studies but were rarely positioned as explicit learning outcomes (Power et al., 2023; Thomas et al., 2017). Where structured and facilitated debriefings were incorporated, simulations created space for emotional reflection and meaning making (Conrad et al., 2024; Johnson et al., 2024). However, in many interventions, emotional engagement appeared to be treated as something to be managed or resolved, rather than critically examined or integrated into learning design (Brandau & Lloyd, 2024; Hsu et al., 2023; Lim et al., 2025).

5.2 What is left out: Identity, equity, and evaluation gaps

Despite their stated aim of preparing students for complex, real-world encounters, the reviewed literature revealed notable silences around identity, structural context, and equity. Except for one study focusing on bias and microaggressions (Hamed et al., 2024), most simulations were designed

as culturally neutral experiences, with little attention to how student identity might shape experiences of workplace violence or preparedness training.

A small number of studies reported differences in confidence or learning outcomes across demographic groups, including gender and race, but these findings were rarely interrogated or theoretically contextualised (Alfred et al., 2018; Thomas et al., 2017; Zhao et al., 2025; Zhu et al., 2025). None of the reviewed studies explicitly incorporated frameworks of structural competence, intersectionality, or professional precarity into their simulation design or evaluation strategies.

Methodologically, the dominance of self-report measures raises important questions about how preparedness is conceptualised and assessed. While confidence and perceived competence are meaningful indicators, several studies demonstrated that increases in self-reported readiness did not always align with objective or observed performance (Conrad et al., 2024; Darby-Littlejohn, 2025; Goh et al., 2020; Johnson et al., 2024). Moreover, few studies employed longitudinal designs, limiting insight into skills retention or behavioural transfer over time (Johnson et al., 2024; Lim et al., 2025).

Finally, the evidence base was geographically and economically narrow. All included studies were conducted in high- or upper-middle-income settings, typically assuming access to advanced simulation infrastructure and dedicated training facilities (Clay et al., 2025; Tobias et al., 2024; Wu et al., 2025). The absence of studies from low-resource contexts raises questions about whose pedagogies and assumptions shape dominant models of “best practice” in simulation-based violence preparedness.

Beyond questions of learner outcomes, these gaps extend to the pedagogical labour underpinning simulation-based education. This silence also extends to the educators themselves. Few studies described how facilitators were prepared to hold emotional space, respond to student distress, or engage with identity-based tensions during debriefing. This absence may reflect a broader undervaluing of facilitation as a relational and

ethical skillset in simulation leadership (de Wijse-van Heeswijk, 2021; Macdiarmid, 2017).

Few studies used objective behavioural assessments, and even fewer included follow-up data to examine long-term effects. This short-termism reinforces a “tick-box” logic of simulation success – focused more on momentary reassurance than enduring professional growth (Houlden & Crichton, 2024). It also reflects the challenges of assessing complex learning outcomes such as moral reasoning, emotional resilience, and interprofessional communication (Amin et al., 2024) – domains that may be difficult to measure but are central to real-world violence preparedness.

5.3 Rethinking simulation: Toward an inclusive pedagogy

The findings of this review suggest that simulation-based interventions tend to frame workplace violence preparedness as an individual responsibility, grounded in skills acquisition and emotional regulation. While these elements are undoubtedly important, they do not capture the full scope of preparedness required across diverse care environments.

Simulations that integrated reflective debriefing, relational learning, and emotionally credible scenarios demonstrated greater potential to support holistic preparedness, particularly by enabling students to process uncertainty, discomfort, and ethical tension (Conrad et al., 2024; Hamed et al., 2024; Johnson et al., 2024). However, such approaches remain the exception rather than the norm.

These patterns point to the need for a more critically reflective simulation pedagogy – one that moves beyond procedural mastery and emotional control to engage with identity, equity, and structural conditions shaping workplace violence. Rather than treating these dimensions as optional enhancements, the reviewed evidence suggests they are central to preparing students not only to manage violent encounters, but to navigate the complex emotional and social realities of frontline professional practice.

6 Conclusion

Workplace violence in healthcare and social service professions is both prevalent and deeply complex – emotionally charged, ethically demanding, and difficult to prepare for using conventional teaching methods. This systematic review examined how digital simulation-based training interventions have been used to prepare undergraduate healthcare students for workplace violence, with particular attention to de-escalation, emotional regulation, and situational confidence.

Across 19 studies, the review identified an emerging but uneven field. While the use of immersive simulation, gamification, and virtual platforms reflects substantial pedagogical innovation, the design and evaluation of these interventions often remained narrow in scope. Workplace violence was framed as an individual challenge, most commonly within nursing education, and assessed through short-term self-report metrics. Emotional safety, identity, and structural context were frequently absent, suggesting that simulations, despite their technical sophistication, may replicate rather than challenge existing assumptions about professionalism and resilience.

This review contributes a novel lens by foregrounding the affective, discursive, and equity dimensions of simulation. It introduces the concept of affective fidelity – the capacity of a simulation to engage emotional and relational realities – as a critical but underdeveloped feature of current training. It also challenges the prevailing idea that procedural mastery alone constitutes preparedness, particularly in the face of escalating aggression and occupational risk.

As interest in simulation continues to grow globally, the findings of this review signal the importance of rethinking not just how we simulate workplace violence, but what kind of professional practice those simulations promote. In under-resourced and emotionally demanding contexts, effective violence preparedness will depend not only on access to tools, but on their capacity to reflect the psychological, cultural, and structural realities that shape professional experience. Ultimately, preparing health professionals for workplace violence requires training interventions

that extend beyond technical competence to embrace emotional fidelity, equity, and structural awareness.

7 Limitations and recommendations

7.1 Limitations

While this review offers a critical synthesis of simulation-based interventions for workplace violence preparedness, several limitations warrant consideration. Conceptually, the included studies varied significantly in how they defined simulation, artificial intelligence, and competence. This lack of consistency complicated comparison and limited interpretive depth. For example, interventions using asynchronous screen-based modules and high-immersion virtual reality were often grouped under the same umbrella, despite clear differences in pedagogical potential and learner experience.

Geographically, the review is marked by a strong bias toward high- and upper-middle-income countries. All 19 studies were conducted in technologically resourced environments, with none originating from low-income settings. This overrepresentation reflects a broader inequality in simulation research, where access to advanced infrastructure may be wrongly equated with global applicability. The result is an evidence base that may not fully capture the realities, constraints, or innovations of under-resourced education systems.

Methodologically, many of the studies reviewed were limited by small sample sizes, a reliance on self-report tools, and short-term post-intervention assessments. Only a few used objective behavioural measures, and even fewer included follow-up data to assess longer-term outcomes. Emotional responses – although frequently reported – were rarely theorised or assessed with validated affective tools. Similarly, few studies disaggregated findings by identity variables such as race, gender, or prior trauma exposure, limiting insight into how different students experienced and benefited from simulation-based training.

Finally, the review itself was limited to English-language publications and peer-reviewed sources. While necessary for feasibility, this exclusion may have resulted in selection bias and the omission of relevant grey literature or non-English studies, especially from LMICs. The initial scoping phase was broad, and although refinement occurred over screening rounds, some relevant but non-standardised interventions may have been missed due to inconsistent terminology.

7.2 Recommendations

Despite these limitations, the review offers clear directions for future research and practice. First, there is a need for longitudinal studies that track how simulation-based training influences students' responses to workplace violence over time. These studies should include mixed-method evaluations, combining performance metrics with learner narratives, affective changes, and contextual variables. In particular, trials in low- and middle-income countries are needed – not only to expand geographic representation, but to surface adaptive, locally relevant simulation strategies that may be overlooked in high-tech paradigms.

For educators and curriculum designers, the findings point to the importance of designing for emotion, not just procedural knowledge. Simulations should integrate structured debriefings, space for emotional reflection, and assessment strategies that go beyond confidence scores. The concept of affective fidelity can guide this process.

Simulation scenarios should also prioritise relational realism. Culturally responsive role-plays, identity-diverse avatars, and interdisciplinary cases can help students engage with the complexity of real-world violence. Rather than reducing scenarios to controlled clinical scripts, educators can introduce ambiguity, emotional tension, and interpersonal conflict to cultivate deeper reflection.

Equally important is the preparedness of simulation facilitators. Those leading violence-related simulations must be trained not only in logistical setup, but in trauma-informed pedagogy, emotional containment, and

equity literacy. Without these capabilities, even well-designed simulations risk becoming emotionally unsafe or pedagogically shallow.

Future research should move beyond self-report evaluation. The field would benefit from the development or adaptation of validated instruments that measure performance, emotional insight, and structural understanding. Simulation outcomes should not be limited to what students say they feel confident about – they must include what students can demonstrate, reflect on, and carry forward into practice.

Finally, equity must be central. Simulation design, implementation, and evaluation should monitor for differential outcomes across gender, race, and background. Inclusive casting, identity-sensitive facilitation, and culturally grounded case development are not just ethical imperatives – they are pedagogical necessities.

By critically interrogating how simulation-based education frames workplace violence, this review offers a platform for reimagining both research and teaching. It invites scholars and practitioners to design interventions that are emotionally resonant, structurally aware, and attuned to the diverse realities of frontline professionals. Simulation holds immense potential – but only when grounded in context, care, and critical consciousness.

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CHAPTER 3

PEER EVALUATION IN INTERPROFESSIONAL GROUP WORK TO FOSTER EXPERIENTIAL LEARNING: PERCEPTIONS OF UNDERGRADUATE HEALTH SCIENCES STUDENTS

¹. R Koch / ². Y Heymans

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¹. Centre for Health Professions Education
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
rhea.koch@nwu.ac.za
ORCID: 0000-0003-2398-9475

². Centre for Health Professions Education
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
yolande.heyman@nwu.ac.za
ORCID: 0000-0003-4459-2266

Abstract

To function effectively in a healthcare landscape, health professions educators must prepare students with the necessary interpersonal skills to work effectively in a multidisciplinary team. Despite the ongoing emphasis on interprofessional education (IPE) in health sciences, the development of interpersonal skills remains a challenge. Although peer evaluation has the potential to enhance experiential learning and foster interpersonal competencies, exploring students' perceptions of the use of peer evaluation to foster experiential learning remains underexplored in health professions education. Grounded in an interpretive paradigm, data in this qualitative research were collected using an open-ended reflection activity at the end of the academic semester. The study population comprised all students registered for a compulsory, second-year, interprofessional module in the Faculty of Health Sciences at a university in South Africa (N: 1734). A total of 1145 students consented to the use of their responses in the reflection activity for research purposes. Findings from the thematic analysis reveal that students moved through each stage of Kolb's experiential learning cycle in a meaningful way. The responses suggest that peer evaluation did not just assess performance; it became part of the learning itself. It helped students see more clearly what good group work looks like and gave them the chance to grow their own interprofessional skills. By framing peer evaluation as an active learning process rather than merely an assessment tool, this study contributes to a deeper understanding of how students engage with and learn from peer evaluation. Addressing a gap in health professions education literature, this study explores undergraduate healthcare students' perceptions of using peer evaluation within interprofessional group work (IPGW) to foster experiential learning.

Keywords: peer evaluation, peer learning, interprofessional group work, peer review, experiential learning, undergraduate health sciences students.

1 Introduction and background

To function in a collaborative, real-world healthcare setting requires more than disciplinary expertise (Volmink, 2018). The healthcare landscape is marked by complexity, interdependence, and shared responsibility; therefore, health professions educators must prepare healthcare students with the necessary interpersonal skills to communicate respectfully, work across professional boundaries, and provide constructive peer feedback (Barr & Gray, 2013). As health professions education continues to shift toward competency-based and collaborative care, there is increasing recognition that interpersonal skills must be explicitly taught, scaffolded, and practised in authentic, interdisciplinary learning environments (Patel et al., 2025).

This study was conducted within the context of a large, undergraduate online module offered by the Faculty of Health Sciences at a South African university. The module has over 1,500 students and aims to foster interprofessional collaboration, allowing students from 14 healthcare disciplines to learn from, with and about one another during the theoretical and practical component. A central feature of the practical component is the Interprofessional Group work (IPGW) activity, in which the students are placed in groups of five, each representing a different healthcare discipline. Over a period of four months, and using Google Sites, interprofessional group members work together to design a fictitious, yet contextually grounded wellness clinic website that addresses a health-related issue of their choosing. Group work allows students to apply their disciplinary knowledge to a work-related context and also enables the development of interpersonal skills such as effective communication, cooperation, contribution and attitude, and accountability (Fellenz, 2006). While the value of group work as a teaching strategy is widely confirmed in research, challenges persist in implementing peer evaluation and feedback effectively within group work (Francis et al., 2025; Ion et al., 2023).

Also grappling with these challenges associated with peer evaluation and feedback, this chapter reports on the perceptions of undergraduate

healthcare students at a higher education institution in South Africa on the use of peer evaluation within interprofessional group work to foster experiential learning.

Drawing from the work of Topping (2009), peer evaluation refers to a structured process in which individuals assess the contributions, behaviours, and performance of their peers within a collaborative setting. In health professions education, peer evaluation serves as both an assessment and learning tool that fosters accountability, promotes self- and other-awareness, and develops interpersonal competencies such as giving and receiving constructive feedback (Senden & Coertjens, 2024). When implemented thoughtfully, peer evaluation encourages students to reflect on group dynamics, recognise diverse contributions, and take ownership of their role in group success. It also prepares students for real-world professional environments where peer evaluation and feedback are integral to team-based care, quality improvement, and lifelong learning (Ibarra-Sáiz et al., 2020).

To support the development of competencies associated with peer evaluation and feedback, the design of the peer evaluation activities was informed by Kolb's experiential learning theory. The peer evaluation component was facilitated using TEAMMATES, an online system to facilitate peer evaluation and feedback in group work developed by the Centre for Development of Teaching and Learning (CDTL) at the National University of Singapore (TEAMMATES, n.d., www.teammatesv4.appspot.com). Over the course of two rounds, students assess their fellow group members in terms of key collaborative dimensions such as attitude, contribution, cooperation, communication, and accountability. In addition, students were also required to provide constructive feedback to their fellow group members on how they could improve their interpersonal skills (see Annexure A for screenshots of the TEAMMATES interface).

2 Experiential Learning Theory

Experiential Learning Theory (ELT) was developed by David Kolb (Kolb & Kolb, 2006). ELT puts the learner and the learner's lived experiences at the

centre of the learning process (Kolb, 1984). As illustrated in Figure 3.1, Kolb (Kolb & Kolb, 2017) argues that at the heart of ELT is the Experiential Learning Cycle, which consists of four interrelated stages, namely Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualisation (AC) and Active Experimentation (AE).

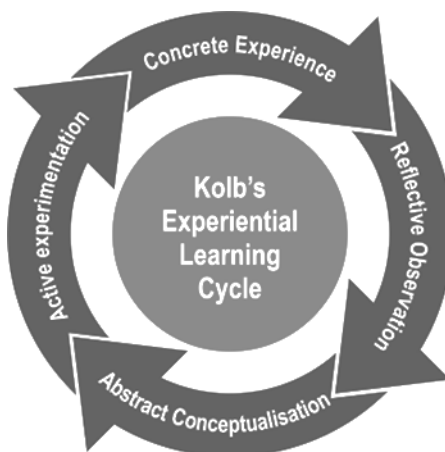


Figure 3.1: Kolb's Experiential Learning Cycle (Adopted from Kolb and Kolb (2017))

Stage 1 in the Experiential Learning Cycle refers to Concrete Experience (CE), where learning takes place through direct, tangible experience, e.g., what the student does. Kolb and Kolb (2018) argue that it is the experience itself and the fact that the learner is pushed outside his/her comfort zone that enables learning to occur.

The second stage in the Experiential Learning Cycle is Reflective Observation (RO). In this stage, the student moves from an active participant in the experience to an observer (Kolb, 2015), and learning takes place by reflecting on that experience from multiple perspectives. In addition, reflecting on their experience lays the foundation for deeper understanding (Youngcharoen & Piyakhachornrot, 2024).

Stage three of the Experiential Learning Cycle entails Abstract Conceptualisation (AC). During stage three, the learner interprets his/her reflection and begins to make sense of the experience by forming new ideas,

theories and concepts. According to Kolb (2015), this is where the learner thinks critically about what happened and why, connecting his/her RO to existing knowledge to develop a broader insight which could inform future actions (Kolb & Kolb, 2006; Kolb, 2015; Youngcharoen & Piyakhachornrot, 2024).

Stage four in Kolb's Experiential Learning Cycle focuses on Active Experimentation (AE), and during this stage, learners apply what they have learned, which entails, but is not limited to, testing new ideas or approaches in real-world situations, using the insights gained from the previous stages to guide their actions and to generate new experiences (Kolb & Kolb, 2006; Youngcharoen & Piyakhachornrot, 2024).

According to Kolb and Kolb (2018), learning is not a linear process of transmitting knowledge but a continuous cycle of creating knowledge as learners move through all four stages in the Experiential Learning Cycle. By unpacking, examining and testing their existing ways of knowing, being and doing, students refine and deepen their understanding (Kolb, 2015). According to Kolb and Kolb (2006), many scholars acknowledge the successes of using experiential learning in skills development. Kolb and Kolb (2018) emphasise that experiential learning requires careful planning to ensure a balance between content and the learning process. During the design of the IPGW activity, which entailed group members evaluating each other and providing constructive feedback aimed at enhancing interpersonal skills, the lecturers designed and structured the learning activity around Kolb's Experiential Learning Cycle. Engaging in peer evaluation and asking the students to provide constructive feedback students learned through a direct and tangible experience (CE). Upon receiving their peers' constructive feedback, students reflected on their feedback and experience (RO), which allowed them to identify what they did that worked, what did not work, why what they did worked or did not work and what they needed to focus on to improve their interpersonal skills (AC). In the subsequent group tasks, students were encouraged to experiment actively with new strategies and approaches based on these new insights (AE). By integrating two rounds of peer evaluation within a broader cycle of group activities, the IPGW design created another

opportunity for students to again learn and deepen their understanding of interprofessional peer evaluation and give constructive feedback by being guided through the four stages of Kolb's Experiential Learning Cycle.

3 Problem statement

Despite the growing emphasis on interprofessional education (IPE) in health sciences, the development of interpersonal skills such as giving and receiving constructive feedback remains a persistent challenge, particularly within group-based learning contexts. Within the context of this study, the authors argue that in IPGW, students often struggle with evaluating fellow group members and providing constructive feedback to enhance interpersonal skills. Although peer evaluation has the potential to enhance experiential learning and foster essential interpersonal competencies, students' perceptions exploring the use of peer evaluation to foster experiential learning remain underexplored in health professions education. This study addresses this gap by reporting on the perceptions of undergraduate healthcare students at a higher education institution in South Africa on the use of peer evaluation within IPGW to foster experiential learning.

4 Research design and methodology

4.1 Research design

This study is grounded in an interpretive paradigm which focuses on understanding how people make sense of their experiences. This aligns with this study, as students perceive working in interprofessional groups, evaluating their fellow group members, and giving constructive feedback differently. A qualitative approach was therefore chosen to collect and analyse data to provide insight into how undergraduate health sciences students at a higher education institution in South Africa experienced peer evaluation within IPGW to foster experiential learning.

4.2 Population and sampling

The study population comprised all students registered for a compulsory, second-year, interprofessional module in the Faculty of Health Sciences at a comprehensive, multi-campus university in South Africa (N:1734). Using non-probability and voluntary sampling allowed all students an equal opportunity to participate. After being fully informed about the intended research, 1145 students (n:1145) consented to the use of their responses in the reflection activity being used for research purposes.

4.3 Data collection

Data collection commenced after approval by the Health Research Ethics Committee in the Faculty (NWU-00187-21-A1) and the Institutional Research Data Gatekeepers Committee (NWU-GK-21-026). Students were asked to respond to the reflective question: *“Please share your thoughts on the peer-reviews, not only to evaluate each member's contribution to the team, but also to help you enhance your teamwork skills?”* Students' responses were collected using QuestionPro, a web-based software programme for administering online surveys.

4.4 Data analysis

To ensure the anonymity and confidentiality of participants, the collected data were deidentified and any identifiable information removed. Data were thematically analysed using ATLAS.ti 23, a qualitative data analysis software, and was guided by the steps of Creswell and Clark (2018) and the principles of Tesch (1990). After preparing the data, the authors engaged with the data to familiarise themselves with the content, noting their initial thoughts on the data. Data were deductively analysed using the four stages in Kolb's Experiential Learning Cycle. Mindfully analysing the participants' reflections, the authors linked the related text to a code. For text segments that could not be linked to an initial code, the authors created new codes (Tesch, 1990). Using the networking functionality in ATLAS.ti 23, the researcher linked the codes to sub-themes and sub-themes to themes. Lastly, the researchers discussed the findings to make meaning of the data.

Co-coding was used to enhance the validity and trustworthiness of the research.

5 Findings and discussion

In this study, a research question guided the data analysis process to identify the themes and sub-themes. The research question posed was: What are the perceptions of undergraduate healthcare students at a higher education institution in South Africa on the use of peer evaluation within IPGW to foster experiential learning? Findings are presented under four themes with sub-themes and supporting quotations are included to elucidate the findings, as illustrated in the figure below.

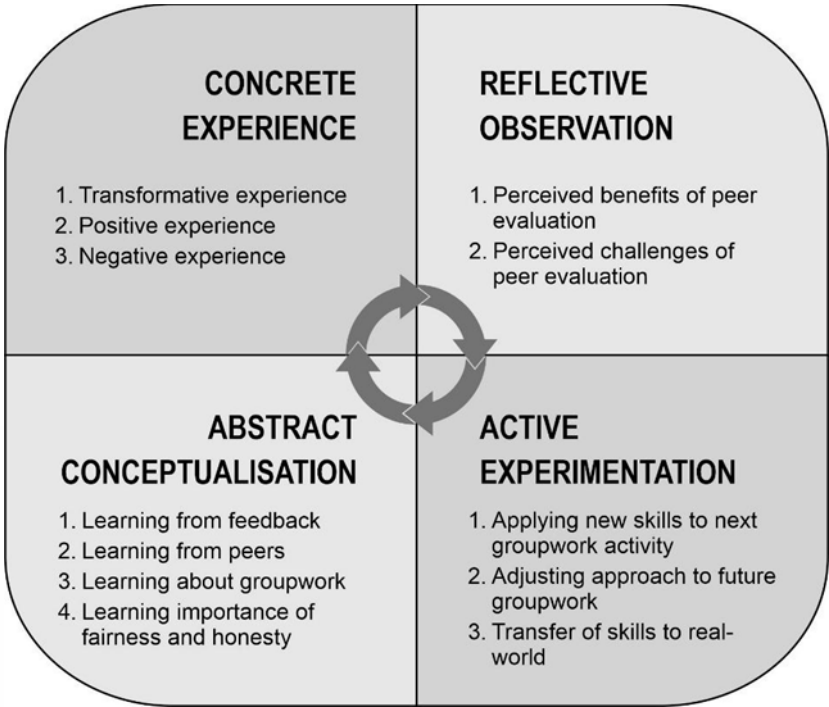


Figure 3.2: Themes and sub-themes

5.1 Theme 1: Concrete experience – Engaging with group work and peer evaluation

This theme relates to the first stage of Kolb's learning cycle (CE) by examining what students experienced during the group work and peer evaluation tasks, which formed the foundation for subsequent reflection and learning.

5.1.1 Sub-theme 1.1 Transformative experience

While critical reflection is often seen as the key driver of learning, Kolb and Kolb (2018) argue that it is the transformative experience that disrupts our expectations or pushes us out of our comfort zone that sets the learning process in motion. As noted previously, students were placed in diverse groups with peers from different cultures, disciplines and campuses. In addition, students were also required to take on different group roles during various activities such as chair, scribe, time-teller, submitter and finaliser. This exposed them to unfamiliar dynamics and new challenges.

Students reflected on the difficulty of giving feedback to their peers. One student explained that: *"It is not always easy to review your peer's work."* Another noted *"Peer reviews are also difficult, but had a positive effect."* These reflections show that the peer evaluation experience pushed students beyond their comfort zones giving them a concrete experience that was significant for their learning as highlighted by Kolb (1984). Stenberg et al. (2021) also stress the importance for health professions educators to create these activities that challenge students and support them to develop the skills to give and receive feedback effectively.

5.1.2 Sub-theme 1.2 Positive experience

Most students reported a positive experience of the peer evaluation. They reported that the inclusion of peer evaluation in group work played a key role in the overall success of the collaboration within their groups. As this student noted, *"it did help change a lot of things in the group everyone shared work equally and it made it easy for us all because we knew that we will be evaluated for it."* This aligns with the findings of Yin et al. (2022), who reported that even though there were some mixed feelings, the majority of

their participants displayed a positive attitude towards peer evaluation. In contrast, Double et al. (2019) argue that students' perceptions of peer evaluation are not always positive, particularly among those with little experience. However, they note that the quality of feedback tends to improve over time, highlighting the importance of providing students with guidance and practice.

While students reflected on both giving and receiving feedback, the data showed a much stronger emphasis on the value of receiving feedback. Several responses revealed a genuine interest in hearing how their contributions were perceived by others. As these students reflected: *"I think it is great, it lets you see yourself in someone else's eyes and you can learn from constructive criticism ..."* Another noted, *"The peer review is a space that examines how you've contributed your efforts and whether or not that made group members happy. Therefore, it is always reasonable for peer review to exist so that individuals can be evaluated and learn from their mistakes."*

5.1.3 Sub-theme 1.3 Negative experience

A small number of students reported having a negative experience with peer evaluation. Analysing the data revealed that students reporting negative experiences pivoted around students not enjoying doing the peer review, feeling that the peer reviews were not accurately done by group members and that lecturers should be the only ones assessing the students' work. In addition, one participant suggested the use of a different criteria as opposed to what they had to use to assess their group members. Supporting quotations include: *"please remove it [the peer evaluation] as a review on what individuals have done. It should be a review on if everyone did their part and to comment on it not to put the marks in the students hands due to some student can be deliberate and give bad marks in situations and it is the lecturers part of assessment."* Another student added, *"Peer reviews are quite unfair because there isn't always honesty I don't recommend them."*

Findings support research conducted by Chin (2016) who states that students sometimes, due to the concern that their grades are influenced by and dependent on other students, do not see the advantages of peer

evaluation. Senden and Coertjens (2024) also speaks to the negative emotions that may arise from peer evaluation and mention that it should be managed through careful design and the training of students prior to peer evaluation.

5.2 Theme 2: Reflective Observation – Processing the feedback

This theme relates to the second stage of Kolb’s learning cycle (RO) and explores what students noticed, realised, or felt as they reflected on the peer evaluation experience. Including peer evaluation in group work encourages students to reflect on their own learning by switching between the observer and the observed (Stenberg et al., 2021). By evaluating the work of others, students are prompted to apply the same critical lens to their own efforts and understanding.

Consistent with other studies, student feedback on reflection often centred around the perceived benefits and the challenges they encountered with the peer evaluation process (Kaminski et al., 2024).

5.2.1 Sub-theme 2.1 Perceived benefits of peer evaluation

Peer evaluation enhances group work and group performance

Students frequently commented that the peer evaluation had a positive impact on how their groups functioned. One student noted, *“With my group, everyone improved on their teamwork skills after seeing the peer reviews.”*

Many felt that peer evaluation helped improve work ethic and collaboration within their groups. As this student notes, *“The peer review keeps members from slacking and thus creating a better work ethic”*. Another explained: Peer reviews are a great way to push one to the right direction and learn to work collaboratively with one another, it pushes one to want to change and do better. Another mentioned *“The peer reviews helped the team to get better with each task because we could always reflect on what we were lacking on and we worked on it together as a team”*.

Linn et al. (2022) found that good academic achievement can be expected from students who worked collaboratively within their groups. From the findings it is clear that the peer evaluation not only contributed to effective group performance, but also led to better cooperation from group members.

Peer evaluation makes group work more fair

Kaminski et al. (2024) mentions that it is a primary concern for educators to ensure equal contribution from students in group work. Fellenz (2006) and Stenberg et al. (2021) agree that for them, the perception of fairness is crucial in promoting student learning. Adding peer evaluation to the interprofessional group work activities in this study added transparency that made the group work experience feel more just and balanced. Allowing group members to assign marks based on individual contributions positively affected students' perception of fairness. One student explained, *“The peer reviews allow each team member to be marked according to their participation and contribution within the group, which creates more fairness in the marking system.”* Other students echoed this, saying that it helped prevent free-riding and ensured that everyone's effort was visible. A few students mentioned that it was an added benefit for them to be able to recognise those who went above and beyond. As one student reflected, *“All my group members contributed to the activities, but some did give more time and effort and deserve to get good marks. I feel the evaluation helped to award credit where needed but also let members know if their contributions and work is enough.”*

Peer evaluation provides a platform for feedback that is less confrontational and structured

According to Fellenz (2006), the full potential of group work can only be reached when problems such as intragroup conflict can be successfully managed. From the student feedback, it appears that the carefully planned and structured peer evaluation activities, have provided a platform for dealing with group issues resulting in less conflict within the groups.

Students valued the anonymous peer evaluation process as a structured way to share feedback that felt less confrontational than addressing group issues directly. Although anonymity was somewhat limited within the small group setting, many still felt that the format created a safer space for honest communication and helped to minimise the risk of conflict. One student explained, *“I think it is a very valuable way of anonymously making people aware of the aspects that they are lacking in, and also to have people tell me where I am lacking. It avoids direct and offensive confrontation, and still produces self-improvement.”* Others echoed this, saying that the process made it easier to give and receive honest input without damaging group relationships. As one participant put it, *“The fact that its anonymous gives the chance to give honest feedback without causing tension between teammates.”* Others agreed that the anonymous format ensures that *“feelings won’t be hurt”* and that the anonymity *“decreases any bad vibes”*.

The structured, anonymous format not only encouraged honesty but also helped students focus on growth, rather than defensiveness. As this student reflects, *“This was a very upbuilding activity as you could express your honest opinion to try and help another person improve their teamwork abilities. It also helped me to realise that I can improve in certain aspects, without feeling attacked by other members.”* Another echoed this sentiment, *“It was nice to get an honest opinion about my group work without getting offended, so that I can work on my weaknesses.”*

Peer evaluation keeps members accountable

According to Yang et al. (2022) peer evaluation reduces what they call *“social loafing”*. This term refers to the concept that people are more likely to put in less effort when working in a group compared to working individually. They mention that peer evaluation keeps members accountable for their individual contribution and the awareness of impending peer evaluation can affect their group work behaviour and communication. This is in line with the findings of this study, where many students felt that peer evaluation helped promote accountability within their groups. Knowing that their contributions would be evaluated by their peers encouraged group members to participate more actively and share

the workload more equally. As one student noted, “It did help change a lot of things in the group - everyone shared work equally, and it made it easy for us all because we knew that we will be evaluated for it.” Another put it simply: *“Peer reviews made students accountable as an added measure to ensure no one slacked off.”* Supporting this, another student stated, *“I think it was very effective, because you will do your part because nobody wants a bad peer review.”*

In addition to keeping others accountable, several students reflected that the process also made them more responsible for their own efforts within the group. *“They were helpful in my view because in a way they pushed me to do the things that needed to be done.”*

Peer evaluation motivates group members to work harder

In addition to encouraging accountability, peer evaluation also served as a strong motivator for many students. Knowing that their peers would review their contributions created a sense of ongoing focus and encouraged them to maintain a high standard of participation. As this student reflected, *“I think this is a great way of encouraging group members to not lose focus”*. Another stated that, *“It is a great tool to motivate team members as well as yourself to push harder and to fully own up to your role in each activity”*. Some students expressed that they wanted to perform well not only to contribute to the group, but also to receive positive feedback. One student reflected, *“It was motivating - I wanted to be rated best.”*

Others described peer evaluation as a push to take initiative and give their best effort, with one noting, *“Peer reviews are a great way to push one in the right direction and learn to work collaboratively... it pushes one to want to change and do better.”* Another student wrote *“Peer reviews encourages us to strive to produce high quality work.”*. For some, this sense of motivation was ongoing, as one student put it: *“Peer reviews are a beautiful initiative as they teach us to always pull up our socks.”*

Peer evaluation shows you what and how to improve

One of the strongest perceived benefits of the peer evaluation process was that it showed students both what they needed to improve and how they need to do it. Many participants said the feedback they received gave them clear, practical direction. One student wrote, *"After the reviews you know what points you need to focus and what you should do differently."* This is in line with the findings from a scoping review done by Stenberg et al. (2021). The authors confirm that peer evaluation help students to identify gaps leading to improvement in their group performance.

Several students described the process as useful for self-assessment and growth. As this student explains, *"It is good to receive both positive and negative feedback about my leadership skills to encourage me and to show me in which areas there is room for growth."* Another noted, *"I feel that the peer review is a good way of expressing how one feels towards the group members without being judgemental and over critical, thus giving each person an opportunity for personal growth."* Many described the process as an opportunity for introspection and noted that it encouraged them to reflect more honestly on their own role within the group. As one student put it, *"It helped me to learn more about myself as a team player"*. Others reflected on the importance of self-reflection, with one noting, *"I really think its a good idea because you always first need to look at yourself and then at others."* For some students, the experience was eye-opening because it revealed aspects of their group work behaviour they had not previously been aware of. *"They did help me to see my wrongs, the things that I am not aware of, and to correct them and work well with others,"* one student explained. Another noted, *"Sometimes we do not realise that we are doing something wrong until it is pointed out to us. It is an excellent way to help each other to reach their fullest potential when working with others."* These comments suggest that the peer evaluation process prompted genuine self-reflection and a willingness to take responsibility for personal development.

In addition to personal insight, students commented that the process clarified what was expected of them within the group. Peer feedback helped

make roles, responsibilities, and standards more explicit – particularly for those who had initially struggled to understand how to contribute. This student explained, *“I definitely saw what it really means to work in a group and what people expect of you when you are working in a group.”* Another echoed this by saying *“we had time to explain what is expected from us and made sure we all understand.”* Once expectations were clearer, students reported that it was easier to engage with the task and participate more meaningfully.

Students were also eager to give feedback so that others can also see what and how to improve themselves. The reason that they may feel so positive about the feedback is because prior to round one of the peer review we had a session to explain to them what constructive feedback looks like and how it is different from criticism. The session also included how receiving constructive feedback should be approached. As this student summarised, *“I think it is a great platform... I think most people would like to know how to better themselves. For this reason I like the peer reviews so that I can improve my teamwork skills, but also help other to improve theirs.”*

Peer evaluation gives students a voice

According to Yang et al. (2022), adding a component to peer evaluation that allows students to express their opinion rather than only assigning a score, can lead to better motivation and engagement. In this study, the data showed that students indeed felt empowered and that their voices were heard.

Many students felt that the peer evaluation gave them a chance to share their experience of how the group worked together and how each member contributed. Several students said it made them feel that their opinions were valued. One student explained, *“This is a way for us to feel that our voice is heard and that our opinions matter.”* Others mentioned that it allowed them to raise issues or offer support when needed. As one student put it, *“It gives us a chance to voice if one peer needs help - academically or not.”* Some also appreciated being able to speak honestly about how they felt in the group, with one noting, *“The peer reviews were great because we*

were all able to speak our thoughts about how we feel in regards to students and group work.” Overall, students valued having a space where they could express their thoughts and be heard.

Students feel validated through peer feedback

Another benefit that emerged strongly was the sense of validation students felt through receiving peer feedback. Many described how the comments boosted their confidence and made them feel seen and appreciated for their efforts. One student reflected, *“It lets you see yourself in someone else's eyes and you can learn from constructive criticism – and also get a boost from the positive feedback.”* For some, the feedback served as recognition of the hard work they had put into the group. A student wrote, *“It was quite special to hear all of the compliments as well as everyone's gratitude towards me. I was the group facilitator and I really worked hard to guide my group, and it was nice to see that they saw that and appreciated it.”*

In addition to feeling validated themselves, several students also valued the opportunity to encourage and build up their peers. As this student noted, *“I think it's a good way to build others up”*. They appreciated having a structured way to recognise good effort and acknowledge the contributions of others, something that may not always happen in typical group work settings. As this student mentions, *“peer reviews are a good idea as it is a platform to appreciate members”*. Another agreed and stated *“I learned to...appreciate and commend others for their good ideas, that I did not think of before.”* This sentiment was also echoed in a study done by Kaminski et al (2024) where they mentioned that students appreciated giving recognition to high-performing members.

5.2.2 Sub-theme 2.2 Perceived challenges of peer evaluation

Difficulty evaluating peers

While most students responded positively to the peer evaluation process, a few expressed discomfort with having to evaluate their peers, especially when it came to assigning marks. Some described feeling uneasy or even

guilty about giving low scores to group members, even when those members had not contributed equally. One student noted, *“It is a good idea, but most of the time we are not comfortable pointing out the negative side of things or a person - even if it is set in a positive way.”* Another reflected that it simply *“wasn’t easy”* to rate their group members, particularly when it could affect someone’s marks, *“It is not always easy to review your peer’s work. If the review does not affect his module mark, it would be easier to be honest.”*

These findings echo the literature which identifies discomfort and feelings of unease as common challenges in peer evaluation (Senden & Coertjens, 2024; Stenberg et al., 2021; Topping, 2009; Yang et al., 2022; Yin et al., 2022).

Concerns about bias and subjectivity

Some students raised concerns about the influence of bias and subjectivity in the peer evaluation process. They felt that feedback and marks were sometimes shaped more by personal feelings than by an objective assessment of contribution. One student noted, *“People rate you according to how they feel about you,”* while another commented, *“Some team members use favouritism when reviewing other students.”* According to Linn et al. (2022), anonymity of the peer evaluation process can help reduce the bias caused by the social relationship between group members.

A few students also worried that disagreement or interpersonal tension could negatively affect their scores. As one reflected, *“it’s a subjective way of scoring – one person doesn’t agree with you, gives you a bad mark, and negatively influences all of your marks.”* Another expressed a similar concern: *“I feel like group members could use this intentionally against you if they do not like you or agree with your ideas and opinions.”* These comments highlight the challenge of ensuring fairness when implementing group work and peer evaluation. Yang et al. (2022) cautions that the design of peer evaluation activities should be preceded by careful strategies to mitigate bias like policies, peer evaluation training, penalties and rewards.

Concerns about fairness

In addition to concerns about bias, a number of students questioned the fairness of the peer evaluation. Some felt that their efforts were not fully recognised, especially when much of their work happened behind the scenes or wasn't visible to the group. As one student explained, *"Many people do not realise how much work is being done and not necessarily talked about. People rate their team on how hard they think the person worked, while in actual fact a lot more is done than realised."* Others felt that marks were sometimes too evenly distributed, regardless of individual contribution: *"You sometimes did more than another person, but the group gives you the same mark."* There were also comments about the accuracy of evaluations, with one student sharing, *"I almost did all the work and submitted the assignment, and some students rated me a 6 for workload. I just feel that it's not accurate."*

Fellenz (2006) emphasised the importance and complexity of fairness perception in assessment, describing it as a necessary condition for student learning. This complexity is further illustrated in a review by Senden and Coertjens (2024), which highlights that the literature presents mixed findings. Some studies suggest that anonymity reduces students' perceptions of fairness, whereas others report no significant difference.

Even though fairness remained a recurring concern for a small but vocal group, some students were able to take constructive value from the process despite these frustrations, *"Personally I feel that the marks given were unfair, but through the constructive feedback it helped me to be an active listener and helped with group coordination"*.

Doubting the impact of peer evaluation

While the majority of students found value in the peer evaluation process, a small number questioned whether it led to any real improvement. One student commented that their peers seemed demotivated by criticism rather than encouraged to grow. *"The peer review process does little to enhance skills, as the continual reviews mean that group members are demotivated by criticism."* Others noted that the process lacked seriousness

and follow through within their groups, as illustrated by this response *“I don't think it enhanced my group members team work. I still had to do all the work. They did not take it seriously.”* Another noted, *“I think it's of no use if the team members are not willing to talk about the feedback and improve of them”*.

A few felt the feedback they received was too positive to be helpful, *“The peer reviews didn't have any effect on the group because only good feedback was given so no one received critique”*. Some doubted whether those who needed to change would actually do so. As one student put it, *“Peer evaluations won't make stubborn people change their views.”* Although these views were in the minority, they highlight that the impact of peer evaluation can vary depending on group dynamics and individual attitudes.

A small number of students also seemed unsure about the purpose of the peer review, viewing it more as a way to inform lecturers about group issues rather than as a learning tool. For them, it functioned more as a kind of *“whistle-blowing”* mechanism to highlight non-participation than as an opportunity for constructive feedback as this response illustrates, *“Absolute best thing ever, so it can be made clear to the 'teachers' for who is doing what and who is actually contributing to the team”*.

5.3 Theme 3: Abstract Conceptualisation – Learning from the experience

This theme relates to the third stage of Kolb's learning cycle (abstract conceptualisation) and explores how students made sense of their experiences, identified lessons learned, and began to develop ideas for how to approach group work differently in the future. Schellhase (2006) describes it as the *“thinking”* stage where meaning is made from experience, distinct from simply *“feeling”*.

5.3.1 Sub-theme 3.1 Learning from constructive feedback

A strong theme that emerged in students' reflections was the value of constructive feedback as a tool for self-improvement and personal growth.

The majority of students described how the feedback they received from their peers helped them to reflect on their skills, attitudes, and performance, and led to meaningful changes in how they approached their work. One student explained, *"It helps a lot because you can read the constructive criticisms that others have on you, and you can then take that criticism and work on yourself and improve yourself."* For some students, the experience extended beyond practical skills to deeper personal development: *"It helped me to work on the things I'm not good at. This developed my personal growth as well."* Another simply stated, *"Reflection is key to better yourself"*.

Several students emphasised that the value of feedback depends on how it is received. The ability to approach feedback with an open mind was seen as key to using it productively. As this student explained, *"The only issue I had with this is that not every person accepts constructive criticism. Some take it as an attack on their self worth, even if it wasn't meant as an attack or insult. So, the only thing that I felt is important is that students should really be reminded that the criticism is there to help, not to question their character."* Those who viewed critique as a learning opportunity described how it helped them to improve both their work and their mindset. As one student put it, *"Some critique that you receive on your own work can be good if you look at it in a way that you can better yourself."*

Students also highlighted that the structured peer evaluation allowed for feedback that was constructive, rather than just critical. As one student noted, *"I think the peer reviews allow a medium for constructive criticism among group members in a way that is kind yet still professional and helpful."* Interestingly, most did not experience the feedback as negative or hurtful. The positive responses from this study may be linked to the guidance provided before the peer evaluation, as advocated by Kaminski et al. (2024) and Topping (2009). This guidance gave students the language and tools to engage with feedback more effectively. As one student noted, *"I found it helpful, because the criticism was always constructive."*

5.3.2 Sub-theme 3.2 Learning from peers

Double et al. (2019) found in their study that peer evaluation can have a greater impact on academic performance than teacher assessment. They therefore recommend that activities should be structured to utilise and promote peer learning. In this study, students reflected on how peer evaluation enabled them to learn from each other. As one student explained, *“I think it is very good to evaluate each other because that means that we are learning from each other.”*

Many students expressed their appreciation for their peers’ different perspectives and saw them as valuable learning opportunities. As this student noted, *“The peer reviews is an excellent way to better your teamwork skills. You learn from another person point of view what you can better within your skills.”* This was echoed by other students, who said, *“It was a way for me to express what I have experienced and to learn from others perspective on what I can do better”* and *“Peer reviews helped me realise my faults and pushed me to want to be better as I drew courage from my peers.”*

Because the groups were intentionally diverse, made up of students from different campuses, disciplines, backgrounds, and ethnicities some challenges were anticipated. However, many students came to see the diversity in their groups as a valuable learning opportunity. One student reflected, *“I think that my teamwork skill got enhanced by teaching me how to work better with others that has other problems that i have and to still be able to work with these individuals despite our differences.”* Others echoed this sentiment, saying, *“We got a chance to learn about one another,”* For some, the experience helped build confidence in navigating group dynamics with unfamiliar people: *“it helped me alot because it taught me how to deal with different people especially those you don't know.”*

5.3.3 Sub-theme 3.3 Learning what group work is all about - Identifying key group work competencies

In their reflections, the students described how the peer evaluation helped them to develop a clearer understanding of what group work entails. As one

student came to understand, *“I definitely saw what it really means to work in a group and what people expect of you when you are working in a group.”*

Fellenz (2006) emphasises the importance of interpersonal skills for effective group work. In this study, the peer evaluation activities were designed with a focus on interprofessional competencies such as cooperation, communication, contribution, attitude, and accountability. In reflecting on the peer evaluation process, students identified what they saw as crucial group work competencies, which closely aligned with those emphasised by the researchers.

