An Exploration of the Learning Environment and Career Intentions. A Mixed Methods Study of Paediatric Interns in KwaZulu-Natal

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As the candidate's supervisor, I have approved this thesis for submission

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Signed: [redacted] Date: 21 February 2018

DECLARATION

I, Kimesh Naidoo, declare as follows:

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ii. The research reported in this thesis, except where otherwise indicated, is my original research.

iii. This dissertation does not contain other persons' data, graphs or other information, unless specifically acknowledged as being sourced from other persons.

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Signed  Date 21 February 2018

Dr Kimesh Naidoo

[212561429]

DEDICATION

This thesis is dedicated to my parents

Next to God, thy Parents

William Penn

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ABSTRACT

Background:

Globally, there is increased pressure on health professions education to be responsive to inequities in health care. These imperatives are clearly evident in KwaZulu-Natal (KZN) with its high disease burden. Poor doctor to patient ratios here are exacerbated by migration of medical practitioners to urban areas, private practice and developed countries. South Africa's two–year internship aims at producing primary health care clinicians for the public health system. Gaps in knowledge of internship and intern career intentions, in resource challenged contexts, have translated to the failure by both higher education authorities and national health departments to include the internship period in strategies, to ensure that the inequities in health care are addressed.

Aim:

This explorative study used a mixed methodology approach to explore the factors that influence perceptions of the learning environment (LE) during internship and their influence on career intentions.

Methods:

The study used a social constructivist worldview drawing on a sequential explanatory mixed methods design to understand the construct of the LE and its influence on career intentions. Both quantitative and qualitative methods that included surveys using a locally validated version of the Postgraduate Hospital Educational Environment Measure (PHEEM) and focus group discussions were generated. This study was conducted among interns in Paediatrics at four hospital complexes in KwaZulu-Natal in 2015. The Communities of Practice theory and the Social Cognitive Career Theory were drawn on and supplemented by the theory of alienation and engagement to develop a conceptual framework that informed the analyses of the relationship between perceptions of the LE and career intentions.

Results/Findings:

Perceptions of the LE were found to be influenced by both external (disease burden, workload and resource constraints) and individual related contextual factors (supervisor -intern relationships, mentorship, feedback and demography). These factors acted as alienating influences that curtailed access and restricted participation within communities of practice in internship. A narrow view of the role and scope of interns was reflected in significant differences between interns and their supervisor's perceptions of the LE and gaps in assessment practices of SA interns compared with international best practices. Poor perceptions of the LE drove interns away from SA's public health system and from caring for children. There were strong aspirations to specialise and weaker aspirations to enter primary health care amongst the sampled interns.

Conclusion:

Contextual factors in a resource limited LE impacted on identity and career self-efficacy formation of SA interns who failed to see a future role for themselves in primary health care and child health within the public health system. Expanding on the framework of communities of practice a new model of understanding, of how the interplay of contextual factors in resource challenged contexts affects internship learning and career interest formation, was developed. This new knowledge of context on learning and career interest provides the framework to understand the discordance between national health needs and career aspirations of interns in resource challenged environments. This new understanding provides the theoretical underpinning for changes in policy, practice, curricula content and future research to improve access and create an expansive participatory framework for SA interns. These proposed changes in the SA learning environment has the potential to ensure a sustainable public health system and redress the inequity seen in distorted doctor patient ratios in areas of need.

Key Words:

Internship; Learning environment; Career choice; Career intentions; Career self-efficacy; Communities of practice; Workplace based learning; Work-based assessments

Ukuhlolwa Kwendawo Yokufunda kanye Nezinhloso Zomsebenzi. Ucwaningo Lwezindlela Ezixubile lwe
Pediatric Interns KwaZulu-Natal

IQOQA

Isendlalelo:

Emhlabeni jikelele, kunengcindezi eyengeziwe emfundweni yobungcweti bezempilo ukuze iphendule ukungalingani ekunakekelweni kwezempilo. Lezi zidingo zibonakala ngokusobala KwaZulu-Natal (KZN) nomthwalo onzima wezifo. Izilinganiso zikadokotela nesiguli ezingezinhle lapha zenziwa zibe zimbi nakakhulu ukuthuthela kodokotela ezindaweni zasemadolobheni, ezindaweni ezizimele kanye namazwe athuthukile. I-*internship* yaseNingizimu Afrikha yeminyaka emibili ihlose ukukhiqiza odokotela bokunakekelwa kwezempilo okuyisisekelo ohlelweni lwezempilo lukahulumeni. Ukushoda olwazini lwe-*internship* kanye nezinhloso zemisebenzi yabafundi abasaqeqeshwa, ezimweni ezinenselelo yezinsiza, kuguqule ukwehluleka kwazo zombili iziphathimandla zemfundo ephakeme kanye neminyango yezempilo kazwelonke ukufaka isikhathi sokufundela umsebenzi amasu, ukuze kuqinisekiswe ukuthi ukungalingani ekunakekelweni kwezempilo kuyaxazululwa.

Umgomo:

Lolu cwaningo lokuhlola lusebenzise indlela yokusebenza exubile ukuhlola izici ezithonya imibono ngendawo yokufunda (LE) phakathi ne-*internship* kanye nomthelela wazo ezinjongweni zomsebenzi.

Izindlela:

Ucwaningo lusebenzise umdwebo wombono womhlaba we-*social constructivist* kumklamo wezindlela ezixubile ezichazayo ezilandelanayo ukuze kuqondwe ukwakhiwa kwe-LE nomthelela wayo ezinjongweni zomsebenzi. Zombili izindlela zobuningi nekhwalithi ezihlanganisa ukuhlola kusetshenziswa inguqulo eqinisekisiwe yasendaweni ye-*Postgraduate Hospital Educational Environment Measure* (PHEEM) kanye nokugxila izingxoxo zamaqembu zakhiwe. Lolu cwaningo lwenziwa phakathi kwabafundela umsebenzi wokwelapha izingane ezikhungweni ezine zezibhedlela KwaZulu-Natal ngo-2015. Ithiyori ye-*Communities of Practice* kanye ne-*Social Cognitive Career Theory* yadwetshwa futhi yengezwa ngenjulalwazi ye-*alienation* kanye nokuzibandakanya ukuze kwakhiwe uhlaka lomqondo olwazisa abantu. Ihlaziya ubudlelwano phakathi kwemibono ye-LE kanye nezinhloso zomsebenzi.

Imiphumela/Okutholakele:

Imibono ye-LE itholwe ithonywa yizinto zombili zangaphandle (umthwalo wezifo, umthwalo womsebenzi kanye nezingqinamba zezinsiza) kanye nezici zomongo ezihlobene nomuntu ngamunye (ubudlelwano bomphathi ne-*intern*, ukuqeqeshwa, impendulo kanye nezibalo zabantu). Lezi zici zisebenze njengamathonya ahlukanisayo anqande ukufinyelela futhi akhawulela ukubamba iqhaza emiphakathini yokuzijwayeza ekuqeqesheni umsebenzi. Umbono omncane wendima nobubanzi babafundi abaqeqeshwayo ubonakale ekwehlukeni okukhulu phakathi kwabafundi abasaqeqeshwa kanye nemibono yomphathi wabo nge-LE kanye namagebe ezinkambisweni zokuhlola zabafundi baseNingizimu Afrikha uma kuqhathaniswa nezinqubo ezihamba phambili zamazwe ngamazwe. Imibono engemihle nge-LE yaxosha abaqeqeshwayo ohlelweni lwezempilo lomphakathi lwaseNingizimu Afrikha nasekunakekeleni izingane. Bekunezifiso eziqinile zokukhethekile kanye nezifiso ezibuthakathaka zokungena ekunakekelweni kwezempilo okuyisisekelo phakathi kwabafundi abasafunda amasampula.

Isiphetho:

Izici zomongo ku-LE enomkhawulo eyinsiza zibe nomthelela ekuzaziseni nasekusungulweni kokuziphilisa ngokusebenza ngempumelelo kwabafundi base-SA abaqeqeshelwe umsebenzi abahlulekile ukuzibonela indima yesikhathi esizayo ekunakekelweni kwezempilo okuyisisekelo kanye nempilo yezingane ohlelweni lwezempilo lukahulumeni. Ukunwetshwa kohlaka lwemiphakathi yokuqhuba imodeli entsha yokuqonda, yokuthi ukuxhumana kwezimo zengqikithi ezimweni ezinenselelo yezinsiza kuthinta kanjani ukufunda kokuqeqeshelwa umsebenzi kanye nokwakhiwa kwentshisekelo yomsebenzi, kwathuthukiswa. Lolu lwazi olusha lwengqikithi yokufunda nentshisekelo yomsebenzi luhlinzeka ngohlaka lokuqonda ukungaboni ngaso linye phakathi kwezidingo zezempilo kuzwelonke kanye nezifiso zomsebenzi zabaqeqeshwayo ezindaweni ezinenselelo yezinsiza. Lokhu kuqonda okusha kunikeza isisekelo senjulalwazi yezinguquko kwinqubomgomo, inkambiso, okuqukethwe kohlelokufunda kanye nocwaningo lwangomuso ukuze kuthuthukiswe ukufinyelela nokudala uhlaka olubanzi lokubamba iqhaza kwabaqeqeshwayo baseNingizimu Afrikha. Lezi zinguquko ezihlongozwayo endaweni yokufunda yaseNingizimu Afrikha zinamandla okuqinisekisa uhlelo lwezempilo lomphakathi oluzinzile futhi kulungiswe ukungalingani okubonwa ezilinganisweni zeziguli nodokotela ezihlanekezelwe ezindaweni ezinezidingo.

Amagama Asemqoka:

I-*internship*; Indawo yokufunda; Ukukhetha umsebenzi; Izinhloso zomsebenzi; Ukuzisiza ngomsebenzi wakho; Imiphakathi yokuzijwayeza; Ukufunda okusekelwe emsebenzini; Ukuhlola okusekelwe emsebenzini

TABLE OF CONTENTS

DECLARATION i
DEDICATION ii
ACKNOWLEDGEMENTS iii
ABSTRACT iv
TABLE OF CONTENTS viii
LIST OF TABLES xii
LIST OF FIGURES xiii
LIST OF APPENDICES xiv
OPERATIONAL DEFINITIONS xv
ABBREVIATIONS AND ACRONYMS xx
PEER REVIEWED PUBLICATIONS xxi
Manuscripts published xxi
Manuscripts accepted for publication xxi
Manuscripts in submission for publication xxi
CONFERENCE PRESENTATIONS xxii
International xxii
National xxii
Other Presentations xxii
PREAMBLE xxiii
CHAPTER 1: INTRODUCTION 1
1.1 Context of the Study 1
1.2 Problem statement 2
1.3 Research question 4
1.4 Aims and objectives of the study 4
1.5 Significance of this study 4
1.6 Literature review 6
1.6.1 History of Internship 6
1.6.2 Medical internship in South Africa 7
1.6.3 Learning in internship 8
1.6.4 Identity formation in Internship 8
1.6.5 Contextual factors affecting internship 9
1.6.6 Defining and evaluating the Learning Environment (LE) 10
1.6.6.1 Defining the Learning Environment 10
1.6.6.2 Evaluating the Learning Environment 11
1.6.6.3 Developing a reliable and valid LE measurement 12
1.6.6.4 Use of the Postgraduate Hospital Educational Environment Measure (PHEEM) to evaluate perceptions of the LE 12

1.6.7 Career intentions amongst interns 13
1.6.8 Conclusion of the Literature review 14
1.7 Overview of the thesis 15
CHAPTER 2: THEORETICAL FRAMEWORK 16
2.1 Introduction 16
2.2 Philosophical assumptions and beliefs 16
2.2.1 Research paradigm 16
2.2.2 Ontological stance 16
2.2.3 Epistemological stance 17
2.3 Theoretical frameworks 17
2.3.1 Introduction to the theoretical frameworks used in the study 17
2.3.2 Alienation and Engagement 17
2.3.3 Communities of Practice (COP) 18
2.3.4 Social Cognitive Career Theory (SCCT). 20
2.3.5 The role of self-efficacy in career intentions 21
2.4 Conclusion 21
CHAPTER 3: METHODOLOGY 22
3.1 Introduction 22
3.2 Mixed methods 22
3.3 Controversies associated with mixed methods 23
3.4 Rationale for using sequential explanatory mixed methodologies 23
3.5 Location of study 25
3.6 Study Participants 26
3.7 Phases of the study 27
3.8 Pilot study 29
3.9 Expert Focus group discussion 29
3.10 Data Collection 30
3.11 Sampling 32
3.12 Data Analysis 33
3.13 Quality Inferences 34
3.13.1 Validity (Quantitative component) 34
3.13.2 Reliability (Quantitative component) 34
3.13.3 Trustworthiness (Qualitative component) 34
3.13.3.1 Member checking and respondent validation 35
3.13.3.2 Debriefing (Peer Review) and Audit Trail 35
3.13.4 Interpretive rigour 35
3.13.5 Triangulation 35
3.13.6 Generalization 35
3.14 Ethical issues 36

3.15 Reflexive statement 37
3.16 Conclusion 38
CHAPTER 4: THE LEARNING ENVIRONMENT AND WORK-BASED ASSESSMENT OF INTERNS IN SOUTH AFRICA 40
4.1 Introduction 40
4.2 Publication details 40
4.2.1 Journal Information 40
4.2.2 Publication Record 41
4.2.3 Contribution record 41
4.3 Manuscript 42
4.4 Key findings and contribution of this manuscript to the thesis 61
CHAPTER 5: EVALUATING THE LEARNING ENVIRONMENT 62
5.1 Introduction 62
5.2 Publication details 62
5.2.1 Journal Information 62
5.2.3 Publication Record 63
5.2.4 Contribution record 63
5.3 Manuscript 64
5.4 Key findings and contribution of this manuscript to the thesis 74
CHAPTER 6: THE INFLUENCE OF INDIVIDUAL FACTORS IN THE LEARNING ENVIRONMENT OF SOUTH AFRICAN INTERNS 75
6.1 Introduction 75
6.2 Publication details 75
6.2.1 Journal Information 75
6.2.2 Publication Record 76
6.2.3 Contribution record 76
6.3 Manuscript 77
6.4 Key findings and contribution of this manuscript to the thesis 98
CHAPTER 7: IMPACT OF THE LEARNING ENVIRONMENT ON CAREER INTENTIONS OF PAEDIATRIC INTERNS 99
7.1 Introduction 99
7.2 Publication details 99
7.2.1 Journal Information 99
7.2.3 Publication Record 99
7.2.4 Contribution record 100
7.3 Manuscript 101
7.4 Key findings and contribution of this manuscript to the thesis 108
CHAPTER 8: HOW DO INTERNS' PERCEPTIONS OF THE LEARNING ENVIRONMENT INFLUENCE THEIR CAREER INTENTIONS? 109

8.1 Introduction 109
8.2 Publication details 109
8.2.1 Journal Information 109
8.2.2 Publication Record 110
8.2.3 Contribution record 110
8.3 Manuscript 111
8.4 Key findings and contribution of this manuscript to the thesis 129
CHAPTER 9: SYNTHESIS 130
9.1 Introduction 130
9.2 Summary of main findings 130
9.3 Main insights of the study 135
9.3.1 The internship learning environment has a multifactorial nature with an interplay of contextual factors. 135
9.3.2 Access and participation of interns in the learning environment 139
9.3.3 The role of contextual factors within the LE as barriers and affordances to career intentions 140
9.4 Implications of the study 142
9.4.1 Structural changes in terms of context 143
9.4.2 Policy changes 143
9.4.3 Practice changes 144
9.4.4 Theoretical implications 145
9.5 Limitations of the study 145
9.6 Conclusion 146
CHAPTER 10: CONSOLIDATED REFERENCES 148
APPENDICES 164

LIST OF TABLES

Table 1. Associations found with measured perceptions of the Learning Environment 11

Table 2. Evolution of the core aspects of the Communities of Practice theory.....19

Table 3. Actual envisaged numbers of interns in various hospitals and in Paediatrics for 2015–2016 .27

Table 4. Phases and stages of the research project.....28

Table 5. Data collection methods and instruments used in various stages of the research study.....31

Table 6. Contributions of Manuscripts and Alignment to Research objectives 133

Table 7. Contextual factors identified within the Learning environment.....136

LIST OF FIGURES

Figure 1. Visual representation of the intersection of three broad areas that influence this study 5

Figure 2. Diagrammatic (visual) presentation of Sequential explanatory mixed methods design of the study 24

Figure 3. Map of the various health districts in SA highlighting high disease burden rates in the province KwaZulu-Natal. (Reference 159) 26

Figure 4. Data Analysis in various stages of the study.....33

Figure 5. Schematic depiction of relationship of impact of Contextual factors on Career intentions..129

Figure 6. Conceptual model of the Influences of the Learning environment on career development of interns within a community of practice 138