According to Kaminski et al. (2024) group cooperation is one of the core competencies in interprofessional education. For them high-performing groups often have a strong sense of mutual respect, trust and a shared purpose. The data revealed that peer evaluation assisted students to recognise that group work requires working together towards a shared goal. One student reflected, *“I found it interesting to tell my group members what to improve so we can work together with respect.”* Others mention they learned to *“Work together not against each other,”* and that *“we are all here for the same reason.”* Many noted the importance of respecting and trusting one another. Several students reflected on the need to let go of control and rely on others to do their part: *“you need to trust your teammates”* and *“I should trust people more in doing their part.”* Others spoke more broadly about group relationships, saying *“It is important to be understanding of each other and respectful,”* and *“Group members should cooperate, respect one another.”*

Communication is consistently identified as a core competency essential for effective interprofessional collaboration in healthcare (Kaminski et al., 2024; Patel et al., 2025) The students in this study also mentioned communication repeatedly as a key competency for successful group work. As this student states, *“My thoughts on the peer reviews.. made my aware on effective communication as a key to a productive collaboration.”* Some students mentioned that good communication within a group can avoid misunderstandings and aid in resolving conflict. As this student explained: *“Communicating resolves what ignorance couldn't, communicating allows*

you to explore solutions to problems encountered." Another student added, *"communication is also an important aspect that can save a lot of misunderstandings."* Students also emphasised the importance of listening and sharing ideas. One participant reflected, *"We should always be able to listen to other people's opinions."* Several comments pointed to communication as essential not just for practical reasons but also for building mutual respect: *"The key points in group work is communication, respect for each other and each other's ideas, to listen and to give you opinion appropriately."* Others emphasised on staying in regular contact to avoid last-minute pressure: *"Communicating more frequently instead of only communicating when the due date is near."*

Several reflections highlighted that attendance and contribution were non-negotiables for successful group work. One participant wrote, *"It is the strongest aspect in ensuring teamwork, fairness and equal amount of contribution towards an activity."* Another shared, *"Everyone has to make time for the group activity, they have to put in the effort when doing the activities and show up. Lastly workload has to be divided equally."* Others echoed this sentiment: *"I think as a group member you should try your best to be there and contribute where necessary"*.

Time management and punctuality were also seen as essential. Many students spoke about the need to make time for meetings and to stick to agreed schedules. One wrote, *"In group work we should all agree on time chosen for the meeting and be available."* Another pointed out that, *"respecting time is crucial because that means people had to clear their schedule to meet each other."* Others highlighted the need to plan ahead and stay organised: *"do not leave things for last minute."*

Attitude in group work refers to a group member's overall approach to the group task, the process and the other members (Normandin et al., 2023; Patel et al., 2025). Several reflections from the data highlight that students realise the importance of having a positive attitude when working in a group. As this student notes, *"the best way to have a successful teamwork is communication and positive attitudes towards each other as a team."* Another simply states, *"[a] positive attitude is very crucial in a team work."*

Accountability was discussed earlier in this chapter, as students identified it as one of the key benefits of peer evaluation. Kaminski et al. (2024) describe accountability in group work as the process through which individual contributions are recognised and evaluated, with the potential to influence the outcomes. This then encourages members to meet their responsibilities and deter those students who would otherwise not have contributed equally. As this student noted, *“Peer reviews allow for students to mention if anyone did not pull their weight or behaved inappropriately. This made students accountable and as an added measure to ensure no one slacked off.”*

5.3.4 Sub-theme 3.4 Learning the importance of fairness and honesty in peer evaluation

Another lesson students reported on was the importance of fairness and honesty in the peer evaluation process. Several students acknowledged that peer feedback can only lead to improvement if it is given sincerely and without bias. As one student put it, *“Peer review should be honest review of each group member and shouldn't go with favouritism.”* Some students raised concerns about superficial or insincere feedback, suggesting that not everyone took the process seriously. One noted, *“In my group, it was something they simply did to get a mark. I was the only one that put some thought into my answer. The rest answered with one-liners.”* Another wrote, *“I think it is a good way for people to become aware and work on areas they lack in,... The only problem is this will only work if everyone's feedback is honest, and not based on personal feelings and pettiness.”* The value placed on honest input was clearly expressed: *“Honest answers are needed. Not answers to make your teammates like you.”* Others echoed this: *“It is important to be honest during the reviews.”*

5.4 Theme 4: Active Experimentation – Applying insights to future group work

This theme relates to the fourth stage of Kolb's learning cycle (active experimentation) and focuses on how students applied their new knowledge and skills to the remaining group work activities. Students also

discussed how they will adjust their approach to future group work and how they can see themselves transfer group work skills to real-world healthcare settings.

5.4.1 *Sub-theme 4.1 Applying new skills in the next group work activity*

According to Senden and Coertjens (2024) peer evaluation does not automatically enhance learning. They highlight that feedback is a complex process, influenced by multiple elements that can enhance or limit its effectiveness in supporting learning. The data showed that many students learned from the feedback they received to make changes in the next group activity. The careful planning of the structured peer evaluation process in this study may have contributed to the positive reaction that allowed students to apply the feedback effectively in future activities.

Knowing what to improve made it easier to take action, and several students said it helped them avoid repeating earlier mistakes. One student wrote, *“The peer reviews was a great idea to get to see if you were working effectively with your team and allows you the opportunity to see where you can improve and work on so that for the remaining activities you could truly put your best effort into being better.”* Another noted, *“Peer reviews are good as they give members opportunity to rate each other and know how they can improve if there are any mistakes that needs to be solves so that the group as a whole can function properly on the next group assignment.”* Others shared that the process helped them stay focused on getting better with each task: *“I think when every member reads through their reviews they can see what they need to work on and improve on. It helps to let every member want to do better every time they do a group task.”*

Students appreciated having the chance to put feedback into action and saw it as an opportunity to challenge themselves. For some, the goal of improving their peer reviews was a clear motivator. One student shared, *“It was motivating, I wanted to be rated best,”* while another wrote, *“i did strive to get a better review the second time which might have helped the teamwork.”* Several reflected on how the feedback pushed them to participate more actively: *“The peer review helped me because if a member mentioned that I didn’t fully participate, I made sure to fully participate on*

the next assessment,” As one student summed it up, “The peer reviews was a great idea to get to see if you were working effectively with your team and allows you the opportunity to see where you can improve and work on so that for the remaining activities you could truly put your best effort into being better.”

Ibarra-Sáiz et al. (2020) found in their studies that the process of evaluating their own and the work of their group members is a valuable tool for students to develop new group work skills. Students reported an eagerness to apply their newly acquired skills and made specific mention of time management, communication and overall group work competencies.

Students showed a strong commitment to improving their time management, especially in terms of being more available and punctual for group meetings. One student wrote, *“I know now that I should be on time,”* while another simply noted, *“[I need to] be punctual as well.”* Others observed the impact on their peers too, with one writing, *“It helped one of my teammates to be on time.”* In addition to showing up on time, students also reflected on managing deadlines more effectively so as not to let their groups down. As one student shared, *“I have learnt the importance of planning my work and managing my time correctly.”* There was also a growing awareness that good time management supports the whole group: *“We all learnt to keep to deadlines to not let the group down.”*

Many students reported improvements in their communication skills as a result of the peer evaluation process. They mentioned becoming more confident in expressing themselves during group tasks and discussions, and also recognised the value of listening. One student reflected, *“Through the constructive feedback it help me to be an active listener.”* Another simply noted, *“I improved my communication skills.”* Some expressed a renewed intention to communicate more effectively in future group work: *“I need to communicate a bit more,”* and *“I need to... pay more attention to other people’s opinions.”*

Students also reported that the peer evaluation process helped them develop stronger overall group work skills. Seeing how their peers experienced their contributions gave them specific ideas on how to improve

and motivated them to be better group members. One student noted, *"Many of us learned and developed teamwork skills from the reviews as we got to understand how others perceived our work ethics."* Their commitment to continued improvement was clearly expressed: *"It was well received and I can work on my group work to better it for the future,"* and *"I believe teamwork is not only about getting the work done. It also involves enhancing ones skills and the skills of fellow teammates."* Another said, *"I liked that we could get and give feedback, because this helped us learn what we can do better in the future when working in a group of people."*

5.4.2 Sub-theme 4.2 Adjusting approach to future group work

According to Linn et al. (2022) emphasising a cooperative group work attitude early in students' studies can support the development of skills needed by healthcare professionals. It is therefore encouraging that the data from this study show a shift in students' attitudes towards group work.

Some students explicitly reflected on how they plan to approach group work differently in the future. A key realisation for several was that being too controlling or taking over group tasks could undermine collaboration. They acknowledged the need to trust group members more and create space for everyone's input. As one student put it, *"I learned that I try to control other people and everything they do, I should trust people more in doing their part."* Another echoed this: *"To pay more attention to other people's opinions and learn to not take as much charge as I am use to."* Similarly, one student reflected, *"I think sometimes people think that I try to do everything and I learned that I should stop trying to make everything perfect and instead use something of everyone."*

Others shared how the peer feedback shifted their perspective, making them more aware of how their behaviour was experienced by group members. As one student noted, *"During my peer review evaluation I got lower marks then I thought I would get, but during this I realised that not everyone sees how you do things the same way as you see them, even though you thought you did your best, someone else might think you could have done more or communicated differently. This helps me to improve my teamworking skills for next year and in my field of study to approach*

teamwork in a different way, looking out of someone else's perspective a not my own.” Another shared, “I should not expect everyone to be like me because they aren’t me. I must learn that some people want to wait until the last minute before submitting the activity, although I don’t like it. My group was good and in the end we had much fun.”

Several students committed to being more constructive group members in the future by expressing their opinions more, showing greater patience, and improving their communication and time management. As one reflected, *“Someone from my teammates said I need to express my opinions more and that is what I will do in future with regards to group work.”* Another explained, *“The peer reviews are a great way of showing you where one needs to improve in terms of work, behaviour or personality. I had to be more positive and patient with my teammates.”*

5.4.3 Sub-theme 4.3 Transfer of group work skills to real-world contexts

Stenberg et al. (2021) and Linn et al. (2022) both highlight that peer evaluation play an important role in preparing students for the collaboration and group work required in real-world healthcare practice.

In this study, the data show that students planned to apply what they had learned to their future roles as healthcare professionals. One student noted, *“It helps us as you now know where you should pay attention to and what you should work on. As one day you will need these skills when working.”* Another explained, *“It was great to work as team, every task for us was easy cause we were working together to approach it. And I learned so many strategies to approach the world as health professionals.”*

Some students emphasised how peer feedback helped them reflect on their own growth and weaknesses in preparation for professional collaboration. *“By making use of the peer reviews I personally can see what my weaknesses is, and work on it to improve it, so that one day in the actual health care, where I must work in a group, I would be able to learn from my mistakes, and only try to be better.”* Others also recognised the value of feedback as a

transferable skill: *“It’s good to work as team and evaluate each other’s work, this can help for future purpose to evaluate at work.”*

6 Conclusion

Peer evaluation in group work may be commonly used in higher education, but its role as structured learning mechanism rather than just an assessment tool remains underexplored. By framing peer evaluation as an active learning process rather than merely an assessment tool, this study aimed to contribute to a deeper understanding of how students engage with and learn from peer evaluation.

The data shows that students moved through each stage of Kolb’s experiential learning cycle in a meaningful way. They gained real experience through the group tasks, reflected on those experiences, drew out lessons about themselves and others, and made concrete plans to change their behaviour in future group work settings. The responses suggest that peer evaluation did not just assess performance, it became part of the learning itself. It helped students see more clearly what good group work looks like and gave them the chance to grow their own skills.

However, it is important that educators provide structured guidance to ensure constructive and unbiased feedback. Educators should also address concerns around fairness and facilitate discussion on self-reflection and professional growth. Anonymity and scoring mechanisms influenced the perceived fairness and must be carefully designed to support honest evaluations.

The study highlights the importance of students engaging meaningfully with feedback if peer evaluation is to be used as a tool for group work skills development. Therefore, further training on feedback literacy may improve students’ ability to give and to receive actionable feedback that can strengthen their group work competencies in healthcare settings.

7 Limitations and recommendations

In this study, the authors relied only on an open-ended reflection activity as a data collection tool. Incorporating an additional data source, such as focus groups could have provided additional insights. In addition, this study only included the voices of students who consented to their reflections being used for research purposes. This implies that valuable feedback from non-consenting students may have been missed. Finally, the scope of this study was confined to the perspectives of students, leaving out the experiences of lecturers and instructional designers. It is therefore recommended that future studies should broaden their scope to include these voices.

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CHAPTER 4

INVESTIGATING THE RELATIONSHIP BETWEEN STRESS AND TEAMWORK DURING INTERPROFESSIONAL COLLABORATION

^{1.} F Delawala / ^{2.} Y Heymans

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^{1.} Centre for Health Professions Education
Faculty of Health Science, North-West University
Potchefstroom, South Africa
rhini.delawala@gmail.com
ORCID: 0000-0002-7985-3684

^{2.} Centre for Health Professions Education
Faculty of Health Science, North-West University
Potchefstroom, South Africa
Yolande.heyman@nwu.ac.za
ORCID: 0000-0003-4459-2266

Abstract

This study explored the relationship between stress and teamwork in interprofessional collaboration (IPC). Stressors arising from collaborative efforts can either hinder or enhance team performance, ultimately shaping IPC dynamics. While stress is often associated with negative outcomes, it can also foster teamwork, enhance performance, and build resilience, particularly within IPC settings.

We conducted an integrative literature review of published data from 2013 to 2023, critically analysing and synthesising 16 studies. Several key themes emerged regarding IPC, teamwork, and stress. Our analysis revealed that while excessive stress can significantly undermine IPC, moderate levels of stress can promote collaboration, improve problem-solving skills, drive innovation and support professional growth. Conversely, excessive stress exacerbates issues such as poor communication, role ambiguity, and power imbalances, all of which compromise optimal healthcare delivery, negatively affect patient well-being and hinder holistic care.

Introducing moderate stressors in interprofessional education and training is encouraged to enhance IPC in healthcare service delivery. Health professions students must be equipped with skills that foster resilience and enable them to cope effectively with stressors in IPE. Therefore, stress management should be integrated into IPE curricula to prepare students for the challenges of high-pressure environments, ensuring they can contribute to optimal healthcare delivery through collaborative practices.

Keywords: interprofessional collaboration, stress, teamwork, interprofessional education, health professions education, resilience.

1 Introduction and background

Interprofessional Collaborative Practice (IPCP) is the applied model that brings together health professionals from diverse backgrounds to work with patients, families, and communities, ensuring comprehensive, holistic, and high-quality care across various settings (World Health Organization, 2010). IPCP offers numerous benefits, including, but not limited to, improved patient care and quality of life, reduced healthcare costs, increased job satisfaction, and fewer medical errors (Jaruseviciene et al., 2019). Interprofessional (IP) teamwork is fundamental to IPCP. Within the context of this chapter, a team is defined as a group of individuals with complementary knowledge, skills, and attributes – collectively referred to as competencies – who share a common goal: optimal patient care (Contu & Pecis, 2017). While IP teamwork enhances patient outcomes, several barriers can hinder effective collaboration, one of the most significant being stress.

Stress is a response to external stimuli and demands (Bashir and Ismail Ramay, 2010), often manifesting as physical, emotional or cognitive symptoms such as headaches, tension and forgetfulness (Kranner et al., 2010). In IP teams, the pressures of collaboration can amplify stress, potentially affecting the quality of learning and teamwork. Stress arises from the combined demands experienced in collaborative work, and its intensity can impact the quality of learning in IP teams. Factors such as time constraints (Teng et al., 2010), poor communication (Lown & Manning, 2010), lack of team cohesiveness (Thompson et al., 2015), disagreement on ethics (Engel and Prentice, 2013), conflict and poor management (Greenberg, 2011), intra-team conflict (Puck & Pregernig, 2014), trust issues (Han & Harms, 2010), and lack of support and work overload (Khamisa et al., 2015) contribute to stress. These elements not only affect collaboration but also hinder the timely achievement of goals.

Interprofessional Education (IPE) aims to address current healthcare challenges through education (Van Wyk & De Beer, 2017) and fosters interactions among health students (Burch, 2014) who are traditionally

trained in isolation, leading to “tribalism”. While improvements in educational methods are necessary, the transition from tribalism to collaborative learning is advocated (Treadwell et al., 2014). As a form of pre-service learning, IPE focuses on equipping health students with team-based initiatives (Taylor et al., 2019), preparing them for effective collaboration to meet the evolving needs of the healthcare system (Almoghira, Nazar & Illing, 2021).

2 Problem statement and aim

Interprofessional Education and Collaborative Practice (IPECP) training helps reduce errors, facilitate holistic treatment, break learning barriers, and improve understanding across health professions (Laverentz, Young & Cramer, 2021). IPE prepares students for collaboration, fostering collaborative practice which addresses practical components, enabling professionals to refine their skills and promote team diversification (Prelock, Potvin & Savard, 2017). While IPE enhances students’ readiness for the healthcare system by encouraging teamwork, its effectiveness may be influenced by stress-related factors (Lachmann et al., 2013). Team members may experience conflicting pressures that contribute to stress, potentially affecting collaboration. However, there is limited literature exploring the relationship between stress and teamwork in IPC. This study aims to investigate whether a relationship exists between IPC and stress in health teams through an integrative literature review.

3 Research design and methodology

To analyse and synthesise data related to IPC, teamwork and stress, the authors conducted an integrative literature review following the five-step methodology proposed by Whittemore and Knafl (2005). By immersing and integrating themes from various academic sources, it minimised errors and bias while providing insights into how these themes interact in training and practice contexts (Whittemore & Knafl, 2005). This study was classified as no-risk and aligned with the ethical principles of beneficence and non-maleficence. Ethical approval was obtained from the North-West University

Health Research Ethics Committee (NWU-HREC) under clearance number NWU-00509-19-A1. The ILR design facilitated secure data retrieval and ensured compliance with ethical standards.

3.1 Step 1: Problem identification and keyword development

The research objective informed the identification of keywords for the literature search. Initial search terms included combinations of *interprofessional*, *teamwork*, *collaboration*, *competencies* and *stress*. Preliminary searches indicated limited literature addressing the intersection of these concepts. Consequently, the authors applied a refined search string – *interprofessional AND team AND stress** – reflecting the three central constructs of the review.

3.2 Step 2: Literature search

The authors conducted a systematic search using databases available through the North-West University (NWU) library. Databases accessed via EBSCOhost included Academic Search Premier, CINAHL, MEDLINE, PsycINFO®, PsycARTICLES®, and SocINDEX. Additional databases consulted were ScienceDirect, Scopus, Web of Science, African Journals, Index to South African Periodicals (ISAP), PubMed Central, and the Cochrane Library. The authors used the EPPI-Reviewer software to manage records, remove duplicates, and screen abstracts for relevance.

3.3 Step 3: Data evaluation

During preliminary screening, it became evident that stress was frequently not identified as a primary keyword in IPE and collaboration studies, but rather embedded within related constructs such as conflict, role ambiguity, coping, resilience and emotional burden. To avoid the exclusion of relevant literature and in keeping with the principles of an integrative literature review, studies were therefore retained where stress-related experiences were discussed implicitly within IP teamwork or education contexts, even when stress was not the primary indexed term. While substantial research exists on teamwork and collaboration in IP settings, limited studies explore their relationship with stress. Therefore, selection criteria were restricted to

studies published between 2013 and 2023 containing at least one of the key terms or conceptually relevant stress-related constructs and demonstrating scientific rigour. The primary focus was to investigate the connections between IPC, teamwork, and stress, particularly within the contexts of IPE and Interprofessional Learning (IPL). Searches were streamlined using the EPPI-reviewer software, facilitating the elimination of duplicates and the retention of relevant full-text articles. On EBSCOhost, an initial search without date constraints yielded 1,055 results. By expanding the search across multiple databases with date limits, a total of 4,887 articles were identified. After removing duplicates and studies that fell outside the specified date range, 4,257 records remained.

Grey literature (Williams-Whitt et al., 2016), non-English publications and inaccessible sources were excluded. Quality appraisal was conducted using the Johns Hopkins Research Evidence Appraisal Tool and the Critical Appraisal Skills Programme (CASP) tool, depending on study design. Studies meeting at least 70% of appraisal criteria were included. A concept matrix (Figure 4.1) was developed by aligning identified themes from the articles with existing literature. The core concepts – *interprofessional*, *team* and *stress* – formed the foundation of the matrix's structure and comparisons.

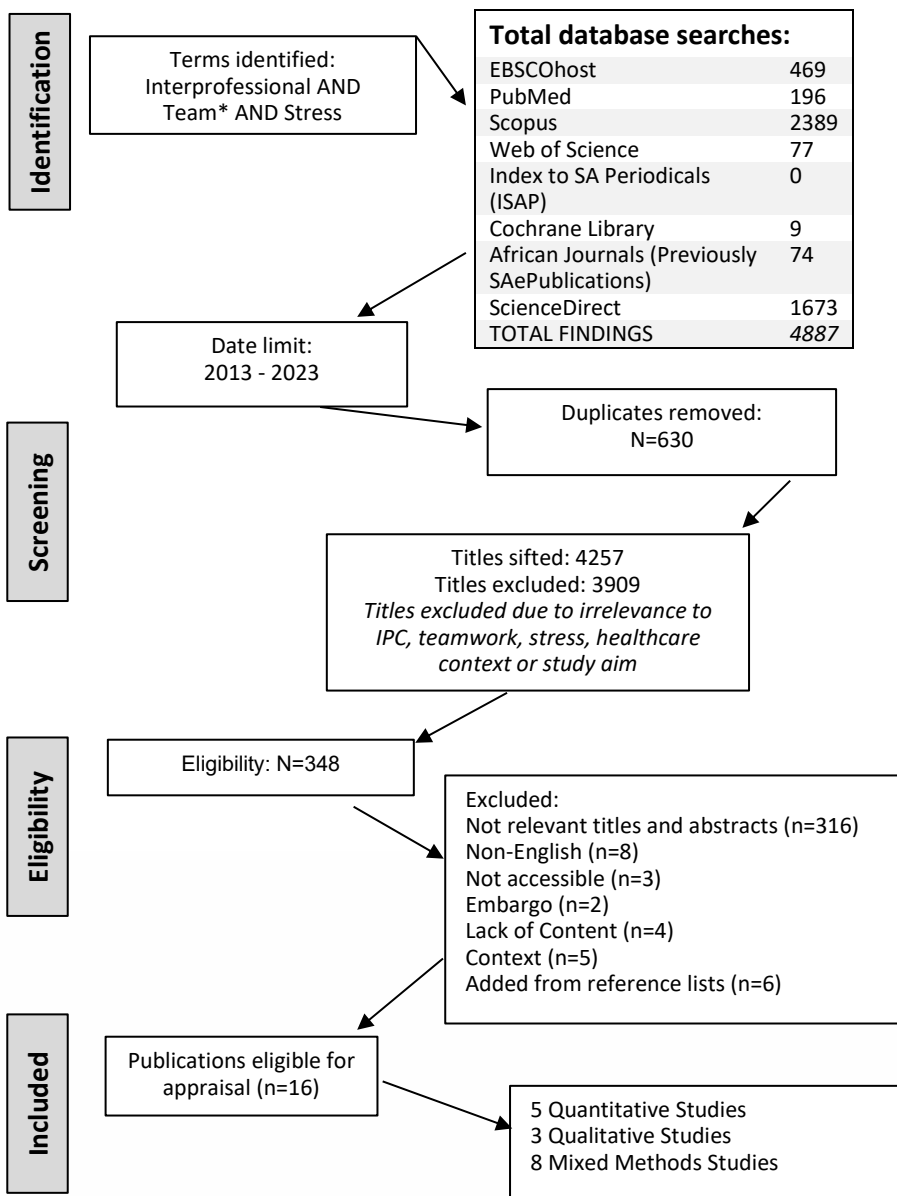


Figure 4.1: Summary of the literature review process

3.4 Step 4: Data analysis

During data analysis, the included studies were summarised in tabular format and compared using a constant comparative method (Creswell & Poth, 2018), supported by a concept matrix and verification by an experienced researcher. Following rigorous screening based on language, embargo status, format compliance, title relevance and overall significance, 16 critically assessed publications were selected. Non-academic and grey publications were excluded to maintain academic rigour.

The selected studies were analysed using the constant comparative method (Bridges et al., 2011). Quality appraisal focused on purpose, content, thematic definitions, sampling methods, data collection and analysis, and conclusions. Given the diversity of sampling in the ILR, this comprehensive approach was appropriate (Whittemore & Knafl, 2005).

Quantitative studies were appraised using the Johns Hopkins Research Evidence Appraisal Tool (Johns Hopkins University, 2017), qualitative studies using the Critical Appraisal Skills Programme (CASP) tool (CASP, 2018), and mixed-methods studies using both tools, as the Johns Hopkins tool alone did not fully address qualitative components. Scores were calculated as percentages based on applicable appraisal criteria: quantitative studies were scored out of 13, qualitative studies out of 10, and mixed-methods studies using an adapted scoring approach based on relevance and applicability.

3.5 Step 5: Data presentation

Findings were synthesised to address the research question and prepared for dissemination in an accredited journal. The selected articles are summarised in Table 4.1-Table 4.3.

Table 4.1: Summary of eligible quantitative articles

Quantitative studies N = 5				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
Ketcherside et al. (2017). Translating Interprofessional theory to interprofessional practice.	Kirkville and Brockport.	148 participated in the survey, including 34 community/public health education professionals and 114 registered nurses (RN). The Interprofessional Socialisation and Valuing Scale (ISVS) measured perceptions and attitudes of IPC.	Descriptive statistics and measures of central tendency were calculated for the study variables. Independent sample t-tests were conducted to compare participants' mean scores. Limited by a small sample size and the absence of population parameters. Self-reported data introduced validity concerns, and the instrument had not been validated across all groups. Generalisability was restricted in the broader clinical context.	Early exposure to IPE contributed to positive perceptions and attitudes toward IPC. The development of teamwork behaviours and competencies facilitated the effective translation of theoretical knowledge into clinical practice. These findings support the recommendation of incorporating IPE at the undergraduate level.
King et al. (2010). The Interprofessional Socialization and Valuing Scale: A tool for evaluating the shift toward collaborative care	Bloorview Research Institute; University of Western Ontario; Middlesex-	124 health professional students participated in the ISVS measuring beliefs, behaviours and attitudes.	The ISVS offered conceptual insights into key aspects of socialisation, enabling the examination of professional interactions within a socio-cultural context. No population size, the sample consisted exclusively	Participants reported initial discomfort with collaboration; however, participation in IPE workshops positively influenced their perceptions, sense of value, appreciation

Quantitative studies N = 5				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
approaches in healthcare settings.	London Health Unit.		of male participants. The findings cannot be generalised to clinicians who were not represented in the sample.	and understanding of collaboration.
Maharajan et al. (2017). Attitudes and readiness of students of healthcare professions towards Interprofessional learning.	International Medical University.	809 students from medical, pharmacy, dental and health sciences completed the survey. The Readiness for Interprofessional Learning Scale (RIPLS) and Interdisciplinary Education Perception Scale (IEPS) were employed.	The study employed a large sample size and achieved a strong response rate of 83%. The study employed a cross-sectional and exploratory design, which limits the extent to which its findings can be generalised to other university contexts.	IPL integrated with clinical problem-solving was identified as valuable. Participation in IPL positively influenced students' perceptions and attitudes toward future collaborative practice and enhanced their communication skills. Readiness varied by academic year and health profession. These findings support the integration of IPL into healthcare curricula.
Reising et al. (2017). An analysis of interprofessional communication and teamwork skill acquisition in simulation.	Indiana University.	94 nursing and medical students participated in the study, which evaluated IP communication within a high-fidelity simulation setting. The Indiana University Simulation Integration Rubric (IUSIR) was employed.	Robust sample size, and its findings were consistent with previous research, offering additional evidence supporting the sequential use of high-fidelity simulation. Findings confirmed the effectiveness of simulation-	IP simulation activities enhanced communication and teamwork competencies. The findings supported the use of team-based training as an effective approach for developing these skills.

Quantitative studies N = 5				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
			based methods in enhancing communication skills. The study did not report the overall population size and included only nursing and medical students.	
Sexton et al. (2016). Understanding healthcare professionals' self-efficacy to resolve interprofessional conflict.	University of Toledo and University of Western Ontario.	183 licensed individuals from nursing, medical, pharmacy and social work (SW) responded. The interpersonal communication competence scale (ICCS-SF), problem-solving skills scale (PSI), and team self-assessment questionnaire (TSAQ) were employed.	The study featured a substantial sample size with broad professional representation. The study yielded a low response rate of 29%.	Participants demonstrated moderate confidence in managing team conflict and communicating effectively in IP settings. However, inadequate training and education were identified as key barriers to conflict resolution.

Table 4.2: Summary of eligible qualitative articles

Qualitative studies N = 3				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
Aune and Olufsen (2014). From fragmented to interdisciplinary understanding of integrated antenatal and postnatal care- An interprofessional project between public health nursing students and midwifery students.	Sør-Trøndelag University College.	58 midwifery and public health students participated in the project, with reflection notes as part of the data collection process.	Students provided anonymous and unrestrained responses. Qualitative data were rigorously analysed using systematic text condensation by the first and second authors. Only nursing and midwifery students.	Although students initially held negative perceptions of collaboration, they identified blind spots in their understanding and awareness of other professional roles, leading to improved interdisciplinary understanding and shifts in knowledge and attitudes. Engagement in practical collaborative activities was perceived as beneficial for delivering optimal patient care.
Gum (2013). Immersing undergraduates into an interprofessional longitudinal rural placement.	Flinders University Rural Clinical School. South East Regional Community Health Service.	The Integrated Multi-Disciplinary Model of Education in Rural Settings (IMMERSe) was piloted in a rural region. five students (nutrition & dietetics, speech therapy and paramedics) participated in the pilot. Data collection involved focus	Complexity theory informed the study's conceptual framework. Data analysis was conducted in relation to students' perspectives and reflections on professionalism, teamwork and academic relationships. Only three professional roles were represented, and the	Students developed a newfound respect for professionals from other disciplines and gained a clearer understanding of how to utilise and integrate their own roles within teams. IPL in rural community placements improved teamwork, professionalism, and collegiality. Findings

Qualitative studies N = 3				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
		group interviews and reflective writing.	perspectives of clinicians and educators were not included.	underscored the importance of IPE in fostering IPC among graduates, particularly in rural healthcare settings.
Peterson and Brommelsiek (2017). Interprofessional education to foster communication and resilience among health professional students.	University of Missouri	Students from nursing, pharmacy, clinical psychology and SW participated. The programme featured classroom-based immersion using case studies and patient scenarios centred on the veteran patient population. Data were gathered through student reflection journals and focus groups.	Data were collected through weekly student reflections and end-of-course focus groups using guided semi-structured interviews. Colaizzi's method was employed to analyse the qualitative data. Resilience was incorporated as an objective quantitative measure in the evaluation of the original course session.	The Interprofessional Education Collaborative (IPEC) core competencies informed the curriculum design. The course aimed at enhancing resilience in contexts involving patient-related challenges and IP conflict. Participation led to improvement in problem-solving skills, coping strategies, and confidence in managing negative emotions.

Table 4.3: Summary of eligible mixed-methods articles

Mixed method N = 8				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
Dennis et al. (2017). An Interprofessional Simulation-based learning activity for nursing and physiotherapy students.	Curtin University	198 nursing and PT students participated. The Satisfaction and Self-Confidence in Learning (SSCL) Survey and five items from Instructional Materials Motivational Scale were administered. Open-ended questions were used to capture qualitative insights, which were analysed using thematic analysis.	A mixed-method observational study was conducted, incorporating a simulated patient-centred scenario to facilitate an IPL activity. The quantitative component did not report the population size, and the SSCL scale had not been validated across other healthcare provider groups. The absence of demographic data limited cross-group comparability, and the sample represented only two disciplines.	Respondents highlighted the benefits of interactions, including enhanced role clarity, improved communication, and strengthened teamwork, all contributing to better patient outcomes.
Konrad et al. (2017). A five-session Interprofessional team immersion program for health profession students.	University of New England	30 students from PT, dental hygiene, OT, SW, dental medicine, nursing, pharmacy, and physician assistant completed the pre-Interprofessional Team Immersion (IPTI) survey, 32 completed the post- survey. A shortened version of the IEPS, the Interprofessional Care Core Competencies Global Rating Scale (ICCC-GRS) and	Changes in self-reported pre- and post-IPTI intervention scores on the IEPS and ICCG-GRS were analysed using related-samples Wilcoxon signed-rank tests. An inductive approach was employed for thematic coding of the qualitative data. The quantitative section did not report the overall population size. The study was further constrained by selection bias, a small sample	Post-IPTI survey results revealed enhanced professional knowledge, recognition of role overlap and increased appreciation for other disciplines. Students applied their expertise in prospective practice settings and expressed a desire for improved teamwork and patient-centred focus. IP teamwork was associated

Mixed method N = 8				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
		open-ended questions were utilised.	size, and the use of measurement tools with limited validation.	with increased confidence, communication and competencies.
Lachmann et al. (2013). Capturing students' learning experiences and academic emotions at an Interprofessional training ward.	Karolinska Institute.	42 students (medical, nursing, PT and OT) responded to 30-40 questionnaires. Using mobile phones, they reported their experiences, learning activities, and academic emotions multiple times throughout the course. Data were collected via the Contextual Activity Sampling System (CASS) and CASS-query application, which delivered questionnaires consisting of 30 questions.	A descriptive design was employed to explore students' experiences and academic emotions during collaborative and triological activities. The CASS, informed by the Experience Sampling Method, facilitated the systematic and frequent collection of data. Factor analysis was conducted. The quantitative component lacked a predetermined population size. Due to competing activities and anxiety-related concerns, 37 of the 42 students completed the study. The resulting small sample size, coupled with participant attrition, may have introduced bias into the findings.	The results indicated a nuanced understanding of students' academic emotional experiences and the collaborative creation of new knowledge. Reported stress levels decreased compared to the first day of the Interprofessional Team Ward (IPTW). Engagement in the triological approach was associated with high challenges and increased competence.

Mixed method N = 8				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
Michalec et al. (2017). A longitudinal mixed-methods study of IPE students' perceptions of health profession groups: Revisiting the contact hypothesis.	University of Delaware and Thomas Jefferson University.	528 students from the Jefferson Health Mentors Program (JHMP) completed the SSRQ. Couples and family therapy, medicine, nursing, OT, pharmacy, and PT students completed the SSRQ by rating different health profession programmes via academic ability, competence, interpersonal and leadership skills, independence and teamwork, decision-making, practical skills, and confidence.	Descriptive statistics were utilised and SSRQ scores were compared using a t-test. Semi-structured interviews were conducted with 20 randomly selected students. Interviews were transcribed, coded, and compared. The coding team held consensus meetings to review outcomes, memos and notes. The study was conducted with a single cohort of students, and the quantitative component involved a small sample size. In the absence of a control group, it is possible that changes in student stereotypes may have occurred over time independent of the IPE programme.	A reduction in the stereotyping of other health professions was observed. Informal IP interactions may have contributed positively to students' perceptions and understanding of other professional roles.
Paige et al. (2014). Getting a head start: High-fidelity, simulation-based operating room team training of Interprofessional students.	Louisiana State University Health Sciences Center.	18 nursing, 20 nurse anaesthetist, and 28 medical students participated. Pre- and post-training questionnaires were administered, and team performance assessed using the Operating Room Teamwork Assessment Scale (ORTAS). The Team-Based Behaviours framework and	A quasi-experimental pre-/post-intervention comparison design was employed. Pre- and post-intervention scores were analysed, using t-tests, while mean scores on the teamwork scales were evaluated using both one-way ANOVA and t-tests. Responses were transcribed and analysed Data triangulation was conducted.	High-fidelity simulation (HFS) operation room (OR) team training led to immediate improvements in participants' attitudes, behaviour, and communication. HFS was also associated with cultural shifts and enhanced team functioning.

Mixed method N = 8				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
		Adaptive Communication and Response tool were employed to evaluate distinct components. Open-ended questions captured students' reflections.	No predetermined population size was established for quantitative component. The small sample size limits the generalisability of the findings. Three simulation scenarios were represented by medical students. ORTAS ratings were aggregated at the group level.	
Sadideen et al. (2016). Using "The Burn Suite" as a Novel High Fidelity Simulation Tool for Interprofessional and Team Training.	Imperial College London and New Queen Elizabeth Hospital Birmingham	22 doctors, nurses, nursing assistants and simulated patients participated in "The Burn Suite (TBS)" designed to enhance the delivery of burns education for clinicians. Evaluation included five-point Likert-type questionnaires and post-experience semi-structured interviews. TBS was examined as part of a simulation-based team training programme.	TBS is a low-cost, high-fidelity, portable, immersive simulation environment. Five-point Likert-type questionnaires were developed to establish face and content validity. Semi-structured interviews conducted for data triangulation. No defined population was established for the quantitative component, as this was a pilot study without follow-up. The participant pool was limited in size and lacked diversity across professional backgrounds.	The simulation experience was perceived as authentic due to its high psychological and social fidelity, contributed to improvements in IPC, communication and teamwork. TBS elicited positive and genuine responses from participants. Simulation-based training effectively fostered the development of specific teamwork competencies without posing risk to patient safety.
Shortridge et al. (2019). Teaching and evaluating	University of Oklahoma and	63 OT, PT and nurse practitioner students organised into teams. After an hour of activities,	Analysis of covariance was conducted to assess variations in team performance ratings. Student reflections indicated that the	Team performance outcomes were positive. Student reflections highlighted patient-centeredness, mutual

Mixed method N = 8				
Reference	Setting	Sample and Data sources	Strengths & Limitations	Key Study Outcomes
interprofessional teamwork using sequenced instruction and TeamSTEPPS Team Performance Observation Tool (TPOT).	University of Kansas	participants completed the TPOT, evaluating performance across domains including team structure, leadership, situation monitoring, communication, and mutual support. Students submitted reflective statements.	experience enhanced their understanding of effective collaboration within a healthcare team. No structured qualitative analysis was conducted, as the student reflections were brief.	respect among health professions and family-centred decision-making. These findings support the importance of teaching IP knowledge and skills within healthcare education.
Turrentine et al. (2016). Interprofessional training enhances collaboration between nurses and medical students: A pilot study.	University of Virginia.	145 fourth-year nursing students, clinical nurse leaders, RNs, and 155-fourth year medical students participated. A subset of 15 nursing and medical students completed pre and post-tests using standardised patients. Collaborative behaviour and geriatric assessment instructions were captured on videotape, and interactions were subsequently reviewed by a member of the study team.	A 10-question geriatric assessment was administered, with both pre- and post-tests validated by content experts. Data were analysed using descriptive statistics, paired samples t-tests, and independent samples t-tests. The quantitative component was limited by a small sample size. The assessment of IPE was constrained by time, and not all interactions were recorded, precluding the possibility of transcript-based analysis.	The integration of geriatric assessment skills within IPE enabled students to collaborate effectively in patient evaluations. Analysis revealed that IP competencies were demonstrated through shared problem-solving, conflict resolution, patient-centred care, decision-making, role clarification, communication, and knowledge exchange.

Table 4.4: Concept Matrix table for the Integrative Literature Review

Themes mentioned												
	Stress	Conflict	Confidence	Respect	Knowledge and/or skills	Perceptions and/or attitudes	Roles	Communication	Optimal Care	Collaborative value	IPE	Team/ Teamwork
Qualitative studies												
Aune & Olufsen (2014)						√	√		√	√	√	√
Gum et al. (2013)				√	√	√	√	√	√	√	√	√
Peterson & Brommelsik. (2017)	√	√	√		√	√			√		√	√
Quantitative studies												
Ketcherside et al. (2017)					√	√					√	√
King et al. (2010)						√				√	√	√
Maharajan et al. (2017)						√		√	√	√	√	√
Reising et al. (2017)								√			√	√
Sexton & Orchard (2016)		√	√					√	√		√	√
Mixed methods studies												
Dennis et al. (2017)				√			√	√	√	√	√	√
Konrad et al. (2017)			√		√		√	√		√	√	√

Themes mentioned												
	Stress	Conflict	Confidence	Respect	Knowledge and/or skills	Perceptions and/ or attitudes	Roles	Communication	Optimal Care	Collaborative value	IPE	Team/ Teamwork
Lachmann et al. (2023)	√				√						√	√
Michalec et al. (2017)						√	√			√	√	√
Paige et al. (2014)						√		√			√	√
Sadideen et al. (2015)					√				√	√	√	√
Shortridge et al. (2019)				√	√		√			√	√	√
Turrentine et al. (2016)		√			√			√	√	√	√	√
Total	2	3	3	3	8	8	6	8	8	10	16	16

4 Results and discussion

Table 4.4 identified IPE-relevant themes, and data extraction was conducted to examine their alignment with existing literature. 'Collaboration' and 'IPL' emerged as the most prevalent themes, whereas 'stress' and 'conflict' were the least explored. The primary themes were reinforced by various sub-themes, with some overlap prompting discussion across multiple conceptual domains.

4.1 Stress

Although stress was explicitly addressed in only a small number of studies, it emerged most clearly within IPE immersion experiences, emphasising the importance of coping skills and resilience. Anticipating challenges in IPL fostered confidence in managing stress and negative emotions (Peterson & Brommelsiek, 2017). Stress levels were frequently high at the outset, largely due to hierarchical structures and unfamiliarity with peers from different professions, impeding communication and support. However, as collaboration improved over time, stress levels declined (Lachmann et al., 2013). Role ambiguity was also identified as a significant stressor; yet early exposure to IPE mitigated role ambiguity, enhanced patient care, and fostered potential collaboration. Our findings suggest a need for IPE programmes to incorporate stress management strategies to prepare students for the realities of clinical practice.

4.2 Conflict

Conflict was a significant source of stress in IP teams, arising from hierarchical structures, ethical dilemmas and cultural differences (Peterson & Brommelsiek, 2017). Communication skills were linked to conflict management and confidence (Sexton & Orchard, 2016). In resolution strategies, communication was identified as a core competency. Students reported applying conflict resolution skills to navigate differences in perspectives and recommendations. Integrating conflict into IPE supports

students in developing coping mechanisms and resolution strategies for managing IP challenges.

4.3 Respect for professional roles

Respect for professional roles was a critical factor in effective teamwork. In IPE, professionals are expected to work and learn together, necessitating recognition and appreciation of distinct roles and overlapping responsibilities. Students identified respect and role comprehension as essential learning outcomes (Konrad et al., 2017). Engagement in collaborative teams enhanced professional knowledge, and improvements in teamwork were observed when overlapping roles were acknowledged, fostering mutual respect as a core competency positively correlated with effective collaboration. Conversely, disrespect generated tension and conflict, negatively impacting communication and goal attainment through sentiments of rejection or criticism. Furthermore, difficulties in understanding diverse perspectives hindered effective collaboration and contributed to increased stress.

4.4 Confidence

Enhanced knowledge of other professions improved students' self-assurance (Konrad et al., 2017). Confidence was developed in managing negative emotions during IPC, which supported effective coping strategies (Peterson & Brommelsiek, 2017). Prior experience in IPC fostered healthcare professionals' confidence in conflict resolution (Sexton & Orchard, 2016).

4.5 Perceptions and/or attitudes

IP teamwork contributed to improved attitudes toward other health professions (Ketcherside et al., 2017). The importance of a self-perceived capacity for collaboration was emphasised, while limited collaboration posed a barrier to IPE (King et al., 2010). Inadequate IPC reinforced professional silos, hindering communication and increasing stress levels.

4.6 Communication

Enhanced communication and simulation contributed to optimal patient care (Reising et al., 2017), which was essential in addressing professional isolation in remote areas (Gum et al., 2013). Tribalism-driven communication barriers hindered teamwork and elevated stress levels, whereas purposeful communication fostered collaboration and reduced stress. Consequently, ensuring patient safety necessitated efficient IP communication.

4.7 Optimal care

IPE immersion equipped students with confidence, coordination, and a patient-centred approach to care (Peterson & Brommelsiek, 2017). Simulations were emphasised as safe environments for practising care delivery under stressful conditions (Sadideen et al., 2015). While positive stress (eustress) in IPC enhanced performance, excessive stress impeded collaboration.