LIST OF APPENDICES

APPENDIX 1: APPROVAL FROM THE UKZN BIOMEDICAL RESEARCH ETHICS COMMITTEE 165
APPENDIX 2: AMENDED APPROVAL FROM THE UKZN BIOMEDICAL RESEARCH ETHICS COMMITTEE 166
APPENDIX 3: APPROVAL FROM THE KZN DEPARTMENT OF HEALTH 167
APPENDIX 4: APPROVAL FROM THE KZN DEPARTMENT OF HEALTH (EXTENDED) 168
APPENDIX 5: GATEKEEPER APPROVAL FROM ADDINGTON HOSPITAL 169
APPENDIX 6: GATEKEEPER APPROVAL EDENDALE HOSPITAL 170
APPENDIX 7: GATEKEEPER APPROVAL FROM GREYS HOSPITAL 171
APPENDIX 8: GATEKEEPER APPROVAL FROM KING EDWARD VIII HOSPITAL 172
APPENDIX 9: APPROVAL FROM THE MAHATMA GANDHI MEMORIAL HOSPITAL 173
APPENDIX 10: APPROVAL FROM PRINCE MSHYENI MEMORIAL HOSPITAL 174
APPENDIX 11: SOUTH AFRICAN ASSOCIATION OF HEALTH EDUCATIONALISTS, 2017 – ORAL PRESENTATION 175
APPENDIX 12: SOUTH AFRICAN ASSOCIATION OF HEALTH EDUCATIONALISTS, 2017 – POSTER PRESENTATION 176
APPENDIX 13: INTERNATIONAL ASSOCIATION FOR MEDICAL EDUCATION, 2017 – POSTER PRESENTATION 177
APPENDIX 14: 10TH ANNUAL TEACHI IN HIGHER EDUCATION CONFERENCE, 2017 – ORAL PRESENTATION 178
APPENDIX 15: OTTAWA ICME JOINT CONFERENCE, 2018 – ORAL PRESENTATION 179
APPENDIX 16: LETTER FROM HPCSA –INTERN SUBCOMMITEE MEETING 180
APPENDIX 17: ACCEPTED JOURNAL ARTICLE: AFRICAN JOURNAL OF HEALTH PROFESSIONS EDUCATION (AJHPE955R1) 181
APPENDIX 18: ACCEPTED JOURNAL ARTICLE: BMC MEDICAL EDUCATION (MEED-D-17-00055R2) 183
APPENDIX 19: ACCEPTED JOURNAL ARTICLE: AFRICAN JOURNAL OF HEALTH PROFESSIONS EDUCATION (AJHPE953R1) 184
APPENDIX 20: ACCEPTED JOURNAL ARTICLE FROM THE SOUTH AFRICAN MEDICAL JOURNAL 185
APPENDIX 21: PROOF OF SUBMISSION TO AFRICAN JOURNAL OF PRIMARY HEALTH AND FAMILY MEDICINE CARE 186
APPENDIX 22: INFORMED CONSENT – PILOT STUDY 187
APPENDIX 23: INFORMED CONSENT EXPERT FOCUS GROUP 189
APPENDIX 24: INFORMED CONSENT – INTERN SURVEY 190
APPENDIX 25: INFORMED CONSENT – FOCUS GROUP DISCUSSION –INTERNS 192
APPENDIX 26: MODIFIED PHEEM – SUPERVISOR SURVEY 195
APPENDIX 27: MODIFIED PHEEM – INTERN SURVEY 196
APPENDIX 28: DR KL NAIDOO EDITING LETTER DD 07 DECEMBER 2017 197

OPERATIONAL DEFINITIONS

Blame culture: Is the tendency to look for one person or organization that can be held responsible for a bad state of affairs, in internship this often refers to a negative patient related incident.

Can MEDS: Can MEDS is a framework devised by the Royal College of Physicians and Surgeons of Canada that identifies and describes the abilities (competencies) physicians require to effectively meet the health care needs of the people they serve.

Child health: Child health is a state of physical, mental, intellectual, social and emotional well-being and not merely the absence of disease or infirmity. In this study, it is used with the term Paediatrics and on its own to indicate the generalist holistic care of children by primary health care practitioners. It is regarded as a component of primary health care (generalist care) and is not considered as a speciality.

Clinical Educator/Clinical Tutor: Refers to a qualified medical practitioner who is appointed by a university to be responsible for clinical training of undergraduate students and registrars. In training (academic) hospitals, this person is also generally responsible for intern supervision.

Complex: Refers to a group of hospitals of varying sizes and designations, which function together including in the training of interns and registrars.

Factor /Variable: the term factor is used to indicate an element of a cause, which contributes to a particular result, whilst a variable refers to an unknown quantity (that can change) in an equation. In this study, the term factor is used more extensively.

Fee-paying government school: refers to educational facilities that are jointly funded by government subsidies and by parents paying a certain fee. The term reflects the disparate nature of education in post-apartheid South Africa. Generally, fee-paying government schools are in previously advantaged communities in SA.

Geographical origin: refers to a person's place of home and upbringing.

Health Professions Council of South Africa (HPCSA): accrediting and regulatory body for all health professionals in South Africa. It is responsible for accrediting hospitals and departments within hospitals for qualifying to train interns. It is responsible for the overall structure and governance of the internship program in the country. The HPCSA is also responsible for the completion of internship certification and suspensions of registrations.

Internship (medical Internship): refers to the entire period of 24 months of intern training. It is equivalent to Foundation years 1 and 2 in the British system. It varies from one to two years in most Sub-Saharan countries. It is similar to the first year of the United States residency program although major differences exist. The South African intern does a mix of all major medical specialities.

Intern Block: locally used term to refer to the various rotations in the various specialities in the 24 months of internship. The various 'blocks' are generally 4 months each of Paediatrics, General Surgery, Obstetrics/Gynaecology and Internal Medicine (Adult Medicine) as well as two months each of Anaesthetics, Orthopaedics, Psychiatry and Family Medicine.

Intern Curator: appointed by the hospital to co-ordinate and overseer the medical internship program. Is responsible for liaison between hospital management, intern supervisor in each discipline, interns and the HPCSA.

Intern (medical intern): In this study, the term 'intern' refers exclusively to a medical intern. This refers to a recently graduated doctor in the first two years (24 months) post qualification. These medical doctors are salaried employees of the various provincial departments of Health and are expected to work under supervision at accredited hospitals in South Africa.

Intern Supervisor: This is a medical practitioner, who is responsible for supervision of interns during their training. They can be also affiliated to a university as a clinical educator or tutor.

Lower Middle Income Countries: WHO member states are grouped into four income groups based on World Bank list of analytical income classification of economies for a fiscal year. Most lower income countries in the world are within Sub-Saharan Africa. South Africa is classified as an upper middle-income country in this study. LMIC refers to both all lower and middle income countries. http://www.who.int/healthinfo/global_burden_disease/definition_regions/en/

Matric: refers to the final exit examination on leaving high school in SA. Also referred to as the national certificate examination.

Medical officer: refers to a medical practitioner who has completed internship and has been certified by the Health Professions Council of South Africa. In South Africa, the first year as a medical officer includes placement in facilities designated as community service postings. Following this one year, the medical officer can leave state practice if he/she wishes and enter private practice or decide to apply to a university postgraduate programme to specialise or remain as a medical officer within state facilities.

National health Insurance (NHI): proposed new system of health financing and structuring in SA that aims at ensuring equity in the provision of health care to all citizens in the country.

Non fee-paying government school: refers to educational facilities that are completely funded by government subsidies. The term reflects the disparate nature of education in post-apartheid South Africa. Generally, non-fee-paying government schools cater for previously disadvantaged communities in SA.

Paediatrics: the branch of medicine dealing with children and their diseases. This branch of medicine can be provided by generalists and specialist paediatricians. In this study, Paediatrics was used specifically in the context of its provision by generalist medical practitioners. This reflected national health needs.

Paediatric Block: refers to the 4 months the intern spends in Paediatrics in his internship.

Primary health care: health care provided for people making an initial approach to a medical practitioner or clinic for advice or treatment. It refers to undifferentiated care by a generalist clinician in this study.

Primary health care clinician: is a clinician who provides both the first contact for a person with an undiagnosed health concern as well as continuing care of varied medical conditions, not limited by cause, organ system, or diagnosis. In this study, the term primary health care clinician is used in preference to the term 'general practitioner' as the latter term has been largely associated with the private medical sector in SA. The term 'Primary health care clinician' is therefore used in this study and refers to a generalist clinician both within the public health care system and within the private health care system.

Private health sector: in this system refers to the health care system provided by private persons, consortiums and companies and does not fall within the governmental fiscal provisions.

Public health system/sector: in this system refers to the health care system provided by national, provincial and municipal levels of government within various types of institutions including clinics and hospitals.

Private school: refers to educational facilities that completely privately funded with no government funding. The term reflects the disparate nature of education in post-apartheid South Africa. Generally, private schools caters for largely advantaged communities in SA.

Registrar (resident): a medical practitioner who is spending four years within a postgraduate university affiliated program to specialise in a branch of medicine (also called senior resident in the US System).

Regional Hospital: A hospital administered by the provincial health department and employing specialists in various disciplines. Usually drains patients from district hospitals and large clinics. Most interns in SA are allocated to train in these hospitals.

Rural geographic origin: where a person's home and upbringing has largely been on a farm or in an area not considered a town or city.