4.8 Collaborative value

Collaboration was the cornerstone of IPE and was influenced by attitudes, preparedness, and educational attainment; students demonstrated superior teamwork and collaborative abilities. Fostering teamwork necessitated patient input and involvement. However, working with unfamiliar individuals often evoked apprehension and anxiety. Early exposure to teamwork enhanced collaborative skills, improved patient care, increased comfort levels, and ultimately reduced stress (Turrentine et al., 2016). In our analysis, collaboration was described as a mindset; therefore, curricula should intentionally cultivate shared responsibility, mutual respect, and role clarity across disciplines – ultimately aligning with the WHO 2010 framework.

4.9 Team/teamwork

Teamwork was essential for addressing complex health challenges and optimising patient care (Dennis et al., 2017). Leadership within teams

played a pivotal role in ensuring effective functioning, though some members resisted collaboration, creating stress for facilitators. Facilitators fostered resilience, participation, and satisfaction, guiding teams to achieve goals under pressure. ILR analysis indicated that stress, teamwork, and IPC are interconnected, with facilitators mitigating stressors such as lack of respect, poor communication, and role ambiguity.

Overall, these findings demonstrate that while IPE research emphasises collaboration and shared learning, it must equally consider the psychosocial factors that shape team dynamics. Addressing underexplored areas such as stress and conflict may lead to more resilient, adaptable interprofessional teams and enhance the sustainability of collaborative practice in diverse health settings.

Figure 4.2 provides a visual synthesis of the integrative literature review findings, illustrating how stress, teamwork, and IPC interact across the included studies.

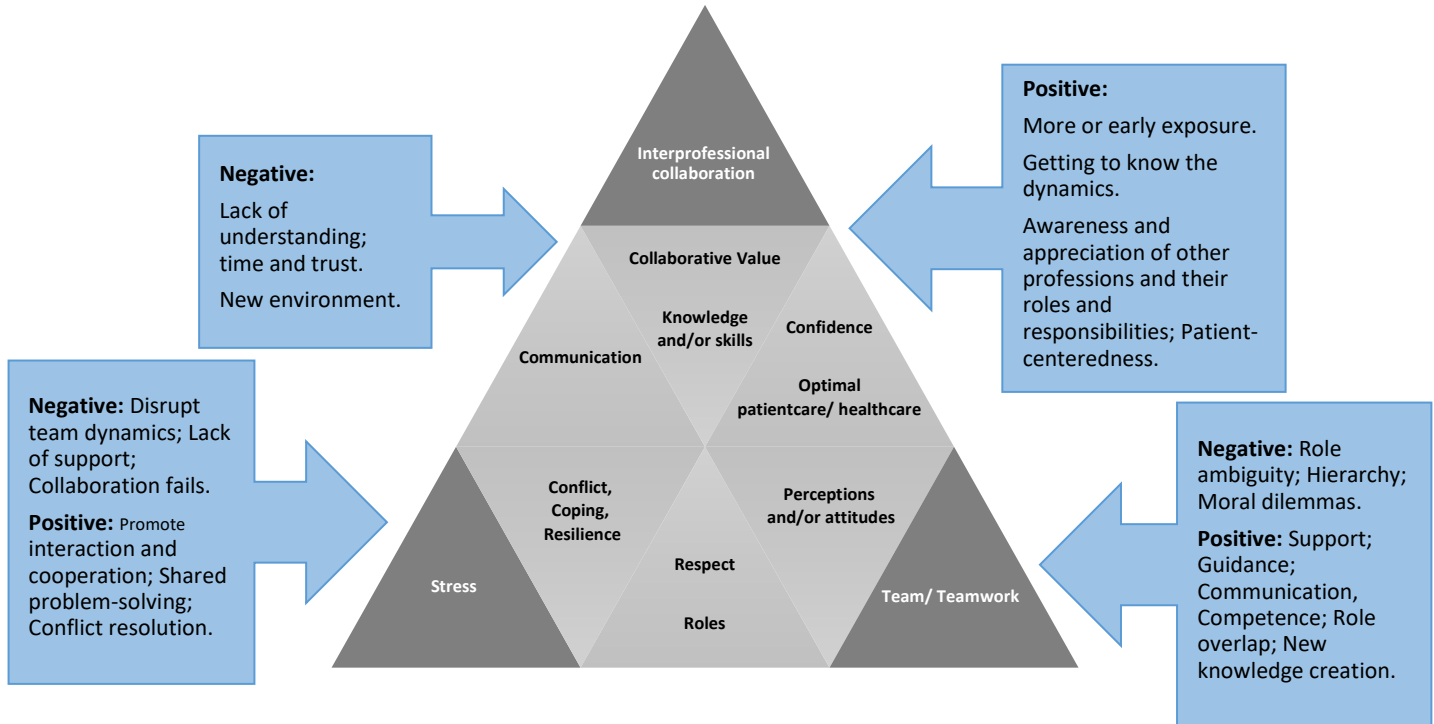


Figure 4.2: Visual synthesis of findings depicting the relationships between IPC, teamwork and stress

5 Conclusion

In the ILR, 16 studies met the inclusion and quality criteria. While all examined IPC and teamwork, only three explicitly identified stress as a contributing factor. However, many studies referenced related elements – such as conflict, confidence, perceptions, and collaboration – that influence stress. Additional team dynamics were shaped by IPE and the pursuit of optimal patient care. A deeper analysis was conducted through thematic coding and comparison, which allowed us to examine how these related elements interacted within and across studies. This approach highlighted that stress often functioned as a latent factor, driven by commonly studied components including hierarchical structures, power dynamics, communication barriers, role ambiguity, and respect for professional roles. Although stress was not always explicitly mentioned, its contributing factors were deeply embedded within IPC processes and experiences. Educators and health professionals should remain aware of the various factors that can generate stress, recognising both its positive and negative impacts on IPC. This insight underscores the importance of integrating stress management and resilience-building strategies into IPE curricula to better prepare health professionals for collaborative practice.

6 Limitations

No research is without limitations. Embargo restrictions prevented access to certain articles, and limiting the search to English-language publications may have excluded relevant non-English studies. The focus on a specific time frame may have omitted older, recent or emerging research. Title and abstract screening may have overlooked key information not immediately visible. Additionally, the review did not differentiate between studies targeting students and healthcare professionals, reducing specificity. Strict eligibility criteria and reliance on references from excluded studies may have led to the omission of valuable data. Finally, keyword selection may have inadvertently excluded relevant research.

7 Recommendations

Recognising that team members experience stress differently is crucial, as it directly impacts team performance. Effective team management and awareness of stress-related factors in IP settings are essential for fostering positive collaboration. To sustain the effectiveness of teamwork, it is essential that students develop the skills necessary to manage stress. Preparing students to anticipate and navigate stressful situations enhances their ability to address health challenges in real-world settings. Therefore, equipping students to function effectively in high-pressure team environments should be a priority for IPE programmes.

This study identified a gap in the literature concerning the relationship between stress, IPC, and teamwork. Future research should explore how stress influences teamwork and performance in IPECP for both students and healthcare professionals. To inform educational strategies and clinical practice, a more comprehensive investigation is needed into the impact of stress on IP teamwork, goal attainment, and the quality of patient care.

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CHAPTER 5

NATURE OF CONTINUOUS PROFESSIONAL DEVELOPMENT PROGRAMMES AIMED TO ENHANCE INTERPROFESSIONAL COMPETENCIES OF INTENSIVE CARE TEAMS: PERCEPTIONS OF INTENSIVE CARE UNIT PROFESSIONALS, NORTH WEST PROVINCE, SOUTH AFRICA

¹. NE Zenani / ². S Scholtz / ³. Y Heymans

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¹. School of Nursing Science
Faculty of Health Sciences
North-West University, Mmabatho, South Africa
sunshine.zenani@nwu.ac.za
ORCID: 0000-0001-7397-6707

³. Centre for Health Professions Education
Faculty of Health Science, North-West University
Potchefstroom, South Africa
Yolande.heyman@nwu.ac.za
ORCID: 0000-0003-4459-2266

². School of Nursing Science, Faculty of Health Sciences
North-West University, Mmabatho, South Africa
suegnet.scholtz@nwu.ac.za
ORCID: 0000-0002-4316-5257

Abstract

Poor interprofessional collaborative practices in the intensive care units (ICUs) due to a lack of interprofessional collaborative competencies could lead to litigation cases. Continuous professional development (CPD) programmes are critical for strengthening the interprofessional collaborative competencies needed for safe, high-quality care in ICU. This chapter reports on the perception of ICU teams regarding the nature of a CPD programme to enhance the interprofessional collaborative competencies of ICU teams in the North-West Province (NWP), South Africa. Data were collected using 12 semi-structured focus groups with ICU teams across two public and two private hospitals in two districts of the NWP. The data were then thematically analysed and clustered around four themes with sub-themes. The findings underscore the importance of identifying contextual factors contributing to the lack of interprofessional collaboration among ICU teams. Factors include power dynamics and insufficient interprofessional communication stemming from role ambiguity. Consequently, learning outcomes should address the indicated factors to promote interprofessional collaborative practices among ICU teams. Thus, ICU teams should be made aware of the significance of shared leadership and collective decision-making. The study further advocates for the inclusion of interactive teaching and learning modalities supported by technology to maintain sustainability. Furthermore, the programme should be concise and repetitive to consolidate the acquired interprofessional competencies, facilitated by experienced ICU stakeholders. A neutral facilitator is advised to prevent power imbalances. Interprofessional competencies should be assessed in real time using checklists and surveys. The programme's effectiveness should be evaluated over time through quality improvement measures.

Keywords: continuous professional development programme, interprofessional collaborative competencies, intensive care unit teams

1 Introduction

Patients admitted to intensive care units (ICU) require comprehensive and complex care involving an interprofessional team and the use of advanced technology for treatment and monitoring (Gundo et al., 2019:1). This dynamic environment demands that the interprofessional team in the ICU collaborates interdependently and possesses specialised knowledge, skills, and attributes to make complex decisions essential for caring for critically ill patients (Mahomed & Mahomed, 2018:35). Interprofessional care, which is vital in the ICU, refers to the provision of services by a collaborative team of healthcare professionals with complementary knowledge who recognise the distinct contributions of each member in pursuit of a shared goal (Donovan et al., 2018:1). In the ICU, interprofessional care is affected by various factors, including processual, contextual, organisational, and relational factors, such as culture, professional authority, routines, and rituals (ref). If these factors that influence interprofessional care are not adequately identified and managed, they may lead to an unstable ICU team organisation, inefficient team collaboration, and subsequently, unmet patient needs and delays or errors in diagnosis. Several studies have been conducted to validate the importance of interprofessional care in the ICU. Chapman et al. (2021:980) conducted a pre-post-intervention study examining the advantages of collaborative interprofessional practice in the ICU. They determined that high-quality ICU care requires the active participation of all interprofessional team members, with deficiencies in teamwork and communication contributing to one-third of ICU medical errors. In contrast, successful collaborative care between professionals is correlated with reduced mortality, higher patient satisfaction scores, fewer health-associated infections in the ICU, and increased job satisfaction among ICU professionals (ref). Interprofessional collaborative care requires continuous professional development (CPD) programmes focused on skills, knowledge, and attributes that enhance interprofessional care in the ICU (Chapman et al., 2021:981).

Interprofessional care in the ICU can also be enhanced through CPD, which serves as a catalyst for assuring the competence of healthcare professionals

in the ICU (Gundo et al., 2019:1). Moreover, CPD programmes assist ICU collaborative teams – comprising doctors, nurses, pharmacists, and allied health professionals – in minimising practice errors that may compromise patient safety. Furthermore, Van Heerden (2021:1) discussed how CPD programmes improve job satisfaction by promoting professional growth and ensuring an understanding of contemporary evidence in the field and ICU practice. Van Heerden (2021:1) further observed that knowledge acquired during pre-licensure education often has a half-life of around two and a half years. Consequently, it is essential to enhance learning, skills, unique traits, and values to improve competency and safeguard patients in care (Van Heerden, 2021:1). To ensure optimal interprofessional care in the ICU through CPD, ICU healthcare professionals are expected to exhibit sound collaborative interprofessional competencies. Leal Silva et al. (2023:22) suggest that identifying interprofessional competencies is essential for foundational interprofessional care. The Canadian Interprofessional Health Collaborative (CIHC) and the United States Interprofessional Education Collaborative (IPEC) have jointly established an interprofessional competency framework that delineates the competencies necessary for effective interprofessional care in the ICU (CIHC, 2024:1). According to the interprofessional competency framework, the relationship-focused care competency requires that the ICU team develops and maintains good interdependent relationships to support effective partnerships in the ICU. Interprofessional communication competency requires that the ICU team communicates constructively using effective communication strategies that emphasise inclusion, equity, and diversity (CIHC, 2024:1). In terms of role clarity, the ICU team must understand the roles, knowledge, and expertise of each team member for effective collaborative practices. In team functioning, the ICU team is expected to understand the nature of interprofessional teams in the planning, implementation, and evaluation of care in the ICU. Developing these interprofessional collaborative competencies through CPD is crucial to the success of interprofessional collaboration (CIHC, 2024). Furthermore, the ICU team must exhibit competency in addressing disagreements to ensure a positive psychological environment and must value each member's unique contribution to the team (CIHC, 2024:1). The development of interprofessional collaborative

competencies requires the implementation of interprofessional education (IPE), which involves two or more healthcare professionals learning together to enhance interprofessional cooperation and ultimately improve patient health outcomes (Filies & Frantz, 2021:104).

2 Problem statement

The NWP is experiencing a significant deficiency in CPD programmes designed to augment the interprofessional collaborative competencies of ICU teams (Mboweni & Risenga, 2023:3). The absence of such CPD programmes that enhance interprofessional competencies creates a lack of effective interprofessional collaborative practices and impairs ICU teams' ability to respond effectively as a cohesive unit to complex critical demands. This shortfall in CPD programmes further contributes to fragmented care delivery, an increase in adverse events, and potential legal actions within the ICU (Ritchedze, 2024:7). The authors believe that CPD programmes can enhance collaborative skills, knowledge and attitudes, which are essential to ensure safe, coordinated, and high-quality critical care. Consequently, this study sought to address the following research question: What is the perception of ICU teams regarding the nature of a CPD programme to enhance the interprofessional collaborative competencies of ICU teams in NWP, South Africa?

3 Ethical considerations

Ethics approval was granted by the respective university (XXXX-0051-23-A1). Subsequently, goodwill permission was granted by the four Research Gatekeeper Committees representing two public and two private hospitals.

4 Study area

This study was carried out in the NWP of South Africa. The researchers investigated four hospitals located in two districts of the NWP. Two were public hospitals and two were private hospitals.

5 Population and sampling

The study's target population consisted of ICU nurses, ICU doctors, pharmacists, and clinical facilitators. The study employed non-probability sampling. A non-probability selection method was chosen because participant selection was based on their relevant experience, expertise, and the information they could contribute to address the study's objective (Brink & Van der Walt, 2006:67). Data saturation dictated the sample size for this study. Participants comprised ICU nurses, doctors, pharmacists, and clinical facilitators who had more than two years of work experience in the ICU on a permanent, contractual or flexible basis.

6 Data collection

The authors used a qualitative method to collect and analyse the data. After being fully informed, an independent research assistant obtained voluntary consent. Twelve focus groups, comprising x number of participants, were used to collect data from purposively selected ICU professionals. Author 1 conducted the focus groups. After the introduction, a brief overview of the study, and reminding participants that only partial confidentiality could be assured due to the nature of the focus groups, Author 1 requested permission to record the focus groups. To ensure anonymity and confidentiality, participants who consented used pseudonyms. To collect the data, the authors used a semi-structured interview guide comprising five open-ended questions and probing questions to gain insight into the proposed research question. Each focus group lasted 45-60 minutes.

7 Trustworthiness of findings

The trustworthiness of the study was ensured through the principles of credibility, dependability, confirmability, and transferability. Credibility was enhanced by a clearly defined research question, the use of a semi-structured interview guide validated by experts in ICUs and IPE, collaborative data analysis with a co-coder and promoters, and member checking through comparison of video recordings with cleaned

transcriptions to minimise bias and human error (Brink et al., 2018:112). Dependability was supported through peer debriefing, whereby the researcher engaged the two promoters to probe interpretations and clarify meanings, ensuring that similar findings could be obtained if the study were repeated in a comparable context (Brink et al., 2018:111). Confirmability was strengthened by maintaining an audit trail, including detailed field notes taken during online focus groups to support accurate and relevant data interpretation (Braun & Clarke, 2017:38). Transferability was achieved through thick description, providing detailed contextual accounts, comprehensive participant feedback, and in-depth analysis to demonstrate that the findings were grounded in extensive research and applicable to similar contexts (Brink et al., 2018:158).

8 Data analysis

Author 1 transcribed the focus group recordings verbatim and, to enhance anonymity and confidentiality, replaced any identified information with a code. Author 1 used member checking to ensure that the transcript was a true and honest reflection of the focus group. Data were thematically analysed using ATLAS.ti 23 (ATLAS.ti, 2025:1) and the steps outlined by Clarke and Braun (2017:45). Author 1 served as the primary coder, and to enhance the reliability of the data analysis procedure, Authors 2 and 3 served as co-coders. In step one, the authors familiarised themselves with the data to gain an understanding of the breadth and depth of the transcripts (Clarke & Braun, 2017:45). Step two entailed identifying codes, finalising the code list, and linking the data to the codes. Where new information emerged, new codes were added to the code list. In step three, codes were clustered into potential themes. In step four, the authors reviewed and refined the themes, ensuring an accurate reflection of the data set. Step five involved a deeper analysis, during which the authors clarified the aspects of each theme. The final step involved interpreting the data, where the authors explained the significance of the themes in answering the research question of this study. The authors further detailed the conclusions and provided a rich and detailed account of the findings (Clarke & Braun, 2017:45).

9 Findings

The authors delineated demographic characteristics and themes, along with their sub-themes, to achieve the objective of this qualitative study, which was to explore the perceptions of the ICU teams regarding the nature of a CPD programme to enhance the interprofessional competencies of ICU teams in NWP, South Africa.

9.1 Demographic characteristics of the participants

Sixty-two participants participated in the study, and more than half were female. All participants had formal education, held degrees in nursing, pharmacy, or medicine, and were licensed to practise by the appropriate regulatory authorities. In the discussion to follow, the authors outline the findings of the focus groups in terms of themes and their corresponding sub-themes.

The themes illustrate the development and design of CPD programmes. Each theme is substantiated by pertinent participant narratives, offering nuanced and contextual insights into ICU professionals' perspectives on the CPD programme designed to improve the interprofessional competencies of ICU teams.

9.2 Theme 1: Planning

Planning ensures that the learning objectives and instructional methodologies align with the requirements of the ICU team and the intensive care system. This theme is subdivided into four sub-themes: contextual factors, preferred venue selection, potential challenges, and barriers to effective CPD implementation.

9.2.1 *Contextual factors*

The study revealed that identifying contextual factors is a crucial component in planning a collaboratively based CPD programme. This allows CPD designers to ensure that the CPD programme meets the needs of participants and is aligned with the goals of ICU teams and the healthcare facility. In this study, the authors identified a need for a relevant CPD

programme that will be applicable in the ICU. There is a requirement to formulate CPD programmes accredited by statutory bodies, thereby primarily incentivising the participation of doctors in the ICU. Moreover, participants indicated that hierarchical systems and ambiguous positions pose considerable obstacles to efficient collaboration within ICU teams. This could pose a threat to engagement in the CPD programme, as power dynamics may influence the degree to which respect is fostered during the learning experience. Additionally, numerous professionals highlighted the lack of organised communication frameworks, which frequently leads to disjointed patient care. The ICU teams emphasised that interdisciplinary collaboration is often hindered by entrenched power dynamics.

There is a general lack of structured communication across disciplines sometimes, making it difficult to work as a team. (P8: Adult ICU Private: Pharmacist)

... one doctor comes, prescribes something on the patient and the other one comes and cancels. So, we need to be involved, and you know, to resolve that conflict and say ... But I think between the two of you; you need to discuss this and involve them in the discussion so that ... err ...you know, the patient, in the end, doesn't suffer because two people are not agreeing. (P16: High Care Private: Professional Nurse)

Some of the professionals felt unable to voice their concerns, even in situations where patient safety was at risk. This poses a threat to ensuring patient safety and honest, open engagement for the proposed CPD programme. Junior professionals and those within the ICU team may be reluctant to share their insights. Moreover, the lack of standardised communication frameworks further exacerbated interprofessional communication and clinical decision-making, leading to inconsistencies in clinical practice. As noted in the responses below, a lack of collaboration among ICU professionals, as well as disempowerment in conflict management and interprofessional decision-making in patient care, can be mitigated by the interprofessional CPD programme. Furthermore, the study revealed a lack of interprofessional collaborative protocols (which are

defined as...), which can also be addressed by the CPD programme to enhance the interprofessional competencies of the ICU team.

Collaboration is a problem here. Each profession works in their own corners, which impacts our work. (P3: NICU Public: Doctor)

I cannot handle conflict well. The other day, this one doctor's patient was sick, and the doctor was rude to me. I totally ignored her. I was like, I am not going to deal with her, even though I had to hand over the patient's progress, and that is wrong of me because the patient may suffer. I just left her to do all the wrong things and will speak with her the next day when her seniors are around. (P13: ICU Public: Professional Nurse)

There is [sic] no admission criteria for ICU, and it makes it worse that this is a multidisciplinary team. If the doctor who is overseeing ICU is guided to say: if I admit a gynae patient, I expect Dr So and So on such and such a date to follow up that patient, because there's nothing like that, that's why at the end gonna le di-conflict/[there are conflicts] because the patient will be admitted by this particular ICU doctor who just gives a bed and doesn't care for a patient. (P24: Adult ICU: Professional Nurse, Public Hospital)

Additionally, the relevance of CPD programmes to real-world ICU conditions was another concern raised by participants. Many emphasised that existing CPD programmes do not adequately reflect the complexity of ICU environments, and for doctors to engage and commit, they must be accredited CPD programmes. Training programmes often lack direct applicability to ICU practice and suggest topics that are irrelevant to the ICU.

I think hygiene matters in the ICU. In the course as the team, we can investigate what is causing infections in the ICU since it is bound to happen. (P55: ICU Private: Professional Nurse)

We can talk about responsiveness towards an emergency in the ICU because that is a problem currently. The doctors sometimes take a long time to come. (P8: NICU Private: Professional Nurse)

CPD should be structured to match ICU workflows; otherwise, it becomes difficult to apply. (P2: Private: Clinical Training coordinator)

Participants suggested that training sessions should be structured around real-life case studies and emergency scenarios to better prepare staff for high-pressure environments when working in teams in the ICU context.

Scenarios can be great so that when an actual emergency happens, we already know the response steps. (P3: ICU: Clinical training facilitator)

Participants also revealed that it will be of great importance to reward attendance at CPD by issuing certificates. Therefore, this illustrates how formal recognition of skills through certificates, when documented in a portfolio, could enhance a professional's qualifications and career trajectory.

They can get certificates at the end of the course, which must go into their portfolio of evidence. (P19: ICU Private: Clinical facilitator)

Additionally, the professional nurses included in the study, specifically those working in public hospitals, revealed that there are limited opportunities for CPD to enhance their skills, knowledge, and attributes in ICUs. This leads to a feeling of complacency, disconnected from the latest evidence-based practices and ICU-relevant protocols. This, therefore, is a gap that the CPD programme aims to address, promoting quality improvement within ICUs in NWP public hospitals.

... there are no refresher courses, there is no training; we just work. We do not know what are the latest developments that can help to improve our skills in a way ... (P20: ICU Public: Professional nurse)

... since the council has stopped the specialised training, we have less specialised ICU nurses in the ward, and there are no CPD courses for us to feel empowered to even help the students that come and locum in the unit. (P16 ICU Public: Professional Nurse)

9.2.2 Preferred venue selection

Participants observed that hospital-specific training venues could enhance attendance, as travel limitations and shift obligations often hinder healthcare workers from participating in CPD programmes.

I think that if maybe you'll do it in small groups and then maybe in the boardroom and then we take turns because our shifts are very busy. (P6: ICU Private: Pharmacists)

The training can be near the ICU to minimise disruptions to the care that patients will receive. (P48: ICU Private: Training coordinator)

Some CPD sessions are held off-site, making it difficult for staff to attend, particularly those on back-to-back shifts. (P3: ICU Private: Doctor)

Additionally, the participants revealed that the CPD programme could also use simulation settings for the training intervention. Not only are simulation settings a safe learning environment where patients are omitted, but the setting, according to the participants, facilitates cross-disciplinary communication, allowing each ICU team member to identify their role and responsibilities within the ICU. The latter aids in effective collaborative care.

I think for other professions in the team to know what we are going through; we can always role play in the simulation lab. One will see everyone's job, and they can take notes. (P31: ICU Private: Professional Nurse)

As a team, we can practise taking care of a patient in a small simulation and talk it through as the team. (P26: Private: Professional Nurse)

9.2.3 Potential challenges/barriers to effective collaborative CPD implementation

The study revealed that the obstacles to CPD success in ICU settings include time constraints, limited resources, a negative attitude among staff towards in-service training, and working shift patterns. Moreover, the ICU team often

faces an overwhelming workload, and they indicate that little time is spared for additional training. This is due to the urgency of patient care, which pushes CPD activities down the priority list.

The availability of personnel can be a problem because everybody's busy with their own setup and things, and then time, people don't have time to ... uh ... to abide by that. The visits are at 10 a.m., and this sister might not be coming, that cannot do ... and even things that are happening in ICU, there will be a patient admitted or maybe ... uhm ... a death or a resus, it will be disturbed by those things. (P26: ICU Public: Professional Nurse)

Moreover, working shift patterns may also complicate CPD scheduling. Thus, finding a suitable time that accommodates everyone might be challenging.

Like us, the other disciplines, they've got ... days are already occupied, I don't know which day is free. Because I was in NICU, there is a day that they discuss their deaths or have training. Maternity ... it's Wednesdays, Orthopaedic ... I don't know if it's Wednesday or ... surgical is another day. And then availability of a day here for us to squeeze, we might have a challenge because of that and the shifts we need all representatives from all the teams, and already they are having their own active programme. (P51: ICU Public: Professional Nurse)

Additionally, the clinical facilitators included in the study revealed that the ICU professionals may exhibit resistance and negativity towards in-service training. This further encourages the CPD programme designer to seek the reason behind the resistance. Could it be low morale, disengagement, or the irrelevance of the current CPD programmes offered to the ICU healthcare professionals? Knowing this will assist significantly in developing CPD programmes that are intriguing, gain interest, and encourage engagement from ICU professionals.

... as a clinical facilitator, I have noticed in the years that at times there is resistance and negativity from the staff when they are scheduled

for training. They are not always willing to attend. (P40: ICU Public: Clinical facilitator)

... I get a sense that the staff just complete the training simply just to get it over with. In some instances, it is just a cut-and-paste exercise where they just replicate the responses, and it makes me worry if learning takes place. (P19: ICU Private: Clinical facilitator)

In modern healthcare services, technology such as computers in ICUs is increasingly used for interprofessional communication and patient record management. In contrast, participants in public hospitals reported that access to computers and computer illiteracy can be a challenge if the CPD programme aims to include online training, as the facilities lack the necessary infrastructure to accommodate computer access for training purposes.

... to be honest, computer access and computer literacy can be a challenge. We don't have one for the staff, and there are older nurses, too. In my business plan, I have included an additional computer for the unit so that the staff can use it for research or any other information. (P35: ICU Public: Professional nurse/unit manager)

9.3 Theme 2: Aims and objectives

This theme focuses on the identified knowledge gap, skills gap, and attitude gap, which can be defined as the aims and objectives of the CPD programme.

9.3.1 Identified knowledge gap/Knowledge to include in the CPD programme

The study revealed limited interprofessional collaborative care and awareness, where the ICU team shared decision-making, demonstrated good communication, and the team worked collectively to achieve a common goal. Moreover, the lack of interprofessional collaborative care and awareness predisposes ICU team members to feel unheard and unseen, as well as undermined in their unique roles and the contributions each

member makes to the ICU team. Below are the transcripts to support the findings.

... there is no communication between the very same team. Surprisingly enough here, a Peds doctor can request a bed here in the ICU and will not follow up with the patient. The patient will be admitted, and when you call the doctor, he will say I requested the bed, but that is a surgical patient call the other doctors, and that confuses us ... (P10: ICU Public: Professional Nurse)

I am sometimes afraid to tell the doctor that but you prescribed this medication, but for this diagnosis and patient, it is wrong, or it is too much, and the doctor will say, No, just follow my orders ... if only we can accommodate each other's knowledge, I think the outcome of the patient can be better. (P14: ICU Public: Professional Nurse)

The whole team is supposed to have take over [sic] in each shift and know which patients are in ICU, but they don't come, they come only when it is a resus, by the time they are supposed to save a life you are supposed to bring him on board /that what is wrong with the patient, when was he admitted because he comes in clueless ... (P17: ICU Public: Professional Nurse)

9.3.2 Identified skills gap

The skills identified for inclusion in the collaborative competency-based CPD programme include communication, structured communication, and team decision-making. Thus, transparent and structured communication was highlighted as essential to ensuring patient safety and effective teamwork. Participants strongly advocated for CPD programmes that emphasise communication skills, including structured team communication training, particularly in high-pressure ICU settings. One participant summed it up by saying: Communication is a skill we have to have as a team because everything actually anchors from communication, respect, teamwork ... yeah, everything stems from there. (P28: ICU Public: Pharmacist). However, due to a lack of interprofessional communication, professionals in the study highlighted that critical patient information is often misinterpreted or lost

due to inconsistent handover practices, as one participant stated: Miscommunication between team members leads to adverse errors in patient management. We need structured ways to address this. (P3 ICU Private: Clinical Training coordinator)

Another skills gap that was identified is conflict resolution. The ICU professionals revealed that, due to reasons not limited to power dynamics and unclear roles and responsibilities, the ICU team struggles to address conflicts among themselves, which later affects the patients' treatment care plan and the morale of the ICU team.

From my experience, I have experienced a lot of conflict, especially between the ICU specialists, so we as pharmacists as well as the nurses must know how to manage conflict between the specialists for the sake of the patients here in ICU. (P22: ICU Private: Pharmacist)

I just feel that my opinions don't matter, so I decide that I won't speak up even when I see a problem, even though it is good for me to speak up and tell the doctor what I am seeing or thinking about a certain treatment plan. (P14: ICU Public: Professional Nurse)

Additionally, team decision-making skills were identified as a gap within the ICU team. The reasons brought forward included the lack of standard protocols recognised by the entire team. Additionally, due to limited ICU staff, the institutions have recruited new staff members on a flexible basis to meet the ICU's requirements. Some of the newly appointed staff members introduce treatment plans that are unfamiliar to the existing ICU team. This creates discord in decision-making, and in some instances, it is fuelled by hierarchical structures. The professional nurses felt that their opinions were suppressed and regarded as inferior in the decision-making process.

You know, we nurses assess the patient and see a need, and another discipline comes in, and the very same doctors come in who admitted the patient do the same and sometimes consult other disciplines to say that I've got this patient, I need this and this or can you come and

intervene with your expertise towards this patient. Only a few of the doctors do that ... (P22: ICU Private: Professional Nurse)

Moreover, the study revealed a need to strengthen means that promote collaborative care, where various healthcare professionals share their expertise and knowledge to provide comprehensive patient care.

I think, err, we need like a multidisciplinary approach, it's best for the patient to get, to obtain proper care ... Everybody put in their ideas, how are they going to be implemented, uhm, develop ways together to help the patient fully. (P42: ICU Private: Doctor)

9.3.3 *Identified attitude to be addressed by the CPD programme*

Professional respect and empathy are key to fostering strong collaborative relationships among ICU team members. Participants revealed that CPD could include teaching on demonstrating mutual respect and empathy by the team to reinforce good communication and collaboration within the ICU team. Moreover, the ICU team should be encouraged to acknowledge each other's roles, years of experience, and expertise in the ICU. Acknowledging the unique contributions of each team member will encourage interprofessional team members to share decisions and foster positive team cohesion.

A respectful environment encourages professional development and continuous learning. (P7: ICU Private: Clinical Training Coordinator)

... mutual respect, you know. I think as healthcare practitioners, we don't need to undermine or underestimate each one's suggestions or ideas. We can be encouraged to come up with those ideas instead of the other person saying, Who are you? I am this? we can speak with each other with respect, instead even when one brings a new protocol to check is it correct, this one we can use this one we cannot use and so and so ... (P14: High Care Private: Doctor)

Team cohesion and professional relationships were closely linked to patient safety and workplace morale. Many participants expressed the need for CPD programmes to integrate strategies that promote inclusivity and respect in

the workplace. One participant sums it up by stating: Doctors and nurses must respect each other's expertise and input in patient care. This needs to be in that training. (P2: ICU Private: Doctor)

9.3.4 *Benefits of participating in the CPD programme*

This sub-theme highlights the benefits of the interprofessional CPD programme for patients, their families, and ICU healthcare professionals who form part of the ICU team. For the patients, the participants revealed that the CPD programme has the potential to address communication flaws within the interprofessional ICU team. Attending to communication, the CPD programme could enhance how information is shared within the team, leading to improved patient care and better patient outcomes. Moreover, the CPD programme could reinforce collaboration when caring for a patient who requires interprofessional intervention from various healthcare disciplines within the ICU.

... as my colleague mentioned before, if the patient has a medical condition but is here for surgical intervention, the course can help the team to communicate and share information and how to take care of the patient so that the patient may receive a proper and total healthcare. (P4: High Care Private: Professional Nurse)

The participants revealed that the CPD programme has the potential to improve team performance. Furthermore, the CPD programme can aid in role clarification, where the team is aware of the unique contributions each member makes to the team, which will ultimately promote good teamwork and coordination in the ICU. As one participant noted:

It can help with teamwork and cooperation. If we don't cooperate, the patients will suffer. Yes, it is something we can try. (P8: ICU Private: Doctor).

Moreover, some of the participants revealed that the CPD programme could shift the focus towards holistic and family-centred care in the ICU. Therefore, acknowledging optimal health outcomes in the ICU, especially

for patients with cardiac conditions, engaging families in decision-making could be beneficial for quality care.

If the course involves the family, the family should be involved, nê? because they form part of the care of the patients, especially the cardiac patients that are in the ICU for a while. (P9 ICU Private: Clinical Facilitator)

9.4 Theme 3: Curriculum design and implementation

This theme highlights key factors influencing the delivery of CPD programmes, focusing on CPD facilitation, requirements for a facilitator, modes of delivery, programme duration, interactive teaching and learning strategies, technology that can be adopted for the CPD program, and evaluation of the CPD programme.

9.4.1 ICU healthcare professionals in leadership roles as facilitators of the CPD programme

Including ICU healthcare professionals in leadership positions was identified as a crucial determinant of CPD programme success. The participants highlighted that the heads of departments, nurse managers, and training coordinators within the hospitals should be the lead facilitators of the programme. These facilitators were mentioned mainly due to their expertise, vast experience, authority, accountability for the ICU team, and their level of communication with the rest of the ICU team. Additionally, their role in the ICU earns them respect and the ability to influence the ICU team, which could be useful in facilitating and promoting engagement in the CPD programme.

I think the head of the department of the ICU will be ideal. He has been working in the ICU for many years, and also because he is in the right position to bring the team and even the doctors and say, Dr, remember, we cannot do that. We need to sit down as the team. What do you think, Sister? We must revise these standing orders, or we must work on these protocols because you are confusing the staff,

and also, he has access to all of us. (P10: ICU Public: Professional Nurse)

... the nurse manager, she is the middle of the team. Everyone has the most respect for the unit manager, even the physicians and the surgeons, and everyone. (P33: ICU Public: Professional Nurse)

However, some participants further highlighted that the facilitators could also be neutral individuals. In this context, neutrality refers to an individual's capacity to remain objective and equitable and to refrain from imposing personal beliefs or ideas. Therefore, participants suggested that familiarity with the CPD facilitator might compromise fairness, objectivity, and mediation during CPD facilitation.

I think it will be best if it's a neutral person, but I don't know who, who everyone won't know, you see, and somebody who wouldn't be biased. (P6: ICU Private: Pharmacist)

The clinical trainers in the hospitals who are not assigned to the ICU for operations and have experience in teaching can be good because at least they will not be biased. (P7: ICU Private: Pharmacist)

9.4.2 Mode of delivery

Participants expressed diverse preferences on the mode of delivery for the CPD programme. Some participants highlighted the convenience and accessibility of adopting virtual platforms due to the demanding and complex work schedules, including the shift work of the ICU team. In contrast, many emphasised the importance of contact learning for team cohesion, building trust, clarifying roles, and team building. Overall, the findings were based on efficiency and relational depth, suggesting a hybrid approach for the best outcome of the CPD programme.

We can be very busy in the unit, so contact is not gonna work for us; also, we are also more practical. We need more time with the patients. We cannot all be in the class. Our patients will be left alone, you see, but when we do it online, it can be safer. (P59: ICU Private: Professional Nurse)

I was thinking if we can meet in contact, with the multidisciplinary team weekly, especially in the morning, so that ... err ... the doctor maybe will present the patient, diagnose and everything; then we discuss, physio has his own or her out ... in ... input ... err ... the doctor input and the plan and everything. We discuss we analyse, and then we see the loopholes so that next time we can improve, bed to bed. Then next week again, the very same day, same time in the morning. (P57: ICU Public: Professional Nurse)

Contact will do, but scheduled according to shifts so that we know each other better, but then virtual won't do ... (P60: ICU Public: Pharmacist)

9.4.3 Programme duration

The participants revealed that they prefer a shorter timeframe for the CPD programme. The duration provided included weeks, a couple of months, or was provided continuously. The short-term periods would ensure flexibility, making it easier for the ICU team to engage in ongoing training activities without disturbing their work–life balance. Moreover, it would be essential to ensure that the scheduled CPD caters inclusively to everyone in the ICU team, including flexible and agency employees.

Usually, a two-week timeframe is good because of the working shifts, like the others are off and the others are coming, so two weeks will cover both shifts. (P19: ICU Private: Clinical Facilitator)

I think from my side is ... err ... the timeframe can be like three months, where you introduce the CPD and every staff member goes through it, or you can do it collectively, but with every new employee and with us, we also have the agencies that ... that do not work in the unit. They ... they need to know what is happening in the unit. (P12: ICU: Professional Nurse)

Additionally, the participants revealed that the CPD programme could be done continuously to cater for the new staff who join the ICU team. Moreover, refresher courses could serve as a means of knowledge

reinforcement, as well as ensure optimal team functioning for achieving the best outcomes in the ICU. As one participant noted: It needs to be continuous, so I don't think there's a certain timeframe, cause ... especially with the new employees coming in, and some leaving, so it will have to be continuous. (P12: ICU Private: Professional Nurse)

9.4.4 *Interactive teaching and learning strategies*

The study has revealed that incorporating various interactive teaching strategies is vital for enhancing team-based communication, clarity of roles and responsibilities, teamwork, and critical thinking, which are fundamental in the ICU. These strategies include mixed-discipline discussions, reflective group discussions, team-building exercises, face-to-face workshops with small group discussions, and reviewing clinical treatment protocols as a team.

... I think the CPD can include multidisciplinary small discussions or activities that would make us work more closer and together is to have these multidisciplinary team in our unit because we don't have the major rounds whereby we have pharmacists, physiotherapists, Surgical; like we are a multidisciplinary ICU, everybody come for himself at any given time, so there's no proper handing-over to each other so maybe if we can have that major rounds, it can assist to reach everyone. (P10: ICU Public: Professional Nurse)

We can have case scenarios, and they should be very realistic to what can happen in the ICU. (P8: NICU Private: Professional Nurse)

I think a role-play will be good, and you give us a scenario for role play as a team (P13: ICU Private: Clinical Facilitator)

9.4.5 *Use of technology*

Given the pace, complexity, and demands of the ICU setting, the participants identified specific technological devices that could facilitate broader participation and enhance engagement and real-time learning. Technology devices include cell phones, computers, and the use of videos and the learning management system e.g., Moodle.

... because we work with younger people and younger people are more active on cell phones, it will be great to include using of cell phones. (P9: ICU Private: Clinical Facilitator)

... what will advantage us is if we are having a computer here so that everybody ... maybe on a Monday we sit we do the work together online. (P27: ICU Public: Professional Nurse)

For instance, we can have a short video on communication styles or professionalism in ICU, and we show them these short video clips, just to get their attention and later do role plays. (P9: ICU Private: Clinical Facilitator)

We can use what we already have. We use Moodle to circulate the training. And then you do the training on your own time and do the training. I think that's why also the staff like it. It's because it's on your own time, even at home. I can have access, and I can do my training. (P9: ICU Private: Unit manager (Professional Nurse))

9.4.6 Evaluation of the CPD programme using quality improvement programmes

Furthermore, the study revealed that quality improvement actions could be used to evaluate the efficiency and effectiveness of the CPD programme. Quality improvement programmes provide a framework for assessing and enhancing the knowledge, skills, attributes and team performance of healthcare professionals in the ICU.

Mm ... QIP, Quality Improvement Programme. When she picks up a problem in the ICU team, she'll develop a tool, and then she monitors maybe weekly to say are people doing what they are not doing. That can be adopted for the CPD. (P47: ICU Public: Professional Nurse)

9.5 Theme 4: Assessment strategies

The final theme examines the assessment strategies that could be employed to evaluate CPD effectiveness, with a focus on real-time skill evaluation using checklists and surveys. Participants indicated that direct observation

is a practical assessment strategy to ensure that ICU professionals can apply CPD learning in practice. Additionally, the study revealed that the CPD programme could adopt hospital-specific tools used to measure competency. These include a structured approach to measuring practical skills and task performance after training. Supporting quotations include:

We can have a ... maybe like a sheet where you're going to be ticking off stuff so that you can see that they are done, all that was taught in the CPD, and the shift leader can do that. (P25: ICU Public: Professional Nurse)

... if we have a patient who needs ... uh ... that multidisciplinary team, you can pick that patient and see what's happening there, check the documents and the staff and tick for competence. (P43: ICU Private: Clinical training coordinator)

... we've got what we call essential competencies, that ... that's the measure that we're using in the hospital. The essential competencies are about the practical part of what we are doing ... So that you can measure if this staff member can do a certain task properly. (P41: ICU Private: Professional Nurse)

10 Discussion

This study found that comprehensive planning is essential for successfully designing and implementing a CPD programme to enhance the interprofessional competencies of ICU teams. A thorough plan should include identifying the structural and logistical elements that could affect the efficacy of the CPD programme. Moreover, this study revealed that identifying contextual factors in the planning phase of the CPD programme helps to recognise the distinct demands, difficulties, and opportunities within the ICU and its personnel. This finding is similar to Pun et al. (2022:31) and Thethwayo et al. (2024:2098), who stated that ensuring effective planning in CPD programme design can assist in assessing the skills gap, available resources, and the presence or absence of collaborative practices across ICU teams effectively. Therefore, the authors of this chapter claim

that the knowledge, skills, and attitude gaps surrounding interprofessional collaborative care could be addressed in the aims and objectives of CPD programmes, and this could be reflected in the teaching and learning methods and techniques employed. This notion supports work by Sockalingam et al. (2022:432), who argue that incorporating the identified knowledge, skills, and attitude gaps into the CPD programme's aims and objectives aligns with the participants' needs, thereby fostering motivation to attend, engage, and commit to the programme. Therefore, the authors further mention that conducting a situational analysis during the planning phase of the CPD programme ensures that the CPD programme aligns with specific developments and facilitates a continuum of lifelong interventions to address the skills and knowledge requirements of healthcare workers, thereby becoming a learner-centred programme. The findings of this study align with those of Giusti et al. (2024:1570), who discussed the significance of actively involving staff members' needs through the training needs elicitation process, which shapes a more effective CPD and maximises training outcomes while minimising any resistance to change from staff members.

Similarly, Yaqub et al. (2020:112) in Ghana asserted that for organisations to fulfil the requirements and aims of the CPD programme, it is essential to conduct not only a needs analysis of the personnel, but also a comprehensive evaluation of the specific needs of the organisations and patients' families to ascertain that the patients' needs and those of the caregivers are the integral focus of the CPD programme. Consequently, the CPD programme must focus on the intricacies of and rectify inadequate performance in the ICU team, and by conducting a situational analysis, potential constraints could be managed by including them as scenarios in the CPD (Yaqub et al., 2020:112). Findings further align with the work of Holloway et al. (2018:12), who assert that CPD programmes must address the needs of the participants, address workplace-related matters, and involve leaders in the facilitation of the CPD. This study supports findings by Freeman et al. (2010:375) and Holloway et al. (2018:12), as it confirms that having leaders from different disciplines in the ICU and using them as

facilitators in the CPD programme could foster effective interprofessional collaboration.

However, despite the endorsement of interprofessional facilitators for IPE CPD programmes, some facilitators frequently perceive themselves as inadequately prepared and encounter challenges (Evans et al., 2016:702; Evans et al., 2019:1). It is therefore imperative to assist facilitators responsible for training IPE teams in developing the knowledge and skills they need to foster a culture of collaborative practice, allowing ICU team members to learn with, about and from each other. Providing training for CPD programme facilitators will enhance the confidence and proficiency of interprofessional team facilitators in assisting attendees (Xyrichis & Rose, 2024:1). Regarding the mode of delivery for the CPD programme, this study emphasised a need for flexibility, therefore encouraging a hybrid approach. The findings concur with Lazinski et al. (2021:15) and Oliveira et al. (2024:128), who state that the use of a hybrid approach could lead to positive attitude and knowledge change, which is a favourable reaction for IPE activities. Moreover, the hybrid approach holds great promise for fostering a cost-effective teaching approach in low-resourced settings, such as the NWP in South Africa, and offers flexibility to facilitators. This study additionally demonstrated that, due to the intricate and high-pressure environment of the ICU, interactive teaching and learning methodologies enhance the reinforcement of knowledge acquisition. Therefore, interactive teaching and learning methodologies enhance team collaboration in the ICU and facilitate team-based communication, fostering open dialogue among team members. Moreover, this study further reveals that employing pedagogical methods such as interdisciplinary conversations, role-playing, in-person workshops, team-building exercises, and collaborative tasks in small groups, as well as reviewing protocols as an ICU team, is recommended as an effective interactive teaching and learning method for promoting engagement in the CPD programme. The findings align with those of Amerongen et al. (2015:47), who demonstrated that interactive learning in IPE CPD programmes for ICU teams cultivates a culture of interprofessional collaboration that seeks to mitigate the power dynamics that arise in the absence of good interprofessional skills training.

Furthermore, the literature affirms that interactive modalities enhance knowledge of roles and duties, facilitate the exchange of expertise, and encourage shared leadership for improved patient care in the ICU.

This study found that incorporating technology, such as cell phones with applications or software containing CPD content, would be of great benefit to the CPD programme as it could provide easy access for shift workers and those working in high-demand settings, including the ICU. Additionally, using learning management systems (LMS) with videos featuring real-life case scenarios could promote critical thinking, reasoning, and better decision-making in the ICU. These findings support the work of Ngezi et al. (2021:245), who affirm that incorporating technology into the CPD programme will encourage engagement and ease of access to the CPD content for participants. However, Ngezi et al. (2021:245) further discuss that technology, for instance, LMS, must be designed to be interactive and provide automated access to various types of learning content to accommodate different learning styles. This study concurs with Gómez-Pérez et al. (2023:263), who also stated that various types of content, such as reading materials, audio recordings, video recordings, web conferences, learning games, chats, and forums, can be included. Therefore, the authors of this chapter believe that the use of a diverse range of content technologies would accommodate the varied learning styles exhibited by ICU teams. Moreover, the varied content technologies could reinforce collaboration and support the different stages that each profession is at in terms of its professional development. Moreover, to ensure that participants attend the interactive teaching programme, this study revealed that it would be beneficial to have a CPD programme for a short duration. That would accommodate high acuity with limited time for in-service training, and it would be less disruptive to patient care. Therefore, the brief period would attract more participants due to its feasibility and later create a culture of learning without overburdening the ICU team. Shuyi et al. (2024:74) concur with the findings of this study, which suggest that a short-period CPD programme, when developed according to the needs of the ICU team, offers clinically relevant, accessible, and practical learning that aligns with the demanding ICU environment. Noteworthy is that, despite the

availability of specific tools to assess interprofessional competencies, such as Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEEPPS) team survey tools, clinical survey tools, and relational teamwork scales, the interprofessional healthcare professionals who participated in this study, including the training coordinators, made no mention of using evaluation tools to assess interprofessional competencies. However, to measure competency, the study participants revealed that real-time assessments using checklists and surveys would be beneficial for the CPD programme. Ong et al. (2019:1) support the findings and state that real-time assessments provide instant feedback to participants, allowing them to either reinforce or correct the effective demonstration of interprofessional competencies. For the overall evaluation of CPD programmes, participants highlighted that incorporating quality improvement programmes, such as the implementation of the Plan–Do–Study–Act cycle, which is widely used in healthcare services, could be beneficial.

Lastly, this study revealed that implementing CPD programmes serves as a crucial element in empowering the ICU teams to provide safe and quality care. In instances where miscommunication may result from a lack of effective interprofessional communication and collaboration, the CPD programme could promote open discussion and opportunities to develop structured communication frameworks for the ICU team. Pun et al. (2022:31) concur with these findings and note that implementing interprofessional CPD programmes for the ICU team fosters a better workplace where effective interpersonal relationships are established, thereby enhancing job satisfaction and productivity. Pun et al. (2022:31) further allude that the outcomes of the CPD programme are often attributed to the enhanced interprofessional collaboration skills, cooperation, coordination, communication, and partnership that are embedded in the CPD programme. Moreover, this study further revealed that for patients, the CPD programme could reinforce the delivery of safe and high-quality care, which in turn minimises morbidity and mortality rates associated with poor interprofessional collaborative care. Therefore, the patients' needs will be identified promptly by the ICU team due to the

robust interprofessional communication and teamwork developed by the CPD programme. Thus, this leaves fewer opportunities for late diagnosis or specific treatment intervention by the team. The findings are supported by Ong et al. (2019:1), who state that high-quality healthcare must be clinically effective for the overall needs of the patients, effective, patient-centred, and safe. Interprofessional CPD programmes are integral to achieving the required outcomes. Ntinga (2017:1) also supports the findings that effective ICU care depends on effective collaborative teams; interprofessional CPD programmes in the ICU allow for enhanced patient safety, better utilisation of resources, avoidance of treatment duplication, and improved standards of patient care. Additionally, the participants revealed that if the CPD is implemented, even patients' families could benefit from the ICU teams who have received the training, as the programmes would encourage them to include patients' families in decision-making regarding the patient's care. Schot et al. (2020:34) align with the findings of this study and discuss how interprofessional CPD programmes help to build trusting relationships between patients' families and foster a humanistic approach. They further discuss how a humanistic approach provides patients' families with more respect, empathy, and compassion, as the ICU team is taught in the CPD programme to be culturally sensitive towards themselves as a team and towards the patients and their families (Schot et al., 2020:34). In settings such as the ICU, where optimal patient care relies on effective collaborative practice, developing interprofessional competencies through CPD programmes promotes safe and high-quality patient care. Moreover, the CPD programmes ensure that the ICU teams are encouraged to embrace a patient safety culture – a safety culture that augments shared commitment and dedication to patient safety in ICU, cohesive collaboration, and the minimisation of adverse events that compromise the livelihood of patients. Therefore, in essence, optimising CPD programmes for ICU teams fosters a culture of shared responsibility and a shared mental model, which is critical for creating a safe culture and positive psychological setting in the ICU.

11 Limitations and recommendations

The study was conducted only in the North West Province (NWP) of South Africa and only with ICU teams across two public and two private hospitals in two districts of the NWP. This implies that the voices of other ICU members in other provinces and in private and district hospitals were not included. Furthermore, the data were exclusively derived from ICU experts, which may have resulted in a lack of diverse viewpoints regarding team composition and healthcare procedures in non-ICU environments. Conducting this study in more than one province and in more private and public hospitals may yield additional insights into the perception of the ICU teams regarding the nature of a CPD programme to enhance the interprofessional competencies of ICU teams.

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CHAPTER 6

DEVELOPING A CULTURAL COMPETENCE TRAINING PROGRAMME FOR NURSING PROFESSIONALS IN SOUTH AFRICA

KD Shopo

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School of Nursing,
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
khumo.shopo@nwu.ac.za
ORCID ID: 0000-0001-5940-6222

Abstract

Cultural competence has emerged as a vital strategy for improving healthcare providers' ability to deliver culturally appropriate care and achieve positive patient outcomes. In South Africa, a country rich in linguistic and cultural diversity, the integration of cultural competence across healthcare disciplines is essential. However, existing research has highlighted a significant gap: midwives often lack sufficient cultural knowledge and insight into their patients' practices. To address this, a cultural competence training programme was designed to equip midwives with the necessary knowledge, skills, and attributes for culturally congruent care. This manuscript discusses the development of a cultural competence programme for midwives.

The programme's development was grounded in a multi-method study conducted between 2018 and 2019. This research encompassed concept analysis, quantitative and qualitative approaches, and literature integration. The programme was developed following the ADDIE model, providing a systematic framework for design and implementation. Validation involved expert review through the Delphi technique, with consensus reached after two iterative rounds involving a panel of five selected experts ($n = 5$).

As this manuscript reports on the third and last phase of a multi-method study, results from the first and second phases were synthesised to reach the objective. Programme content was informed by thematic analysis of interview data and a literature review, and was structured into three focused study units: (1) Introduction to cultural competence, (2) Utilising cultural competence skills, and (3) Application of cultural competence. The resulting programme offers both theoretical and practical guidance, making it suitable for integration into undergraduate nursing education and as a professional development course for practising nurses.

Keywords: cultural competence, culturally diverse, eDelphi, midwives, programme development

1 Introduction and background

The global landscape is characterised by a culturally and linguistically diverse (CALD) population owing to decreasing geographic boundaries due to migration (Pham, Berecki-Gisolf, Clapperton, O'Brien, et al., 2021). Nurses and midwives consequently need theoretical knowledge and practical skills to provide culturally competent, congruent and sensitive care to this diverse population (Wehbe-Alamah, 2019). Cultural competence and the achievement of culturally congruent care are imperative for nurses and other healthcare professionals (Jeffreys, 2019). Govere and Govere (2016) argued that providing culturally competent healthcare is critical to increasing patient satisfaction, which is a key determinant of quality of care that is correlated with patients adhering to treatment. Similarly, cultural competence is a strategy that attempts to make healthcare services more accessible, acceptable and effective for persons from culturally and linguistically diverse communities (Kirmayer, 2012).

According to the Merriam-Webster dictionary (2025), competence is defined as the state of having sufficient knowledge, judgement, skill or strength in a particular respect. Cultural competence as a concept is defined as an ongoing learning process in which a nurse or midwife working with culturally diverse patients intentionally engages, and is empowered with the cultural knowledge, cultural awareness, cultural skills, cultural encounters, and cultural desire to become a culturally competent practitioner and consequently improving healthcare quality as well as patient outcomes (Shopo, Du Preez, Rabie & Bester, 2023a). While cultural competence is also identified as a strategy to improve the capacity of healthcare systems and providers to render culturally congruent healthcare and achieve positive patient outcomes (Shopo, Rabie, Du Preez, & Bester, 2024), it is also a dynamic and evolutionary process that requires personal desire and effort from the healthcare professionals (Sharifi, Adib-Hajbaghery & Najafi, 2019). The healthcare professionals in the context of this study refers to midwives. Wehbe-Alamah (2019), in her review, concluded that providing culturally congruent care that is respectful of diverse cultural beliefs, values, and

practices is a moral and ethical responsibility for healthcare professionals as well as a human right for patients.

According to the Nursing Act 33 of 2005, the title of midwife may only be used by a person who has met the prescribed education requirements for registration as a midwife, has acquired and maintained the competence to practise as a midwife, and is registered in terms of section 31(1)(b) of the Nursing Act of 2005. Upon completion of the Advanced Diploma in Midwifery or a Bachelor's degree in Nursing and Midwifery, the Professional Nurse is registered with the South African Nursing Council (SANC), which is a regulatory body, and the license to practise is renewed annually. The SANC, as the responsible body for regulating nursing education, training and practice, has prescribed competencies for midwives in that regard. According to Jeffreys (2019), preparing these nursing professionals to provide quality healthcare in the culturally and linguistically diverse population requires a comprehensive approach that emphasises cultural competence education in undergraduate as well as professional education and professional life. Competence will be evidenced by performance demonstrating effective application of knowledge, skills, judgement, and personal attributes required to practise safely and ethically as health professionals.

Nurse educators play a significant role in developing undergraduate nursing students' knowledge and attitudes regarding diverse cultural issues in nursing, including the strategies and programmes needed to develop their cultural competence (Sharifi et al., 2019). Similarly to these authors, Betancourt and Green (2010) suggested that an educational intervention has the best chance of having an impact on healthcare if it is multifaceted. Within the South African context, nurses and midwives undergo basic undergraduate training at either colleges or universities; the duration of training is three years and four years, respectively. Several researchers have indicated that the curriculum for undergraduate training for nurses in South Africa (SA) lacks a component on cultural competence (Shopo et al., 2024; Moeta, Mogale, Mgozolazi, Moagi, & Pema-Bhana, 2019; Mhlongo, 2016; De Beer & Chipps, 2014).

In heeding the call for a culturally competent workforce, various countries have developed programmes that integrate cultural competence at policy level and consequently guideline documents within healthcare organisations. Researchers who have laid a foundation regarding frameworks and models that are currently being used in the field of cultural competence include Madeleine Leininger, who coined the Theory of Culture Care Diversity and Universality in the early 1950s upon realising a need for transcultural nursing (Leininger, 1999). Following that, other researchers built on the foundation laid, and Campinha-Bacote (2002) developed a model named “The Process of Cultural Competence in the delivery of Healthcare Services”. This model outlines the five constructs that are applied by many researchers: cultural awareness, cultural knowledge, cultural skill, cultural encounters, and cultural desire. These constructs form the basis of several developmental phases in the field of cultural competence. Marianne Jeffreys, who is also an expert in cultural competence, further advocated for an inclusive, caring framework within a healthcare system where diversity is embraced by creating culturally safe environments (Jeffreys, 2019). She developed a Cultural Competence and Confidence model, primarily focusing on the self-efficacy of nursing students and other healthcare professionals.

Literature confirms that exposing nurses, nursing students and other healthcare professionals to a well-structured cultural competence learning programme has the potential to improve their cultural competence skills. In a study by Fair et al. (2021), the Operational Refugee and Migrant Maternal Approach (ORAMMA) project developed a cultural competence training programme for health professionals to aid in providing perinatal care for migrant women. The training resulted in a significant increase in the knowledge, self-perceived cultural competence levels, and skills scores amongst midwives. In another study, Choi and Han (2020) developed a Global Multicultural Nursing Competency Enhancement (GMNCE) Program, which was implemented with nursing students in Malaysia. These authors concluded that the program is effective in the improvement of cultural competence of nursing students, which included the five constructs (cultural knowledge, cultural awareness, cultural skill, cultural encounters

and cultural desire). In Finland, Kaihlanen et al. (2019) provided focused cultural competence training for nurses, and their results confirmed that training increased awareness of one's own cultural features, which can be useful for easing cross-cultural encounters in a healthcare setting and improving the cultural competence of nurses.

In SA, Shopo and colleagues identified that midwives lack knowledge of cultural competence when providing care to women in maternity (Shopo, Rabie, Du Preez, & Bester, 2023b). Led by evidence-based research, a programme for cultural competence was developed to enhance the skills of midwives in the North West Province (NWP) of SA. To the best of the author's knowledge, no cultural competence programme for midwives could be located in scientific literature within SA.

2 Problem statement and aim

Nurses and midwives in SA are exposed to a culturally and linguistically diverse population, they need to be capacitated with cultural competence skills and knowledge. This gap was identified in theory and practice, whereby the researcher could not identify a cultural competence programme for midwives within the SA context. Evidence from literature confirms that provision of culturally competent care is linked to improved quality of maternal care, improved patient outcomes and adherence to medication by patients from diverse cultures. The overall aim of the study was to develop a cultural competence programme for midwives in the North West Province to empower them in the process of providing culturally competent care. Following the outlined background and the problem statement, a research question was posed: What knowledge and skills should be included in a cultural competence programme for midwives in the SA context?

3 Research design and methodology

This manuscript reports on the fifth and final objective from a doctoral study; the methodology for objectives 1 to 4 is described in the published

manuscripts. The basis for developing the programme was on the findings of a multi-method, multi-phase research design. The multi-method included a concept analysis, a quantitative research design, a qualitative descriptive research design, and a literature synthesis to develop a programme. The description below follows the depiction of Figure 6.1 for ease of reference.

3.1 Step 1: Phase 1

Phase 1 had one objective, and the researcher applied the concept analysis process by Walker and Avant (2014) to explore and describe the conceptual meaning of cultural competence within midwifery (Shopo et al., 2023a). The steps by Walker and Avant (2014) included concept selection (step 1), determining the aims or purpose of analysis (step 2), identifying uses of the concept (step 3), determining the defining attributes (step 4), identifying a model case (step 5), identifying additional cases (step 6), identifying antecedents and consequences (step 7), and defining empirical referents (step 8). In this process, multiple data sources were consulted in search of relevant scientific information to inform the programme development.

3.2 Step 1: Phase 2

Phase 2 had three objectives, with five hospitals in the NWP selected for the empirical part of the study. Firstly, a descriptive, cross-sectional survey design determined the midwives' self-reported levels of cultural competence towards women receiving maternal care (Shopo et al., 2023c) using the Transcultural Self-Efficacy Tool (TSET) questionnaire (Objective 2). An all-inclusive sample of midwives (N = 104, n = 82) participated in the survey; the response rate was 79% (Shopo et al., 2023c). Secondly, a qualitative descriptive approach was then applied to explore and describe the experiences of women receiving maternal care regarding the cultural practices and competency of midwives in providing culturally competent care (Objective 3). A qualitative research design was employed to explore perspectives of diverse stakeholders and to uncover the meanings they ascribed to culturally competent care (Creswell & Poth, 2018:45). Purposive sampling of women receiving maternal care in the selected hospitals was done; these women participated in in-depth interviews. The women were

admitted in maternity wards and postnatal wards and had at least two pregnancies or more; first-time pregnant women were excluded as they would not be able to inform the study. In total, fifty women receiving maternal care ($n = 50$), who met the inclusion criteria, took part in the in-depth interviews, which were conducted until data saturation was reached (Polit & Beck, 2017:877). Even though no new data emerging from the fourth hospital, the researcher continued to collect data in the fifth hospital as it had been selected.

Lastly, in Phase 2 a qualitative descriptive approach using semi-structured individual interviews explored and described the experiences of midwives regarding the provision of culturally competent care to women receiving maternal care (Objective 4). The midwives ($N = 104$, $n = 34$) were purposefully selected from five hospitals who had more than one year of experience in the wards. The midwives took part in semi-structured interviews conducted by the researcher, who was knowledgeable in qualitative data collection methods until data saturation was declared. A purposive sampling technique was applied in the selection of both population groups (Creswell & Poth, 2018). No payment was made to participants, but the researcher offered them a light snack and juice after the interviews as a token of appreciation.

The empirical study outlined above was conducted in the NWP, whereby a combination of large district, regional and tertiary hospitals was selected. The decision to select these hospitals was prompted by the fact that approximately 60–70% of all women who use government facilities require hospital services at some stage during their pregnancies (Department of Health, 2015).

Immediately after each interview, data were transferred to a password-protected laptop of the researcher, and confirmation of the recording was done before deleting the audio file. The participants were anonymous as the researcher used codes to identify each interview; thus, a folder was created with the relevant numbering of the interviews. Data analysis on the empirical data followed Creswell's generic qualitative analysis approach combined with Tesch's eight steps in the coding process (Creswell, 2014). An

independent co-coder followed the same analysis, with consensus meetings held to enhance credibility of the results.

Polit and Beck (2017) describe a framework (as depicted in Figure 6.1) as the conceptual underpinning of the study. The researcher was guided by the framework in a systematic development of the programme for cultural competence. Synthesis and integration of data were carried out based on the results of phases 1 and 2. The researcher then systematically followed the analysis, design, development, implementation and evaluation (ADDIE) model of curriculum development by Robinson and Dearmon (2013). It is important to note that only the first three steps of the ADDIE model (as depicted in Figure 6.1) were carried out; implementation and evaluation of the programme will be done in a separate study.

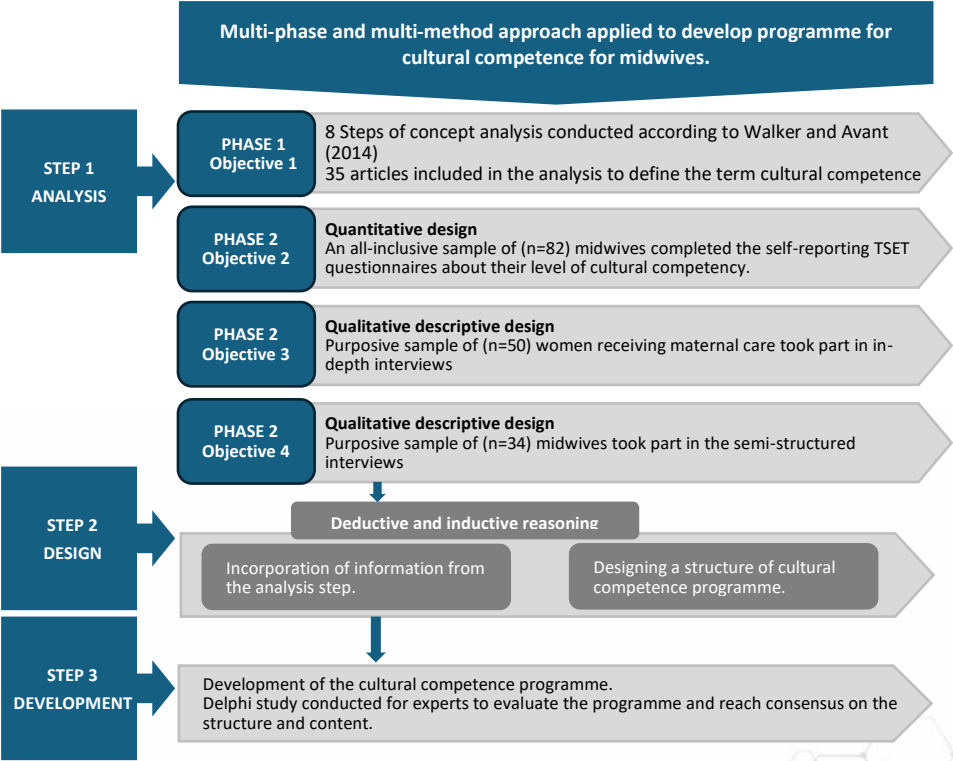


Figure 6.1: Incorporated phases for development of cultural competence programme

3.3 Step 2: Phase 3 (Design)

In Phase 3, the results from Phases 1 and 2 were synthesised to develop a cultural competence programme for midwives in the South African context (Objective 5). The process of development is outlined in the findings and discussion section as the main focus of this manuscript was development of the cultural competence programme. After development of the programme for midwives, the researcher carried out a consensus Delphi with criterion-purposively selected experts. Participants in a Delphi study are purposively recruited experts in the clinical nursing field, as well as researchers who are members of the Academy of Nursing South Africa (ANSA) and the Forum of University Nursing Deans of South Africa (FUNDISA), and who authored articles from the scientific research sites, such as ResearchGate. The researcher sent invitations to N = 15 experts via email using blind copy (BCC) to maintain anonymity after identifying them on the lists provided by FUNDISA and ANSA; however, only five (n = 5) experts consented to participate.

The experts received an email detailing the information on the study as well as the purpose of the Delphi and inviting them to be part of the process. After receiving the experts' responses to the invitation, the researcher then started preparing a questionnaire to send via email. The experts received no payment for participating; however, they received a token of appreciation, in the form of data sent to them electronically. The researcher kept confidential the names, locations and expertise of the participants involved in the process. The researcher continued observing the ethical principles of respect, autonomy, and confidentiality during the Delphi process.

The electronic Delphi (e-Delphi) could uniquely and effectively connect the opinions of expert health education researchers and practitioners from around the country and thus provided the researcher with information to systematically generate an agreed-upon direction for the cultural competence programme (Donohoe, Stellefson, & Tennant, 2012:40). The researcher ensured that the responses from the experts at each round were captured correctly and then circulated for evaluation without names of participants. Following the Delphi technique, the developed cultural

competence programme was agreed upon after two rounds as relevant to enhance the knowledge and skills of midwives. There were no disagreements from the experts on any aspects of the programme. Consensus was thus confirmed after the two rounds of the Delphi process.

4 Ethical aspects

The researcher obtained ethical clearance from the Health Research Ethics Committee of the North-West University (NWU-HREC), ethics number NWU-00067-18-S1. A presentation was made to participants, including the research study objectives, data collection methods and measures to ensure their confidentiality and anonymity. The participants exercised their right to self-determination by signing informed consent forms after getting information about the study. The ethical principles of respect for persons, beneficence and justice were applied in this study.

Lincoln and Guba's trustworthiness principles as cited by Polit and Beck (2018:982–983) were applied as they enhanced quality criteria, which are credibility (confidence in the truth-value of the findings was ensured by having a co-coder during data analysis), dependability (stability of the data over time was ensured by having one researcher collecting data across the five hospitals for both populations), confirmability (objectivity or neutrality of the data), transferability (this study is context-specific; however, the methodology is described in a manner that the study can be replicated in other settings or groups), and authenticity (the extent to which researchers fairly and faithfully show a range of different realities from the participants).

5 Findings and discussion

The previous sections focused on the methodology that was applied in the multi-method research, this section provides the findings of each section including the process of programme development.

The findings of the concept analysis identified key components: antecedents including cultural diversity and ongoing learning process; defining attributes comprising cultural knowledge, cultural awareness, cultural skills, cultural

encounters, and cultural desire; and the consequences which encompass development of culturally competent practitioners, improved quality of care, and improved health outcomes (Shopo et al., 2023a). These antecedents, attributes and consequences was significant in the development of a programme as they are necessary for cultural competence.

Furthermore, the self-reporting survey results (Objective 2, Phase 2) indicated that midwives have a moderate level of cultural competence, emphasising the need to develop the programme (Shopo et al., 2023c). The in-depth interviews with the women receiving maternal care provided rich data on the different cultural practices that exist within the province. The main themes that emerged were: self-care by a pregnant woman, important cultural practices for diverse women, cultural care of the newborn and perception about maternal care provided (Shopo et al., 2024). Lastly, Phase 2, Objective 4 data collection comprised semi-structured interviews with the midwives. The findings further confirmed that the programme for cultural competence is necessary for midwives in the NWP. Six themes that emerged were: communication is a key component of cultural competence; midwives lack knowledge and insight about patients' cultural practices; hospitals do not have a policy on culturally competent care; patients are secretive about cultural practices during labour; facility structure makes it impossible to accommodate different cultural practices; and midwives do not understand the concept of cultural competence (Shopo et al., 2023b). The following section discusses the programme development process based on the ADDIE model.

5.1 Step 3: Programme development

The ADDIE model of programme development was followed to develop the cultural competence programme for midwives in the NWP. According to Robinson and Dearmon (2013:204), the ADDIE model is a useful tool for curriculum building and for educational and practice performance improvement. The developed programme for cultural competence is envisaged to enhance the skills, knowledge and ability the midwives, thereby consequently bringing about an improvement in their practice.

Several researchers have applied the ADDIE model in developing educational programmes and learning instructions (Almomen, Kaufman, Alotaibi, Al-Rowais, Albeik & Albattal, 2016; Bopape, Mothiba & Bastiaens, 2019; Hadi, Kuntjoro, Sumarni, Anwar, Widyawati & Pujiastuti, 2017; Pretorius, Van Dyk, Small & Amukugo, 2016; Robinson & Dearmon, 2013; Widyastuti & Susiana, 2019).

The ADDIE model is also referred to as an instructional system design model representing a series of iterative steps that are applied to build effective education and training in five steps: analysis, design, development, implementation and evaluation (Almomen et al., 2016:539). The following section discusses how the first three steps were applied in this study.

5.2 Step 1: Analysis

The researcher conducted a literature review, which guided the concept analysis for this study. The analysis step occurred during the first two phases of this study, as depicted in Figure 6.1. The concept analysis, followed by self-reporting questionnaires on levels of cultural competence completed by midwives, the in-depth interviews with women receiving maternal care, and lastly, the semi-structured interviews with the midwives, form part of the first two phases. Furthermore, the researcher used inductive and deductive reasoning for analysis to develop the programme. The women receiving maternal care provided information regarding important cultural practices during the antenatal, intrapartum and postnatal phases of their pregnancies. The analysis provided the researcher with information on where the midwives rated themselves in terms of cultural competence levels, including their knowledge related to providing quality maternal care that is culturally appropriate.

5.3 Step 2: Design

The second step in the ADDIE model is design, which revolves around the programme objectives and outcomes (Robinson & Dearmon, 2013:205). The structure of the cultural competence programme was realised at the design phase. Hadi et al. (2017:150) emphasised that the design step is

where the outline and description of the module and storyboard are created. The objective of the cultural competence programme was to empower the midwives with cultural knowledge, skills, and attributes needed in the process of becoming culturally competent practitioners. Bopape et al. (2019:270) indicated that the design of the learning outcomes, content of the training programme, teaching and learning methods, and instructional strategies needs to be done at this stage.

In order to fulfil the intended objectives of a qualification within a learning programme, it is essential that the associated learning outcomes are acquired in a systematic and coherent manner (SAQA, 2000:15). The following learning outcomes were formulated to ensure that the objective of the programme is met. At the end of the programme, the midwife should:

- Understand and describe concepts such as culture, diversity, competence, cultural competence, cultural diplomacy, transcultural care and culturally congruent care.
- Discuss the different cultural competence models and their application.
- Demonstrate the ability to explain cultural diversity including important cultural practices for diverse women.
- Demonstrate cultural sensitivity by respecting the diverse cultural values and beliefs of women from antenatal to postpartum period.
- Be able to communicate effectively with the women receiving maternal care.
- Demonstrate ability to provide health education to women about safe cultural practices.
- Demonstrate ability to provide quality maternal healthcare using cultural competence skills.
- Contribute to the development of policies and or guidelines for cultural competency in their different environments (hospital, clinics or waiting homes).

The SAQA (2000:16) states that applied competence means that a qualification must address both the theoretical as well as practical needs of the learners. The design phase for the programme, therefore, included outlining the teaching and learning methods in which the midwives would engage during instruction, such as lectures, critical debates, role-playing, and case studies during the workshops. The mode of delivering the programme will be flexible enough to accommodate midwives, and would include a blend of online learning and lectures during the workshop. Workshops, which are well-planned and purposeful, are an effective method of educating (Muller & Bester, 2016:514). The researcher planned to make use of prepared workshops for the face-to-face and online lectures.

5.4 Step 3: Development

As the third step in the ADDIE model, the development depends on first and second steps being carried out correctly. Aldoobie (2015:70) suggested that this is where the instructional designer starts to develop and create a good-quality factual sample for the instructional design, and a runthrough the course content. Course content is the subject matter for completion in the course, including skills, knowledge and attitudes, as well as the planned activities that the midwives must cover in order to develop required competencies and reach the outcomes (Armstrong, 2017:237). Muller and Bester (2016:511) further explain learning content as the topics or themes included in the educational programme.

The researcher developed the content based on the learning outcomes so that there was sufficient time for presentation and interaction with midwives during instruction. The content is therefore based on three study units, 1) Introduction to cultural competence, 2) Utilising cultural competence skills, and 3) Application of cultural competence in midwifery practice. The following section outlines the related content of these study units.

Study unit 1 is theoretical content and covers cultural competence concepts; cultural competence models and the application; cultural diversity in maternal health; and different cultural practices in maternal health. Study

unit 2 also consists mainly of theoretical component covering cultural values and beliefs of women receiving maternal care; intercultural communication; effective and ineffective communication in maternal care. Lastly, study unit 3 focuses on the practical component with a focus on safe cultural practices in maternal health and incorporating cultural competence in maternal care.

The programme is envisaged to run for a period of two weeks, followed by assessment of competence. Assessment processes are important to ensure there is an alignment between the purpose of the learning programme and the way in which assessment of the learning outcomes occurs, and the way in which learners are credited (SAQA, 2000:15). The assessment will include written assignments as well as assessment of competence levels using the cultural competence questionnaires, for example the Transcultural Self-Efficacy Tool (Jeffreys, 2019). The assessment of the practical skills, which include communication and assessment, can be in the format of a Portfolio of Evidence submitted at the end of training whereby midwives are expected to apply knowledge obtained during instruction. Therefore, at the end of participating in the programme, the midwife must demonstrate an applied competence. SAQA (2000:16) differentiates applied competence as follows:

- Foundational competence, which is described as an understanding of what is done and why.
- Practical competence, which is described as a demonstrated ability to do a particular thing.
- Reflexive competence is described as the demonstrated ability to integrate or connect performance to learn from actions and adapt to change and unforeseen circumstances.

Integrated assessments, according to SAQA (2000:21), refer to a form of assessment that allows the learner (in this study, a midwife) to demonstrate applied competence, and use a range of formative and summative assessment methods. The researcher planned that the formative and summative assessments would be in the form of written assignments, as well as practical assessment. The development of the assessment processes

must be in such a way that it ensures alignment between the cultural competence programme's purpose and the way in which the learning outcomes are assessed. Table 6.1 below outlines the learning outcomes which are aligned to the assessment criteria.

Table 6.1: Specific learning outcomes of the Cultural Competence Programme

After completion of this cultural competence programme, the midwife will:	The midwife will prove that the outcomes have been realised by demonstrating the ability to:
<i>Theoretical component</i> 1. Understand and describe concepts such as culture, diversity, competence, cultural competence, transcultural care, cultural diplomacy and culturally congruent care. 2. Discuss the different cultural competence models and their application. 3. Demonstrate the ability to explain cultural diversity, including important cultural practices for diverse women. 4. Demonstrate cultural sensitivity by respecting the diverse cultural values and beliefs of women from the antenatal to the postpartum period. 5. Communicate effectively with women receiving maternal care reflecting the Ubuntu philosophy. <i>Practical component</i> 6. Demonstrate the ability to provide health education to women about safe cultural	<i>Theoretical component</i> 1. Discuss the concepts related to cultural competence and relate them to midwifery context. 2. Analyse the different cultural competence models. a. Discuss the assumptions of the following models: i. Leininger's Culture Care Model (2002) ii. Purnell Model of Cultural Competence (2002) iii. Campinha-Bacote Model (The process of Cultural Competence in the Delivery of Healthcare Services, 2002) b. Apply the different cultural competence models to the midwifery context. 3. Explain cultural diversity as a concept applicable to the healthcare environment. a. Identify different cultural practices in midwifery that are prevalent within the NWP. 4. Identify the cultural values and beliefs of women receiving maternal care in the NWP. a. Demonstrate cultural sensitivity when providing maternal care. 5. Discuss communication between people with different cultures (intercultural communication). a. Discuss effective communication in the midwifery context. b. Explain ineffective communication and its consequences in maternal care.

practices.	c. Describe Ubuntu philosophy within context of midwifery.
7. Demonstrate the ability to provide quality maternal healthcare using cultural competence skills. 8. Contribute to the development of policies and/or guidelines for cultural competency in their different environments (hospitals, clinics or waiting homes).	<i>Practical component</i> 6. Identify safe cultural practices prevalent in the NWP and provide health education to women receiving maternal care. 7. Design a care plan for diverse women incorporating the cultural knowledge, skills and attributes acquired during the programme. 8. Draft guidelines to incorporate culturally competent care in the different working environments (hospitals, clinics or waiting homes).

6 Limitations and recommendations

While the study made a significant contribution by means of a reliable programme for cultural competence, the researcher acknowledges that there are some limitations. The study was carried out in one province out of the nine provinces of SA; therefore, the findings cannot be generalised. The methodology is described in such a way that other researchers can replicate the study in other contexts.

The recommendations include that the programme be implemented and evaluated; this is currently being done in a post-doctoral project by the researcher. To ensure sustainability of the programme, there is a need to formally integrate the programme into an undergraduate midwifery curriculum. This will ensure that the programme is not a once-off training intervention. Furthermore, policy formulation and implementation by the NWP Department of Health in integrating the cultural competence component in the maternity guidelines are needed. The maternity guidelines used in the public hospitals must be updated to include the standards relating to the provision of culturally competent care. The

programme forms a basis for further research to be conducted in other contexts within SA.

7 Conclusion

The cultural competence programme for midwives was developed following a multi-phase, multi-method approach. The developed programme was validated using a Delphi technique, whereby consensus from a panel of experts was reached. The findings demonstrate that a well-structured, context-specific training can meaningfully enhance the awareness, confidence and skills of midwives when providing care to women from diverse backgrounds. This cultural competence programme is thus intended to enhance and strengthen the ability of midwives to provide quality, culturally appropriate midwifery services to culturally and linguistically diverse patients. Culturally competent midwives can contribute positively to a more respectful and person-centred maternal healthcare system.

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CHAPTER 7

A REVIEW OF CONTINUOUS PROFESSIONAL DEVELOPMENT PROGRAMMES FOR INTERPROFESSIONAL COMPETENCIES OF INTENSIVE CARE TEAMS

1. NE Zenani / 2. S Scholtz / 3. Y Heymans

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¹ School of Nursing Science
Faculty of Health Sciences
North-West University, Mmabatho, South Africa
sunshine.zenani@nwu.ac.za
ORCID: 0000-0001-7397-6707

³ Centre for Health Professions Education
Faculty of Health Science, North-West University
Potchefstroom, South Africa
Yolande.heyman@nwu.ac.za
ORCID: 0000-0003-4459-2266

² School of Nursing Science, Faculty of Health Sciences
North-West University, Mmabatho, South Africa
suegnet.scholtz@nwu.ac.za
ORCID: 0000-0002-4316-5257

Abstract

Professionals in intensive care units (ICU) care for patients facing life-threatening situations; ensuring patient safety and high-quality care for critically ill patients requires ICU teams to work together in interprofessional teams that rely on effective interprofessional skills. This chapter presents the findings of the integrative literature review guided by the question: What is available in the literature on continuous professional development programmes aimed at enhancing the interprofessional competencies of ICU teams? An integrative literature review outlined by Whitemore and Knafl (2005) was performed. Four electronic databases, namely Cochrane Library, CINAHL, ScienceDirect, and PubMed, were searched to find relevant articles published articles, using the search terms “continuous professional development programmes”, “interprofessional competencies”, “interprofessional collaborative practices”, and “intensive care teams”. The retrieved articles underwent rigorous screening and quality appraisal based on the research inclusion criteria for the review, resulting in 19 peer-reviewed articles that qualified for thematic analysis. The review shows that continuous professional development (CPD) programmes that improve the interprofessional competencies of ICU teams are designed based on the needs and clinical gaps identified in the ICU through conducting situational analyses. The situational analysis guides the learning outcomes, the programme's teaching strategies, learning activities, and how the competence and success of the programme are to be evaluated. Various multidimensional assessment tools and approaches, such as reflective team discussions, are recommended. Additionally, when correctly implemented, the CPD programme supports patient safety and fosters a positive psychological environment, which helps improve team cohesion and job satisfaction.

Keywords: continuous professional development programmes, interprofessional competencies, interprofessional collaborative practices, intensive care teams.

1 Introduction

Patients in intensive care unit (ICU) settings receive care from various medical and healthcare professionals according to their diagnoses and treatment requirements. Interprofessional care necessitates that healthcare personnel in the ICU collaborate efficiently to protect patient safety and guarantee favourable outcomes for critically ill individuals (Sedighi Nezhad & Mahmoudi, 2023:6; Vaseghi et al., 2022:496). Attaining superior patient-centred care requires effective interprofessional communication, collaborative leadership, and cooperation (Andersen et al., 2023:1119556; Goldman & Xyrichis, 2020:580; Loura et al., 2021:63). Moreover, it necessitates robust team values, ethics, well-defined roles and duties, and mutual trust and respect, all essential for efficient interprofessional collaboration practices in an ICU (Loura et al., 2021:2). Consequently, fostering interprofessional abilities in an ICU environment is a crucial and requisite measure to improve advanced interprofessional collaboration in ICUs (Vaseghi et al., 2022:496). Interprofessional competencies are crucial for fostering interprofessional identity and culture within interprofessional ICU teams. Furthermore, interprofessional abilities enhance the quality and cost-effectiveness of key healthcare services through accountable care practices that mitigate unfavourable outcomes and foster patient-centred care (Boltey et al., 2023:857). Thus, any project that improves interprofessional competencies in an ICU requires assessment and execution. This article presents the results of an integrative literature analysis addressing the question: What literature exists regarding continuous professional development programmes to enhance the interprofessional capabilities of ICU teams?

2 Background

Continuous professional development (CPD) is essential for healthcare practitioners. CPD programmes are continuous, self-directed, systematic, and outcome-oriented learning tools for professional enhancement (King et al., 2021:104652). In healthcare, CPDs are educational programmes that are

characterised by several definitions. This may be termed workforce development, continuing medical education, or ongoing education (Beasley, 2021:240). The CPD programmes in healthcare seek to maintain the information and skills healthcare workers acquire. It additionally promotes competence by mandating essential skills pertinent to the job profile or by including new skills that facilitate safe and high-quality healthcare practices (Khatri et al., 2021:15; King et al., 2021:104652; Vázquez-Calatayud et al., 2021:102963). The CPD programmes are strongly endorsed for improving public safety against inadequate care, which may result in harm (King et al., 2021:104652). In CPD programmes, healthcare professionals gain knowledge, skills, and attributes through diverse activities, including experiential learning at the bedside, observation, collaboration with interprofessional teams, or participation in formal teaching programmes (Khatri et al., 2021:15). In most healthcare professions, CPD programmes are associated with licensure and governed by regulations established by regulatory councils. This allows healthcare personnel to continuously learn within their positions (Khatri et al., 2021:15).

Critically sick patients in the ICU are clinically and psychologically vulnerable. Minor errors in care can result in considerable morbidity and mortality events (Kendall-Gallagher et al., 2017:20; Donovan et al., 2018:980). The complexity of the ICU necessitates extremely efficient and effective interprofessional collaboration among varied team members. Critically ill patients rely on the specialised knowledge, abilities, and qualities of an interprofessional team to operate cohesively, collaboratively, and effectively, hence enhancing their chances of survival and care in an ICU (Kendall-Gallagher et al., 2017:20). Interprofessional collaboration in the ICU entails effective relationships and shared objectives that encompass complementary and interdependent responsibilities, mutual trust, respect, and power-sharing (Schmid et al., 2022:381). The authors utilised the six competency domains from the Canadian Interprofessional Health Collaborative (CIHC) framework, depicted in Figure 7.1, to elucidate the fundamental competencies necessary for delivering quality care and enhancing professional collaboration (CIHC, 2024:1).