Semi-urban geographic origin: term used specifically in this study to differentiate urban areas from township areas/ peri-urban settlements. The term is used in this specific context in this study to highlight the historic racial and socio-economic differences, which persist in SA today, based on geographical origin. Semi-urban (including 'townships') areas generally indicate a poorer socio-economic area in most parts of SA

Specialist: term to designate medical practitioner who has spent an extra period of time (usually a university registered period of 4 years) and has passed a certain number of entry, interim and exit postgraduate exams set by the university and professional led bodies e.g. College of Medicine of South Africa. In South Africa to be a registered Paediatric specialist a registrar has to complete four years of working within a postgraduate registrar program, pass two College of Medicine (Paediatrics) examinations and complete a University set Masters Coursework.

Teaching hospital: A hospital usually affiliated to a medical faculty of a university, which is accredited by the university as a training hospital. Usually provides the platform for the training of undergraduate medical and other health science students, postgraduate registrars and specialists. The hospitals usually have interns working in them as well.

Township: refers to a lower socio-economic residential area situated usually on the outskirts of a town or city and historically represents the geographical location allocated to Black South Africans. It is used as a measure of economic disadvantage.

Urban geographical origin: refers to cities, suburbs, and towns.

Undergraduate clinical years: refers to the final three years of the undergraduate medical degree. This is a heavily supervised and formally period of undergraduate training. All clinical work done in

this period is unpaid. The university is responsible for this training period. Also referred to as ‘clerkships’, ‘junior interns’ or ‘student interns’.

University origin: refers to the university in which an intern studied undergraduate medicine.

Work place based learning: learning that derives its purposes for the contexts of work.

Work-based assessments: assessment of knowledge, skills and behaviours in authentic workplace settings. It refers to a broad category of assessments and methods conducted using resources available in a candidate’s work place, during the course of their work-schedule.

Year of internship: refers to either the first or second year of the two year internship programme

ABBREVIATIONS AND ACRONYMS

BREC: Biomedical Research Ethics of University of KwaZulu–Natal (Institutional Regulatory Board)

COP: Communities of Practice

DOPS: Directly Observed Procedural Skills

ECL: Early Career Learning

EPA: Entrustable Professional Activities

FGD: Focus Group Discussion

HIV: Human Immunodeficiency Virus Infection

HPCSA: Health Professional Council of South Africa

KZN: Kwa Zulu-Natal

LE: Learning Environment

LMIC: Lower and Middle Income Countries

Mini-CEX: Mini (Clinical Evaluation Exercise)

Mini-PAT: Mini Peer Assessment Tool

MSF: Multi Source feedback

NHI: National Health Insurance

PHEEM: Postgraduate Hospital Educational Environmental Measurement

PMB: Pietermaritzburg

SA: South Africa

SCCT: Social Cognitive Career Theory

SSA: Sub-Saharan African

TB: Tuberculosis

WBA: Workplace–based assessments

WBL: Workplace–based learning

UKZN: University of KwaZulu–Natal

PEER REVIEWED PUBLICATIONS

Manuscripts published

Naidoo KL, Van Wyk JM, Adhikari M. Impact of the learning environment on career intentions of paediatric interns. SAMJ. 2017; 107(11):987-993. ISSN 2078-5135. http://www.samj.org.za/index.php/samj/article/view/12111. doi:10.7196/SAMJ.2017.v107i11.12589. [Accessed on 20 Nov. 2017]

Naidoo, K. L., J. M. Van Wyk and M. Adhikari (2017). "The learning environment of paediatric interns in South Africa." BMC Medical Education 17(1): 235. https://doi.org/10.1186/s12909-017-1080-3

Manuscripts accepted for publication

Naidoo KL, Van Wyk JM, Adhikari M. Comparing International and South African Work-based Assessment of Medical Interns'. Practice African Journal of Health Professions Education (Ref.: AJHPE955R1)

Naidoo KL, Van Wyk JM, Adhikari M. 'Sense of Belonging': The influence of individual factors in the learning environment of South African interns. African Journal of Health Professions Education (Ref.: AJHPE953R1)

Manuscripts in submission for publication

Naidoo KL, Van Wyk JM. Perceptions of the Learning Environment influence Intern Career Intentions. The African Journal of Primary Health Care & Family Medicine (PHCFM)

CONFERENCE PRESENTATIONS

International

Oral

Naidoo K L, Van Wyk JM, Adhikari M. Comparing Work-based Assessment amongst South African Interns with International best practices. Abstract number 695. Ottawa ICME Joint Conference, Abu Dhabi, 10 to 14 March 2018

Poster

Naidoo KL, Van Wyk JM, Adhikari M. 'The Learning Environment'- Conflicting views of South African junior doctors and their supervisors. Abstract number 1936. International Association for Medical Education, Helsinki, Finland, 27 to 30 August 2017.

National

Oral

Naidoo KL, Van Wyk JM, Adhikari M. 'Assessing South Africa's Medical Interns'- Comparing Workplace based assessment in SA with International best practice. Abstract number 248(3). South African Association of Health Educationalists, Potchefstroom, South Africa, 06 to 08 July 2017

Naidoo KL, Van Wyk JM, Adhikari M. 'Preparedness for Practice'-Pilot Study into changing competencies among recently qualified medical graduates. Abstract number 10-201 TLHEC. 10th Annual Teaching in Higher Education Conference, Elangeni Hotel, Durban, 20 to 22 September 2016.

Poster

Naidoo KL, Van Wyk JM, Adhikari M. 'Alienation and engagement' among newly qualified doctors. Abstract number 248(1). South African Association of Health Educationalists, Potchefstroom, South Africa, 06 to 08 July 2017.

Other Presentations

Naidoo KL. Intern assessment and Internship training findings on the Learning environment. Presentation to HPCSA Intern –Subcommittee. Consultation on new Intern electronic logbook, Durban. 26 May 2017.

PREAMBLE

The format of this thesis is in accordance with the recommendations for a PhD via manuscript format, as presented within the School of Clinical Medicine, College of Health Sciences University of KwaZulu-Natal, South Africa. It includes the submission of a thesis with a collection of research articles, in conjunction with introductory and summary chapters, as opposed to a traditional monograph format.

This thesis comprises published journal articles, accepted for publication journal articles, and a manuscript under review. The integrative material links the chapters and the findings to the overall aim of the study *vis-a-vis* an exploration of the learning environment and career Intentions of Paediatric Interns in KwaZulu–Natal.

The synthesis chapter at the end outlines the conclusions formed based on a combination of results from the papers presented and includes recommendations for the way forward. The contribution of the candidate is indicated for each manuscript, with details of the journals and their submission and review processes where necessary.

The candidate essentially followed the same process in terms of planning, conducting and preparing the research for examination with the same key milestones as for a traditional thesis. A large proportion of the methodology and literature is revealed within each of the publications. The methodology and literature review is also presented within the integrative material, especially in Chapter One (Introduction), Chapter Two (Theoretical framework), Chapter Three (Methodology) and Chapter Nine (synthesis), with a summative page after each article to establish the link between the chapters. This may lead to a fair amount of repetition between the integrative material and the manuscripts, which is necessitated by virtue of the manuscript format of PhD presentation.

Please note the following with respect to this particular thesis report:

(i) The Vancouver referencing style has been observed in the integrative material. All references which are not specific to each manuscript are consolidated in Chapter 10

(ii) Manuscripts are presented in the format required of the specific journal; hence stylistic differences (font, line spacing, headings etc.);

(iii) Use of active (first person) and passive voice (third person) have been used in the manuscripts and the integrative material.

CHAPTER 1: INTRODUCTION

1.1 Context of the Study

Inequity between health care needs and health care delivery is the major challenge facing modern medicine in the 21st century. [1] This inequity is manifested in a severe maldistribution of medical practitioners between, urban and rural areas and public and private health sectors, and is most severe in Sub-Saharan (SSA) countries. [1-4] This maldistribution of medical practitioners compromises access and health coverage, particularly for vulnerable populations such as children and the socio-economically deprived. [5] This situation exacerbates existing poor doctor–patient ratios and compromises the provision of primary health care. [5, 6]

South Africa (SA) has adequate training institutions, professional regulation and fiscal space for relatively high remuneration levels compared with many SSA countries. [2] Despite this, the training and retention of competent medical practitioners in the public health care system, which caters for the majority (82.5%) of the population, is an ongoing crisis in SA. [7, 8] This inability to deal decisively with the maldistribution in the medical practitioners is one of the major issues that has led to the poor performing health care system in SA. [9]

The public health care system in SA is emerging from a fragmented and racialized past while it attempts to create a district based primary health care driven system. [10] The significant challenges being faced by the public health system includes a quadruple disease burden which comprises communicable diseases (HIV/AIDS and Tuberculosis epidemics); non-communicable diseases (hypertension and diabetes); maternal, neonatal and child disease burdens and inter-personal trauma and violence. [10-12] In addition ineffective and suboptimal leadership, and management and governance of the public health care system have contributed to a deepening crisis. [7] An increased culture of a lack of accountability has spurred on a crisis of poor staff motivation, sub-optimal performance and often-unacceptable attitudes of healthcare workers towards patients that results in inefficiency in the health service and compromised patient care. [2] These highlighted challenges coalesce and health care providers on the 'frontline' are compromised in their ability to provide an adequate quality of health care. [13, 14]