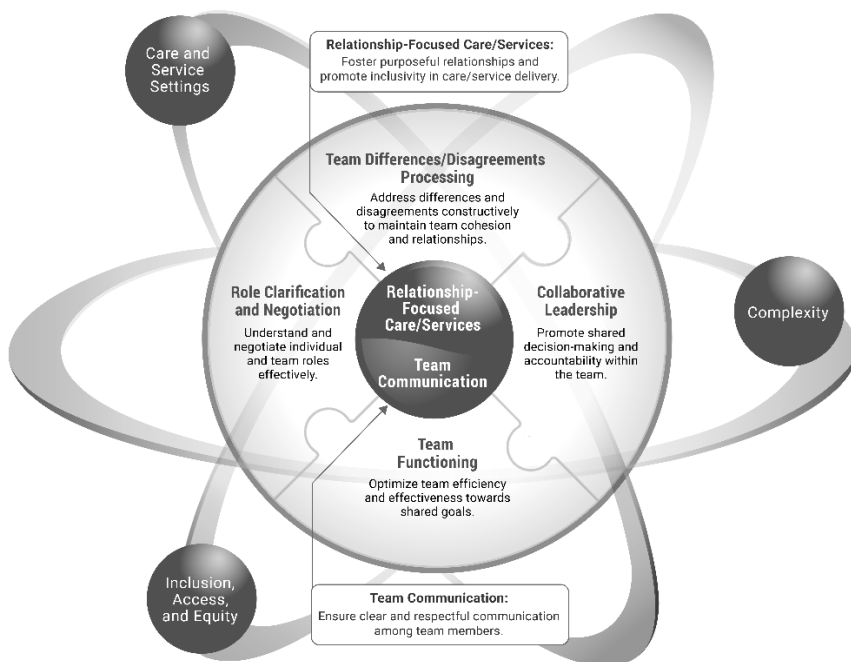


Figure 7.1: Canadian Interprofessional Health Collaborative Competency Framework for Advancing Collaboration 2024. Source: (CIHC, 2024:1); www.cihc-cpis.com

The CIHC Competency Framework for Advancing Collaboration (CIHC, 2024:1) emphasises six competency areas. It delineates the knowledge, abilities, attitudes, and values that inform the judgements and behaviours critical for collaborative practice. The relationship-oriented care/services and team communication domains are central to the framework. Clarification of roles and negotiation, team dynamics, processing of differences and arguments, and collaborative leadership are vital for fostering relationship-centred care/services and effective team communication. In this study, the inability to foster relationships in the ICU adversely affects effective interprofessional teamwork. Interprofessional conflict may arise from unaddressed power dynamics, poorly managed and negotiated roles and responsibilities, and inadequate strategies for resolving differences and disagreements constructively, thereby undermining team cohesion and trust (Michailidou, 2021:14; Palma et al.,

2022:24; Stollings et al., 2020:562). Consequently, interprofessional collaboration practices are implicated, resulting in inadequate communication across interprofessional teams, interprofessional tension, conflicts, and incivility among ICU team members (Schmid et al., 2022:381). The treatment administered to critically sick patients become fragmented or task-oriented rather than holistic, characterised by shared decision-making and team accountability (Palma et al., 2022:24). Literature indicates that insufficient interprofessional competencies and their application to guarantee safe and quality care in the ICU are regarded as the primary factors contributing to interprofessional conflicts, inadequate communication, and a deficiency in collaborative practices (Dunn et al., 2018:284; Goldman & Xyrichis, 2020:580; Goldman et al., 2018:407; Schmid et al., 2022:381). Goldman and Xyrichis (2020:580) contend that interprofessional ICU disagreements adversely impact team communication. This further involves team consultation, team-based diagnosis, planning, and execution of patient-centred care delivery. Consequently, increased tension and conflicts would likely result in interprofessional arguments over decision-making among team members, affecting a patient's treatment and quality of care in an ICU (Goldman & Xyrichis, 2020:580).

The Framework for Advancing Collaboration (CIHC, 2024:1) identifies three important criteria that facilitate interprofessional collaboration: inclusion, access, and equity; complexity; and the care and service setting. The ICU team embodies and exemplifies principles rooted in its members' diverse perspectives, talents, beliefs, and experiences to improve teamwork for relationship-centred care (CIHC, 2024:1). Moreover, the ICU staff must exhibit culturally sensitive care considering the team's and patients' cultural variety (Shopo et al., 2023:330). Exhibiting cultural diversity in the ICU environment is essential, particularly amidst heightened emotions, urgency, and panic at critical decision-making moments. Fostering trustworthy relationships among ICU teams will ultimately enable them to understand one another and enhance their appreciation for cultural diversity and culturally sensitive treatment (Brooks, 2020:1).

The second aspect identified as complexity pertains to recognising that the methodology for team-based cooperation may differ when a team member operates in distinct disciplines, varying along a continuum from simple to complicated (CIHC, 2024:1). In a specialised environment like the ICU, the complexity is heightened because of the collaborative care numerous healthcare experts provide. The third factor is the care or service environment. The Framework for Advancing Collaboration (CIHC, 2024:1) defines the care/service setting as the context in which healthcare professionals operate, encompassing the home environment, work and leisure conditions, and accessible support. Such settings profoundly affect collaboration for effective treatment and services (CIHC, 2024:1).

The CIHC Framework for Advancing Collaboration (CIHC, 2024:1) offers a robust theoretical basis for improving interprofessional competency development to facilitate effective collaboration; however, Vaseghi et al. (2022:496) and Leal Silva et al. (2023:1) contend that the majority of medical, nursing and health-allied curricula inadequately address and cultivate interprofessional competencies. Zenani et al. (2023:315) agree on including interprofessional competencies in health education curricula to educate healthcare professionals on collaborative learning and interaction.

A curriculum comprises at least four essential components: material, pedagogical tactics, assessment systems, and evaluation processes. The systematic arrangement of these four elements into a coherent framework is called curriculum design (Grant, 2018:71). The curriculum design in healthcare education is developed for the students and the advantage of healthcare communities. The curriculum's content and student experiences must enhance clinical practice and elevate health education standards (Grant, 2018:71). The authors assert that the curriculum design for CPD programmes in the ICU should be based on the needs of ICU teams, identified knowledge and practice gaps, research, and feedback from patients receiving care from these teams. The curriculum should be pertinent and targeted to address these shortcomings. Consequently, the initial strategy for curriculum design is to ensure that the characteristics of the ICU team are integrated into the curriculum for CPD programmes that increase interprofessional competencies. The ICU team's competencies,

attributes, and scope of practice are emphasised in the material and the educational process (Grant, 2018:71; Tun, 2019:1168). The second strategy is to guarantee that the learning process yields integrated experiences that modify the ICU team's behaviour regarding interprofessional collaboration practices in the ICU. The third method is to promote the ICU to deliver safe and high-quality care as an outcome of the CPD programme (Grant, 2018:71; Tun, 2019:1168).

Competency-based education (CBE) remains pertinent and favoured for CPD programmes in professional healthcare education when compared to traditional approaches (Ige et al., 2024:685). The literature delineates fundamental concepts that distinguish CBE as follows. CBE emphasises the results of training and education, assessing students' competencies relative to established standards. Moreover, CBE necessitates a flexible curriculum that fosters a learner-centred approach (Grant, 2018:71; Ige et al., 2024:685; Tun, 2019:1168). Despite the above debate, limited research examines the nature of interprofessional continuing professional development programmes that strengthen the interprofessional abilities of ICU teams. This study addresses the research question: "What does the literature reveal about the nature of interprofessional continuous professional development programmes designed to enhance the interprofessional competencies of ICU teams?"

The study is approved by the North-West University Health Research Ethics Committee (HREC) and assigned the number (NWU-0051-23-S1).

3 Methods

The authors employed the integrative literature review methodology outlined by Whittemore and Knafl (2005:546) to guarantee a methodologically rigorous integrative literature review. An integrative literature review is valuable for examining the scope and depth of studies published on a certain research issue. Moreover, integrative literature reviews facilitate the exploration of the background and concepts pertinent to a study (Christmals et al., 2018:2377960818783820). This review facilitated the synthesis of previous empirical data to enhance the

knowledge of continuous professional development programmes designed to cultivate interprofessional capabilities within critical care teams (Whittemore & Knafl, 2005:546). An integrative literature review, as defined by Whittemore and Knafl (2005:546), encompasses five stages: problem identification, literature search, data evaluation, data analysis, and presentation of findings. The authors adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for reporting their findings (Moher et al., 2010:336).

The researchers' enquiry for this integrative literature analysis was, "What literature exists regarding continuous professional development programmes designed to enhance the interprofessional competencies of ICU teams?" The research question was formulated using the PICO format (Schardt et al., 2007:1), but the comparator was excluded from this study; therefore, the PIO format was utilised as follows:

- Population (P): ICU teams comprising nurses, medical professionals, and allied healthcare practitioners collaborating within an ICU.
- Intervention (I): Interprofessional continuous professional development programmes.
- Outcome (O): Enhanced interprofessional abilities that facilitated collaboration among professionals.

3.1 Identification of the problem

The absence of interprofessional competencies within ICU teams results in medical errors, fosters professional tensions, and exacerbates conflicts and communication deficiencies, thereby jeopardising the psychological climate for ICU personnel and the safety of critically ill patients (Vincent et al., 2020:1450). This implication in clinical practice is evidenced by increased adverse events that elevate the likelihood of lawsuits (Hlongwa & Rispel, 2021:1; Ngoben, 2022:1; Zenani et al., 2023:2). To address the limitations of skills, knowledge, and traits in suboptimal interprofessional collaboration in the ICU, the authors aimed to explore and describe the available literature

on CPD programmes aimed at enhancing the interprofessional competencies of ICU teams. The results will inform guidelines for developing CPD programmes to enhance interprofessional competencies within ICU teams.

3.2 Literature search

The authors, aided by a research assistant from the institution, searched four research databases: Cochrane Library, ScienceDirect, CINAHL, and PubMed. The literature search encompassed mixed-method, qualitative, and quantitative research studies as part of the inclusion criteria. Additionally, it encompassed reports and grey literature, including dissertations, to thoroughly comprehend the subject under investigation. The PIO structure was an inclusion criterion to decompose the problem into searchable components. Moreover, only full-text publications in English were considered, as all authors are proficient in English, facilitating thorough analysis and comprehensive synthesis of English manuscripts compared to those in other languages.

Furthermore, English is a global academic language, providing access to many works for review. The review encompassed published materials from 2010 to 2023. The initial research on interprofessional abilities and implementation suggestions as essential competencies for Interprofessional Collaborative Practice was released in 2011, justifying the search's commencement in 2010 (CIHC, 2024:1). The exclusion criteria encompassed papers that failed to match the specified standards, non-peer-reviewed sources, and those identified as duplicates during the screening process within the databases utilised for the search. Search descriptors included: Continuing professional development, continuing education, continuing education, staff education, health education development, programmes, training, education, intensive care teams, intensive care unit, emergency unit, critical care team, critical care unit, interprofessional, inter-profession, interprofessional connections, interprofessional competencies, interprofessional education, interprofessional collaboration, multidisciplinary, cross-disciplinary, and transdisciplinary. The Boolean operators employed to amalgamate the different descriptors were "AND"

and "OR". The preliminary search yielded 1,066 sources. The authors identified seven reviews and 250 trials in the Cochrane Library. ScienceDirect provided 435 publications, while PubMed offered 339 publications. Figure 7.2 illustrates the search approach employed by the authors utilising the PRISMA flowchart model.

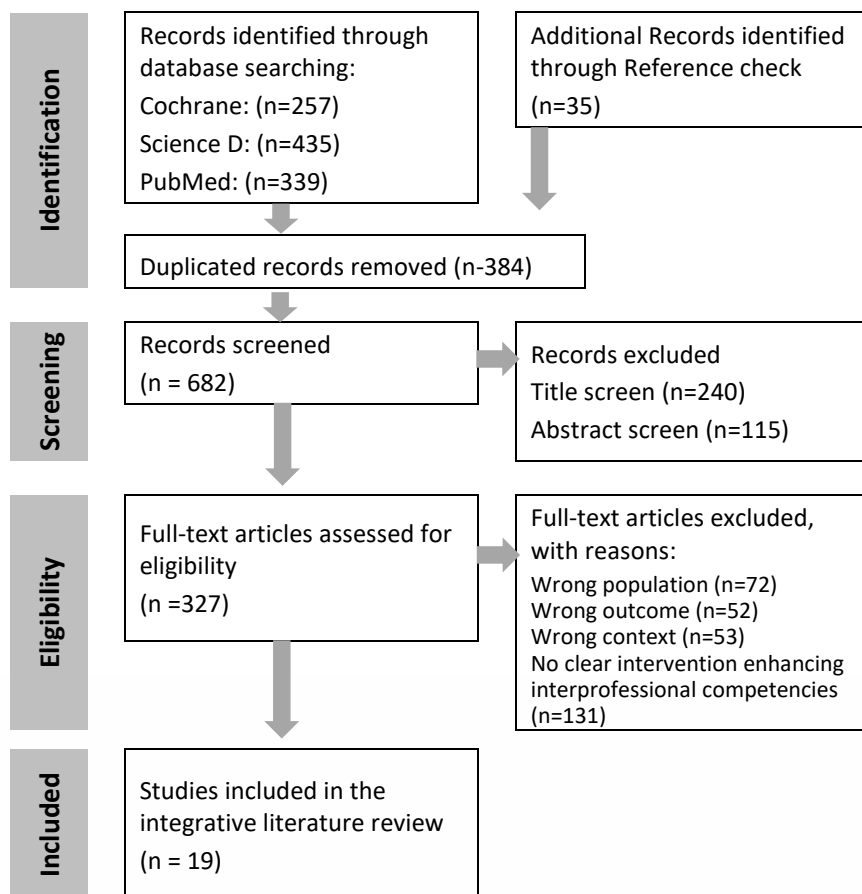


Figure 7.2: Presentation of the search strategy using the PRISMA flowchart model. Source: Adopted from the PRISMA 2009 diagram (Moher et al., 2010:336)

3.3 Data evaluation

The initial search retrieved 1,031 published articles. Author 1 uploaded the articles to the Rayyan data extraction software and thereafter checked the references of the articles to identify additional and relevant articles. Author 1 identified an additional 35 articles. The Rayyan software detected and removed 384 duplicates. Authors 1 and 2 screened the titles of the articles and removed articles deemed irrelevant ($n = 240$). Authors 1 and 2 independently reviewed the abstracts using the pre-determined inclusion and exclusion criteria and removed an additional 115 articles. Authors 1 and 2 then screened the text of the remaining 327 articles for eligibility against the inclusion criteria. Using the Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool (Newhouse et al., 2017:22), the authors critically appraised the identified articles that met the inclusion criteria. Mixed-method studies were appraised using the Mixed Methods Appraisal Tool (MMAT) by Hong et al. (2018:285), as the Johns Hopkins Nursing Evidence-Based Practice Research Evidence appraisal tool could not be used for this purpose. After the screening and quality appraisal, 19 articles were deemed relevant for the integrative literature review.

3.4 Data analysis

Author 1 imported the selected articles into ATLAS.ti 24 and, in collaboration with an independent co-coder and Author 3, conducted a thematic analysis of the data. Following the methodology of Whitemore and Knafl (2005:546), Author 1 and the co-coder separately reviewed the data to become acquainted with its content and to deduce relevant codes. During a meeting, the coders discussed the proposed codebook, whereafter Author 1 and the co-coder coded one of the data sets. Codes were added inductively to the planned codebook when needed. After coding the initial data set, the coders convened to deliberate on the coding to achieve consensus and then finalise the codebook. Upon finalisation of the codebook, the coder and co-coder assigned relevant text from the remaining 19 articles to the appropriate codes. The second and third authors validated the coding procedure for consistency during the coding phase. The authors convened after the completion of coding to deliberate

on the findings and establish links. The authors utilised the relationship and networking features in ATLAS.ti 24 to connect codes to code groups, code groups to sub-themes, and sub-themes to themes. After that, Author 1 compiled a data extraction table comprising the author/s with year and country, research method, characteristics of CPD programmes, assessment, competencies obtained, and impact of CPD programmes on ICU teams and ICU settings.

4 Findings

To address the objective of this review, namely, to explore the nature of the CPD programmes aimed at enhancing the interprofessional competencies of ICU teams, Table 7.1 summarised the findings obtained from the data analysis (Annexure A).

Table 7.1: Summary of the findings

Category	Details
Origin of articles	• The included studies originated from diverse geographical locations, reflecting a global interest in interprofessional training for ICU teams. Articles were from the United States of America (n = 5), Canada (n = 3), Germany (n = 3), Spain (n=1), Denmark (n = 1), the United Kingdom (n = 1), Colombia (n=1), Central Iran (n = 1), Thailand (n = 1), Indonesia (n = 1), and Australia (n = 1).
Study design	• The studies employed a variety of research designs and methodologies to examine interprofessional training interventions. These included systematic reviews (n = 3), an ethnographic study (n = 1), a cross-sectional study (n = 1), and mixed-method studies (n = 14).
Focus	• The CPD programmes were developed based on the specific needs of ICU professionals and gaps in practice. • The CPDs were grounded in interprofessional education principles, emphasising learning with, from, and about each other. • The CPDs primarily focused on improving teamwork and clinical outcomes in an ICU setting and focusing on interprofessional team-based simulation training.

	• In addition, the CPDs focused on enhancing interprofessional competencies such as communication, collaboration, relational coordination, decision-making, and patient safety among ICU professionals in ICU teams. • Many CPDs emphasised technical skills development, such as advanced interprofessional life support, cardiovascular and respiratory treatment, interprofessional ventilation courses, and palliative care.	
Themes	Description	Sub-themes
Theme 1: Planning	Theme 1 focuses on planning CPD programmes, considering contextual factors, logistics, and participant demographics to ensure relevance and effectiveness.	Situation analysis • training needs analysis • target group (participants) Logistics • recruitment and marketing • venue selection Contextual factors, challenges, and barriers to effective CPD implementation
Theme 2: CPD aims, objectives/ outcomes	Theme 2 focuses on the aim/purpose/outcomes of the CPD programmes in terms of knowledge, skills and attitudes. In addition, it focuses on the benefits of the CPD programme for the ICU teams, patients, and healthcare institutions.	Aim of the CPD in terms of • Knowledge • Skills • Attitudes Benefits of participating in the CPD for • ICU teams • patients • healthcare institutions
Theme 3: Design, delivery and evaluation of the CPD	Theme 3 addresses how CPD programmes are designed and delivered. The theme focuses on curriculum design, teaching and learning strategies, learning activities in which professionals learn with, from and about each other, and content to enhance the interprofessional competencies of ICU teams.	Curriculum development • models and frameworks • course developers Delivery • mode of delivery • CPD duration • facilitators Teaching and learning strategies Learning activities

		Technology used Evaluation of the CPD offering
Theme 4: Assessment and feedback	Theme 4 explores participant assessment practices and feedback practices within the CPD programme.	Assessment practices Feedback

5 Discussion

5.1 Theme 1: Planning

Theme 1 emphasises the planning of CPD programmes, addressing contextual factors, logistics, and participant demographics to ensure relevance and effectiveness. The theme focuses on the importance of conducting a situation analysis, considering the logistics and contextual factors, challenges, and barriers to effective CPD implementation that promote interprofessional abilities that are essential for promoting collaboration within ICU teams; therefore, the development of the CPD course must be meticulously organised. These programmes are structured to dismantle conventional barriers in critical care, fostering collaboration and communication skills vital for providing superior patient care (Reeves et al., 2016:656). The authors subsequently examine the selected sub-themes.

5.1.1 Sub-theme 1.1: Situational analysis

Training needs analysis

From the analysis, performing a situation analysis, which includes a training needs analysis and pre-assessment evaluations to identify the knowledge and/or skills deficiencies among ICU workers that require rectification, is essential. Needs analysis are done using questionnaires containing close-ended Likert scale and/or open-ended type of questions. Questions centred around course expectations, course structure, content, and logistics. Course participants' feedback is considered pivotal in developing the course content and structure, thereby improving participant engagement (Bernal et al., 2023:765; Brewster et al., 2017:79; Flentje et al., 2020:1; Graham et

al., 2018:75; Irajpour et al., 2019:196; Lown et al., 2011:401; Manggala et al., 2022:617; Michael et al., 2022:939187; Nicholson et al., 2019:100284; Nonas et al., 2022:270; O'Brien et al., 2023:85; Weile et al., 2021:1). Holloway et al. (2018) assert that CPD programmes must be pertinent, intentional, and inclusive of diverse personal and professional development needs. Assessing training needs is crucial for ensuring that CPD programmes enhance the performance growth of ICU professionals effectively. Moreover, conducting a training needs analysis provides an understanding of the unknown factors in the workplace, such as policy and management structure, which may cause the skills or knowledge gap. This information could save superfluous expenditures on unsuitable education and direct efforts towards assisting ICU teams and the organisation in achieving their objectives or addressing training requirements (Holloway et al., 2018:7).

Intended Audience/Participants in the Continuing Professional Development

The analysis indicated that the intended audience for the CPD programme comprised interprofessional healthcare teams (Bernal et al., 2023:765; Fettig et al., 2022:1157; Irajpour et al., 2019:196; Lincoln et al., 2020:e033521; Lown et al., 2011:401; Manggala et al., 2022:617; Michael et al., 2022:939187; Watts et al., 2014:521). The presence of the interprofessional team in the ICU participating in CPD programmes facilitated mutual learning and enhanced interprofessional collaboration, improving the quality and safety of critical care. McLaney et al. (2022:112) characterise interprofessional teams as diverse experts and healthcare practitioners who possess a collective identity and collaborate in a cohesive and interdependent manner to address intricate care challenges and deliver health services. The findings concur with Australian research, suggesting that interprofessional CPD programmes should include multiple professions to encourage team-based learning (Main & Anderson, 2023:23). In the United States of America (USA), the interprofessional nature of participants in the CPD programmes enables joint accreditation for CPD programmes. It provides simultaneous accreditation across health practitioner groups.

5.1.2 *Sub-theme 1.2: Logistics*

Logistics are essential in the planning of CPD programmes that improve the interprofessional competencies of ICU teams, encompassing elements such as marketing and recruitment, venue selection, contextual factors, and obstacles to implementing ICU CPD programmes that enhance these competencies. These elements collectively aid facilitators in minimising disruptions, enhancing participant engagement, and attaining the learning objectives of the CPD efforts (Michael et al., 2022:939187; Bernal et al., 2023:765; House et al., 2023:102001).

Recruitment and Marketing

The review emphasises the importance of efficient scheduling and promotion of CPD programmes for ICU teams as a crucial strategy for obtaining management support and attaining successful results (Abu-Rish Blakeney et al., 2019:481; Fettig et al., 2022:1157; George & Quatrara, 2018:144; House et al., 2023:102001; Lown et al., 2011:401). For example, in Canada, George and Quatrara (2018:144) pre-emptively engaged with executive management three months before the trial, disseminating course content and coordinating meetings with ICU teams to address enquiries and concerns. Fettig et al. (2022:1157) in the USA utilised targeted emails and promotional materials to enlist people for their communication skills training designed to enhance team relationships in the ICU. Do et al. (2022:808) highlighted that utilising authority figures could enhance the requisite support for course implementation. Management endorsement links training with operational requirements and cultivates a learning culture, encouraging staff participation in training efforts. House et al. (2023:102001) executed a two-month recruiting and marketing initiative for their training programme in Germany, including emails, virtual meetings, and in-person engagements with the ICU team to delineate objectives, content, expectations, and assessment methodologies. Abu-Rish Blakeney et al. (2019:481) improved marketing initiatives by issuing weekly reminders and occasional announcements during staff meetings, rewarding confirmed participants with coffee vouchers and entries into a prize draw, thus cultivating innovative relationships with management and staff to

guarantee complete attendance. Hill et al. (2021:1228) assert that recruitment and marketing campaigns enhance participation rates, and institutions that actively promote training opportunities experience increased workforce engagement, ultimately resulting in improved patient outcomes due to augmented clinical knowledge and skills, particularly in the ICU environment.

Selection of venue

The selection of locations for interprofessional training programmes is essential for the efficacy of programme facilitation. The review reveals that training facilities comprised simulation laboratories, ICU environments, and lecture halls within affiliated universities and hospitals, furnished with sophisticated mannequins for authentic patient–staff interactions (Bernal et al., 2023:765; Brewster et al., 2017:79; Fetting et al., 2022:1157; Flentje et al., 2020:1; Graham et al., 2018:75; Irajpour et al., 2019:196; Lincoln et al., 2020:e033521; Manggala et al., 2022:617; Michael et al., 2022:939187; Nonas et al., 2022:270; Weile et al., 2021:1). The simulation laboratories accurately mimicked actual ICU settings, enabling participants to hone their abilities in a realistic situation, thus improving the integration of theory and practice (Nonas et al., 2022:270; Watts et al., 2014:521). Literature indicates that when healthcare students promptly use theoretical information in simulated laboratories, they get deeper insights and retain knowledge and abilities efficiently. Furthermore, swift theory practice integration in simulation laboratories fosters reflective learning, allowing healthcare students to critically analyse their actions and outcomes, which leads to CPD (Fadana & Vember, 2021:1; Nxumalo, 2011:1; Weeks et al., 2019:29).

Several studies included in-situ simulation, wherein training interventions occurred within hospital environments, including ICUs, emergency departments, and simulation laboratories, enhancing skill display and retention (House et al., 2023:102001; Watts et al., 2014:521). The course facilitators employed specialised teaching rooms furnished with audiovisual equipment for instructional sessions before practical training in simulation areas, as noted by Nonas et al. (2022:270), Nicholson et al. (2019:100284), Watts et al. (2014:521), Manggala et al. (2022:617), and Fetting et al.

(2022:1157). These hospitals, designated as teaching institutions, upheld service-level agreements with universities, enabling the incorporation of academic resources into the training programmes. Nonas et al. (2022:270) executed a mixed-method study in Thailand, incorporating commercial and state hospitals and university simulation centres for training objectives. The partnership between universities and hospitals is essential for supplying requisite resources and ensuring participant involvement, improving the skill development of ICU teams and eventually fostering safe, high-quality patient care (Nxumalo, 2011:1).

5.1.3 Sub-theme 1.3: Contextual considerations, challenges and barriers to effective CPD implementation

According to the Oxford Dictionary, contextual factors denote the diverse aspects or conditions that may affect, shape, or characterise a specific scenario. As part of the contextual factors, the review emphasised the need for the CPD programmes to be tailored to the specific needs of participants, infrastructure, and resources while being culturally sensitive and inclusive (Lown et al., 2011:401; Watts et al., 2014:521; Nonas et al., 2022:270). For instance, Nonas et al. (2022:270) highlighted the importance of having translators to accommodate varying English proficiency levels among ICU teams, ensuring effective communication and understanding. The review also underscored the significance of selecting appropriate interprofessional faculty committed to the programme's objectives and the necessity of leadership support for ICU teams to attend training (Lown et al., 2011:401). The presence of cross-cultural champions could motivate diverse professionals to engage with CPD programmes, enhancing their effectiveness.

The review indicated that developing and facilitating CPD programmes to enhance interprofessional competencies among ICU teams presents unique challenges that require careful strategic planning. High-fidelity simulators were utilised to create realistic ICU scenarios; however, Brewster et al. (2017:79) noted that the effectiveness of interventions could be compromised if only lower-fidelity equipment were used. Similarly, Chang, Chen et al. (2025:104424) reported limitations in equipment, such as using

plastic bags as simulated lungs, which restricted scenario complexity and educational effectiveness. Effective planning and resource collaboration with stakeholders, as demonstrated by Nonas et al. (2022:270), are essential for creating conducive learning environments. Cost implications were also a common concern, with George and Quatrara (2018:144) estimating simulation training costs at \$326 per session. Nationally and globally, interprofessional CPD programmes present similar common barriers, including lack of resources, lack of time, and cost implication (Chetty et al., 2020:1; Mulder, 2019:1; Santos et al., 2018:1601). Addressing these challenges before implementing interprofessional ICU CPD programmes is crucial.

5.2 Theme 2: Aims, objectives/outcomes of the CPD

Attaining competencies after CPD programmes is of benefit both to the individual and to the organisation's success. Competencies in this context encompass knowledge, skills, and attitude which are essential for ensuring that the ICU teams can demonstrate their roles and adapt to the ever-evolving demands in the ICU effectively. Through acquiring competencies, the ICU teams are equipped to manage complex challenges. In the review, the learning objectives that led to developing the achieved competencies were structured. They were specific, measurable, realistic, and relevant to the included training activities.

5.2.1 Sub-theme 2.1: Aim/objectives/outcomes of the CPD

Knowledge

The CPD course's content focused on technical and non-technical ICU-related skills, enhancing interprofessional competencies among the teams. Topics included advanced critical illness support, interprofessional approaches to patient transport, support for surrogate decision-makers, mechanical ventilation, relational coordination, communication skills training, and medication safety programmes (Brewster et al., 2017:79; Fetting et al., 2022:1157; House et al., 2023:102001; Lincoln et al., 2020:e033521; Mangala et al., 2022:617; Michael et al., 2022:939187; Nonas et al.,

2022:270; Watts et al., 2014:521). The common theme across these topics was their relevance to patient care and the collaborative scope of practice for ICU teams. The content emphasised the need for effective communication and teamwork to ensure safe and quality care. Van Diggele et al. (2020:455) recommend that the content of interprofessional education (IPE) programmes should focus on patient needs to break down hierarchical barriers and enhance collaborative care.

Skills

The most evident skills that were developed across the articles included collaborative leadership, interprofessional communication, clarification of roles and responsibilities, problem-solving, critical thinking, decision-making and dynamic prioritisation (Abu-Rish Blakeney et al., 2019:481; Bernal et al., 2023:765; Brewster et al., 2017:79; George & Quatrara, 2018:144; Fetting et al., 2022:1157; Flentje et al., 2020:1; Graham et al., 2018:75; House et al., 2023:102001; Lincoln et al., 2020:e033521; Lown et al., 2011:401; Manggala et al., 2022:617; Michael et al., 2022:939187; Nicholson et al., 2019:100284; Nonas et al., 2022:270; Watts et al., 2014:521; Weile et al., 2021:1). Nonas et al. (2022:270) outlined specific skills for each phase of their programme. Similarly, Watts et al. (2014:521) integrated competencies into simulation training, which included enhanced critical thinking, clinical reasoning, and team-based communication. The art of embedding the skills in the training programmes ensured that the focus shifted from merely acquiring theoretical knowledge to developing practical skills and behaviours that could be applied in real-world situations. This approach helps the ICU teams, not only to understand concepts but also to demonstrate proficiency in the specific tasks required by their roles. According to Mulder (2019:1), integrating skills development into training enhances the alignment between learning objectives and job requirements, making the training more effective and purpose driven.

Attitudes

The interprofessional CPD programmes in the review fostered a culture of values and ethics, trust and respect among the ICU healthcare professionals

(Lown et al., 2011:401; Michael et al., 2022:939187; Nicholson et al., 2019:100284; Nonas et al., 2022:270; Watts et al., 2014:521). The developed attitudes promote effective interprofessional collaboration and communication among the ICU teams, which encourages the development of other essential attitudes, such as empathy and a patient-centred approach. The findings are supported by Van Diggele et al. (2020:455), who discuss that interprofessional CPD programmes increase empathy, team efficacy, and collaboration among ICU teams.

5.2.2 Sub-theme 2.2: Benefits of participating in the CPD

The review highlighted the three-dimensional advantages of interprofessional CPD programmes for ICU teams, patient safety, and organisational outcomes. These programmes enhance the quality of care, improve ICU teams' perceptions of safety, and foster a culture of patient safety by implementing structured systems that prevent adverse events.

ICU teams

The review revealed that for ICU teams, the CPD programmes have assisted in improving team dynamics by clarifying roles and responsibilities and addressing cross-cultural differences for better interprofessional collaboration. Moreover, the CPD programmes strengthened team trust and respect, ultimately aiding in team coordination, improving the psychological safety environment of the ICU, and facilitating shared decision-making. Literature supports the findings and indicates that interprofessional CPD for ICU teams increases team cohesion and enable conflict resolution among the team and allows a more supportive working environment (Hill et al., 2021:1228; Mulder, 2019:1).

Patients

As a benefit for patients, the review discovered that the CPD programmes aimed at enhancing the interprofessional competencies of ICU teams reduce adverse events and promote patient-centred care. For example, Nonas et al. (2022:270) reported improved management of respiratory conditions, while Flentje et al. (2020:1) and George and Quatrara (2018:144)

noted decreased adverse events and improved resuscitation times following their respective interprofessional training interventions. Additionally, Gómez-Pérez et al. (2023:263) emphasised the role of the programme in recognising and mitigating medication errors. Xyrichis and Rose (2024:103536) support the findings and state that interprofessional CPD programmes in ICU support quality healthcare where mortality and morbidity rates are decreased due to high team interaction and coordination. Moreover, the CPD programmes decrease inappropriate care, healthcare-associated infections, and extended patient stays and duration of mechanical ventilation.

Healthcare institutions

Greater returns were noted for the healthcare establishments facilitating interprofessional CPD programmes for their ICU teams. Job satisfaction and retention among ICU staff were identified, with George and Quatrara (2018:144) estimating a significant reduction in ICU team turnover costs post-intervention. House et al. (2023:102001) found high ratings on the intent-to-stay scale among ICU teams, indicating improved morale and collaboration for positive patient outcomes. Lastly, the review showed that interprofessional interventions positively impact organisational outcomes by decreasing patient readmission rates and lengths of stay, ultimately enhancing patient satisfaction scores (Abu-Rish Blakeney et al., 2019:481; Bernal et al., 2023:765; Chang et al., 2025:1; Fettig et al., 2022:1157; George & Quatrara, 2018:144; Nonas et al., 2022:270). The inclusion of structured interdisciplinary bedside rounds further strengthened relationships between ICU teams and patients, ensuring that patient opinions were integral to care decisions (Abu-Rish Blakeney et al., 2019:481; Bernal et al., 2023:765; Fettig et al., 2022:1157; George & Quatrara, 2018:144). Therefore, the interprofessional CPD programmes in the ICU are of great benefit; they enhance patient safety significantly, foster a culture of collaboration, and equip the ICU teams with innovative skills on how to provide team-based care to address the complex needs of the patients (Xyrichis & Rose, 2024:103536).

5.3 Theme 3: Design, delivery and evaluation of the CPD

5.3.1 Sub-theme 3.1: Curriculum development

Curriculum models and frameworks

The curriculum model is a foundational framework for developing, implementing, and evaluating CPD programmes, particularly for ICU teams. An effective curriculum model enhances the relevance and coherence of training, addressing the specific needs of these teams (Enser & Enser, 2021:1). The review identified seven models, including the Interprofessional Learning Continuum (ILC), the Vital Talk Model, the Interprofessional Education (IPE) curriculum, the Simulation-Enhanced curriculum, the Kern Six-Step Model, and the Kirkpatrick Model. The ILC, utilised by Abu-Rish Blakeney et al. (2019:481) in Colombia, facilitated interprofessional collaboration among advanced heart failure teams, leading to improved teamwork. Similarly, Brewster et al. (2017:79) reported positive team performance in an advanced life support training programme in Australia that incorporated the ILC. This model serves as both a conceptual framework for programme development and a tool for evaluating interprofessional education and health outcomes, adaptable to various cultural and policy contexts (Costanzo et al., 2010:1). The Vital Talk Model, employed by Bernal et al. (2023:765) and Fettig et al. (2022:1157), focuses on goal-of-care conversations among healthcare professionals and patients, which are crucial for ensuring informed decision-making and ethical care in the ICU. The absence of such discussions could lead to decisional conflicts and psychological distress, highlighting the importance of equipping ICU teams with the skills to engage in these critical conversations. Nicholson et al. (2019:100284) adopted the IPE curriculum in a mixed-method study, promoting values and ethics for interprofessional collaboration among nurses and residents in a paediatric acute care setting. The IPE curriculum fosters a safety culture and enables healthcare professionals to learn collaboratively, ultimately improving healthcare outcomes. It incorporates social and educational theories that support interprofessional learning, which is essential for the post-licensure training programme (Mohammed et al., 2021:S16). The Simulation Enhanced curriculum is favoured for CPD

programmes to enhance interprofessional competencies among ICU teams. Simulation training allows interprofessional teams to practise skills in a controlled environment, facilitating the development of complex cognitive skills such as critical thinking, decision-making and teamwork in managing intricate clinical scenarios (Abu-Rish Blakeney et al., 2019:481; Brewster et al., 2017:79; George & Quatrara, 2018:144; Michael et al., 2022:939187; Nonas et al., 2022:270; O'Brien et al., 2023:85; Watts et al., 2014:521).

The Kern Six-Step Model was applied in Germany for developing an interprofessional advanced critical illness life support course, demonstrating structured course development and high efficiency (Flentje et al., 2020:1; Michael et al., 2022:939187). The Kern Six-Step Model addresses ICU teams' specific challenges while considering their unique needs and organisational context, promoting effective training interventions. Khamis et al. (2016:279) discuss that the six-step model, as proposed by Kern's, represents a widely used systematic approach to curriculum development that complies with the requirements of healthcare accrediting bodies and links curricula to healthcare needs. The six steps include problem identification, general needs assessment, target needs assessment, goals and objectives, educational strategies, implementation, evaluation, and feedback. For CPD programmes, Govindarajan and Rajaragupathy (2024:1223) discuss that Kern's six-step model is a curriculum model of choice, as it could ensure that the CPD programme addresses the identified gaps in knowledge or skills effectively.

Lastly, as reviewed by Weile et al. (2021:1) in Denmark, the Kirkpatrick Model was utilised to evaluate interprofessional simulation-based training outcomes in emergency and critical care settings. Literature reveals that the Kirkpatrick Model is highly effective in assessing CPD programmes because it provides a multifaceted framework to evaluate the immediate and long-term impact of the training, not only on participants, but also on the organisations (Allen et al., 2019:1087; Bhatia et al., 2021:27; Rehman & Ganaie, 2024:456; Walker et al., 2019:210). The Kirkpatrick Model evaluates the participants' reactions, learning behaviours, and programme results. There are four levels: the first examines the participants' satisfaction to gauge if the participants are engaged in the content. The second level

measures acquiring knowledge and skills, which is fundamental for professional development. The third level evaluates the behaviours, assessing how participants can apply what they have learned in their respective roles to ensure that the CPD leads to evidence-based practice and improvements in practice. Finally, the last level examines the impact on the organisation, such as improved performance, patient satisfaction index, or patient safety (Kirkpatrick & Kirkpatrick, 2006:1).

Course developers

The interprofessional CPD programmes for ICU teams were designed by a variety of healthcare professionals from diverse specialities, who brought a wealth of expertise together to enhance the interprofessional competencies of the ICU teams (Abu-Rish Blakeney et al., 2019:481; Bernal et al., 2023:765; Fettig et al., 2022:1157; Flentje et al., 2020:1; House et al., 2023:102001; Michael et al., 2022:939187; O'Brien et al., 2023:85; Weile et al., 2021:1). The collaborative efforts of the interprofessional course developers ensured that the curriculum reflected of the real ICU challenges, was comprehensive, and integrated the unique perspectives to create a multifaceted learning environment. Literature reveals that the involvement of valued experts in the curriculum design of interprofessional CPD programmes is pivotal in fostering a unified approach that promotes the improvement of teamwork and a deeper appreciation for the diverse skills each healthcare professional brings for the benefit of healthcare professionals and patients alike (Delawala et al., 2022:1; Goldman et al., 2018:407; Verd-Aulí et al., 2021:3).

5.3.2 Sub-theme 3.2: Delivery

Mode of delivery

The review also highlighted the adoption of various modes of delivery, including online learning as a prerequisite for contact classes, formal lectures facilitated by interdisciplinary teams, face-to-face workshops, interprofessional discussions, group work activities, role-plays, peer-review of protocols or ICU guidelines, team-building exercises, and simulation

training using high- and low-fidelity methods (Abu-Rish Blakeney et al., 2019:481; Bernal et al., 2023:765; Brewster et al., 2017:79; Fetting et al., 2022:1157; Gómez-Pérez et al., 2023:263; Michael et al., 2022:939187; Nonas et al., 2022:270). The variety of modes of delivery adopted by the programmes promoted active learning in which the participants engaged with the course content. Additionally, they accommodated the diversity of the learning styles exhibited by the interprofessional team; this reinforced collaboration and supported the different stages that each profession is at in terms of professional development.

A blended learning approach was predominantly noted, which is recognised as effective and efficient for the training of healthcare professionals, cost-effectively combining face-to-face and online learning (Abbacan-Tuguic, 2021:443; Abuhassna et al., 2022:66; Namyssova et al., 2019:22; O'Connor et al., 2011:63). Blended learning allows students to achieve better outcomes than traditional methods, fostering independence and autonomy in their learning, which is particularly beneficial for ICU teams with demanding schedules (Abuhassna et al., 2022:66). An interprofessional course on advanced critical illness support in Germany included pre-e-learning modules before face-to-face lectures, resulting in positive interprofessional discussions and participant engagement. Similarly, a Canadian interprofessional advanced life support programme incorporated pre-course e-learning and case-based scenarios, promoting knowledge acquisition and retention while facilitating interprofessional discussions (Michael et al., 2022:939187). Leidl et al. (2020:104318) support using blended learning in CPD programmes for healthcare professionals, emphasising its ability to address geographical challenges and provide flexible learning options for those with demanding workloads. This approach enhances diversity in the student population and fosters interaction, reflection, and robust discussions, which are critical for deep learning in adult learners.

CPD duration

The first logistics component identified was the duration of the programmes. Most of the CPD programmes in the review were short-term.

According to a systematic review by George and Quatrara (2018:144), interprofessional CPD programmes can range from 30 minutes to several days, like findings by Weile et al. (2021:1), which noted programme durations from 15 minutes to four weeks. There are doubts about whether deep learning can be achieved in just 15 minutes, and the article does not confirm this further. Moreover, other articles have shown that the duration typically lasts a few hours to a couple of weeks, such as Brewster et al. (2017:79), which was facilitated for four hours, and Michael et al. (2022:939187) for four weeks and two days. The rest of the CPD programmes varied in duration from 12 hours to a maximum of eight days (Bernal et al., 2023:765; Fettig et al., 2022:1157; Flentje et al., 2020:1; Irajpour et al., 2019:196; Manggala et al., 2022:617; Michael et al., 2022:939187; Nonas et al., 2022:270; Weile et al., 2021:1). Nine of the studies did not indicate the specific timeframe of the training intervention (Abu-Rish Blakeney et al., 2019:481; Gómez-Pérez et al., 2023:263; Graham et al., 2018:75; House et al., 2023:102001; Lincoln et al., 2020:e033521; Lown et al., 2011:401; Nicholson et al., 2019:100284; O'Brien et al., 2023:59; Watts et al., 2014:521). Eisenberg et al. (2013:603) assert that clearly defined programme durations are essential for allowing participants adequate time to internalise and practise new knowledge and skills. Eisenberg et al. (2013:603) further note that overly brief courses may lead to superficial understanding, while excessively lengthy programmes could cause fatigue and reduce participant engagement. Therefore, it is crucial to gather feedback from participants regarding their preferred course duration to tailor training to their needs and expectations, thereby enhancing their commitment to the programme (Bernal et al., 2023:765; Brewster et al., 2017:79; Flentje et al., 2020:1; Graham et al., 2018:75; Irajpour et al., 2019:196; Manggala et al., 2022:617; Michael et al., 2022:939187; Nicholson et al., 2019:100284; Nonas et al., 2022:270; Weile et al., 2021:1).

Facilitators

The facilitation of the course involved teams representing various professions, particularly in an interprofessional simulation-enhanced mechanical ventilation course, where two professionals led 50-minute

didactic sessions followed by a 10-minute question-and-answer session (Nonas et al., 2022:270). Before the course, facilitators underwent a five-day "train the trainer" programme to ensure standardisation and enhance learning outcomes, allowing consistent training across different instructors. The interactive nature of the facilitators promoted engagement through various methods, including open-ended questions, peer discussions, interprofessional meetings, and debriefing sessions (Abu-Rish Blakeney et al., 2019:481; Bernal et al., 2023:765; Brewster et al., 2017:79; Fettig et al., 2022:1157; Gómez-Pérez et al., 2023:263; Michael et al., 2022:939187; Nonas et al., 2022:270). Xyrichis and Rose (2024:103536) support using interprofessional facilitators as it fosters collaboration, unique contributions from the various healthcare professionals, role clarification, team critical thinking, and effective communication among ICU teams, which are essential for addressing conflicts and enhancing interprofessional collaborative practices.

5.3.3 *Sub-theme 3.3: Teaching and learning strategies*

Effective selection of teaching and learning approaches is crucial in the instructional design of training interventions, particularly for ICU teams. The aim is to facilitate the deep processing of information, enabling students to connect new skills and knowledge to their existing experiences (Xu, 2016:54). The review indicated a significant emphasis on a student-centred approach, where instructors act as facilitators, empowering students to take control of their learning through small mixed-discipline group activities. Literature advocates for a student-centred approach as it aligns with essential soft skills required in health services and the knowledge-based economy, including problem-solving, critical thinking, collaboration, innovation, and creativity (Bara & Xhomara, 2020:180; Doyle, 2023:1; Logeswaran et al., 2021:e79; Shehata et al., 2024:7813). Additionally, reflective group discussions with probing questions were employed to enhance problem-solving and clinical reasoning skills alongside small group simulations overseen by facilitators. O'Connor et al. (2023:103635) affirm that students become passive listeners, unlike large group teaching, where much information is transferred quickly. Instead of understanding how to apply the knowledge in practice, they focus on memorising the content.

However, small group activities stimulate problem-solving and effective engagement. The articles did not clarify whether groupings were pre-determined or participant-chosen, which is essential to avoid bias and fulfil the objectives of relationship-building to develop interprofessional competencies.