In response to the inequity in health care provision in SA, both national health departments and higher education authorities have responded with various strategies. The National department of Health strategic plan for 2014–2019 prioritises high impact interventions targeting HIV /AIDS, TB, maternal and child related health challenges. [15] In addition, the National Health Insurance White paper 2017, provides a longer-term framework for the reorganisation of the primary health care system, hospitals and emergency medical services. [16] Both these plans acknowledge the principle that retention of newly recruited health care staff including medical practitioners underpins the sustainability of the public health care system. [15, 16]

Changes are needed to provide services to the majority of the population that were previously excluded from adequate health services in the SA public health care system. These changes will have to

occur improve the provision of care to address inequities based on racial, geographic and economic lines.This process of transformation forms the key aspect of public health policy in SA to address societal needs. In response to this need to transform, SA medical education has had to align itself with societal needs. SA medical schools have thus made a number of changes in order to redress the inequity in health care provision. [17] Focus on curricula changes including using competency–based frameworks, increased exposure to decentralised teaching platforms and primary health care, and a focus on social accountability are now commonplace in most medical schools in SA. [17, 18] Changes in entry criteria to medical training, in attempts to adequately reflect population demographics within medical graduates has rapidly transformed the demographic composition of interns. [19]

The internship period, following the completion of the undergraduate medical qualification is a crucial component of the medical education trajectory and remains inadequately studied and poorly understood**.** [20-23] This lack of understanding of this core component in medical education becomes a significant factor as health departments and education systems throughout the world, attempt to transform health care delivery to better match societal needs. [1]

Reports of unacceptable workloads, excessive work hours, suboptimal supervision, increasing burnout and stress are being documented among SA interns who are the 'frontline' of medical care in many hospitals. [24–27] The entry and participation of interns within a community of medical practitioners occurs within this challenged environment .This process of participation forms an integral element in work based–learning (WBL) in internship. Multiple factors both external and internal to the intern determine interns experience in this formative period. This final common pathway for all medical practitioners, prior to independent practice is influential in shaping long–term careers for many. [28-30]

1.2 Problem statement

Contextual factors such as an in-hospitable physical work environments, poor employment relationships and workplace cultures have been recognised as having a significant impact on new medical practitioners. [7,16] In addition, new medical practitioners have been largely excluded from efforts by both national health departments and higher education authorities to transform health care provision. There is a lack of clear focus, to use the window of opportunity provided by the internship period, to develop strategies to enhance training, support and career planning in the health care system.

The lack of vision to view the internship period as an integral part of the medical education trajectory may be attributed to the wide geographical and administrative span that constitutes the learning environment of interns. Further education and training associated with internship has fallen outside the scope and authority of most higher education authorities. In addition, there is a lack of adequate research and knowledge on various aspects of internship in SA and other similar high disease burdened and resource constrained contexts.[29,31,32] The view of internship as the culmination of undergraduate education focuses much research on measuring the outcomes of various undergraduate curricula changes, skills training and competency development on internship using preparedness studies

with less attention being paid to the role and experiences gained in internship in shaping individual career and broader health system outcomes. [34–37] This stance is probably due to most medical education research in SA occurring from the perspective of higher education. Whilst there are studies describing the effects of challenging contextual factors on internship there is a dearth of knowledge on understanding intern's experiences of their learning environment and the interplay of contextual factors on individual intern career progression. [26, 27, 38–40] An additional key aspect of internship involves assessment and evaluation of medical practitioners. An understanding of this process within the context of a resource challenged environment will provide insight into internship. These aspects of knowledge about internship is thus crucial if the health system aims to retain medical practitioners for public health service..

The learning environment (LE) of interns in resource challenged, disease burdened contexts is a complex system that has not been adequately analysed. To fully understand this complex system the fields of sociology, vocational psychology and medical education needed to be consulted.

An essential aspect of most enquiry within medical education is the importance of improving patient outcomes. [41] The fundamental question in medical education research ultimately relates to whether an educational intervention can affect patient outcomes. [41] In this study, the educational intervention was thus viewed as the internship period and patient outcomes were viewed as a responsive and sustainable public health system with adequate doctor-patient ratios. In particular, the various factors influencing the LE and an understanding of how these factors influenced career intentions was studied. Career intentions of interns in this environment were thus investigated as a surrogate marker of career interest and retention in a sustainable public health system thus forming the outcomes in this study in medical education.

By gaining a better understanding of the various contextual factors influencing internship, it was envisaged that learning experiences could be improved. [42] This process was aided by using conceptual frameworks such as the learning environment (LE) to fully comprehend internship. Equally, by looking at the outcomes and identifying relationships between those outcomes and the environments that produced them, the postulate in this study was that by adjusting none, we may influence the other. [42] Thus optimising these learning environments may alter career aspirations if such a relationship exists and thereby conditions for a sustainable public health system may be improved. This knowledge is thus viewed as being crucial to health systems in order to optimise the retention of medical practitioners within the public health systems.

1.3 Research question

The key research question that framed this study was: *"What is the relationship between perceptions of the Learning Environment (LE) and Career Intentions of Paediatric Interns in KwaZulu–Natal (KZN)?"*

1.4 Aims and objectives of the study

The overall aim of this study was to explore the Learning Environment (LE) and career intentions of Paediatric interns in KwaZulu–Natal (KZN) hospitals in South Africa (SA) via the following objectives:

1.4.1 To explore the influence of the LE on SA intern assessments and to compare SA intern assessments with international best practices.

1.4.2 To investigate the perceptions of the LE amongst Paediatric interns and their supervisors using locally validated measures.

1.4.3 To identify the individual characteristics of Paediatric interns that influence their perceptions of the LE.

1.4.4 To determine the relationships of career intentions amongst Paediatric interns with their perceptions of the LE.

1.4.5 To explore the views of interns on their experiences in their LE and the relationship of these experiences to career intentions in the SA public health system, primary health care and child health.

1.5 Significance of this study

The uniqueness of this study included its contributions to knowledge on workplace-based learning (WBL), the resource limited context the study was situated in, the use of intern perspectives and the drawing on of a multiplicity of disciplines, worldviews and methods in order to fill significant gaps in knowledge that is deemed crucial to ensure equitable health care.

This study contributes to knowledge on WBL, specifically with regards to the internship period and the relationships with career choice. The links between WBL and career choice remains a complex interplay of influences, which this study attempted to unpack in a resource-constrained context.

Findings from this study whilst context specific reflected a resource challenged, disease burdened context where the inequities between health care provision and health care need are stark. [8] The study defined the LE and quantified perceptions of this construct in a resource challenged context. Validated tools used in this study can thus serve as measures of perceptions of the LE in these contexts.

The study further highlighted and compared WBA in resource-limited contexts with international best practice. The study findings on WBA can therefore serve as a benchmark against which future developments in this field can be measured. Very few studies attempt to evaluate internship within the resource challenged context in SSA.

This study looked at the concepts from the intern perspective by assessing intern perceptions and self-identified career intentions as well as through the lens of an 'insider' perspective of a clinician working within the system.

The study was conducted within a framework that viewed learning within an interpretivist social learning lens despite the predominance of a positivist worldview held by many of the anticipated readership of the research manuscripts associated with this study. This variance in paradigms with anticipated readerships hopes to stimulate innovative views when exploring solutions to the challenges within the public health system.

The originality of this study stemmed further from its use of insights from medical education, sociology and vocational psychology to understand a complex problem. Figure 1 illustrates this intersection of fields drawn on that characterise the theory development that underpins this study.

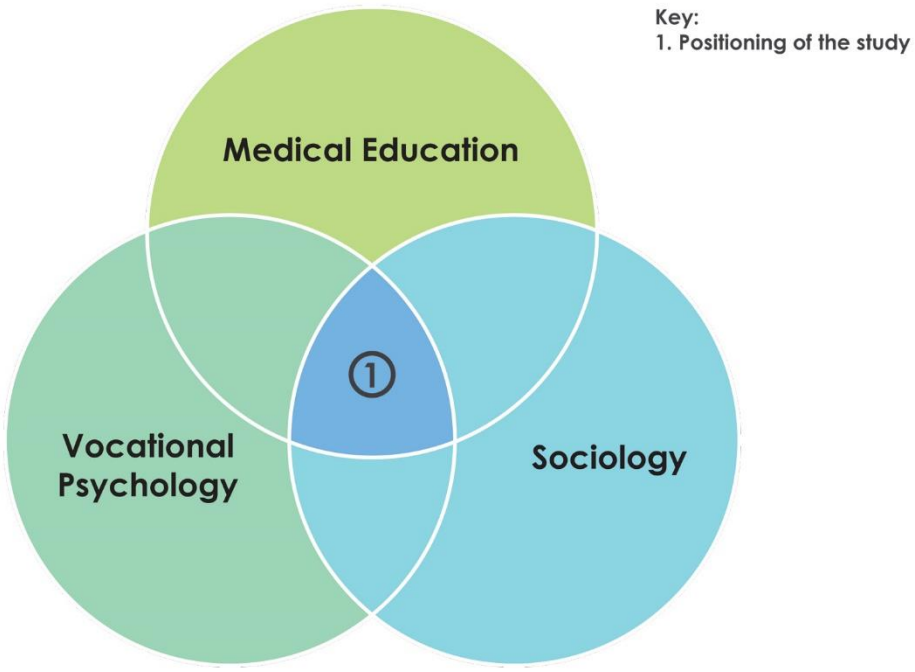

Figure 1. Visual representation of the intersection of three broad areas that influence this study

Internship is viewed as a process whereby newly qualified medical practitioners enter an already established system, gradually assimilate into this system and eventually replace those exiting it. This cycle forms the basis of medical training in which internship forms the entry point.

This study evaluated this cycle of learning and entry of newly qualified medical practitioners. It determined relationships and built theoretical understandings of this cycle where generally entrants are

expected to legitimately traverse such an environment in order to eventually recreate it. The study targeted career intentions of interns towards specific national priority health areas of primary health care and the care of children within the public health system, which has not been adequately addressed in the SSA context. It studied these interactions within the context of multiple environmental challenges and developed knowledge that has implications on policies, processes and practices of the learning cycle in internship. These implications may hold the key to understanding and changing the status quo where there are high levels of attrition of medical practitioners from practising in areas of need.

1.6 Literature review

Introduction to Literature review

The literature review is presented in the introductory chapter to provide an overview of the concepts and related research that has influenced this study. There are two main foci in this study viz. the internship learning environment and career intentions of SA interns.

1.6.1 History of Internship

The concept of internship has been recorded in various ancient societies as early as 600 BCE, with Aristotle defining the differences between '*techno*' (craft of making things), '*episteme*' (knowledge about things), and *'poiesis'* (production process) and *'praxis'* (conduct in a community where an individual realises excellence). [43] The middle ages formalised 'apprenticeships' within guilds as part of knowledge transfer. [43] Internships as a pedagogy are still a crucial component of many professions especially law and medicine. Now in post-industrial society with an increasing emphasis on 'life-long learning', 'learning organisations' or 'knowledge communities' there is again an increasing interest in internships and apprenticeships . [43, 44]

Modern internships involve supervised learning to specific outcome standards within contracts of employment with an emphasis on attainment of formal certification and entry into a profession. The concept of postmodern internships build on this, with an increased focus on transferable skills, lifelong learning and transforming and recreation of learning communities to respond to ever–changing contexts. [43,44] This post-modern pattern of internship synchronises with the call for a change in medical education for the 21st century and with the need to create transformed health care professionals who are willing and able to respond to an ever-changing landscape. [1]

Modern medical internship reportedly begun in the late 19th century and it was found that socio–economic and political issues rather than consideration of educational objectives determined its evolution. [45] Throughout the world medical internship usually consists of a period of 12 to 24 months, which follows the completion of an undergraduate degree. The period is highly supervised by senior medical practitioners and occurs within the authentic workplace setting.

The major aims of medical internship are to prepare the intern for independent, competent, ethical medical practice having obligations to patients, the health systems and communities through a process of certification and assessment. [46] The requirements deemed necessary for medical practitioners in the

21st century also includes the need to be 'leaders' and 'change agents' through the 'transformation of learning' and 'interdependence in education'. [1] This is seen to be accomplished by enabling the future custodians of the health systems of countries to be able to achieve core competencies for effective teamwork in health systems and to use creative adaptation of global resources to address local priorities.[1]

1.6.2 Medical internship in South Africa

Medical internship was introduced in SA in 1950 as a one-year rotation despite calls that it would 'adversely affect the medical profession'. [47]. In the 1990's, following complaints that the SA internship was of a sub–optimal standard and that it provided inadequate exposure to all disciplines in medicine, the process to develop a two year programme started. [47] The aim was to allow exposure to all major disciplines in medicine and the total period of 'undergraduate training including internship' was set at eight years. [47] A phased approach from 2004 to 2007 ensured that all SA graduates from various universities entered into this system. [48]

The South African Internship programme is regulated and overseen by the Health Professions Council of South Africa (HPCSA) without involvement of universities. [46]. Interns are placed at hospital complexes, which are also geographically designated and consist mainly of regional and tertiary hospitals with specialist care and district hospitals (community hospitals) with undifferentiated care. [47] The allocation process is a multi-tiered process, nationally controlled, with the aim of equitable placement of interns, hailing from differing universities and ethnicities throughout the country. [26] Minimum requirements for hospital complexes to be accredited for intern training include adequate patient exposure, senior personnel for supervisors, human resources for support, suitable patient facilities, support services such as laboratories, X-ray facilities and accommodation. Hospital sites are revaluated every two to three years. A senior member of the staff at the hospital complex, assigned as an intern curator, is responsible for the administration and coordination of interns, and acts as a link between the interns, the institutions and the HPCSA. [46] The implementation of internship training is the joint responsibility of the HPCSA, who ensures quality of training and supervision and the Department of Health that is the body responsible for employment and accommodation. Interns are responsible for their own training portfolios utilising HPCSA logbooks and guidelines. [46]

The current internship programme consists of four months of Paediatrics, Obstetrics and Gynaecology, General Surgery, Internal Medicine, Family Medicine with mental health and two months each of Anaesthetics and General Orthopaedics. The Family Medicine/Primary Health Care component exposes interns to undifferentiated care whilst all other domains are based in specialist run units in regional hospitals. [48] The stated purpose of internship in SA is that training must be complementary to the health care system being developed which places an emphasis on the primary health care approach. [46]

1.6.3 Learning in internship

Learning that derives its purposes for the context of work is defined as work–based learning (WBL). [49] WBL is stimulated by workplace activities that engage the learner in discussion and debate with workplace colleagues and has been an important component of medical education [49]. This critical dialogue, if facilitated and adequately resourced can trigger a transformation of the workplace culture into one that exploits situated learning to enhance not only the individual but also team and organizational practices. [50] It is accepted in medical education that much learning occurs in the context of 'doing'. This entails the everyday work of physicians and this 'implicit learning' is experienced not in the classroom but in real life social settings. This implicit learning defines WBL. [51] WBL learning can also be viewed as 'learning–as–participation' as opposed to 'learning–as–acquisition'. [52] In contrast internship 'learning–as–participation' has a collective focus on the process of 'becoming' and 'belonging' through full participation within medical communities. [53]

Participation is not just viewed as a physical action, it also involves 'connection' and includes the 'possibility' of mutual recognition and the ability to 'negotiate meaning'. [54, 55] This social process is significant in the context of clinical medicine and especially where interns as 'novice doctors' work side by side with their 'more experienced' colleagues. [55] Much of the learning, in this context, is seen as 'implicit' or can be overlooked as being viewed as part of the intern development of knowledge, skills and attitudes that they acquire. [56] It is within this framework of WBL, that participation is elevated as a crucial component of learning in internship. Quantifying and capturing the scope and depth of implicit, 'informal' learning within this participatory process is complex and difficult. Understanding how the unique constellation of factors within the SA health care environment influenced these processes thus formed an essential component of this study. These aspects are also echoed in studies of Early Career Learning (ECL) in various professions outside of medicine, which also emphasize the importance of participation, within the interplay of contextual factors and how this influences progress and personal agency. [56]The implicit nature of WBL within internship thus elevates participation as a crucial aspect of early career learning in this context.

This process of participation is closely associated with identity formation of interns during the learning experience. [55] How interns see themselves being 'perceived as being a competent doctor by others' is believed to be the one of the most challenging aspects of this learning experience [55].

1.6.4 Identity formation in Internship

Identity formation in medical education is an important and central to learning in internship. [55, 57, 58] The trajectory of internship can be conceptualised as a complex transformative journey that incorporates identity construction. [59] Identity construction entails both a personal (internal) process and a social (external) process. [60] The fields of psychology and sociology thus form the basis of understanding the concept of identity.

The ‘emergent identity’ that arises, within transition phases in medicine, such as internship, develops as an outcome of a social process of identification from the interactions between the individual and others in the clinical workplace. [55, 61] Identity formation is a more encompassing process than being an active participant in the practices of social communities and constructing identity in relation to these communities. [54] Identity formation as a full participant is a gradual and relational process through ever–changing states of knowledge, skills and attitude development. [62] Identity can also be viewed to be the mutual constitution of the individual and the community and this identity is negotiated within communities of practice and learning trajectories. [54] Research similarly conducted in a high disease burdened context found that the learning process during medical internship was highly influenced by ‘significant others’ from both within and outside the medical community. [59] The ‘community of practice’ either enabled or constrained the development of knowledge, skill and shaped the identity of the intern. [59] It is further postulated in this study that efforts to strengthen the possibilities for positive identity constructions during internship would facilitate the transformation of the medical culture to be more responsive to the needs, beliefs and abilities of interns thereby leading towards a more patient–centred health care system. [59]Identity formation during internship is thus viewed as a predominant social process, which is significantly influenced by the context.