The review further revealed that the instructor-to-student ratio varied, typically involving two to three students per instructor, ensuring that ICU teams received guidance and immediate feedback to enhance learning. Clinical skills demonstrations by skilled professionals and participant document reviews were also included. Peer learning emerged as a vital component, allowing ICU teams to learn collaboratively and deepen their understanding of the content (Chang et al., 2019:1; Fetting et al., 2022:1157; Flentje et al., 2020:1; Graham et al., 2018:75; House et al., 2023:102001; Irajpour et al., 2019:196; Lincoln et al., 2020:e033521; Manggala et al., 2022:617; Michael et al., 2022:939187; Nicholson et al., 2019:100284; Watts et al., 2014:521). Continuous coaching and feedback from facilitators further ensured comprehension throughout the teaching experience. Similarly, Decker et al. (2021:27) support that feedback from facilitators, especially when simulation-based training is involved, must be structured and incorporate various phases, such as facilitating analysis or critique of the team, system, or students themselves. The facilitators must allow for flexibility based on the different students, identify the programme's objectives, and promote critical thinking and reflection to encourage the students to search for evidence-based solutions.

5.3.4 Sub-theme 3.4: Learning activities

Simulation exercises, role-play, team building, and structured bedside training were among the learning activities that were identified in the review as best to promote interprofessional competencies among the ICU team (Fetting et al., 2022:1157; Flentje et al., 2020:1; Graham et al., 2018:75; House et al., 2023:102001; Irajpour et al., 2019:196; Lincoln et al., 2020:e033521; Manggala et al., 2022:617; Michael et al., 2022:939187; Nicholson et al., 2019:100284; Watts et al., 2014:521). Studies support incorporating various teaching activities for interprofessional CPD

programmes for ICU teams as pivotal in accommodating the diversity of learning styles and promoting engagement among ICU professionals. The varied instructional methods further deepen understanding and competencies retention of the complex material essential in ICU. Furthermore, the facilitators of the course could address the unique needs of the team members from different disciplines, fostering an inclusive learning atmosphere that promotes interprofessional collaborative practices (Fettig et al., 2022:1157; Flentje et al., 2020:1; Graham et al., 2018:75; House et al., 2023:102001; Irajpour et al., 2019:196; Lincoln et al., 2020:e033521; Manggala et al., 2022:617; Michael et al., 2022:939187; Nicholson et al., 2019:100284; Watts et al., 2014:521). Literature supports the findings and states that interactive activities encourage active participation and allow ICU specialists to apply theoretical knowledge to practical situations they encounter in the treatment of patients. Simulation and practical workshops are shown to improve clinical skills and improve teamwork by imitating the real situation in which interprofessional collaboration is essential (Govindarajan & Rajaragupathy, 2024:1223; Low et al., 2018:283; Rehman & Ganaie, 2024:456; Tashkandi, 2021:665).

Another noteworthy observation was incorporating pre-reading or pre-course activities before training attendance. Brewster et al. (2017:79) provided course manuals six weeks in advance, while Manggala et al. (2022:617) included an interactive lecture session the day before simulation training. Michael et al. (2022:939187) distributed manuals four weeks prior, and Weile et al. (2021:1) offered pre-course materials a week before the training. As Malcolm Knowles (1970:1) and Bouchrika (2024:1) articulated, these practices uphold adult learning principles. Participants were informed about the course objectives beforehand, allowing them to take ownership of their learning process and self-evaluation through multiple-choice and open-ended evaluations. The pre-reading materials provided foundational knowledge, facilitating progressive engagement during the course.

5.3.5 Sub-theme 3.5: Technology used

The review encourages the use of e-learning alongside high- and low-simulators in the CPD programmes that enhance the interprofessional

competencies of ICU teams (Fettig et al., 2022:1157; Flentje et al., 2020:1; George & Quatrara, 2018:144; House et al., 2023:102001; Lown et al., 2011:401; Manggala et al., 2022:617; Michael et al., 2022:939187; O'Brien et al., 2023:85). The use of the indicated technological tools has proven to enhance learning outcomes, foster student engagement, knowledge retention, and effective interprofessional collaborative practices in the ICU (Tashkandi, 2021:665).

5.4 Theme 4: Assessment and feedback

5.4.1 Sub-theme 4.1: Assessment tools

Assessment tools are crucial for measuring learning outcomes and the effectiveness of CPD interventions. The review indicates that these tools assess both technical and non-technical skills, including communication, collaboration, and patient safety attitudes (Abu-Rish Blakeney et al., 2019:481; Bernal et al., 2023:765; Brewster et al., 2017:79; Fettig et al., 2022:1157; Michael et al., 2022:939187; Nonas et al., 2022:270). The assessment tools were multidimensional, evaluating multiple competencies such as communication, collaboration, role clarification, and conflict resolution. The multidimensional tools that were identified in the review included the following: Jefferson scale towards physician and nurse collaboration, Team STEPPS team perception questionnaire, Relational Coordination Survey, Teams Survey Tool, and Clinical Teamwork Scales. The listed assessment tools varied in length and included Likert scales and open-ended questions, allowing for individual evaluations (Brewster et al., 2017:79; Chang et al., 2019:1; Fettig et al., 2022:1157; George & Quatrara, 2018:144; Irajpour et al., 2019:196; Manggala et al., 2022:617; Nonas et al., 2022:270). The assessment tools were provided before or after the course commenced, or both. The difference was measured to ascertain skills, knowledge acquisition, and changes in the participants' behaviours, attitudes, and reactions. The assessment tools were direct observations assessed by the course facilitators. They formed part of formative and summative evaluation. Moreover, the practical skills were evaluated with specific tools, and the final assessment was done at the end to consolidate

the learning process. Kirkpatrick and Kirkpatrick (2006:1), who wrote on the evaluation of training programmes, affirm that continuous assessment during and after learning is important and ensures that the learning objectives of the CPD programme are being met. Moreover, through the regular evaluation of knowledge and skills, the facilitators can modify the content and delivery method to address the participants' needs better. Additionally, this adaptability enhances the relevance and effectiveness of the CPD programme.

5.4.2 Sub-theme 4.2: Feedback

Feedback in CPD programmes plays a critical role in evaluating not only the effectiveness of the CPD programme in meeting the curriculum objectives, but the feedback also assists in providing direction for the programme and its continuous improvement (Tashkandi, 2021:665). The review revealed that CPD programmes enhance the interprofessional competencies of ICU teams. Feedback to participants should be structured based on the content and learning outcomes against the students' performance; feedback also needs to be provided in reflective discussions and with peer review. The findings concur with the Westerveld framework for interprofessional feedback for training by Tieleman et al. (2023:472), who narrate that feedback for interprofessional programmes needs to be based on the observed task performance, provided timeously and should be in a dialogical format with clear and unambiguous language. Moreover, the feedback must be sense-making, prioritising what is important and forward-looking for the participants.

Obstacles to integrating interprofessional collaboration into CPD: implications and responsive strategies using the Canadian Interprofessional Competency Framework.

Current CPD programmes intended for healthcare professionals are facilitated in overly specialised learning environments. The overly specialised environment, therefore, limits optimal engagement across the various healthcare disciplines, ultimately reducing opportunities for meaningful interprofessional dialogue around healthcare systems and

patient safety innovations. The study has shown that to combat that phenomenon, CPD programmes aimed at enhancing interprofessional competencies should include patient narratives systematically within the CPD. This ensures that the CPD programmes are centred around improving patient outcomes. Moreover, actively including the patients and a variety of healthcare professionals as co-educators within the CPD programme, will reinforce the voice of the patients and support interprofessional communication competency. Activities such as interprofessional case discussions can be included to promote inclusivity and culturally safe communication. In addition, the CPD programme can adopt structured interprofessional tools such as shared language, use of interpreters, and referral templates to promote interprofessional communication as a skill. Furthermore, the study has revealed that the CPD programme should incorporate interprofessional simulation exercises that focus on collaborative conversations. The interprofessional simulations will, as an outcome, promote role clarity, reinforce mutual respect, shared leadership, and initiate interprofessional identity. In the same activity, issues such as power dynamics roles ambiguity can be highlighted and addressed in teams.

The study further revealed that there is low participation with a limited number of learners in CPD programmes that promote interprofessional competencies, which leads to fewer professionals being exposed to shared learning. The study suggests making the CPD programme accessible through digestible content, with short highlight clips within a learning management system to reach a broader audience. Furthermore, making the CPD short-term, to combat the very low response rate, which leads to the inability of the course facilitators to evaluate if the objectives are reached. To promote role clarification and negotiation, which is part of the CIHC competency framework. The study revealed that the CPD programme can include case discussions as a form of learning strategy, in which each profession articulates its contribution. Exercises such as explicit role mapping can be incorporated, and the healthcare professionals can be encouraged by the facilitators to reflect on the overlapping and fluid roles and measures to prevent such instances. This practice will promote role clarification and reduce duplication or gaps in patient care.

6 Limitations and further recommendations

The review indicated that the findings on the interprofessional CPD programme in the ICU may not be generalisable to other disciplines, suggesting the need for further research across various care levels. Additionally, the review did not address the preferred process flow of training programmes lacking elements such as icebreakers to foster rapport and communication among ICU teams. Considering the changes in healthcare education, the review did not indicate how virtual simulation-based training could be incorporated into the CPD programmes, especially for ICU teams whose work schedules require innovative but effective teaching modalities. Further studies could explore the lack and how virtual Observed Structured Clinical Examinations (OSCEs) could be incorporated, allowing ICU professionals to practise and demonstrate clinical skills in standardised medical scenarios as part of the final assessment in interprofessional CPD programmes. Although the ICU teams were provided with interprofessional education with diverse professionals, the review noted that the assessment tools were designed to measure the individual's changed perception of teamwork, collaboration, patient safety attitude, etc. These competencies were not measured as part of summative assessment in groups with structured feedback afterwards to reinforce interprofessional competencies. Future CPD programmes aimed at enhancing the interprofessional competencies of ICU teams could investigate using tools that measure the teams and not necessarily individuals to align with the learning objectives of IPE.

Moreover, incorporating the Interprofessional Education Collaborative (IPEC) framework into healthcare education curricula before the licensure of ICU professionals could facilitate the gradual development of interprofessional competencies, emphasising shared mental models, communication, and collaborative practices. Regulatory bodies should consider integrating the IPEC framework into healthcare education curricula with clearly defined processes for articulating and measuring interprofessional competencies in curricula for pre-licensure socialisation into interprofessional competencies. Additionally, it encourages faculty/healthcare educators' development to enhance interprofessional

education understanding and how to facilitate and evaluate IPE effectively. Furthermore, the review did not clarify whether different healthcare professional regulatory bodies mutually recognised the CPD programmes. Additionally, the process of CPD accreditation for IPE programmes was poorly defined, indicating a need for further research to investigate these identified gaps. The review recommended using in-situ simulation for the CPD programmes that enhance interprofessional competencies of ICU teams for prompt theory integration. When adopting in-situ simulation, it is recommended to be cognisant of the simulation layout and avoid latent adverse events.

7 Conclusion

The review indicated that the establishment and execution of interprofessional CPD programmes should entail collaboration with a diverse range of professionals, stakeholders, regulatory bodies, and support services. This collaboration guarantees the programme's success and strengthens the principles of interprofessional collaborative practices by providing resources and knowledge. CPD empowers ICU teams to develop competencies, insights, and attributes that foster interprofessional collaboration and a culture of patient safety, thereby converting a culture of blame into opportunities for mutual learning. Furthermore, they build a conducive psychological environment where ICU teams thrive through collaboration and reciprocal respect. This improves retention and job satisfaction, ensures compliance with clinical guidelines, minimises adverse events, reduces hospital stays, and consequently decreases litigation costs and capital care expenses for ICU institutions, due to a shared mental model in the care of critically ill patients. Moreover, IPEC frameworks should be integrated into programme design, the formulation of learning objectives, and the incorporation into educational methodologies, assessment strategies, and student interactions to promote the development of interprofessional competencies among ICU teams in a specific, measurable, attainable, and sustainable manner. Thus, the interprofessional CPD programme facilitates crucial transformation in the dynamic ICU setting, requiring a collaborative team approach.

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CHAPTER 8

EXPLORING DIGITAL PEDAGOGIES FOR PROCEDURAL SKILLS TEACHING IN THE PLANNING OF COURSEWORK POSTGRADUATE PROGRAMMES IN OPTOMETRY

¹. N Naicker / ². R Venketsamy

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¹ Division Health Sciences Education
University of the Free State, Bloemfontein
Naickern@ufs.ac.za
ORCID iD: 0000-0001-9226-7797

² Early Childhood Education
University of KwaZulu-Natal
venketsamyt@ukzn.ac.za
ORCID iD: 0000-0002-3594-527X

Abstract

Introduction and Background: In developing new coursework for postgraduate programmes in optometry aimed at upskilling qualified optometrists, a suitable pedagogy as part of curriculum planning needs to be established. It is currently unknown if traditional face-to-face approaches and digital modalities for clinical skills teaching are synergistic or mutually exclusive.

Methods: A convergent parallel mixed-method design was employed, in which qualitative data from online (Microsoft Teams) focus group discussions (FGDs) and quantitative data from an electronic questionnaire (EvaSys V8.2) were simultaneously collected. There were 17 optometric educators purposively sampled from four higher education institutions (HEI) that participated in the FGDs, and 424 conveniently sampled practising optometrists responded to the questionnaire.

Results: Survey participants agreed ($n = 177$; 45%) that virtual observations of skills were equivalent to in-person demonstrations. Neutral responses were recorded by 24% ($n = 88$), and a total of 32.6% ($n = 128$) disagreed. Optometric educators supported in-person skills development with virtual methods as supplementary only. Survey participants indicated neutrality as the highest recorded selection ($n = 154$; 39.2%) regarding whether there were adequate optometrists with enhanced specialised skills to support optometric educators in education and training. Interinstitutional collaboration with international and local HEIs yielded 95.4% and 96.4% agreement for the delivery of education and training.

Conclusion: Interinstitutional collaboration was supported to mitigate the challenges of resource limitations in both expertise and educational materials to deliver education and training. Considering that postgraduate students are working and who may also be geographically dispersed, both blended and hybrid approaches were deemed suitable for teaching skills that straddle traditional and digital modalities.

Keywords: digital pedagogy, clinical skills teaching, optometrists, postgraduate, education and training, interinstitutional collaboration, academic partnership.

1 Introduction and Background

Digital pedagogy has emerged as an innovative 21st-century approach to health sciences higher education (Dhakal, 2023). The rapid migration to digital technologies in higher education arose as a contingency measure to the COVID-19 pandemic and has since maintained that momentum, permeating all aspects of teaching, learning, and assessments (Aluko, Krull and Mhlanga, 2022; Prosen & Ličen, 2025). To remain on par with a rapidly evolving society in this fourth industrial revolution (4IR), it was necessary for higher education to adapt and ‘upgrade’ educational practices from traditional pedagogies to Education 4.0 (Bonfield et al., 2020; Sershan et al., 2025). As we re-evaluate our pedagogical approaches used in undergraduate and postgraduate health sciences education, we must be cognisant of the challenges and multifaceted nuances that come with navigating the digital divide, especially in low and middle-income countries in the Global South (Kanyane, 2023; King & Gotte, 2024; Mwansa, Ngandu and Mkwambi, 2025).

Excluding immersive technologies like virtual reality (VR), augmented reality (AR) and mixed reality (MR) which require high fidelity technological interfaces (Jantanukul, 2024), low-tech technologies using audiovisual (AV) viewing and recording systems and video conferencing programmes can be used innovatively for the delivery of teaching and learning in health sciences education (Chaka, 2020; Yilmaz et al., 2020). While there has been significant pedagogical attention given to online and blended learning for theoretical content knowledge, hands-on clinical skills training in health sciences through an online format has not enjoyed the same exposure and research (Eglseder & Littleton, 2021). In health professions education, the acquisition of clinical skills holds a significant weight in the education and training (Abraham & Singaram, 2019). Habib, Danica and Nadia (2023) cited that the European Commission's Education Action Plan (2021–2027) has reported on the more recent recognition of the value of digital technology in enabling more flexible and student-centred teaching and learning. McGee et al. (2024) noted that digital learning of clinical skills does have the potential to improve educational outcomes. A study with occupational

therapy students found that multimedia resources to develop clinical skills virtually were an effective modality and further promoted self-efficacy in clinical skills (Nash et al., 2022). Fourth-year medical students in a neurosurgery clinical course retained that face-to-face teaching was superior to online teaching (Shen et al., 2025). However, a blended approach incorporating face-to-face delivery and digital learning modalities is most effective for the learning experience (McGee et al., 2024). According to Shen et al. (2025), the effectiveness of online teaching in delivering the same quality of education and training as the traditional face-to-face approach in medical education is still debatable. Digitally enhanced practical teaching is deemed acceptable and usable in health sciences education, but addressing barriers is crucial for successful integration. A paper by Forde and O'Brien (2022) concluded that inaccessibility and inequity of online learning, digital illiteracy among staff, technological challenges, lack of engagement with preparatory material, lack of staff-student interaction, and negative attitudes towards online learning were all barriers to practical skills teaching and learning. Technological infrastructure has been identified as an important factor for improvement within health sciences educational institutions (Mabidi, 2024). Connectivity, bandwidth and technological support could be barriers to effectively migrate to online learning methods (Sahu et al., 2022).

The transition to remote clinical skills teaching during COVID-19 was a 'need to' rather than a 'want to' to maintain continuity in students' educational development. A systematic review found that digital education modalities were as effective as traditional ones for knowledge and practice during the COVID-19 pandemic; hence, they could be a valuable strategy for distance learning (Hao et al., 2022). Though Abraham (2021) found it to be a successful transition from face-to-face training to using multimedia resources by modifying and applying the five-step method of teaching clinical skills (George & Doto, 2001), it was still seen as a temporary contingency measure necessary at the time of COVID-19 and not a modality to be used beyond the COVID19 era for skills teaching (Abraham, 2021).

Currently, the optometry higher education system in South Africa (SA) has no regulated coursework or structured postgraduate qualifications at any

higher education institution in SA. The current postgraduate qualifications are purely research-based, which limits opportunities to upskill in any specialised field of optometry such as vision therapy, paediatric optometry, contact lenses, low vision and ocular disease where specialised diagnoses, management interventions and/or rehabilitation can be comprehensively provided. Though there are enrichment opportunities through continuous professional development (CPD) activities, such do not award any formal recognition or accreditation for additional training. Both practising optometrists and optometric educators identified a strong need for the development of clinically focused postgraduate programmes in various specialised areas for optometry (Naicker & Munsamy, 2024). Such envisaged focused training can support optometrists to skilfully provide specialised and comprehensive eye care services to patients in need while simultaneously recognising the additional competencies acquired by the optometrists.

To establish specific niche area programmes in optometry, skills teaching of postgraduate students who are both working and geographically dispersed around SA need to be carefully considered, amongst other educational factors. Due to the unique intrinsic and extrinsic factors that differentiate an undergraduate student from a postgraduate one, educational teaching and learning practice need to be authentic for the andragogic learner (Blackard et al., 2024). The approach should be innovative and underpinned by adult learning theories applied to health sciences and medical education (Taylor and Hamdy, 2013). Synchronous and asynchronous clinical skill teaching can be scaffolded with a work-integrated learning strategy where workplace-based experiential learning can take place. It is not only because we are in an era of digital transformation that educational strategies need to be technology-mediated, but it is because of the characteristics of a postgraduate scholar that technology in education and training is both useful and necessary. With the incorporation of technology, distance learning is possible which may positively facilitate access, promote practitioner enrollment and support throughput success rates.

Coursework postgraduate education in various specialised fields of optometry is found to be more prevalent in the Global North, with minimal

postgraduate educational opportunities for optometrists in the Global South (Naicker & Munsamy, 2024). Planning for educational expansion requires significant discourse, with the scaffolding of the dual goals of creating access to lifelong learning opportunities for optometrists and for patients to reap the benefits of upskilled optometrists

Health science faculties in South African universities are resource-constrained, a reality that's common amongst low-middle-income countries (LMIC) (Noorbhai & Ojo, 2023). Expanding the educational offerings by incorporating an additional tier to the institutions' programme qualification mix (PQM) through multiple coursework postgraduate programmes, will pose a capacity challenge across all institutions. Capacity challenges are more than just insufficient staff to deliver training; they are much more complex and multifaceted. Higher education Institutions (HEI) working collaboratively in the delivery of postgraduate optometric education would be a novel approach for optometric education and training in SA. Exploring academic partnerships and collaborations to pool resources may be a worthwhile pursuit and requires various stakeholders' input on this novel concept of interinstitutional collaboration.

By exploring theories and establishing a theoretical framework for this investigation, we need to consider the theory of connectivism, which refers to teaching and learning in the digital age. This theory, developed by George Siemens, posits that learning extends beyond individuals to various information resources and connections, where the ability to acquire new knowledge outweighs existing knowledge (Mukhlis et al., 2024). The core argument that Siemens makes is that traditional theories developed before the age of the 4IR inadequately addressed how learning occurs in a rapidly changing knowledge environment, where technology impacts how we live and communicate. The capacity to know more and learn continuously is highly relevant for the 21st century (Mukhlis et al., 2024). It is for this grounding that the strong desire from optometrists to upskill through new postgraduate opportunities resonates with this theory. The postgraduate population of optometrists could be diverse in terms of years of experience, educational backgrounds, age groups, and generational differences, from baby boomers to Generation Z. However, in the current age of innovation,

accepting technology for educational purposes is paramount. The Technology Acceptance Model (TAM) explores the factors that influence individuals to make use of technology (Mugo et al., 2017). As time progresses, the importance of technology acceptance cannot be overstated, particularly in relation to education in health professions. For postgraduate education in optometry, medical education, and all other health professions, the utility of technology and digital literacy becomes crucial to succeed with new-age programmes (Jarahi et al., 2024; Jibrin et al., 2025). To effectively integrate pedagogical, technological and content knowledge it would be prudent not to mention the TPACK Model (Koehler, Mishra and Cain, 2013). The essence of this model is merging of the three pillars to support the educational development through appropriate methods and tools to achieve the outcome competencies. Such a model can be applied to tertiary education and specifically in this case of postgraduate education. It is necessary to explore whether technologies such as digital AV systems can be valid and reliable tools for procedural skills teaching to build both proficiency and competency at a postgraduate level. By examining the four levels of Miller's Pyramid for building clinical competence, the digital showcase of clinical skills which this study investigation explores would be pegged at level three i.e., learning and building competence through virtual observation and demonstration of skills digitally in the case of this study, prior to real-life experiential learning (Hampton et al., 2024). With the onset of artificial intelligence (AI), educators could leverage the opportunity to explore generative AI (gen AI) for creating videos of procedures and clinical skills in the near future as a complementary tool for learning. Currently, as such technologies are emerging in medical education, their effectiveness, quality and accuracy remain uncertain (Artsi et al., 2025).

Four HEIs offer optometry undergraduate qualifications and research-based postgraduate master's and doctoral qualifications in SA. The institutions are the University of Johannesburg (UJ), University of Limpopo (UL), University of the Free State (UFS) and the University of KwaZulu-Natal (UKZN). The identified gap of a lack of postgraduate coursework qualifications in optometry in South Africa creates uncertainty regarding the optimal approach for implementing a digital pedagogy. This is especially concerning

for clinical skills development if students are not based at the universities regularly as is the case with undergraduate students. Regrettably, we are not immune to the challenges encountered by the Global South, despite our status as a middle-income nation. Consequently, expanding educational resources from undergraduate to postgraduate education and training would require careful planning and consideration of factors such as the availability of human resources, funding, training equipment, and capacity. This may alleviate some challenges related to the sustainability and enrolment of the programmes, as the four South African optometry higher education institutions would collaborate to offer postgraduate education and training through digitally enhanced pedagogies.

Nevertheless, the inability to resolve this issue may compel institutions to plan independently which may lead to diverse curricula planning with no cohesion and commonality between institutions. It is therefore essential to generate evidence to guide institutional curriculum planning and specifically investigating pedagogies that are intersected with multimedia and internet-enabled observational systems to support remote learning of clinical skills in patient examination, treatment and rehabilitation. This paper therefore aimed to examine the pedagogical aspect of virtual modalities for clinical skills teaching in the planning of coursework postgraduate programmes of optometry in SA through resource-sharing from interinstitutional collaboration.

2 Research Design and Methodology

To effectively address the research questions, a convergent parallel mixed method design was implemented, collecting qualitative and quantitative data simultaneously (Razali et al., 2019). To establish robust conclusions, the two study methods were conducted concurrently where the findings were merged and interpreted. Both data sets carried an equal weighting from which the findings and interpretations thereof were derived. A target population of optometrists in South Africa was divided into two distinct study groups: optometric educators from HEIs and optometric practitioners in clinical practice. All optometrists registered with the Health Professions

Council of South Africa (HPCSA) were eligible for participation, subject to specific inclusion criteria for the different populations. Focus points and themes probed in the quantitative and qualitative methods were designed to be synergistic and aligned to the objectives. This was done to facilitate easier integration of numerical with textual data.

2.1 Sampling methods and sample size

Non-probability sampling strategies were employed to recruit the optometric educators and the optometric practitioners. The optometric educators used for the qualitative data collection phase were purposively selected based on the inclusion criteria of having at least five years of optometric undergraduate education and training experience and being currently employed at one of the four HEIs where optometry education is offered in SA. Twenty-eight (28) optometric educators were invited to participate in online Focus Group Discussions (FGD) using Microsoft Teams (Microsoft Corporation; Redmond, WA, USA), and 17 of them were available. This yielded a recruitment rate of 60.7%. For the quantitative approach, optometric practitioners were accessed through convenience sampling and chain referral sampling to broaden participation. All HPCSA-registered optometrists of any age, experience level, working situation, or geographic region were eligible to participate. An advertisement with a survey link was disseminated across multiple social media platforms and through numerous companies and organisations within the optometry sector to extend its reach. A survey method was adopted in which optometric practitioners were provided with a self-administered electronic questionnaire developed using the EvaSys survey system, version 8.2 (EvaSys GmbH; Lüneburg, Germany). A minimum sample size of 354 participants was calculated using the following characteristics: population size (N) = 4204, margin of error (E) = $\pm 5\%$, confidence interval = 95%, z -score = 1.96, and percentage value (p) = 0.5. A total of 424 survey participants at the end of the data collection period ensured adequate statistical power and limited the probability of errors.

2.2 Data collection instruments

Four online FGDs that represented the unit of analysis, were conducted by the principal investigator (PI) using a facilitator who was not an optometrist. This was done to mitigate affinity bias as the PI is an optometric educator from one of the four HEIs. The composition of the FGDs consisted of mixed groups of educators from different HEIs. The optometric educators did not represent their institutions' views; instead, they reflected and expressed their own perspectives, which were interpreted as collective opinions. The FGD participants ranged from three to five per group. The FGD agenda was disseminated to all participants prior to their scheduled FGDs. There were three questions presented: the first related to the design features of a postgraduate programme in optometry, the second to a suitable teaching and learning approach for postgraduate coursework programmes, and lastly, the appropriate assessment strategy at the postgraduate level for working health professionals. All FGDs were audiovisually recorded, auto-transcribed and subsequently reviewed by the researcher to ensure authenticity of the discussions. Each FGD lasted approximately 90 minutes. Educators who were HPCSA-registered optometrists with at least five years of undergraduate education and training experience were invited to participate. The purposively sampled educators across the four HEIs that provided written informed consent were recruited as the study sample for the qualitative method.

The quantitative survey instrument had five sections with 47 items in total. The questions and statements were divided into different sections, systematically arranged to achieve the research objectives of a broader study. The questionnaire obtained nominal, ordinal, ratio, and interval data. The interval data were numeric ranked options. The ordinal data were categorical text-type data, with ordered ranked scales using a five-point Likert scale. Likert scale options used were: strongly disagree, disagree, neutral, agree and strongly agree. There were also ranking questions for the participants to select their most and least preferred choices. Some statements were forced-choice, while others allowed multiple selection. The questionnaire was developed using the Evasys survey system (V8.2), and the link was distributed through advertisements on social media

platforms and the principal investigator's professional network. Optometry organisations also agreed to circulate the advertisement and questionnaire through their network and databases. Participants were informed of their rights to anonymity and confidentiality of their responses after clicking the link to the questionnaire prior to the display of statements.

2.3 Quality measures for data collection methods

The FGD agenda underwent an expert quality check by five health sciences researchers from the Faculty of Health Sciences at UFS, who based their evaluation on their prior research experience in designing and conducting FGDs. This exercise helped in finalising the FGD agenda to be used across all focus groups. The agenda contained the time duration per question as a guideline to the facilitator, study objectives, three principal questions with probe points, and clarification of specific terms used in the questions. The same facilitator, who was not an optometrist, was used for all FGDs to avoid any bias in directing the conversations. A pilot FGD was conducted with five optometric educators, and the data obtained were used in the overall data analysis, with the same questions retained and only a single change in vocabulary.

For instrument validation, a group of ten content validity reviewers was purposefully selected based on their postgraduate qualifications in optometry research. The reviewers used a four-point Likert scale to rate the items' relevance in the questionnaire [24]. The scale content validity index (S-CVI) returned a value of 0.921. A survey pilot study was sequentially administered to 15 participants, who completed the online questionnaire over nine weeks from December 2022 to February 2023. The same cohort also performed a qualitative review of the questionnaire as a face validity exercise. The feedback included views on the length of the questionnaire, language usage, and survey completion time. The feedback was then incorporated into the survey's final version. Because changes were made after the pilot stage, the pilot questionnaire findings were not included in the primary empirical data set.

To determine interrater reliability, the intraclass correlation coefficient (ICC) was calculated using IBM SPSS Statistics version 29.0.0.0. ICC estimate of dependability was 0.916 [25]. Internal consistency and exploratory factor analysis (EFA) were calculated using R version 4.3.0. It was determined that the six factors identified were derived from sections A and B and demonstrated Cronbach's alpha (α) reliability scores between 0.66 and 0.87. Four factors were identified in sections C and D, each with a reliability score between 0.53 and 0.81.

2.4 Data analysis

An abductive approach for the qualitative method was employed in this study, where both deductive and inductive data were generated. A qualitative content analysis was carried out utilising Atlas.Ti 23, using primarily deductive logic with a priori coding. Textual data from each of the FGDs was assessed for patterns or common concepts for each question. A code list was predetermined due to the deductive approach adopted with predetermined themes. A priori themes were derived from the study objectives and incorporated into the FGD questions to probe postgraduate pedagogy for clinical skills training to answer the research questions. All participants' names were replaced in the transcript with non-descriptive codes, removing all personal characteristics linked to any participant. Participants were coded according to a standard designation where, for example, FG3p4 represented Focus Group 3 –participant 4 and so forth. Quantitative data analysis was computed using SPSS and R with the support of a biostatistician. Descriptive statistical analysis was conducted with numerical data expressed as frequencies and percentages. Due to the non-normal data distribution found, median and interquartile ranges were computed.

2.5 Ethical considerations

All ethical requirements and due processes were followed to ensure that the research study involving human participants was ethically sound, transparent, avoiding any infringement of human rights and dignity, and abiding by the regulations prescribed by the Protection of Personal

Information Act (POPIA) (Republic of South Africa, 2013) and the University of the Free State Health Sciences Research Ethics Committee's (HSREC) Standard Operating Procedures and Guidelines Version 03.01 (Faculty of Health Sciences, 2021). Informed consent was sought from all participants, where participants' rights to participation were clearly explained. The researcher abided by the principles of biomedical ethics, which are: respect for persons (autonomy and self-determination), beneficence, non-maleficence and justice. Ethical clearance was obtained from HSREC (Ethical approval number UFS-HSD2022/1101/2911).

3 Results

3.1 Online observation of procedural skills through AV systems for building competence versus in-person contact training sessions

3.1.1 Survey results: Optometric practitioners

A survey statement stated that 'online live demonstrations combined with the use of audiovisual teaching aids could develop one's practical skills and clinical competence just as well as being physically present for contact sessions.' Participants' response via the five-point Likert scale showed a marginally higher combined agreement (strongly agree and agree) of 45% with 22.4% indicating neutrality and 32.6% cumulatively disagreed (strongly disagree and disagree) with the statement. The results are illustrated in Figure 8.1.

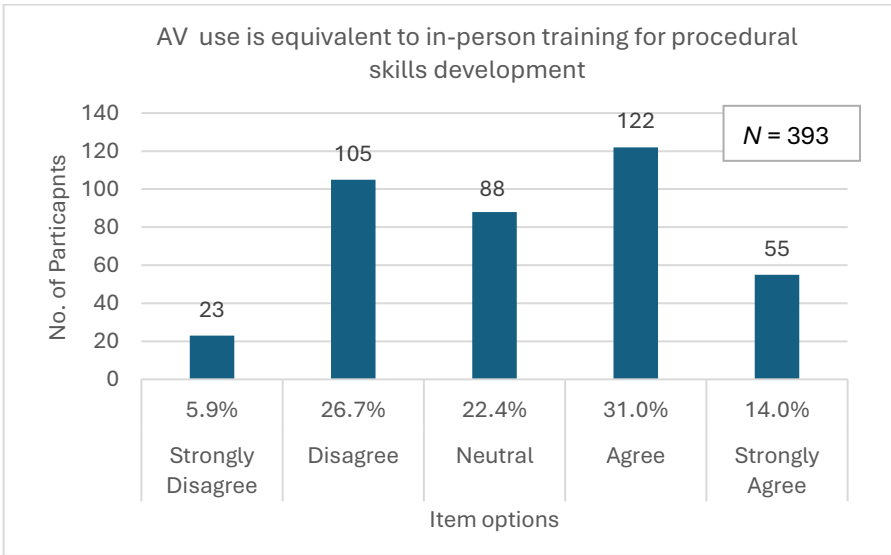


Figure 8.1: Optometric practitioners’ responses as to whether audiovisual (AV) systems used as tools for training of skills would be equivalent to receiving in-person training

3.1.2 Focus group discussion results: Optometric educators

A predetermined theme of a feasible educational strategy at postgraduate level derived from a broad FGD question relating to content delivery and skills transfer for working optometrists, gave rise to the following emergent sub-themes, as illustrated in Figure 8.2.

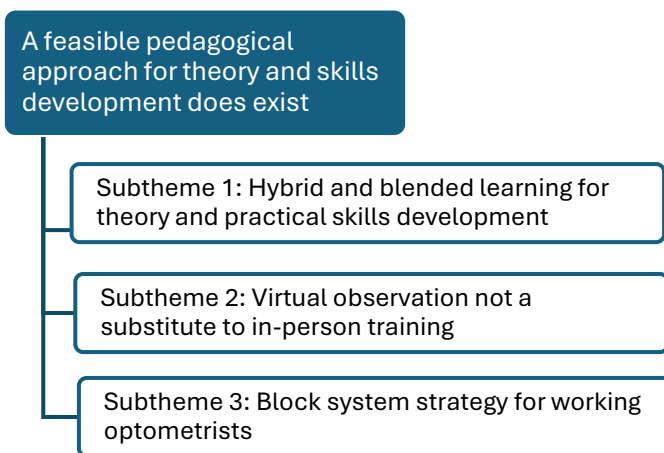


Figure 8.2: A priori theme of a feasible pedagogical approach to clinical skills development, with emergent sub-themes of hybrid and blended learning for practical skills development, and virtual observation is not a substitute for in-person skills training

Finding a suitable pedagogical approach to upskill working optometrists is essential to ensure standards of education are maintained to achieve the intended outcome while being cognisant of extrinsic factors such as family and personal responsibilities, geographic location and travel costs.

Optometric educators across all FGDs readily voiced support for both a blended and a hybrid approach to theory, as optometrists are geographically dispersed and working. FG3p1 stated: *"I think hybrid learning methods work very well to accommodate those that cannot attend face-to-face sessions in conjunction with blended learning because it helps students to be actively involved even if there is no class or practical"*

FG4p2 further stated regarding the pedagogical strategy, that: *"it should not be too onerous, which can result in attrition from the programmes as practitioners are known to have a busy work life"*.

FG4p2, FG3p1 and FG1p3 believed multiple online teaching and learning methods, modes of delivery and activities could be utilised. FG4p2 stated: *"There might be recorded lectures that they can listen to. There might be*

videos that they need to look at. There might be a contact session. So, it needs to be carefully designed because it is not for undergrad students."

The optometric educators generally expressed that practical skills development should be done in person rather than through virtual observations. FG2p3 stated that *"I do believe that theoretical components as well as practical components can be delivered by audiovisual recording, though not necessarily live-streamed, so I think it is important to allow that flexibility according to practitioner availability. The emphasis and need should be face-to-face contact."*

FG1p2 voiced that *"I think certainly one can have a certain part of the training done online and watching the student performing certain activities, but some of it definitely needs to be in-person."*

The belief was that skills could be video recorded for asynchronous learning but done as a pre-practical exercise in preparation for subsequent in-person contact sessions. Such sessions can be conducted as a block-release strategy, considering both the geographic location of students and their work commitments. FG1p5 described that *"the block system allows people who are waiting (for the contact session) to apply for work leave during that time."* FG1p1 stated that *"They would need to engage with the material before they would need to do the block (referring to in-person practical sessions). They can take these blocks at different times of the year, depending on their practice, when it is not too busy. So engage with the material first, and then a practical face-to-face kind of workshop"*

3.1.3 Summary of FGD findings

Optometric educators supported a blended (in-person and online) and hybrid (recorded and livestream) approach to knowledge and skills acquisition. A blended strategy was endorsed to allow flexibility, using various learning materials, online tools, and modalities in the learning process. Regarding the use of digital modalities via AV systems for skills teaching and training, it was considered to be the exception and not the rule. Primarily, skills teaching and transfer were considered to be best achieved through in-person contact sessions, with audiovisual aids serving

as supplementary asynchronous material. A block-release system was proposed as an ideal approach whereby scheduled intermittent contact sessions across the duration of the programme would support student attendance and promote throughput success to navigate work commitments and travel.

3.2 Educational capacity and resources for efficient delivery of teaching and learning in postgraduate programmes for working optometrists

3.2.1 Survey results: Optometric practitioners

Optometric practitioners responded to a statement about whether they believed there were adequate optometrists in SA with expertise in various specialised fields to support HEIs with education and training in the envisaged structured postgraduate programmes. A 5-point Likert scale option was available for this statement. The purpose of this statement was to determine whether those in clinical practice believed that the profession in SA had sufficient capacity to support educators in sustaining teaching and learning by outsourcing aspects of education and training. If this were possible, it could strengthen partnerships in delivering postgraduate education for qualified optometrists. The results found are presented in Figure 8.3, where neutrality was the most prevalent response with a cumulative disagreement percentage of 28.0% and a cumulative agreement percentage of 32.8%.

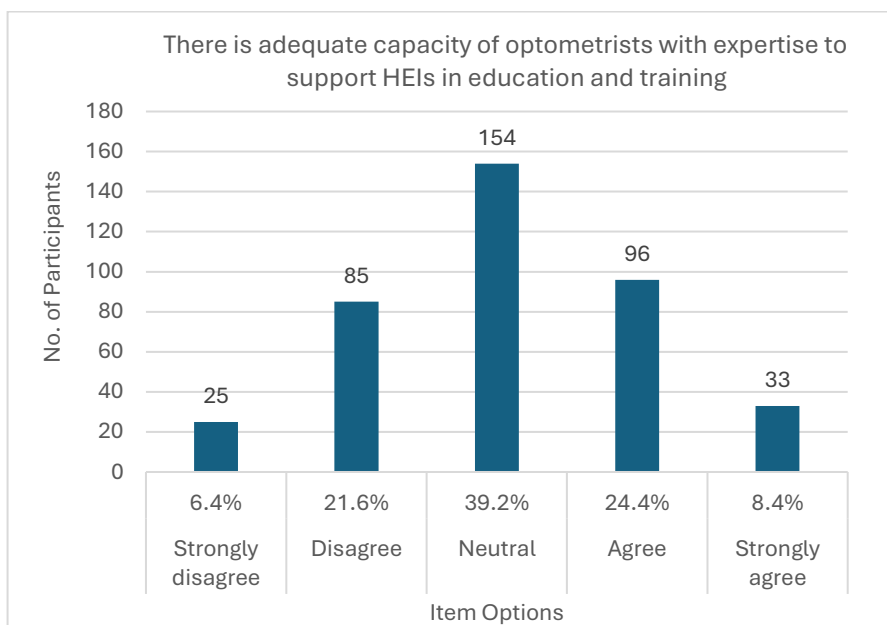


Figure 8.3: Optometric practitioners' views on the capacity of optometrists in SA with expertise in various specialised fields to support the HEIs with the clinical education and training

Optometric practitioners who complete the structured postgraduate programmes in various specialised areas will form a cohort with enhanced skills and competence. To investigate long-term sustainability and capacity building for optometric postgraduate education, it was envisaged that graduates would be able to support the training of future postgraduate students. A survey statement listed various roles that qualified graduates could fulfil to help expand the education and training capacity. Multiple selection options were allowed for this statement in the questionnaire, and the results are presented in Figure 8.4. The results indicated that only 16% of participants shows 'no interest' in supporting the education and training of future enrolled optometrists.

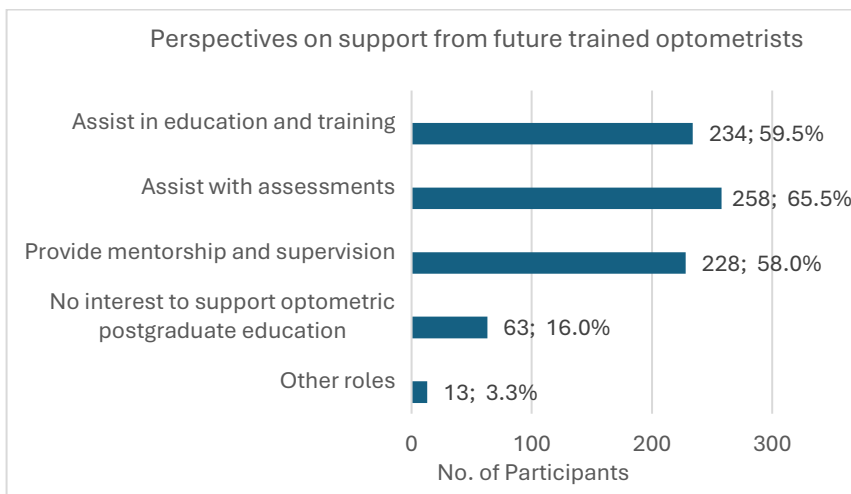


Figure 8.4: Optometric practitioners' roles to take up to support the education and training of future postgraduate students

On two statements regarding both local and international collaboration between optometry HEIs, survey participants fully supported such collaborations for teaching and learning. As illustrated in Figure 8.5, South African HEIs collaborating with international HEIs were strongly supported ($n = 375$; 95.4%), as well as local optometry HEIs collaborating ($n = 379$; 96.4%) to deliver teaching and learning at the postgraduate level in various specialised fields of optometry.

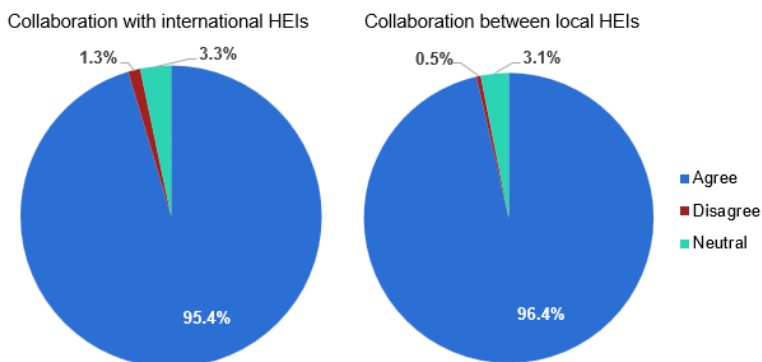


Figure 8.5: South African HEIs to collaborate nationally and internationally for the delivery of postgraduate programmes

Participants rated their level of agreement on the justifiable factors of interinstitutional collaboration for the delivery of education and training in speciality-focused postgraduate optometry programmes in SA and abroad. There was a convincing level of combined agreement (n = 360; 91.6%) that collaboration could benefit the delivery of education and training through sharing resources, such as educational materials and training tools. An equal combined level of agreement (n = 360; 91.6%) supported networking of this nature for human resource support in delivering education and training by identifying specific field experts to assist in the programmes. There were 8.1% (n = 31) and 8.4% (n = 33), respectively, that were neutral on both factors of collaboration, with a single negative response (0.3%) recorded. Table 8.1 presents all five Likert scale responses individually.