Within the environment of SA’s rapidly transforming and disease burdened health system an understanding of how contextual factors influence the development of the identity of interns, remains poorly understood. Insights into the process of identity formation during medical internship given the challenging context, may improve our understanding of influences of contextual factors on interns. These relationships can enable an understanding of the trajectories followed by medical interns and their long-term aspirations in the SA health system.

1.6.5 Contextual factors affecting internship

A concern about the preparedness of tomorrow’s health professionals and their impact on society requires an understanding of the conditions in the LE that can affect their development. [63] Within the framework of ‘complexity theory’ internship can be seen to be a ‘complex adaptive system’ where environmental factors allow adaptive systems to emerge in new ways. [63] The influence of these factors may be variable according to the relationships and the notion of cause and effect but may not necessarily apply when looking at the interaction of these factors. [63] The literature on the contextual factors affecting internship reflects the trend of medical research to reduce complex systems to their component parts whilst searching for predictable patterns of interaction. [63] This view is echoed in the ten-year longitudinal follow up study where a broad range of factors are recognised to influence career intentions and behaviours of British interns. [64] Importantly these factors relate to each other in different directions and magnitudes and thus it was very difficult to disentangle the impacts of specific factors affecting interns [64] The interaction of factors within internship thus reflect a complex relationship that epitomises this period of medical education.

The major themes in the extant literature on contextual factors in the environment and internship relates to the interplay of these factors on learning, supervision, assessment and future career choices. The literature related specifically to the relationship of contextual factors to assessment and supervision is included in Chapter 4. The impact of contextual factors on career choices is dealt with later in this chapter. The relationship of contextual factors on the development of specific competencies was beyond the scope of this study and is only alluded to where relevant.

The learning environment as a concept provided a framework for attempting to understand the influences on internship by placing learning resources in a contextual, rather than in a central relationship with interns. [65] Simply making resources available to learners will not guarantee any kind of improvement in learning and material aspects tend to sub-serve social ones so the concept of the learning environment attempts to understand the various relationships at play. [65] In order to understand the complex web or relationships of contextual factors on the various facets in internship the multidimensional construct of the learning environment needed clarification.

1.6.6 Defining and evaluating the Learning Environment (LE)

1.6.6.1 Defining the Learning Environment

The construct of the 'learning environment' (LE) has been used to understand the influences of the context on learners, when as early as 1961 students perceptions of their LE was identified as an important influence of the success of their learning. [66] The term LE has been in common medical discourse since World Federation of Medical Education (WFME) in 1998 considered the LE as one of the targets of evaluation of medical education programmes. [67]

The actual definition or understanding of the term LE and what it constitutes has been problematic with little exploration of what makes up the construct of the LE. [68] The LE was typically viewed as the 'atmosphere, ethos, tone, ambience or personality' of an institution and is characterised by the pressures, stresses, practices, policies, rewards and values within the institution**.** [69] The LE is also perceived as the material and social context wherein learners 'learn' and was further viewed as the 'intangible aspects of an institution of learning and as a manifestation of the effects on students of the various parts of the curriculum. [70, 71, 72] It can also be 'all embracing' and refer to 'everything that is happening in a classroom, department, faculty or university'. [42, 66, 72] The LE has thus been described as "a subtle concept, encompassing physical, interpersonal, and organisational elements" [73]

Mosby's Medical Dictionary, 8th edition from 2009 defines the LE as 'the sum of the internal and external circumstances and influences surrounding and affecting a person's learning'. [74] Various aspects are embraced when the term LE is used and these include material, social and 'intra-psychological' aspects. [42]

For the purposes of this study, it was imperative that the definition of the LE used was made explicit including the constituents being assessed so that what was meant by the LE was clearly understood. In

this study, the learning environment was based on the perceptions of interns and supervisors. The constituents that comprise the LE in this study referred to:

(i) The physical environment (e.g. facilities, comfort, safety and food);

(ii) The emotional climate (e.g. security, positive methods and reinforcement); and

(iii) The intellectual climate (e.g. learning with patients, reflective practice, evidence based, up to date knowledge and skills) [75].

This definition of what constitutes the LE was chosen as it is explicit, clearly includes all aspects of the LE and is relevant to the needs of the current resource challenged contexts where the physical environment, support structures and learning processes all play a significant role in influencing internship training. The term LE is often used interchangeably to indicate an educational climate, educational environment and/or learning climate. [70–72, 76] In this study, the term LE was also used as a synonym for educational /learning climate or educational environment.

1.6.6.2 Evaluating the Learning Environment

As with the definition and understanding of what constitutes the LE, it can be many things to different people who operate at different levels. [42] Thus quantifying the LE has always been problematic. Understanding the LE and the ways of evaluating it requires an understanding of the origin of the concepts of 'climate' and 'culture'.

In the 1960s and 1970s climate evaluation as a tool to understand organisational functioning was popular. [77, 79] Mainly quantitative surveys were used to measure summary perceptions people had of observable procedures and practices in organisations. [78] It was in this context that relationships with organisational performance, motivation and job satisfaction were evaluated. [79-81] In the 1980s, a distinction developed between culture and climate. [78]

There was a swing towards qualitatively evaluating the 'culture' of an organisation. Here the basic assumptions, beliefs, values and patterns of behaviour and artefacts of an organisation were measured. [78] This response followed reactions to a predominant 'positivist' approach of evaluating climate and moving to a more favoured 'qualitative' anthropological method to investigate organisational culture. Research strategies in the last two decades have shifted to integrating climate and culture. [78] It is in this context the LE was placed and evaluated using both quantitative and qualitative tools such as surveys and focus groups and this allowed for the gathering of more detailed impressions than would not be possible from a single methodological approach. [82]

Various associations with educational outcomes have been made with evaluating the LE. It is the learner's perceptions of the LE rather than the environment itself that has been found to determine behaviour. It is these perceptions, which then evaluated using the PHEEM and other measures that have been used to predict various educational and other outcomes. [66, 71, 72, 83] **Table 1** indicates the various associations with which perceptions of the LE have been associated.

Table 1. Associations found with measured perceptions of the Learning Environment

Associations found with measured perceptions of the Learning Environment
1. Learner satisfaction levels[72,78,80]
2. Job satisfaction levels [72,78,80]
3. Motivation within the workplace [79,81]
4. Success [72]
5. Achievement [72]
6. Career choice [72]

In the light of this and research among interns in the SA context that dealt with the external environment, it was important that the influences of the various factors on the perceptions of the LE among SA interns be determined and understood.

1.6.6.3 Developing a reliable and valid LE measurement

A quantitative evaluation of the LE requires the use of an inventory or instrument chosen based on qualities (psychometric features) or suitability of that instrument to measure the LE. [67] A valid and reliable instrument allows for a meaningful evaluation of the LE and thus appropriate measures to be taken to improve the environment. [67] Standards to support validity includes content, internal structure (reported as measures of internal consistency and factor analysis) and response, relation to other variables and consequences. [84]

Reliability refers to the reproducibility of the measurement with a high correlation between the scores of individual items in an instrument i.e. a high internal consistency, which would indicate the scores evaluate a single construct. [67] Instruments in use to evaluate the LE include many who do not have the most robust psychometric qualities now expected in medical education. [42]

1.6.6.4 Use of the Postgraduate Hospital Educational Environment Measure (PHEEM) to evaluate perceptions of the LE

In the 1990's the Dundee Ready Education Environment Measurement (DREEM) was developed as a 'culture free' inventory to evaluate the learning environment for health professionals. [78, 85] The Postgraduate Hospital Educational Environment Measure (PHEEM) derived from the DREEM tool was tailored to the learning climate in the postgraduate clinical setting. The developers of the measure used a literature review, a form of grounded theory involving focus groups and a Delphi panel drawn from the target population to validate the items of the PHEEM as a 40–item inventory. [85]

There are a number of instruments developed to evaluate the LE in postgraduate areas of medical training. Many are discipline specific and culture specific. It has been difficult to find that one instrument that can be optimally validated. The PHEEM instrument has been extensively used across many countries in differing contexts of postgraduate medical education including amongst interns [67, 78, 86–99]

Critics of the PHEEM cite deficiencies with the validation of the PHEEM where not all validity criteria were shown to be met. [78] A further criticism of the PHEEM instrument is with regard to the

original three subscales as developed by the original authors. There is still controversy as to whether the PHEEM evaluates one construct or many constructs and whether these constructs are aligned with the original three subscales of the original developers. Some studies indicate the unidimensionality of the PHEEM scale [96, 97, 99] whilst others support its multi-dimensionality. [82, 89, 96, 99,100] Results from a multitude of psychometric testing of the PHEEM in varying contexts have yielded these differing results and this remains a concern when using the PHEEM.