Table 8.1: Two factors that could underpin the collaboration between HEIs

Collaboration Factors	Strongly agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly disagree n (%)
Sharing of teaching and learning educational tools and materials	179 (45.5)	181 (46.1)	32 (8.1)	0	1 (0.3)
Source content expertise for teaching and learning	185 (47.1)	175 (44.5)	33 (8.4)	0	0

3.3 Focus group discussion: Optometric educators

During the FGDs, optometric educators were presented with a probing point about the prospects of institutions collaborating to deliver teaching and learning for new postgraduate programmes, framed under a broad FGD question on workable pedagogical strategies. A deductive logic approach was taken by presenting the hypothesised theme to focus groups, from which inductive sub-themes emerged. The theme and sub-theme are presented in Figure 8.6.

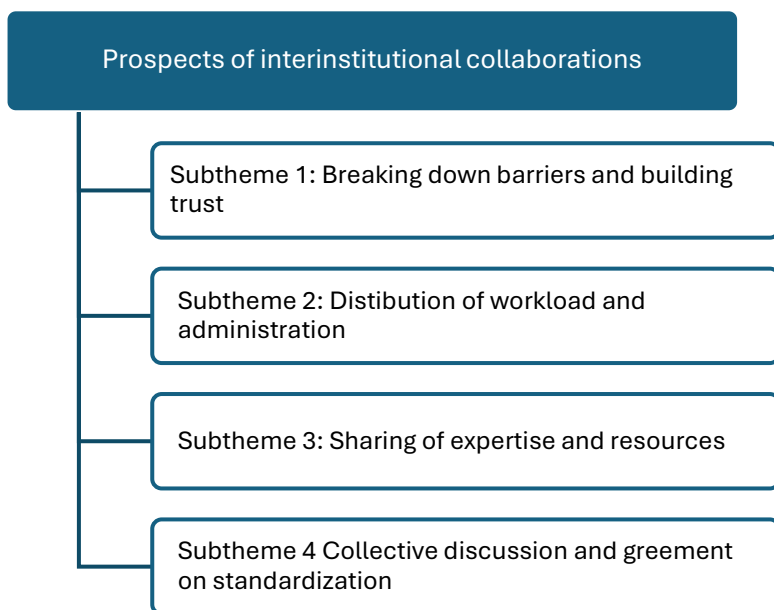


Figure 8.6: A priori theme derived from a FGD question with emergent sub-themes

The rationale for exploring 'capacity' in the delivery of teaching and learning is that all educators are currently involved in the undergraduate training of optometry students. If there is to be an additional programme or programmes with a coursework component, without an increase in the staff establishment at each department, this would pose a workload strain on the existing staff complement. Beyond this issue, there may not be enough skilled educators in the various specialised fields at each HEI to deliver the necessary education and training. It is for this reason that educators' opinions need to be explored on how they envisage sustaining postgraduate education and training, mainly when students are employed as optometrists and distributed across the country.

All four FGDs highly supported interinstitutional collaboration in offering postgraduate coursework programmes in speciality areas. FG1p1 stated: *"I think there definitely is space in South Africa for something like this to work if all stakeholders are properly engaged. I do not think that they (educators in general) would be opposed to it because, in truth, we are all South*

Africans, and in the spirit of ubuntu (humanity towards each other), we would want to work together. We want to uplift all institutions." It was additionally declared by FG2p1 that: *"We are too few institutions to do this independently"*

A barrier to collaboration was described as fear. FG1p1 stated: *"I think it's a fear. There is much fear out there at the moment, and it's a barrier. So I think those are some of the things that would need to be broken down first before we can even think about proper collaboration."*

It was further expressed that professional collaboration between institutions can build trust, support and respect between peers. FG1p4 stated that *"Once we build that collaboration, it will build more trust between institutions, and they will be at that level of willingness to help out, building human relationships between colleagues in another institution. So basically, we'll be engaging in a level where we all trust each other, with whatever is taught in an institution."*

FG4p1 and FG4p3 described the benefits as numerous, with a reduced administrative burden on individual institutions to carry forward the same programmes. FG4p3 stated: *"We have to think carefully about how we then proceed in the best possible way, so that it doesn't place a burden on both the institutions and candidates in terms of course design."*

Participants FG4p3, FG2p4, and others expressed that knowledge sharing from experts in specific speciality areas is not equally distributed across different HEIs, which also have varying strengths: *"I don't think that one institution can take responsibility for perhaps training in one specialty or all for that matter. What is also generally accepted is that some institutions have strengths in a particular speciality, and perhaps that is where we will start, as to which institutions are strong in certain specialties and how we can collectively model these subspecialty training programmes against a similar framework."*

There was a clear sentiment across all FGDs that a collective discussion among all four HEIs is necessary to ensure standardisation of outcomes, teaching and learning modalities, and content. FG3p5 expressed that *"In*

terms of all institutions, we agree upon the content, we agree upon the materials I would like to see that there is some broad generic approach where all institutions work together to deliver the course."

3.3.1 Summary of FGD findings

With optometric educators collectively supporting interinstitutional collaboration, it was initially concluded that for collaboration to be a successful endeavour, fear of judgment and critique must be dispelled, and trust-building needs to occur. The sharing of educational resources and training tools was highlighted as valuable, with specific educators in the profession acknowledged as experts in specialised fields. This human resource support may not only benefit the institution that the 'expert' is employed at but could collaborate in the delivery of teaching and learning with other institutions for the same specialised programme. Collaboration was considered beneficial for distributing the workload, pooling of resources and administration across institutions.

4 Discussion

While optometric practitioners generally agree that online demonstrations of skills for clinical teaching are equivalent to in-person sessions, one cannot ignore the significant number of practitioners who disagreed or were neutral about this issue, indicating a level of uncertainty. In contrast, optometric educators viewed virtual modalities for skills development as supplementary to the traditional approach, perceiving them as an exception rather than the rule. Traditionally, skills development has been only done through in-person contact sessions as standard practice in optometry at the undergraduate level. Even though the idea is not to replace this traditional practice but to make education more accessible, other modalities that can achieve this need should be given the consideration they deserve. We need to make a paradigm shift, accept technology integration into pedagogy, and explore new approaches if we determine their ease of use, practicality, and ability to achieve the outcomes of the learning exercise. A study by Belew et al. (2024) with postgraduate medical and health sciences students found that the acceptance of e-learning was largely promising. This acceptance

stemmed from its usefulness and ease of use, which in turn increased their positive attitude towards learning through technology (Belew et al., 2024). It must be noted, however, that this study was based only on first-generation universities in Ethiopia and lacks generalisability. Mastour, Yousefi, and Niroumand (2025) concurred that ease of use and usefulness play an important role in technology acceptance, based on a study conducted at one of the top universities in Iran (Mastour, Yousefi, and Niroumand, 2025). However, in this age of innovation and due to the COVID-19 pandemic, there has been an increased use of audiovisual tools with newer technologies for observation in health professions education, such as wearable viewing systems that can facilitate mobility during clinical sessions (Sheng et al., 2024).

Especially in scenarios where a patient is in bed and the clinician needs to manoeuvre to get a specific view, a wearable camera recording device would be most appropriate (Brown & Reid, 2022). In optometric clinical skills teaching, wearable technologies could be highly effective. In many instances, you would need to be positioned closer to the patients' eyes and perform procedures such as insertion and evaluation of contact lenses and performance vision training exercises as examples. In this instance, wearing a head-mounted camera to project to students in various sites and regions in the country could be a valuable strategy for livestream observations. Hence, the concept of Internet of Things (IoT) is especially valuable for synchronous teaching. The IoT is a critical need in medical education, and HEIs must ensure that connectivity capabilities and the application of internet-enabled learning technologies are suitable for expanding into various online and digital pedagogies (Mastour et al., 2025). In a literature review paper that proposed a conceptual model linking effective pedagogy with the TPACK model where pedagogical knowledge, technological knowledge and content knowledge are integrated, it further recommended that HEIs invest in technological infrastructure and equip educators and students with advanced technologies to enhance student learning and raise the bar in innovative teaching and learning strategies and institutional competitiveness (Khoza, 2022).

The key stakeholders in this study found an overwhelming need to pursue interinstitutional collaboration in the delivery of teaching and learning. With only four HEIs of optometry in SA and under a resource-limited status quo, it would be well judged to commence with new programme development collaboratively and establish educational partnerships for teaching and learning innovation. A study by Daniels et al. (2015) identified the need for inter-institutional collaboration in higher education, particularly in health professions in South Africa. The study also highlighted the collaborative initiative of establishing a Common Teaching Platform for undergraduate nursing education for all HEIs in the Western Cape. With the advent of globalization, interinstitutional collaborations are strategic drivers for joint research initiatives, staff professional development and educational innovation (Van Vugt and Gallagher, 2026). Interinstitutional collaboration can provide opportunities in postgraduate optometric education for skills transfer, resource sharing, learning from colleagues across different institutions, building professional networks and for student mobility.

Optometric practitioners and educators have overwhelmingly indicated a need for international collaborations. Such initiatives do exist and are in progress such as the European Universities Initiative where a transnational alliance of at least 10% of HEIs across Europe collaborate towards pedagogical transformation and educational excellence (Palmowski and Angouri, 2025). Cross-border institutional collaboration in the African continent focused on optometric education would be an exciting prospect considering that as of 2020, only 16 African nations offer optometric education across 33 HEIs, of which four are in SA (Abu, 2020).

An existing North-South global partnership between Nottingham Trent University in the United Kingdom and Makerere University School of Public Health in Uganda provided opportunities for co-learning for both students and staff across both institutions such as guest lectures, seminars and conference presentations. The broader key areas of this longstanding partnership include community health workers training, tackling antimicrobial resistance, student/staff mobility and joint publications, among others. Though it was hailed a success, this collaboration was not without challenges such as funding for study mobility and academic

scheduling between institutions across hemispheres. Exploring interinstitutional collaboration for optometry education in SA would require multiple stakeholders and multiple stakeholder engagements, as this would be a novel pursuit requiring discourse at the different institutional levels. Institutional competitiveness is more familiar territory as each HEI aims for academic excellence driven by global rankings.

Optometric practitioners indicated a significant level of uncertainty about the 'adequate capacity of optometrists with expertise to support the postgraduate education and training at HEIs'. The existence of this uncertainty implies that optometrists with specialised and advanced skills in SA lack visibility or are very scarce. It is for this reason that optometric practitioners previously declared that receiving professional recognition from the Health Professions Council of South Africa (HPCSA) would motivate them to pursue further education and training, as it would improve their visibility in the profession (Naicker & Munsamy, 2024). Practising optometrists who have completed their postgraduate qualification may consider participating in the education and training of new cohorts of postgraduate students. This consideration supports capacity-building and relieves pressure on full-time educators at HEIs by managing all aspects of education and training, including mentorship and supervision. It is worth noting though, that to effectively mentor and supervise trainees to foster skills proficiency and competency, development in this area is necessary to take on such roles and be effective (Garth et al., 2024). Qualified health professionals are needed to support the education and training of new students, addressing global health workforce challenges. This is the position of the World Health Organisation (WHO) to address the global shortage of healthcare workers with acknowledgement of the constraints experienced in health professions education (WHO, 2013)

Evidence-based practice (EBP) is key in the education and training of health professionals (Lehane et al., 2019). In support of this widely accepted principle, empirical evidence in the use of AV systems for procedural skills training as an adjunct or supplementary tool to in-person skills acquisition was generated as a plausible pedagogical strategy for postgraduate education. Furthermore, evidence supporting the collaborative delivery in

the education and training between the HEIs in SA is a welcome endorsement considering the resource-constrained educational climate in SA. Such empirical evidence holds value for optometric HEIs for curriculum planning for envisaged postgraduate coursework programmes in optometry.

5 Conclusion

Digitalising procedural skills teaching at a postgraduate level for optometrists was recommended as a beneficial educational tool that can support hands-on skills training for the postgraduate scholar. The synchronous and asynchronous use of audiovisual tools to develop procedural skills is a valuable resource that can be adapted for various competencies across multiple clinical specialities in optometry and collaboratively shared between institutions to standardise and maintain quality training across different programmes.

Though a discrepancy between practitioners and educators existed in the usefulness of AV systems for online teaching and learning of procedural skills, it was concluded that a blended and hybrid approach combining online and face-to-face training is a viable pedagogical approach, with an emphasis on in-person contact training. Pivoting between the traditional in-person and pre-recorded and livestream virtual observations should be a strategy adopted by HEIs for clinical teaching in postgraduate qualifications in optometry. There was a firm conviction that collaboration between HEIs on both local and international scales could enhance teaching and learning. Resource sharing of educational materials and expertise could be advantageous for a middle-income nation. The empirical evidence generated from this research can support consistency in the curricula planning phase between all four HEIs. Leveraging technology to deliver education and training collaboratively presents an innovative pedagogical approach for postgraduate-level clinical education. By expanding higher education opportunities for optometrists to upskill, they will be equipped to deliver high-quality care to patients who access the health system. We can support the global vision of both lifelong learning and

internationalisation through collaboration by utilising technology to enhance educational provision and reach, particularly in the Global South.

6 Limitations and Recommendations

Statements about online theoretical engagement were omitted from the online questionnaire because, since the emergence of COVID-19, it has become standard practice to deliver content knowledge through online modalities. However, the population of practitioners may not all have experience in any form of online teaching and learning; hence, their perspective on this modality for theory may be valuable. Although the nature of a survey format does not allow for in-depth exploration of a concept, additional questions about the use of technology and connectivity in the current South African socio-economic climate could have been examined.

As optometric educators had predominantly undergraduate teaching and learning experience, they encountered difficulties during the FGDs in distinguishing the attributes of a postgraduate scholar from those of an undergraduate scholar and heavily reflected on their predominantly undergraduate educational and training backgrounds.

Scheduling participants into the various FGDs was challenging as schedules and availability between educators varied greatly. Though the aim was to mitigate power dynamics by grouping more senior and experienced educators separately from junior educators, it was not always possible in every FGD.

An evidence gap was observed, as most scholarly work focused on undergraduate-level education, training programmes, and undergraduate students, while there is a lack of research on postgraduate education and training. Though concepts could be applied to the postgraduate level, they were not always relevant or applicable.

It is recommended that the HPCSA take a leadership and oversight role in steering the curriculum planning with the HEIs in SA, as there are only four optometry institutions. The HPCSA can facilitate stakeholder engagement

with optometric educators and curriculum developers. It would be a feasible endeavour to ensure all HEIs work synergistically towards establishing their postgraduate programmes. In addition, exploring and planning the collaborative efforts between HEIs under the stewardship of the HPCSA would help expedite this process and strengthen interinstitutional collaboration, which is both novel and unexplored in the higher education sector, particularly in optometric education.

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CHAPTER 9

GROUP WORK IN ANATOMY AND PHYSIOLOGY TO ENHANCE KNOWLEDGE ACQUISITION AND RETENTION: PERSPECTIVES OF NURSE EDUCATORS IN GHANA

1¹. M Nkrumah / 2². Y Heymans / 3³. CD Christmals / 4⁴. AS Abukari /
5⁵. C Schreck

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1¹. Holy Family Nursing and Midwifery Training College
Berekum, Bono Region, Ghana
mnkrumah@nmtcberekum.edu.gh or
40533069@mysis-nwu.ac.za
ORCID iD: 0000-0003-1059-3615

2². Centre for Health Professions Education.
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
yolande.heyman@nwu.ac.za
ORCID iD: 0000-0003-4459-2266

3³. Centre for Health Professions Education
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
christmal.christmals@nwu.ac.za
ORCID iD: 0000-0003-1811-0008

4⁴. Department of Maternal and Child Health
School of Nursing & Midwifery
University of Ghana, Legon Accra, Ghana
Wisconsin International University College, Accra
Ghana
alhassan.sibdow@wiuc-ghana.edu.gh
ORCID iD: 0000-0002-7530-6501

5⁵. School of Human Movement Sciences
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
cornelia.schreck@nwu.ac.za
ORCID iD: 0000-0002-7805-0855

Abstract

Human anatomy and physiology form the scientific foundation of nursing education, yet students often struggle with knowledge acquisition and retention. Although group work is recognised as a valuable pedagogical approach that supports collaborative learning, peer engagement, and professional skills development, its implementation in Nursing Education Institutions in Ghana remains challenging. This chapter explores the perspectives of nurse educators in Ghana on the use of group work to enhance knowledge acquisition and retention in human anatomy and physiology. The authors used an exploratory descriptive qualitative design. Twelve nurse educators were purposively selected from six Nursing Education Institutions across three regional clusters. Data were collected through individual interviews using a semi-structured interview guide. Data were thematically analysed using Braun and Clarke's six-phase framework, supported by ATLAS.ti 23. Findings were clustered into three themes: the use of group work in human anatomy and physiology to enhance knowledge acquisition and retention; nurse educators' attitudes towards group work, including perceived benefits and challenges; and strategies to improve group work implementation to enhance knowledge acquisition and retention when teaching human anatomy and physiology. Nurse educators reported that group work enhances knowledge acquisition and retention in human anatomy and physiology by promoting peer learning, critical thinking, and confidence. However, challenges such as large class sizes, limited resources, time constraints, and inadequate training hinder effective implementation. To address these challenges, educators recommended innovative practices, structured guidance, and institutional support to optimise group work in nursing education.

Keywords: anatomy, physiology, knowledge acquisition and retention, group work, nurse educators, undergraduate nursing students.

1 Introduction and background

In nursing, courses such as human anatomy and physiology lay the scientific foundation for understanding health, illness, and clinical care (Sieck, 2019). However, despite its importance, Sieck (2019) as well as Hasan et al. (2022) explain that students often perceive human anatomy and physiology as difficult due to the abstract nature of the content, complex terminology, and the large amount of information that students must retain (Mhlongo & Masango, 2020). Gultice et al. (2015) argue that although traditional lecture-based approaches are often used to teach human anatomy and physiology, lecturing as a teaching strategy does not always promote deep learning or lead to long-term retention of anatomical and physiological knowledge. Arave and Stonebraker (2023) argue that active participation during group work can enhance knowledge acquisition and retention, self-confidence, clinical decision-making, and problem-solving in health science courses. Horiuchi-Hirose et al. (2023) agree and add that active participation in group work also enhances conceptual understanding and the application of knowledge in clinical settings. A study by Wong (2018) also reported that active participation during group work in nursing programmes promotes emotional engagement and peer accountability, leading to improved learning outcomes and student retention. Along similar lines, Jones et al. (2022) found that group work could aid the development of professional competencies, such as collaboration and communication, required for success in nursing education and clinical practice.

Despite the well-documented benefits of group work in health professions education, incorporating it into human anatomy and physiology instruction at Ghana's Nursing Education Institutions (NEIs) presents difficulties. Nurse educators report difficulties managing large class sizes, a lack of training in group facilitation techniques, low student engagement, and limited resources, which Shermin et al. (2019) argue can reduce the effectiveness of group work and create instructional barriers that jeopardise student learning and educator satisfaction. In a systematic review conducted by Hugo-Van Dyk et al. (2023), the researchers found that most empirical studies on group work in nursing education are conducted in high-income

countries that have adequate infrastructure, trained personnel, and technological resources, with little research from low- and middle-income countries, especially in sub-Saharan Africa, where the educational landscape presents unique challenges.

In Ghana, NEIs are under increasing pressure to produce competent nurses who can work in a variety of healthcare settings (Salifu et al., 2022). To meet this demand, nurse educators must use active learning techniques that encourage clinical reasoning and problem-solving abilities. However, systemic issues, such as overcrowded classrooms, poor infrastructure, and insufficient instructional resources, continue to affect teaching and learning outcomes in basic science courses, including human anatomy and physiology (Salifu et al., 2022). Furthermore, nursing students frequently struggle to apply theoretical knowledge in practice due to the didactic nature of teaching (Amoo et al., 2022). Nurse educators play an important role in bridging this gap by implementing innovative teaching strategies, such as group work, and their insights are critical for developing instructional models that enhance knowledge acquisition and retention in the Ghanaian nursing context.

2 Problem statement

Despite the well-documented benefits of group work, the use of group work in human anatomy and physiology teaching remains challenging. For example, in studies by Ndawo (2016) and Mwale et al. (2024), nurse educators responsible for the teaching of human anatomy and physiology reported difficulties in doing group work due to large classes, having limited resources, the lack of knowledge, skills, and training in the use of group work, and managing low student engagement. Elbilgahy et al. (2020) note that, despite a large body of literature on the effectiveness of group work from students' perspectives, the perspectives and experiences of nurse educators regarding its use have not been explored in depth. Exploring literature reporting on the perceptions of nurse educators who use group work to enhance knowledge acquisition and retention in low- and middle-income countries, especially in sub-Saharan Africa, yielded no results. The

lack of research supports the views of Hobenu et al. (2025), whose gap analysis of clinical education in undergraduate nursing in Ghana highlighted the non-stimulating clinical education climate as one of the unique challenges in nursing education in Ghana. Along similar lines, Kobekyaa and Naidoo (2023) identified barriers, including staff shortages, fragmented supervision, and infrastructural deficits, that limit the practical application of group work and problem-based learning in Ghana. The authors further argue that systemic issues, such as overcrowded classrooms, poor infrastructure, and insufficient instructional resources, continue to affect teaching and learning outcomes in basic science courses, such as human anatomy and physiology.

As a nurse educator in Ghana, Author 1 concurs with the findings of both Kobekyaa and Naidoo (2023) as well as Hobenu et al. (2025) that nurse education institutions in Ghana are under increasing pressure to produce competent nurses who can work in a variety of healthcare settings. Despite calls to use active learning techniques to promote clinical reasoning and problem-solving in nursing education (Kobekyaa & Naidoo, 2023), research on human anatomy and physiology teaching in the Ghanaian context is scarce.

This chapter addresses this lacuna by reporting on how human anatomy and physiology nurse educators (also referred to as tutors in Ghana) at NEIs in Ghana perceive the use of group work to enhance knowledge acquisition and retention.

3 Research design and research methodology

3.1 Study design

To explore how human anatomy and physiology nurse educators at NEIs in Ghana perceive the use of group work to enhance knowledge acquisition and retention, the authors used an exploratory descriptive qualitative approach, which is, according to Busetto et al. (2020), ideal for exploring participants' experiences, beliefs, and instructional practices within a specific context.

3.2 Setting and participants

There are 73 publicly funded NEIs in Ghana, distributed across the 16 regions (Ziba et al., 2021). For this study, the 16 regions were clustered into three clusters, namely the Northern, Middle, and Southern clusters. In each cluster, the researchers purposively selected two NEIs that had annual admissions of more than 100 nursing students, had at least two human anatomy and physiology nurse educators with at least three years of teaching experience, and were actively using group work when teaching human anatomy and physiology. This implies that the study population comprised 12 participants (four nurse educators per cluster in each of the three clusters).

3.3 Data collection

Ethics approval was granted by the appropriate ethics review boards in South Africa and Ghana (NWU-00161-12-23 and GHS-ERC:0006/12/23). After obtaining permission from the purposively selected NEIs, a neutral and independent research assistant recruited the participants, informed them about the intended research, and scheduled the individual interviews at a time and place convenient to the participants. Prior to the individual interview, the neutral and independent research assistant obtained voluntary, written consent. On the day of the individual interview, and after obtaining consent to record the 45-60-minute interview, Author 1 used a semi-structured interview guide comprising eight open-ended questions to gain insight into how human anatomy and physiology nursing educators at NEIs in Ghana use group work to enhance knowledge acquisition and retention. Participants were given ample time to respond to the questions and, where appropriate, probing questions were asked to gain deeper insights. Following the interviews, Author 1 saved the original audio recordings to a password-protected folder behind the institutional firewall. Author 1 then transcribed the recordings of the individual interviews verbatim and used member checking to ensure the transcripts accurately reflected the interviews. To enhance anonymity and confidentiality, Author 1 de-identified the data by replacing any identifiable information with a

code and uploaded the code list to a password-protected folder behind the institutional firewall.

3.4 Data analysis

Working with the de-identified data set, the authors used the six-phase framework, as proposed by Braun and Clarke (2006), to thematically analyse the data. In addition, the authors used ATLAS.ti 23, a qualitative data analysis software, to assist with the data analysis (ATLAS.ti Scientific Software Development, 2025). Author 1 served as the primary coder, and Author 2 supported Author 1. To enhance the reliability of the data analysis procedure and trustworthiness of the findings, a qualified and experienced coder served as co-coder. During phase one, Authors 1 and 2, along with the co-coder, read through the data to gain an understanding of its breadth and depth (Braun & Clarke, 2006). In phase two, Authors 1, 2, and the co-coder identified possible codes, discussed the proposed code list, finalised the code list, and linked text segments in the data to the codes. Where necessary, new codes were added to the code list. In phase three, as suggested by Braun and Clarke (2006), the coders clustered the codes together into potential themes. Thereafter, the coders reviewed and refined the themes to ensure that the coded data, sub-themes, and themes accurately reflected the data. In phases five and six, all the authors met to interpret and discuss the findings in relation to answering the research question.

4 Findings

Findings from the data analysis were clustered under three main themes and ten sub-themes (Table 9.1). To substantiate the findings, the authors include supporting quotations. The identifier at the end of each quotation (e.g., A4) serves as an indication of where the supporting quotation could be found in the collated dataset. However, to ensure anonymity, none of the identifiers can be linked to any participant.

Table 9.1: Themes and sub-themes

Theme	Sub-themes
Theme 1: Use of group work in human anatomy and physiology to enhance knowledge acquisition and retention	Sub-theme 1.1: Space for group work activities
	Sub-theme 1.2: Teaching and learning activities during group work
	Sub-theme 1.3: Group work assessment
Theme 2: Nurse educators' attitudes towards group work for knowledge acquisition and retention in human anatomy and physiology	Sub-theme 2.1: Group work promotes students' personal and academic development
	Sub-theme 2.2: Group work enhances knowledge acquisition and retention
	Sub-theme 2.3: Student challenges during group work
	Sub-theme 2.4: Nurse educators' challenges during group work
Theme 3: Strategies on the use of group work to enhance knowledge acquisition and retention in human anatomy and physiology	Sub-theme 3.1: Adopt innovative practices for group work
	Sub-theme 3.2: Student support for group work activities
	Sub-theme 3.3: Monitoring and managing group work activities

4.1 Theme 1: Use of group work in human anatomy and physiology to enhance knowledge acquisition and retention

Collaborative learning activities in the domain of human anatomy and physiology have been shown to significantly enhance depth of understanding and facilitate knowledge retention. These activities can be implemented across various settings, including in-class sessions, collaborative efforts outside the classroom, and a blended learning approach. The range of activities encompasses research, assignments, presentations, and reports, all of which promote critical thinking and teamwork. Diverse assessment methodologies are employed, with some leveraging grades as motivational catalysts, while others use group work as an educational strategy free of traditional grading structures. Overall, when

well structured, group work enhances knowledge acquisition and retention in this intricate subject. These conclusions are further articulated through the exploration of three sub-themes presented hereafter:

4.1.1 Sub-theme 1.1: Space for group work activities

Participants highlighted the importance of selecting appropriate settings for group work, emphasising that the effectiveness of collaborative activities depends on where they are conducted. Some participants preferred working within the classroom, while others found out-of-class environments more conducive to deeper discussions and task completion. A commonly endorsed approach was a blended method combining in-class and out-of-class group interactions.

4.1.2 Sub-theme 1.2: Teaching and learning activities during group work

Participants described group work activities as diverse and goal-oriented, serving as a platform for deeper learning, knowledge acquisition, and retention. These activities included conducting research, completing assignments, preparing presentations, and compiling reports, all of which contributed to a more engaging and interactive learning experience. One participant highlighted the role of research in group work; another emphasized structured academic tasks; and others noted the collaborative nature of group work, which supports teaching and learning activities. These insights underscore the value of group work in fostering critical thinking, teamwork, and shared responsibility in the learning process.

“With group work, they can do more research and come out with new knowledge.” A1

“Each group is required to present a report on the given topic or question.” A2

“They prepare the presentation together as a group, with everyone contributing.” A8

4.1.3 Sub-theme 1.3: Group work assessment

Participants described varying approaches to assessing group work, reflecting differences in grading practices and motivational strategies. While some nurse educators incorporated grades as an incentive for active participation, others applied selective grading based on the nature of the task. One participant highlighted the role of assessment in encouraging engagement, and another participant noted that while some group presentations were graded, others were not. Additionally, certain teaching methods, such as the jigsaw approach, were primarily used as learning tools rather than for formal grading. These responses suggest that assessment in group work varies according to instructional goals, with grading used strategically to enhance participation and accountability.

“To motivate students to speak and be part of the group, we normally allocate some small marks for continuous assessment for group work. So, that's how it starts. You do it with all the groups.” A7

“There are some presentations that I do grade, but not all of them. So, for those that I grade, I let them know that this presentation or this group work will be graded.” A11

4.2 Theme 2: Nurse educators' attitude towards group work for knowledge acquisition and retention in human anatomy and physiology

Nurse educators emphasised the benefits of group work in promoting student personal and academic development, enhancing knowledge acquisition and retention, and simplifying complex topics. However, challenges such as inadequate participation, poor punctuality, communication barriers, and limited focus on assigned portions can hinder effective group work. Nurse educators face challenges such as large class sizes, insufficient staffing for supervision, insufficient classroom space, and limited time and knowledge for managing group activities. To overcome these issues, more support and training are needed.

4.2.1 *Sub-theme 2.1: Group work promotes student personal and academic development*

Participants highlighted that group work is a crucial pedagogical approach that enhances both academic performance and personal development among nursing students. It creates a relaxed environment that encourages participation, enhances critical thinking, and facilitates skill development. The participants indicated that the informal nature of group discussions supports engagement by allowing nursing students to express themselves freely. Group work also increases student participation and inclusivity, allowing nursing students to contribute from various sources. Nursing students often bring creativity and innovative ways of presenting information. Beyond academic benefits, group work fosters confidence and strengthens relationships between nursing students and nurse educators. Effective implementation of group work ensures efficient syllabus coverage, enhancing overall student performance.

They [nursing students] develop skills in research, information retrieval, and answering questions effectively. It's a valuable learning experience." A5

"It's fantastic because it gives every student the opportunity to participate. In group work, what I've seen is that no answer is wrong, which encourages participation. Students who have read from other sources can contribute as well. It's very useful in teaching anatomy and physiology." A6

"Students learn from their peers and grow their confidence among others...I have mentioned, it even brings me closer to the students. I get to know them better." A12

4.2.2 *Sub-theme 2.2: Group work enhances knowledge acquisition and retention*

Group work is a powerful learning tool that enhances knowledge acquisition and retention by simplifying complex topics, fostering deeper understanding through peer explanations, and promoting hands-on and interactive learning. It allows nursing students to grasp anatomy concepts

more effectively by drawing on diverse perspectives. The hands-on nature of group work reinforces learning, and nursing students benefit from the insights and perspectives that emerge during discussions. It also supports weaker nursing students by enabling them to learn from their peers, creating a supportive learning environment. Group work also sparks interest in the subject matter and facilitates knowledge retention by allowing nursing students to explain concepts in their own language using terms they understand. Some participants intimated as follows:

“We are achieving understanding of the anatomy concepts and the acquisition of knowledge...” A1

“This hands-on approach, combined with group work, enhances their learning experience and retention of knowledge.” A5

“Personally, I benefit from the insights and perspectives that emerge during these group discussions...one reason is that complex terminology is often simplified during group discussions. When students explain concepts to each other in simpler terms....” A2

4.2.3 Sub-theme 2.3: Student challenges during group work

Group work can be effective in enhancing student learning, but it faces several challenges that could constrain knowledge acquisition and retention. Many participants noted that inadequate participation, especially in larger groups and in out-of-class settings, can lead to imbalances in contributions. Most nurse educators also highlighted that communication barriers, especially among nursing students with varying language proficiency, can hinder participation and, in turn, negatively affect knowledge acquisition and retention. Nursing students may also focus on their assigned tasks, limiting the scope of the topic. These challenges underscore the need for structured guidance, clear expectations, and strategies to foster inclusive participation, timely engagement, and effective communication:

“In the in-class setting, some students may not participate fully due to the larger group size...” A2

“For out-of-class group work, the main challenge is lateness.” A2

“Yes, especially considering that language can sometimes pose a challenge.” A1

4.2.4 Sub-theme 2.4: Nurse educators’ challenges during group work

Nurse educators face numerous challenges in implementing group work, including large class sizes, insufficient supervision, inadequate classroom space, and time constraints. Large class sizes make it difficult to monitor engagement and provide individualized support. Forming manageable groups is also challenging due to time constraints. Classroom space is another major concern, as many institutions lack sufficient room for active group discussions. Time constraints make it difficult to integrate group activities within the limited lesson time. Inexperienced nurse educators also face challenges in managing group work effectively due to the learning curve and lack of formal training. These challenges highlight the need for institutional support, including better classroom infrastructure, adequate staffing, and training programmes. The extracts below highlight some of the participants’ perspectives:

“...it's [group work in anatomy and physiology] challenging to supervise and ensure everyone's participation.” A11

“The challenges include large class sizes. When you have a large class, it's difficult to group them...” A12

“In summary, classroom space and time are the main challenges for in-class group work, while lateness...” A2

4.3 Theme 3: Strategies on the use of group work to enhance knowledge acquisition and retention in human anatomy and physiology

Participants in this study reported using a comprehensive approach to group work to improve knowledge acquisition and retention. Participants suggested incorporating online tools like WhatsApp, video conferencing, and Google Forms to facilitate collaboration and track progress. Participants

also emphasised the importance of providing clear instructions and thoughtful grouping based on nursing students' skills and backgrounds. Participants also stressed the need for structured planning, time management, and monitoring participation. Participants recommended forming groups of five to ten nursing students and encouraging active discussion, questioning, and problem-solving. Continuous monitoring was also considered essential to ensuring active participation. Three sub-themes supported these findings, namely, adopting innovative practices for group work, student support for group work activities, and monitoring and managing group work activities.

4.3.1 Sub-theme 3.1: Adopt innovative practices for group work

Participants in this study emphasised the importance of innovative practices in group work to enhance learning. Participants suggested incorporating online tools like WhatsApp calls and video conferencing to facilitate collaboration and track group progress. Participants also encouraged nursing students to explore educational materials beyond traditional textbooks, including YouTube for educational videos. Collaboration among nursing students was also emphasised, with WhatsApp platforms for each year group providing valuable resources and fostering a sense of community. This approach not only enriches nursing students' understanding of complex subjects but also allows them to expand their learning beyond the classroom.

"I advise them to go beyond textbooks and Google by watching educational videos on platforms like YouTube..." A9

"I have a WhatsApp platform for each year group, where students share useful links and information. Sometimes they discover valuable resources that I haven't come across. I review the links they share and provide guidance on reliable sources. This collaboration helps enrich their understanding of anatomy and physiology." A2

4.3.2 *Sub-theme 3.2: Student support for group work activities*

Participants in this study emphasised the importance of providing essential resources and clear instructions for group work activities. Participants recommended materials like whiteboards, flipcharts, markers, and notepads, as well as reliable internet connectivity and laptop access. Participants also emphasised the need for clear guidance, outlining goals, expectations, and tasks to ensure nursing students stay focused. Participants also accentuated the value of thoughtful group composition, balancing skill levels and ensuring that stronger nursing students support their peers. These strategies are crucial for fostering a collaborative and productive learning environment, ensuring that nursing students are well-supported and engaged in group work.

"I make sure to provide specific instructions on what the group should work on." A4

"I know who is good. So, I pick the best, along with average and below-average students, and group them." A6

4.3.3 *Sub-theme 3.3: Monitoring and managing group work activities*

This study emphasises the importance of structured plans, effective time management, and diligent monitoring in group work activities. Clear guidelines, appropriate group sizes, and active student engagement are crucial for a productive learning environment. Nurse educators, participants in this study, noted that nursing students should be given ample time to prepare and to monitor their progress, ensuring they stay on track. Groups should be assigned varying sizes to facilitate meaningful discussions, balancing collaboration and manageability. Active participation is crucial, with nurse educators guiding discussions by asking guiding questions and bringing nursing students back into the conversation if disengagement occurs. Participants also offered input and questions to guide nursing students towards the right conclusions, enriching their learning through active feedback. Ultimately, clear structure, time management, and active monitoring are essential for creating a supportive and dynamic learning environment for nursing students:

“Give them ample time to prepare and specify the areas they need to study or gather information from... then, I monitor their progress. If they're on track, I encourage them to continue.” A4

“If I notice someone isn't engaged, I might ask them about the discussion to bring them back on track...for in-class group work, I move from one group to another, observing their discussions.” A2

“Sometimes, I'll ask them questions to guide them in the right direction before moving on to the next... when you listen to their contributions, add your insights to complement their understanding.” A3

5 Discussion

This research explored the perspectives of nurse educators in Ghanaian NEIs on the use of group work in the teaching of human anatomy and physiology to enhance knowledge acquisition and retention. The results are consistent with the existing literature, which underscores the advantages of collaborative learning in health professions education (Cohen & Lotan, 2014; Horiuchi-Hirose et al., 2023; Hasan et al., 2022). Nonetheless, problems such as insufficient student participation, time management challenges, and inadequate institutional support impede effective implementation. Mitigating these challenges through structured strategies and innovative methodologies could enhance the efficacy of group work in nursing education.

The authors observed that group work is efficacious in fostering deeper learning and augmenting knowledge retention when teaching human anatomy and physiology. This approach can be applied across various settings, such as in-class activities, collaborative endeavours outside the classroom, and blended methodologies. These findings are consistent with Horiuchi-Hirose et al. (2023). Furthermore, nurse educators underscore the advantages of group work in advancing students' personal and academic development, bolstering knowledge acquisition and retention, and demystifying complex topics (Cohen & Lotan, 2014). Nonetheless,

challenges such as inadequate participation, punctuality issues, communication barriers, and limited focus persist.

5.1 Use of group work to enhance knowledge acquisition and retention

The findings confirm that group work constitutes a valuable pedagogical strategy within health professions education, particularly in human anatomy and physiology courses. Nurse educators emphasise that group work promotes active learning, facilitates peer-to-peer knowledge exchange, and enhances critical thinking. These observations align with previous studies, which suggest that cooperative learning enhances deeper understanding and long-term retention of complex biomedical concepts (Yang, 2023). Moreover, group work affords students the opportunity to cultivate communication, teamwork, and problem-solving skills, which are essential competencies for nursing practice (Hastie & Barclay, 2021).

In addition, the study delineated three primary contexts for group work: in-class, out-of-class, and blended learning environments. Anecdotally, the contextual practice of group work among the nurse educators and nursing students underscores this finding. In-class group work activities facilitate direct engagement with educators, thereby promoting real-time feedback and guidance. This practice aligns with constructivist learning theory, which holds that active engagement with educational material enhances comprehension and retention (Chuang, 2021; Fernando & Marikar, 2017). Out-of-class group work allows nursing students to collaborate more flexibly, encouraging self-directed learning and deeper exploration of anatomical and physiological concepts. Earlier studies in curriculum development demonstrated the critical role of the constructivist learning theory in promoting participatory teaching methods, including group work (Fernando & Marikar, 2017). These findings are consistent with current research in innovative teaching methods (Chuang, 2021). Nonetheless, several nurse educators have expressed concerns regarding out-of-class activities, citing disparities in access to learning resources and personal commitments as potential impediments to effective participation. The blended approach, amalgamating both in-class and out-of-class group work,

was identified as the optimal modality for navigating the contextual challenges, as it synergizes structured guidance with flexibility, thereby catering to diverse learning needs and preferences.

During group work, nurse educators used a variety of instructional strategies, such as student-led research, assignments, reports, presentations, and scheduled group learning sessions. These strategies are consistent with active learning methodologies, which have been shown to significantly improve students' understanding of complex scientific concepts (Porquet-Lupine & Brigham 2023; Stott & Hobden, 2019). In support of Porquet-Lupine and Brigham (2023), research and assignments promote inquiry-based learning, requiring students to delve deeply into anatomical and physiological concepts. Presentations and reports reinforce learning by asking students to articulate and organise their knowledge, which promotes cognitive reinforcement. Feyzioğlu and Demirci (2021) emphasise the value of structured group learning sessions, which promote regular engagement and collaborative problem-solving, and along similar lines, Nolan and McNamara (2022) reported that clustering students into small groups increased their engagement in learning human anatomy and physiology.

Assessment emerged as a valuable factor in the success of group work activities. Melville (2020), Hastie and Barclay (2021), as well as Boud and Bearman (2024) found that grading group work can increase student engagement and accountability. Findings from this study support this finding, as responses from the nurse educators indicated that most graded the group work activities, which, according to them, increased student motivation and accountability. In addition, some nurse educators noted that they do not grade group assignments to encourage intrinsic learning and reduce grade-related stress, supporting the work of scholars such as Hastie and Barclay (2021), who state that not grading group work could create a less competitive learning environment, which may encourage deeper conceptual engagement and improve knowledge acquisition and retention. Based on the responses of the nurse educators in this study, as well as research by Boud and Bearman (2024), it is evident that the absence of accountability mechanisms in non-graded group work may discourage participation by less motivated nursing students and lead some to

contribute less while benefiting from the collective effort. Therefore, nurse educators should adopt a balanced approach when grading group work.

5.2 Benefits and challenges in implementing group work

According to the findings, most nurse educators see group work as a valuable tool for improving student learning and development. Group work, according to the nurse educators who participated in this study, fosters peer learning, encourages active student participation, and creates a relaxed learning environment. This is consistent with previous research showing that collaborative learning improves engagement, motivation, and overall academic performance (Xu, 2024; Xu et al., 2015). Working together not only boosts nursing students' confidence but also helps them develop essential skills like teamwork, critical thinking, and problem-solving, all of which are important in nursing practice.

Nurse educators emphasised that group work allows nursing students to discuss and deepen their understanding of complex human anatomy and physiology. These results are consistent with social constructivist theories, which hold that learning occurs through social interactions and shared experiences (Chuang, 2021). Furthermore, group work was perceived to help students improve their communication and interpersonal skills, gain confidence, and strengthen professional relationships, all of which are necessary for effective nursing practice (Koh et al., 2010).

In addition, the study also found that group work improves knowledge acquisition, retention, and application by allowing nursing students to engage with different perspectives, support weaker peers, and simplify complex topics in their native language. This is consistent with research showing that peer-led discussions promote active engagement and help students construct new knowledge more effectively (Liu et al., 2022). Furthermore, collaborative learning strategies help to bridge the gap between theoretical concepts and practical applications, ensuring that students have a comprehensive understanding of human anatomy and physiology (Chuang, 2021).

Despite the benefits, nursing students faced several challenges during group work, including poor punctuality, low participation, communication barriers, and a tendency to focus only on specific aspects of assigned tasks. In some cases, stronger students take over discussions, leaving weaker students disengaged (Mhlongo & Masango, 2020; McKay & Sridharan, 2024; O'Connell et al., 2024). To address these issues, nurse educators who participated in this study recommended establishing structured group work roles and accountability measures to ensure equitable participation. In a qualitative study among South African students, Reddy (2022) reported that most students complained about the “freeriding phenomenon,” in which some students do not actively participate in group work, which breeds frustration and compromises the effectiveness of team learning.

Furthermore, nurse educators faced significant challenges in facilitating group work, including large class sizes, insufficient faculty supervision, insufficient classroom space, and limited institutional support. Supporting the research by Wong (2018) and Albloushi et al. (2024), many nurse educators expressed concern about their own lack of training in collaborative teaching methodologies, which hampered their ability to effectively implement group work. The responses of nurse educators in this study support the views of Elbilgahy et al. (2020) and Buthelezi and Shopo (2023), indicating that a lack of faculty training and resources can impede the successful implementation of active learning strategies. In a phenomenological study conducted among undergraduate students in Hong Kong, Wong (2018) identified conflicts and excessive group work imposed by various course educators on student nurses. To address these challenges, the authors argue that investment in faculty development programmes, increased staffing, and improved learning infrastructure are required to create an environment conducive to group-based learning. While group work in human anatomy and physiology education has obvious advantages, overcoming both student and educator challenges is critical to maximising its effectiveness. Providing structured guidance, incorporating digital learning tools, and cultivating institutional support will be critical to the successful implementation of collaborative learning strategies in nursing education.

5.3 Strategies for enhancing the effectiveness of group work

Participants in the study proposed several strategies for improving the use of group work in human anatomy and physiology education. The use of digital tools like WhatsApp calls, video conferencing, Google Forms for tracking participation, and online discussion forums can improve student engagement and streamline group activities (Xu et al., 2015). Blended learning approaches have been shown to improve student engagement and learning outcomes in health sciences education (Shermin et al., 2019). Using these technologies allows for greater flexibility in group work coordination and accommodates different learning styles.

Nurse educators emphasised the value of teaching nursing students teamwork skills like conflict resolution, time management, and effective communication. As noted by Arruzza et al. (2023), the authors concur that supporting group work activities with necessary resources, such as whiteboards, flipcharts, markers, notepads, internet access, and laptop computers, ensures that nursing students have the tools they need to participate effectively. Furthermore, as Liu et al. (2022) suggest, providing clear instructions and grouping students by skill mix and background enhances collaboration. In addition, as stated by Malik and Shakeel (2022) and Zhang et al. (2024), using structured teaching strategies such as team-based and problem-based learning, which underscore the importance of group work, could, if implemented and facilitated correctly, improve student collaboration in medical and nursing education.

Structured group work organisation, time management strategies, and closely monitoring student participation can all contribute to improving group work effectiveness (Rezaei, 2018). Assigning students to smaller groups of five to ten allows for more effective engagement, and nurse educators can move between groups to encourage participation, facilitate discussions, and ensure that all students contribute. Similarly, young professional midwives utilised small group work to enhance their knowledge in midwifery practice (Hastie & Barclay, 2021). Peer evaluations, structured rubrics, and continuous feedback have been shown to increase accountability and motivation in collaborative learning settings (Liu et al.,

2022). Moreover, nurse educators could enhance effective group work by managing emerging group challenges, focusing on individual contributions, and tracking progress, all of which are critical for maximising the benefits of group-based learning in human anatomy and physiology education.

6 Conclusion

Group work is an important pedagogical strategy for improving knowledge acquisition and retention in anatomy and physiology teaching. Despite the potential benefits, challenges such as low student engagement, insufficient institutional support, and traditional learning attitudes that could negatively impact knowledge acquisition and retention in anatomy and physiology remain. Addressing these challenges necessitates structured pedagogical interventions, faculty training, and curriculum innovations. This study adds to the discussion of collaborative learning in nursing education and the use of group work as a teaching and learning strategy to enhance knowledge acquisition and retention in human anatomy and physiology, which are fundamental to delivering quality care.

7 Limitations and recommendations

While this study offers useful insights into the use of group work in human anatomy and physiology education, it has some limitations. The study included only a small sample of nurse educators from purposefully selected NEIs in Ghana, which may limit the generalisability of the findings. Furthermore, self-reported data from interviews may be susceptible to social desirability bias. Nonetheless, the study's qualitative approach allowed for a thorough examination of nurse educators' experiences and perspectives, providing valuable contextual insights into the use and facilitation of group work as a teaching strategy to enhance knowledge acquisition and retention in human anatomy and physiology. In this study, the authors only employed a qualitative research design; however, conducting more research using other research designs, e.g., a quantitative, mixed, or multi-method research design, may yield additional insights into how human anatomy and physiology nurse educators at NEIs in Ghana

perceive the use of group work to enhance knowledge acquisition and retention.

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CHAPTER 10

KEY INFORMATION SOURCES FOR CLINICAL DECISION-MAKING AMONG GHANAIAAN CLINICAL NURSES AND MIDWIVES

1. LB Owusu / 2. N Scheepers / 3. IS Tenza

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¹ Nursing Department
Kwame Nkrumah University of Science and
Technology (KNUST)
lydiaowusu7@yahoo.com
ORCID iD: 0000-0003-3194-2749

² School of Nursing Science
Faculty of Health Sciences, North-West University
Potchefstroom, South Africa
Nicholin.ScheepersMajokweni@nwu.ac.za
ORCID iD: 0000-0001-6952-7060

³ NuMIQ, Nursing
Faculty of Health Science
North-West University, Potchefstroom
sabelile.tenza@nwu.ac.za
ORCID: 0000-0003-0286-9183

Abstract

Clinical decision-making in healthcare relies on factors such as clinical experience, knowledge of evidence-based practices (EBPs) and patient-specific circumstances. Over the years, there has been a skewed emphasis on the empirical pattern of knowing, overlooking other patterns of knowing. Key sources of information and patterns of knowing influence how nurses and midwives interpret clinical situations, make decisions and provide care. However, in many low- and middle-income countries, such as Ghana, a knowledge gap exists regarding the sources of information, patterns of knowing guiding clinical decision-making in nursing and midwifery practice. It is also not known to what extent nurses and midwives are able to use the empirical pattern of knowing, which has gained priority over the years. This chapter addresses the knowledge gap by examining the primary sources of information, the patterns of knowing that guide clinical decision-making in nursing and midwifery practice in Ghana, as well as their ability to use the empirical pattern of knowing. Recommendations for use of all patterns, with an emphasis on empirical pattern of knowing are provided to facilitate knowledge translation to practice and support clinical decision-making. A cross-sectional quantitative study was conducted with 400 clinical nurses and midwives, sampled through a multistage sampling method. Data were collected using a modified EBP questionnaire and analysed with STATA 16, both descriptively and inferentially. The results show that the most used sources of information in line with the patterns of knowing were empirical (formal education/school training, in-service training, journal articles (34%) and pharmaceutical literature), with journal articles being the least used source, and ethical (hospital policies and protocols). The findings imply the need for enhanced research training. Health facilities and educational institutions should improve access to digital resources and regularly update hospital protocols and curricula for nursing and midwifery education using current evidence.

Keywords: information; decision-making; clinical; nurses; midwives; evidence-based practice

1 Introduction and background

The State of the World's Nursing Report 2025 has provided strategic direction for nurses and midwives to practice to the fullest extent of their abilities, with a policy priority of adapting workplaces to enable them to contribute maximally to healthcare delivery as they work in interdisciplinary teams (World Health Organization, 2025). This action calls for a review of the information sources guiding nurses and midwives' clinical decision-making to enable strategic planning and ensure optimal health (World Health Organization, 2025).

Clinical decision-making in nursing and midwifery is complex, involving critical thinking, knowledge application and ethical considerations to determine the best course of action for a patient's care. Information sources and patterns of knowing play a key role in nurses and midwives clinical decisions making (Fossum et al., 2022).

In 1978, Barbara Carper identified four patterns of knowing: empirical, aesthetic, ethical and personal knowing (Brown et al., 2022; Carper, 2021; Carper, 1978). Subsequently, Chinn also identified additional patterns of knowing, including sociopolitical, unknowing and emancipatory patterns of knowing (Chinn et al., 2021). All these seven (7) patterns of knowing represent the complex phenomenon nurses use in providing care to their patients (Thorne, 2020). Empirical knowing is a positivistic science where knowledge is logically determined through a systematic investigation (Carper, 2021). This knowledge is based on objective information, and the order of this pattern is evidence-based practice (EBP) (Jackson et al., 2009). EBP is a systematic approach to solving problems using current research evidence, patient values and clinical expertise for clinical decision-making (Boswell & Cannon, 2022; Dagne & Beshah, 2021; Li et al., 2019). It plays a critical role in contemporary healthcare by addressing the increasingly complex and evolving demands of society (Mercer, 2018; Virpi et al., 2017). According to Barbara Carper (1978), aesthetic knowing is a more subjective form that focuses on intuition and the interpretation of what nurses "come

to know” and find meaning in what they see. It is gained from experience rather than objective ways (Carper, 1978).

Carper (1978) defined personal knowing as a nurse knowing oneself and developing an interpersonal relationship with their patient. It requires maturity and self-confidence in one’s experiences and capabilities and, therefore, increases with age and experience (Chinn & Kramer, 2014). On the other hand, ethical knowing focuses on morality, and decisions are based on what is right at the moment and what ought to be done for the patient’s good (Chaddha & Agrawal, 2023). Brown et al. (2021) describe ethical knowing as offering alternatives and ensuring a sense of responsibility for patient’s safety and best interests. The source of this knowledge includes ethical codes and professional standards (Collings-Hughes et al., 2022; Giorgini et al., 2015).

Sociopolitical knowing was later developed by White (1995) and refers to the environment within which nursing care takes place. This knowledge enables nurses to recognise the broader determinants of health, which include social, economic and political factors (Camargo et al., 2008; Fyers, 2024; Persegona et al., 2025; White, 1995). Unknowing is another pattern which means the position of how people understand the complex realities of life (Thorne, 2020). It highlights openness and encourages nurses to approach patient care without assumptions (Munhall, 1993; Thorne, 2020). In 2008, Chinn and Kramer added emancipatory knowing, which emphasises social justice and equity, helping nurses recognise the challenges, including institutional injustice, which affect healthcare delivery. It encourages advocacy for marginalised populations (Thorne, 2014; Velasco & Reed, 2023; Walter, 2017).

According to Chinn and Kramer (2014), also supported by Rafii et al. (2022) nursing practice becomes more effective when all the patterns of knowing are together and coherently applied to achieve praxis. Again, professional practice benefits from knowing because it is essential to competent clinical judgement, which goes beyond physical examinations (Sherwood, 2024). It incorporates the abilities of perceptive understanding and active engagement, which strengthen the nurse’s capacity for advocacy and serve

as a critical component of clinical learning (Mantzorou & Mastrogiannis, 2011; Forough Rafii et al., 2021; Rafii et al., 2022). Even though these patterns of knowing in nursing are in place, in many developed countries, there has been a skewed focus towards the use of research, clinical guidelines and formal education as the primary basis for making decisions in healthcare, disregarding other patterns of knowing (Hanney & González-Block, 2015; Thacharodi et al., 2024).

Africa has also emphasised empirical knowledge, as studies show an increase in clinical research in line with global trends (Strüver et al., 2022; Strüver & Ibeneme, 2021). An increase in empirical knowledge generation is expected to be reflected in the practice of nurses and midwives, where clinical decisions would be made based on this evidence generated (Barría, 2022). However, this is not always the case. Increased attention to research use or evidence-based clinical decision-making might have led to less acceptance of other patterns of knowledge in clinical decision-making (Porter, 2010b). Moreover, it is not known to what extent are the nurses and midwives ready to use the empirical pattern of knowing given the increased attention it has received. Understanding of the nurses and midwives' sources of information, their patterns of knowing, and their ability to use empirical pattern of knowing to make clinical decision-making, could assist in the formulation of recommendations for using all patterns of knowing in clinical decision-making, with an emphasis on empirical pattern of knowing (Kitson & Harvey, 2016; Mantzorou & Mastrogiannis, 2011). Hence, the need for this study which assesses the information sources and patterns of knowing by nurses and midwives in Kumasi.

2 Problem statement

The World Health Organisation's Global Strategic Directions for Nursing and Midwifery (2021–2025) emphasises the importance of nurses and midwives accessing and applying various sources of knowledge to improve the quality of care and reach universal health coverage (World Health Organization, 2021). Nursing scholars, beginning with Carper (1978) and later scholars (Chinn et al., 2021; Munhall, 1993; F. Rafii et al., 2021; White, 1995; Zander,

2007) explain that the various ways of knowing influence how healthcare workers interpret clinical situations, make decisions and provide care. Despite this theoretical recognition, global research has consistently shown a dominant emphasis on empirical knowledge, often accompanied by continued reliance on informal information sources in clinical practice (Porter, 2010a).

Globally, research emphasises the growing importance of empirical knowledge in guiding clinical decisions. Evidence from integrative and systematic reviews indicates that nurses and midwives frequently depend on personal experience, peers and other informal sources rather than independently engaging with research evidence. For example, Fossum et al. (2022) found that peers are the primary source of information guiding clinical nursing practice. Similarly, Saunders and Vehviläinen-Julkunen (2016) found that nurses have positive attitudes towards EBP but do not use it in their practice. Similar patterns have been documented over several decades, with a high reliance on informal and interactive sources (Spenceley et al., 2008). Although a small number of studies from African contexts exist, they remain limited in scope and number, underscoring a persistent geographical imbalance in the source of information guiding clinical practice.

While these studies provide valuable insights into information use among nurses and midwives in high-income countries, far less is known about how information sources and patterns of knowing shape clinical decision-making in low- and middle-income countries (LMICs). In Ghana, as in many LMICs, there has been increasing emphasis on empirical knowledge and EBP within education, policy and professional discourse. However, it remains unclear to what extent nurses and midwives' access, interpret and apply empirical knowledge in practice or how the patterns of knowing interact with each other in clinical practice. Existing studies have predominantly focused on EBP attitudes or research utilisation (Agyei et al., 2015; Anaman-Torgbor et al., 2022; Antwi-Yamoah et al., 2021; Atakro et al., 2020), without sufficiently examining the broader range of information sources and patterns of knowing that inform everyday clinical decision-making.

Consequently, a critical gap exists in the literature regarding a comprehensive understanding of the information sources and patterns of knowing that guide clinical nursing and midwifery practice in Ghana and similar LMIC contexts. Addressing this gap is essential for developing contextually appropriate strategies that support balanced knowledge use in clinical decision-making for optimal health.

3 Aims and objectives

This study aims to investigate the current information sources and patterns of knowing that guide clinical decision-making among nurses and midwives, and to formulate recommendations to guide nurses and midwives in using all patterns of knowing to facilitate knowledge translation into practice and inform clinical decision-making, with an emphasis on empirical patterns of knowing. Therefore, the following objectives will be addressed:

- To investigate the primary information sources and the patterns of knowing guiding clinical decision-making in nursing and midwifery practice in Kumasi, Ghana.
- To assess the nurses and midwives' ability to use the empirical pattern of knowing (such as their competence in research skills and evidence-based practice) to inform clinical decision-making.

4 Methods

4.1 Research design

The study employed a cross-sectional design with a quantitative approach to identify the information sources guiding clinical decision-making in nursing and midwifery practice in Kumasi, Ghana.

4.2 Study setting

The study was conducted in the city of Kumasi in the Ashanti region of Ghana. The Ashanti region is the second-most populous region in Ghana

(Ghana Statistical Service, 2021). The Ashanti region was selected for this study due to its strategic location in the middle belt of Ghana, which brings together diverse socio-demographic groups and a mix of urban and rural settings, making it broadly representative of the national context (Ghana Statistical Service, 2021). It also has the highest concentration of healthcare facilities in the country, spanning community-based services to tertiary referral hospitals, thereby enabling the examination of information sources across different levels of nursing and midwifery practice (Awuah et al., 2014). While a large proportion of the population has access to primary care, access to secondary and tertiary services remains uneven, highlighting structural factors that may influence how information is obtained and used (George et al., 2020). Previous studies in the region have examined specific aspects of practice, such as nursing documentation (Tasew et al., 2019) and respectful maternity care (Dzomeku et al., 2021), but there is limited evidence on the broader spectrum of information sources guiding clinical decision-making. These characteristics make Ashanti an ideal setting for generating insights that are both contextually grounded and generalisable for nursing and midwifery practice in Ghana. The study was conducted in six hospitals in Kumasi City: one tertiary facility, four district-level facilities, which are government-owned, and one quasi-health facility representing the private health facilities. Including participants from multiple healthcare facilities across various service levels enhances the external validity of the study's findings and ensures the representation of diverse practice environments and organisational cultures.

4.3 Study population

The study included clinical nursing and midwifery professionals who have practised for a minimum of two (2) years post-qualification within the study area and have a valid licence from the Nursing and Midwifery Council of Ghana. Those who were on study or annual leave were excluded. As of January 2022, the total population of nurses and midwives in the selected health facilities was 3,556, representing the total target population.

4.4 Sample size calculation and sampling strategy

Determining an appropriate sample size was critical to ensuring the statistical power and reliability of the factor analysis. A sample size of 400 clinical nurses and midwives was calculated from the total population of nurses and midwives in the selected health facilities, which was 3,556 as of January 2022, using the Taro Yamane formula for calculating sample sizes (Yamane, 1967) with a 10% estimated dropout rate.

A multistage proportionate sampling was used to allocate the sample size for each facility based on the number of nurses and midwives at each facility (Shimizu, 2014). This step was followed by systematic sampling (Mostafa & Ahmad, 2018) with a sampling frame of nine, which was determined by dividing the population for each hospital by the sample size for that facility. The process was repeated until the required sample size of 400 was obtained. This systematic approach to sample size determination ensured that the study would have sufficient statistical power to detect meaningful patterns in the data while maintaining precision in the estimates.

4.5 Data collection

The data were collected using the EBP questionnaire by Upton and Upton (2006) with permission from the authors. The questionnaire was modified to assess research utilisation (RU) rather than evidence-based practice (EBP), given the conceptual overlap between the two constructs. Specifically, items were reworded to reflect the use of research findings in clinical practice while maintaining the instrument's original structure and domains (knowledge, attitude, and practice). Additionally, items on the sources of information and socio-demographic characteristics were included. No changes were made to the underlying constructs or measurement scale. This chapter reports on a sub-component of a larger study developing a framework to utilise research evidence by nurses and midwives. In the larger study, a first phase focused on situation analysis regarding nurses and midwives' sources of knowledge, as well as their ability to use research skills and evidence-based practice. In this chapter, we report findings from this section, which had the socio-demographic characteristics of respondents, questions on nurses and midwives' information sources,

their competence in research skills and evidence-based practice activities. While the rest of the larger study questionnaire had other subsections on knowledge, attitude and practice, including barriers and facilitators, these are not part of this chapter. Five (5) BSc nurses and midwives with over 10 years' experience in clinical practice reviewed the questionnaire for face validity, and their inputs were used to modify the questionnaire. The modified questionnaire was pretested among 40 clinical nurses and midwives working in two (2) health facilities within the study area but not included in the study. Cronbach's alpha for the modified questionnaire after pretesting was 0.8438, confirming the reliability of the questionnaire (Bonett & Wright, 2014). The modified questionnaire in English was administered online to respondents who consented to the study by trained research assistants (RAs) with a BSc in Nursing or Midwifery. English is the medium of instruction in Ghanaian schools and the official language of nursing and midwifery practice in Ghana, hence its use in the questionnaire. The RAs met the nurses and midwives face to face, provided information on the study to the nurses and midwives and handed the participant information leaflet to them. Their questions were answered, and their verbal consent was obtained. Interested participants' written consents were obtained afterwards, and the link to the online survey was shared with them individually via WhatsApp or Telegram by the RAs from December 2022 to February 2023. The questionnaire took approximately 15 minutes to complete [A1.1][A1.2].

4.6 Data analysis

The results of the online survey were downloaded to an Excel spreadsheet for cleaning, after which they were exported to STATA 16 for coding and analysis. Descriptive statistics were performed by a statistician for the socio-demographic characteristics, the information sources guiding respondents' practice and EBP activities. Inferential analysis was performed using factor analysis and reliability assessment. Statistical significance was established at $p \leq 0.05$.

4.7 Ethical considerations

Ethics approval for the study was obtained from the Health Research and Ethics Committee of Northwest University (NWU) in South Africa, with ethics number NWU-00070-22-A1; the Ghana Health Service (GHS) Ethics Review Committee, with ethics number GHS-ERC 003/07/22; the Komfo Anokye Teaching Hospital Institutional Review Board in Kumasi (KATH IRB/AP/152/22); and the Committee on Human Research, Publication and Ethics of the School of Medicine and Dentistry at the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana (CHRPE/AP/762/22). Permission was also obtained from the Ashanti Regional Health Directorate and Management of the various hospitals before data collection. Both verbal and written informed consent were obtained from respondents before data collection. Confidentiality was ensured by deleting identifiers from the data, such as respondents' names and contact addresses. To ensure privacy, an online survey was used to collect data for respondents to fill on their devices. They were assured of optional participation and the right to withdraw from the study at any time without consequences to promote autonomy.

5 Results and discussion

The study aimed to investigate the primary information sources guiding clinical decision-making in nursing and midwifery practice [A2.1][A2.2], identify factors influencing these information sources, and determine the proportion of practitioners using current evidence-based information. Data were analysed for 400 respondents, yielding a 100% response rate.

5.1 Socio-demographic characteristics

Table 10.1 provides a comprehensive overview of the sample composition across key variables, including educational qualifications, professional categories, age distribution and gender representation. The participants' educational profiles reveal a predominantly diploma-prepared workforce (50.8%). Bachelor's degree holders constituted the second-largest group at 40.3%, indicating that approximately 91.1% of the sample possessed either

a diploma or an undergraduate degree qualification. The findings also show 5.1% are specialist nurses or midwives from the Ghana College of Nurses and Midwives, which are few. This finding aligns with global patterns and highlights the need for targeted support for specialist education to increase their number (World Health Organization, 2024, 2025) since they are more likely to play an influential role in guiding evidence-based practice and mentoring others in information use. The participants’ age distribution demonstrates a predominantly young to middle-aged workforce (30–39 years). The educational qualifications and age distribution reflect the state of the findings of the State of the World’s Nursing 2025 report, where most countries have diplomas and bachelor’s degrees as the entry-level, with a predominantly young to middle-aged workforce (World Health Organization, 2025). These might have implications for technology adoption and more receptivity to evidence-based innovations. This can influence how information is accessed and applied in clinical practice.

Table 10.1: Socio-demographic characteristics of study participants (N = 400)

Characteristic	Category	Frequency	Percentage (%)
Highest academic qualification	Diploma	203	50.8
	Bachelor’s degree	161	40.3
	Master’s degree	16	4.0
	Specialist	20	5.1
Professional category	Nursing	220	55.0
	Midwifery	180	45.0
Age group	20–29 years	134	33.5
	30–39 years	232	58.0
	40–49 years	29	7.3
	50 years and above	5	1.3
Gender	Female	348	87.0
	Male	52	13.0

5.2 Sources of information guiding clinical practice

Table 10.2 outlines the top ten information sources respondents used. Analysis of this study shows that the strongest information source is formal education, as 84.75% of the respondents use the knowledge gained from school, followed by in-service training (80.75%), which illustrates the high role of continuous professional growth in maintaining the current practice standards. Hospital policies and protocols (79.25%) were the third-highest information sources, with intuition-based practice (43%) being the least used source.

Table 10.2: Top information sources guiding clinical practice (N = 400)

Information source	Frequency	Percentage (%)
Formal education/school training	339	84.75
In-service training	323	80.75
Hospital policies and protocols	317	79.25
Conference attendance	258	64.50
Pharmaceutical literature	225	56.25
Online search engines	209	52.25
Personal experience	201	50.25
Physician/Peer consultation	198	49.50
Intuition-based practice	172	43.00
Journal articles	134	34

5.3 Aligning the information sources with the patterns of knowing

The information sources guiding clinical nursing and midwifery practice were aligned with the patterns of knowing and are rated and presented in Table 10.3.

Table 10.3: Sources of information aligned with the patterns of knowing

Pattern of knowing	Aligned source(s) of information	Rating of the usage
Empirical	Formal education/school training (84.75%) In-service training (80.75%) Hospital policies and protocols (79.25%) Journal articles (34%) Pharmaceutical literature (56.25%)	High
Aesthetic	Intuition-based practice (43.00%)	Moderate
Personal	Personal experience (50.25%)	Moderate
Ethical	Formal education/school training (84.75%) Hospital policies and protocols (79.25%)	High
Sociopolitical	Conference attendance (64.50%) Journal articles (34%) Online search engines (52.25%)	Moderate
Unknowing	Personal experience (50.25%) Intuition-based practice (43.00%)	Moderate
Emancipatory	In-service training (80.75%) Conference attendance (64.50%) Journal articles (34%) Online search engines (52.25%)	Moderate

Rating criteria: High = $\geq 75\%$, Moderate = 40–74.99%, Low = $< 40\%$

5.4 Research competence and application skills

The respondents rated themselves on 15 competencies related to EBP activities, ranging from 1 (very poor) to 5 (excellent), as presented in Table 10.4. Search engine competency ($M = 4.10$, standard deviation (SD) = 0.80) and gap identification skills ($M = 3.83$, SD = 0.64) were high; conversely, the ability to conduct research had the lowest mean rating ($M = 3.36$, SD = 0.83), followed by critical analysis of research articles skills ($M = 3.42$, SD = 0.74) and problem formulation skills ($M = 3.47$, SD = 0.75).

**Table 10.4: Descriptive summary of research competence skills
(N = 400)**

Research competency	Mean	Std Dev	Min	Max
Search engine competency	4.10	0.80	1.0	5.0
Practice reflection ability	4.02	0.63	1.0	5.0
Gap identification skills	3.83	0.64	1.0	5.0
Knowledge-sharing frequency	3.80	0.78	1.0	5.0
Idea dissemination frequency	3.80	0.72	1.0	5.0
Evidence application skills	3.78	0.69	2.0	5.0
Educational preparation adequacy	3.68	0.91	1.0	5.0
Applicability assessment skills	3.66	0.72	1.0	5.0
Database awareness	3.64	0.88	1.0	5.0
Practice monitoring frequency	3.58	0.72	1.0	5.0
Validity assessment skills	3.51	0.73	1.0	5.0
Evidence retrieval knowledge	3.51	0.75	1.0	5.0
Problem formulation skills	3.47	0.75	1.0	5.0
Critical analysis skills	3.42	0.74	1.0	5.0
Research conduct ability	3.36	0.83	1.0	5.0

The question is, what information source guides nursing and midwifery practice, enabling us to elucidate the use of current evidence? The primary information sources that nurses and midwives use to guide clinical decision-making include formal education/school training, in-service training, hospital policies and protocols and conference attendance. The study's findings are discussed in the context of the patterns of knowing.

The findings show that nurses' and midwives' sources of information are predominantly institutionally driven, including formal education/school training, in-service training, hospital policies and protocols and conference attendance. This reflects a strong orientation toward structured knowledge, which is particularly characteristic of LMICs, confirmed by other studies

(Graham et al., 2025; Macey et al., 2022; Merry et al., 2023). Empirical knowing was mainly expressed through formal education/school training and in-service training, indicating that practice is largely shaped by foundational and employer-provided knowledge rather than independent engagement with research literature. This pattern aligns with evidence from studies in LMIC contexts where nurses and midwives report limited use of journal articles and research evidence due to structural constraints such as restricted access to databases, limited research training and time with workload pressures (Anaman-Torgbor et al., 2022; Atakro et al., 2020; Dagne & Beshah, 2021; Fossum et al., 2022; Kyei et al., 2023). The use of structured learning environments underscores the importance of fostering a workplace culture that actively promotes evidence-based and reflective practice, particularly through the leadership of nurse managers and nurse educators in both clinical and academic settings. This culture is essential for strengthening the translation of empirical knowledge into day-to-day clinical decision-making. Additionally, the reliance on formal training supports standardised care; it therefore underscores the need for contextually relevant curriculum updates (Owusu et al., 2025) and strengthened in-service education to enhance clinical decision-making for optimal health outcomes.

However, the low use of journal articles, which provide information for empirical knowing, found in our study, is akin to a study in Ethiopia (Dagne et al., 2021) and an integrative review where nursing journals were ranked number four, with 36 quantitative and two mixed-method studies, and number 10 in 13 qualitative and three mixed-methods studies (Fossum et al., 2022). Previous studies have reported structural barriers, including restricted access to databases, limited research training and time constraints with heavy workloads (Anaman-Torgbor et al., 2022; Atakro et al., 2020; Dagne & Beshah, 2021; Fossum et al., 2022; Kyei et al., 2023). The use of information from journal articles forms a significant portion of empirical knowledge. It denotes the independent use of current evidence in practice and scientific knowledge, which can be verified through the scientific process known as nursing science (Baixinho et al., 2014). Institutional strategies such as establishing EBP research hubs within

hospitals, providing access to databases and journals; and supporting nurse or midwife-led clinical research could strengthen research literacy and improve uptake of empirical evidence in patient care.

Table 10.4 shows that respondents expressed the greatest confidence in search engine competence ($M = 4.10$, $SD = 0.80$), indicating excellent skills in everyday internet searching. This result reflects the increased number of young workforce with a high diploma or bachelor's degree found in this study and could be leveraged as the basis for redirecting searching for credible, evidence-based sources of information to guide clinical decision-making for empirical knowing. Training programmes that guide nurses and midwives on appropriate databases and reputable online resources, alongside improving digital infrastructure such as database subscriptions could bridge the gap between general searching skills and effective evidence retrieval. The low use of journal articles could be linked with the low scores in the ability to conduct research ($M = 3.36$, $SD = 0.83$) and critical research appraisal skills ($M = 3.42$, $SD = 0.74$). This result calls for ongoing research education, mentorship by experienced researchers and protected time for literature review to equip the professionals for practice.

Aesthetic knowing involves using intuition as an information source to guide practice, which requires an individual's understanding of clinical issues and adopting a more creative and empathetic response (Bonis, 2009; Chinn & Kramer, 2014). Patient/family-centred care arises from this pattern of knowing. In this study, consistent with findings from an integrative review where it ranked among the least utilised patterns of knowing (Fossum et al., 2022). This finding of low aesthetic knowing raises concern because patient/family-centred care is being promoted globally and has enormous benefits for patients/families and healthcare providers (Park et al., 2018). It also ensures that care is delivered through the lens of the patient and tailored to meet their needs (Edgman-Levitan & Schoenbaum, 2021), with emotional intelligence and sensitivity of the care provider being essential. The findings call for deliberate strategies such as preceptorship models that demonstrate creative and empathetic care approaches, use of varied teaching models in clinical practice. Additionally, continuous and deliberate engagement of patients and families in shared clinical decision-making to

optimise their cooperation and improve patient outcomes. Policies on improving the working conditions of nurses and midwives in low- to middle-income countries to retain them and encourage the use of aesthetic knowing is key.

Personal knowing is reflected in personal experiences, which denotes reflective practice, and influences the nurse–patient relationship and leads to personal growth (Forough Rafii et al., 2021). This was reported by approximately half of the respondents, aligning with high scores in the ability to reflect on practice ($M = 4.02$, $SD = 0.63$ in Table 10.4). This result is akin to a study in the Midwest region of the United States (Miller & Hill, 2018) and Norway (Dalheim et al., 2012). The moderate use of personal experiences could be linked to the younger age distribution of respondents, and the migration of experienced professionals to higher-income countries, as highlighted in the State of the World’s Nursing Report 2025. This report supports using reflective practice in nursing and midwifery care and calls for further research into how using personal experience can be enhanced and formally acknowledged. Integrating reflective journaling and mentorship programmes into both education and clinical practice could enhance personal knowing.

Ethical knowing was demonstrated through an increased use of hospital policies and protocols and formal education/training, indicating a strong reliance on structured ethical frameworks informed by professional standards, guiding nursing and midwifery practice. Similarly, sociopolitical knowing was demonstrated through hospital policies and protocols, online search engines and conference attendance, indicating a positive working environment requiring awareness of broader social systems that support professional development and are shaped by global perspectives. This finding is similar to a study in Norway and Ethiopia (Dagne & Beshah, 2021), where institutional guidelines were among the top information sources. This finding could have implications for developing policies, leadership and systems thinking for nurses to understand the influence of the broader context of care. However, it raises the question of the autonomy of nurses and midwives to implement and evaluate care based on current evidence.

It also raises the issue of outdated or unclear protocols and underscores the regular review and update of hospital policies with current evidence.

Emancipatory knowing was identified through in-service training, which means the use of sound, scientifically planned educational activities to improve employees' performance and, ultimately, output and service quality (Mutshatshi et al., 2022; Sajjadnia et al., 2015). Emancipatory knowing was also demonstrated through online searches, journal articles and conference attendance to obtain information to enable them to build capacity and be aware of, respond to, and comprehend the current societal, political and cultural order (Chinn et al., 2021), fostering social justice and addressing healthcare systems' inequities. This knowing could be strengthened by enlightening nurses and midwives on health equity, advocacy and social determinants of health, which can lead to inclusive care without inequities (Tind et al., 2025).

Unknowing was identified through intuition-based practice and peer and physician consultation, which were used by less than half of the participants. This finding indicates the low use of interactive and human information sources, which is contrary to other studies where nursing professionals prefer human information sources (Alving et al., 2018; Clarke et al., 2013; Ebenezer, 2015; Fossum et al., 2022). This finding could result from the high use of hospital protocols and policies, which provide guidelines for clinical decision-making. Intuition-based practice means that decision-making about care is based on the nurses' and midwives' intuition without recourse to patients and families. This shadows the implementation of patient-centred care and calls for deliberate efforts and support for nurses and midwives to develop active listening and patient-centred care to enhance unknowing and support holistic, person-centred care.

5.5 Research application in clinical practice

5.5.1 Frequency of EBP activities

Participants rated how often they performed specific EBP activities on a scale of 1 (never) to 5 (always). Table 10.5 presents the descriptive summary

of research application skills. The average mean is 3.64 (SD = 0.51), showing that practitioners accept the activities towards EBP at a moderate to good level. Gap identification in practice received the highest average (M = 3.83), and knowledge-sharing (M = 3.80) and idea dissemination (M = 3.80) received high scores. However, critical analysis of literature received the lowest rating (M = 3.42), as was the case in determining its performance in the previous competence assessment.

Table 10.5: Frequency of evidence-based practice (EBP) activities (N = 400)

EBP Activity	Mean	Std Dev	Min	Max
Gap identification in practice	3.83	0.64	1.0	5.0
Knowledge sharing with colleagues	3.80	0.78	1.0	5.0
Idea dissemination to colleagues	3.80	0.72	1.0	5.0
Evidence application in practice	3.78	0.69	2.0	5.0
Applicability assessment of evidence	3.66	0.72	1.0	5.0
Practice monitoring and evaluation	3.58	0.72	1.0	5.0
Validity assessment of evidence	3.51	0.73	1.0	5.0
Evidence retrieval from sources	3.51	0.75	1.0	5.0
Problem formulation from gaps	3.47	0.75	1.0	5.0
Critical analysis of literature	3.42	0.74	1.0	5.0

Earlier studies have identified high confidence in core information searching skills, with nurses preferring computer use as an information source (Clarke et al., 2013; Ebenezer, 2015; Spenceley et al., 2008). This skill could be enhanced by providing education and guidance on the appropriate sites to search for information. The active commonality of practitioners in sharing knowledge was identified as a facilitator influencing information sources. This finding is similar to other study findings where peers predominantly provided information to guide practice (Alving et al., 2018; Ebenezer, 2015),

which is concerning because peer information could deviate from the current evidence. Management structures that provide institutional support, policies and protocols are facilitators. Provision of institutional support in addition to availability of protocols that make practice decision-making easy are facilitators that promote empirical knowing. This is akin to a study by Veeramah, (2016) where nurses and midwives stated that has information in a form they can easily understand have implications for its use. Adherence to lifelong learning (professional development) through in-service training and attaining higher education in nursing and midwifery practice is crucial for professional development, as identified by Mutshatshi et al. (2022).

A lack of awareness of niche healthcare databases, moderate research self-efficacy and time constraints were consistent with findings from multiple international contexts (Dagne & Ayalew, 2020; Farokhzadian et al., 2015; Kocaman et al., 2010; Nwankwo & Amechi, 2019). Addressing these barriers requires coordinated efforts by regulatory bodies, professional associations, healthcare institutions and ministries of health to support continuous professional development, provide study leave opportunities, intensify research education, and improve digital access. Collectively, these strategies can promote the integrated use of all patterns of knowing to facilitate effective knowledge translation and improve clinical decision-making and patient outcomes.

5.6 Factor Analysis of Research Competence Skills

5.6.1 Factor extraction and model specification

Exploratory Factor Analysis (EFA) using Principal Component Analysis with Varimax rotation was conducted to identify the underlying dimensional structure of research competence skills among health professionals. Before conducting the factor analysis, data adequacy was assessed using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity to confirm the appropriateness of the dataset for factor analysis. The factor analysis revealed a three-factor solution that effectively captured the variance in research competence skills as shown in Table 10.6.

This provided a comprehensive framework for understanding the multidimensional nature of research competence in healthcare practice.

Table 10.6: Factor Loadings for Research Competence Skills

Research Competency	Factor 1	Factor 2	Factor 3
Factor 1: Evidence Application and Critical Analysis			
Practice monitoring frequency	0.76	0.12	0.09
Evidence application skills	0.70	0.19	0.06
Applicability assessment skills	0.66	0.24	0.12
Knowledge sharing frequency	0.64	0.11	0.15
Idea dissemination frequency	0.63	0.11	0.16
Validity assessment skills	0.60	0.36	0.07
Critical analysis skills	0.57	0.32	0.32
Evidence retrieval knowledge	0.55	0.24	0.36
Factor 2: Practice Reflection and Gap Identification			
Gap identification skills	0.17	0.69	0.20
Problem formulation skills	0.49	0.59	0.19
Practice reflection ability	0.19	0.55	0.27
Factor 3: Technical Information Literacy			
Database awareness	0.15	0.20	0.72
Search engine competency	0.09	0.17	0.70

The first factor, evidence application and critical analysis, emerged as the most dominant dimension, with loadings ranging from 0.55 to 0.76. The highest loading variable was practice monitoring frequency (0.76). This factor reflects higher-order cognitive and practical skills necessary for implementing evidence-based practice and translating research findings into clinical improvements. This finding mirrors earlier studies across the United States, which identified evidence appraisal as a central competency in EBP frameworks (Melnik et al., 2014; Tilson, 2010). The dominance of this factor suggests that empirical knowing particularly critical evaluation

and application of research, is the defining characteristic of research competence in this population. However, studies worldwide demonstrate that although practitioners recognise the importance of evidence application, actual implementation is inconsistent due to contextual barriers (Abu-Odah et al., 2022; Li et al., 2018). Research competence development should be linked with quality improvement initiatives to enhance practical uptake.

The second factor represents competencies focusing on reflective practice capabilities and self-assessment skills. This factor includes three variables with moderate to strong loadings, with gap identification skills showing the highest loading (0.69). The factor captures the metacognitive aspects of research competence that enable practitioners to recognise limitations in their current practice and identify opportunities for evidence-based improvements. This is akin to earlier studies, which confirmed that reflective practice improves the professionalism and competency of clinical practitioners (Barkhordari-Sharifabad et al., 2025; Embo et al., 2015; Sadare, 2024). The moderate cross-loading of problem formulation skills with Factor 1 (0.49) suggests an interconnection between reflective practice capabilities and evidence application skills. This is consistent with the Iowa Model of EBP, indicating that effective problem formulation serves as a bridge between identifying practice gaps and implementing evidence-based solutions (Collaborative et al., 2017). This demonstrates that empirical knowing cannot function independently of reflective capacity. Practitioners are unlikely to apply research evidence without recognising gaps in practice. Reflective practice should be incorporated into training programmes like clinical audit training; and PICO (Population, Intervention, Comparison and Outcome), a structured framework for the formulation of clinical problem into the curriculum and in-service education.

The third factor, Technical Information Literacy, represents the foundational technical competencies required for accessing and retrieving research information. This factor includes two variables with strong loadings: database awareness (0.72) and search engine competency (0.70). Despite having fewer variables than the other factors, Factor 3 demonstrates clear conceptual coherence and statistical strength. The competencies within this

factor reflect the technical proficiency required to navigate contemporary information systems and databases effectively. They also align with international evidence identifying digital literacy as foundational for EBP implementation (Chan et al., 2020; Mudallal et al., 2025; Shamsaee et al., 2021). In contrast, in many LMICs, limited database access and insufficient training have been reported as major barriers to empirical knowledge use (Abu-Odah et al., 2022; Alqahtani et al., 2022; Bahadori et al., 2016; D'Sa & Varghese, 2020; Dagne & Ayalew, 2020; Jabonete & Roxas, 2022; Sadeghi-Bazargani et al., 2014; Tuppal et al., 2019). The factor represents the foundational layer upon which more sophisticated research competencies are built. Therefore, technical training on digital literacy must be prioritised alongside access to database provision.

Cross-loading patterns provide insights into the interconnected nature of research competence dimensions. Evidence retrieval knowledge showed moderate loadings on both Factor 1 (0.55) and Factor 3 (0.36), suggesting that information retrieval skills bridge technical literacy and evidence application capabilities (Chaliha et al., 2024). Similarly, critical analysis skills demonstrated distributed loadings across all three factors, indicating its fundamental role in all aspects of research competence. Competency development programmes should integrate information retrieval, critical appraisal and reflective applications within real clinical scenarios with simulation-based workshops and case-based learning approaches.

5.6.2 *Hierarchical Structure and Competency Development*

The factor analysis results suggest a hierarchical structure of research competence, with Factor 1 representing the most advanced level of competency, Factor 2 representing developmental capabilities, and Factor 3 representing foundational skills. This hierarchy implies that competency development should progress systematically from foundational technical skills to reflective practice capabilities, and ultimately toward advanced evidence-based application and critical analysis competencies. This parallels Benner's novice-to-expert framework (Benner, 1984) and is similar to staged development models proposed in EBP competency literature (Batt et al., 2021; Dusin et al., 2023). Professional development initiatives should adopt

scaffolded models to build progressively toward advanced evidence application.

6 Conclusion

This study assessed the information sources and patterns of knowing that guide clinical decision-making in nursing and midwifery practice in Ghana, an area that has been underexplored in LMIC contexts. By examining not only the sources of information used but also practitioners' ability to apply the empirical pattern of knowing, the study responds to longstanding calls to strengthen evidence-informed clinical decision-making. The statistically supported three-factor model aligns with international research on EBP competence while reflecting the epistemological complexity of clinical decision-making in nursing and midwifery. Although a substantial proportion of respondents reported using evidence-based sources, the limited use of journal articles and modest critical appraisal skills highlight a persistent gap between the availability of research evidence and its effective use in practice.

These findings have important implications for the future of nursing and midwifery education in LMICs. The strong reliance on formal education and institutional protocols suggests that pre-service training, in-service education and organisational policies play a decisive role in shaping clinical practice. Consequently, nursing and midwifery curricula must move beyond content delivery to deliberately strengthen research literacy, critical appraisal and evidence-application skills (Dwyer, 2023). Embedding these competencies within undergraduate, postgraduate and continuing professional development programmes is essential for preparing a workforce capable of engaging with evolving healthcare demands.

At the institutional level, the high dependence on hospital protocols underscores the need for healthcare managers and regulatory bodies to ensure that clinical guidelines are regularly updated and aligned with current evidence. While protocols support standardised care, overreliance on them may limit professional autonomy and critical judgement if not accompanied by opportunities to access, interpret and apply research

independently. Investment in digital infrastructure, access to research databases, mentorship and protected time for evidence-related activities is therefore crucial.

Overall, this study highlights that strengthening evidence-informed practice in LMICs requires coordinated action across education, regulation and service delivery. By situating empirical knowing within the broader patterns of knowing, the findings emphasise that improving patient outcomes depends not only on increasing access to research evidence but also on building the capacity of nurses and midwives to critically engage with and translate the evidence into contextually appropriate care.

7 Limitations and Recommendations

7.1 Limitations

The cross-sectional design used in the study limits the ability to identify patient outcomes based on the information source guiding the care. Additionally, the online survey limits the inclusion of participants who were not abreast with technology. Also, the study relied on self-reported measures of research competence and EBP activities without direct evaluation of applying empirical knowledge in clinical practice, which may be subject to bias and overestimation. Nonetheless, the study holds promise, as it has revealed contextually relevant findings applicable to low-to middle-income settings. Again, the discussion of the results in the domains of the patterns of knowing provided a comprehensive framework for examining the information sources. Additionally, the large sample size, with a 100% response rate, provided strong statistical power and representation across diverse healthcare settings.

7.2 Recommendations that guide nurses and midwives on using all patterns of knowing to facilitate knowledge translation into practice in clinical decision-making, with an emphasis on the empirical pattern of knowing

7.2.1 *Empirical Knowing (Scientific knowledge)*

- Facilitate regular evidence-based practice workshops on reflective models and patterns of knowing in clinical practice.
- Establish EBP research hubs in hospitals for staff to have access to databases and journals.
- Establish journal clubs among health professionals to review articles and implement EBP in patient care.
- Encourage research projects conducted by clinical nurses and midwives to improve quality of patient care.
- Embed PICO formulation and clinical audit training in CPD programmes.

7.2.2 *Ethical (Ethical Dimensions of Care) and Sociopolitical (Working Environment) Knowing*

- Provide ongoing education on professional codes of conduct, patient advocacy, and human rights in care.
- Ensure regular review and updating of hospital protocols with current evidence.
- Integrate policy literacy and systems-thinking modules into continuing nursing and midwifery education.

7.2.3 *Personal Knowing (Self-awareness)*

- Promote reflective journaling and self-assessment portfolios for nurses and students during training.
- Establish preceptorship and mentorship programmes where experienced nurses model self-awareness and reflective practice.

7.2.4 *Aesthetic Knowing (Art of Nursing)*

- Encourage the use of different teaching models in clinical practice through preceptorship to enhance ethical and empathetic patient care.
- Recognise and reward nurses who demonstrate excellence in applying multiple ways of knowing in patient care.

7.2.5 *Emancipatory Knowing (Social Justice and Equity)*

- Empower nurses to challenge inequities in care delivery and advocate for resource allocation to solve these problems.
- Incorporate training on health equity, advocacy and social determinants of health.
- Encourage nurse-led quality improvement initiatives addressing contextual inequities.

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