Despite varying criticisms, the PHEEM was found to be the most suitable instrument for use in different postgraduate settings because of its high content validity and reliability. [67]

1.6.7 Career intentions amongst interns

It is widely accepted that the most important asset of any health system is its skilled workforce. [101,102] Knowledge about the actual career progress of healthcare practitioners, changes in career choice and eventual career destination is essential for workforce planning, postgraduate medical training and the delivery of healthcare. [101,102]

Career choice has largely been viewed as part of vocational psychology which is particularly interested in how individuals choose careers and how individual and environmental factors impact on these career choices [21] Predictors of career choice arise from both within individuals and from the environment and often these interact to determine outcomes. [21] In this study, the focus is on the influences of the environment on career intentions. In Chapter 2, the career developmental theories used to establish a conceptual framework for this research are presented.

Chapter 7 deals with career intentions and presents a summary of literature for clarification. The literature provide a basis for the argument that career intentions of current SA doctors are not aligned to national priorities and this phenomenon is characteristic of other resource-constrained countries in SSA especially..

Physician migration patterns show a clear trajectory of qualified medical practitioners from SSA, including SA to the higher income countries in the world. [3,30,103,104] Whilst SSA countries are much worse off in terms of physician migration than SA, the trend amongst qualified SA medical practitioners remains the same as physicians in SSA. There are a host of factors related to poor working environments within the national health system and personal factors related to security issues and the need for experience being major catalysts to emigration of medical practitioners from countries of need. [3, 30,103,105]

In-country migration patterns away from under–resourced, disadvantaged communities was noted especially with a persistent rural to urban, public to private, primary care to specialised care bias amongst many qualified medical practitioners in SA and SSA. [30,103,106] Whilst the opportunities to work within a team, in academia and to ‘feel needed and wanted’ are seen to be greater when working in public health care, poor resource availability, lack of trust in the health department management and

perceptions of poor future career opportunities are the major negative factors that drive away SA doctors from the public sector. [107]

There is an overwhelming desire for specialisation amongst all medical practitioners in SA [30,103,106] and this trend is similar in international literature. [106–111] This trend was persistent among interns despite findings from longitudinal studies that most medical practitioners who desire specialisation enter primary care careers in the long term. [29,53,108] However in the 10 year longitudinal follow up in Britain, a context very different to SA and other SSA countries , at year ten, 71% of medical practitioners still remained within the public health system. [64]

Gender issues play an important role in career intentions especially the choice of specialty with Paediatrics being favoured by more female doctors than their male counterparts. This situation however differs with Surgery attracting fewer female doctors. [53,110,112–116] Gendered influences and barriers were also noted with decisions to change intentions, enter general practice and private care in the ten–year cohort study in Britain. [64]

The difference between the influence of individual and external factors on career intention is an important aspect when dealing with career intentions. In many developed countries 'work-life balance', which indicates a pursuit of a career that provides a lifestyle-friendly work environment is cited by many as a factor affecting career intentions and the choice of a speciality. [109,110,115-117] Whilst these largely individual factors played a role, many studies however also indicated the influence of external environmental factors that influenced career intentions. The influence of the teaching platforms, role of mentors, presence of motivating role models and stimulating work experiences was noted. [102,112,115,118] The relative influence of internal compared with external factors on career intentions in resource challenged contexts remains poorly understood.

The first few years after qualification however stood out as an important window when many medical practitioners had their career intentions crystallized and acted on. [22, 23, 28, 29,102] Internship thus offers, an important window of opportunity, where it may be possible to influence long-term career choices. [28]

1.6.8 Conclusion of the Literature review

Internship as an important component of medical education, is reviewed with regard to its history and trajectory specifically within the SA context. Participation and identity formation are seen as critical factors in the internship learning cycle within an interplay of external and internal influences in the LE. The LE as a construct to quantify with the use of appropriate tools is described. Finally, a synopsis of the major themes with regard to factors influencing career intentions of interns is dealt with. There is a significant lack of appropriate studies on internship in resource challenged contexts particularly with regard to the learning environment's influences on career interest.

To evaluate and understand the complexity of internship and career intentions these constructs can be viewed in various ways. The use of existing theoretical frameworks developed over time that reflect

both the key constructs of the study is needed in order to understand interactions between these constructs. The use of these theories will enable a focused evaluation of these constructs within the complex South African context. Chapter two introduces the theoretical frameworks that resonated with this study.

1.7 Overview of the thesis

This thesis is presented in the following ten chapters:

Chapter One provides a context to the study. It provides the problem statement, research aim and objectives. The significance and purpose of the study is followed by an overview of the literature pertaining to the major concepts in this study.

Chapter Two presents the philosophical assumptions and theoretical frameworks that underpin this study.

Chapter Three describes the methodological approach adopted in this study, the research design, study setting and research methods used in the collection and analysis of the data. The chapter presents issues related to trustworthiness, ethical standards and ending the researchers' reflexive positioning.

Chapter Four presents the findings in response to objective one. This chapter explores the influence of the LE on the assessment of the SA Interns and compares the trends of WBA amongst SA interns in relation to international best practices.

Chapter Five presents the findings of the validation of the local version of the PHEEM tool to measure the LE amongst SA Paediatric interns. It describes the perceptions of the LE, of interns and their supervisors.

Chapter Six describes the findings of a study into the influence of individual factors on intern's perceptions of the LE. It presents the relationships found between various demographic and educational characteristics with perceptions of the LE.

Chapter Seven highlights the career intentions of interns who have and have not worked within Paediatrics internship. The findings of the relationships between perceptions of the LE and career intentions towards working within SA, its public sector and with children are presented.

Chapter Eight describes the views of interns of their internship learning experiences and their reasons for their career intentions. The chapter provides insights of interns' views on future career intentions in SA's public sector, primary health care and in Child health.

Chapter Nine provides a synthesis of the study together with conclusions and implications of the findings in this research. It proposes changes to policy and practice within internship in SA that would better align intern's career intention with national health priorities.

A composite reference list is presented in Chapter Ten.

CHAPTER 2: THEORETICAL FRAMEWORK

2.1 Introduction

The previous chapter introduced the problem and context of this study and the literature that informed the framing of this study. It introduced the LE and career choice as two constructs central to this study. This chapter locates the study within the appropriate research paradigm and reviews the several theories that informed the conceptual framing that underpins this study.

2.2 Philosophical assumptions and beliefs

2.2.1 Research paradigm

A paradigm can be described as a set of beliefs that influence the worldview and research position of a researcher and is therefore linked to the assumptions that underlie the creation of knowledge from this study**.** [119,120] In this way, the paradigm influences the orientation of the study and the reflective researcher is expected to reveal the extent to which the design, conduct and analysis of the study had been influenced by such a worldview. [121]

This study was situated within a social constructivist paradigm. The social constructivist paradigm reflects an overarching interpretivist worldview. This interpretivist worldview recognises social forces as dynamic constructs and accepts that the interactions between these constructs are too complex to be captured in absolute measurements. [122] Separating these forces would furthermore not accurately reflect how they interact and thus research in this paradigm is steeped in the need to find meaning. [122] The social constructivist 'constructs' meaning through the many interactions of the social sources of meaning. Thus a more collaborative, social view as opposed to an individual stance on learning was taken in this study and learning was seen as being closely related to context. This study emphasised the importance of social engagement in the learning process, with the intern within a learning environment, being viewed as the unit of analysis.

This emphasis on social learning and context in internship resonated within a social constructivist research paradigm. [123] The social constructivist stance on learning is rooted in the individual's knowledge and acknowledges their interactions with the surroundings and other people before that knowledge is internalized and thus culture and context are emphasised. [124] The assumptions the social constructivist thus makes is that reality and knowledge development does not only take place within an individual, nor by passively being influenced by external forces but that learning occurs when individuals engages in social activities such as interaction and collaboration. [125,126] Thus learning within the social constructivist view occurs as a result of this interaction through participation which develops and reinforces the role and identity of the individual within social structures.

2.2.2 Ontological stance

A relativist ontological stance was taken in this research where reality was seen as complex, subjective, socially constructed and importantly as being context dependent. [119,126] It was within this stance that the perceptions of interns of their learning environment were viewed as being real to them.

2.2.3 Epistemological stance

In educational research epistemological assumptions of knowledge shape, what a researcher accepts as evidence of the nature of learning and this often determines the type of questions that researchers employ about the learning reality and which answers are regarded as valid. [127] Subjectivist epistemology entails the belief that people construct their own understanding of reality based on their interactions with their environment and that the researcher co-constructs this understanding with resultant multiple views of the learning experience. [119,120] In this study, a subjective epistemological stance was taken, where the perceptions of medical interns of their learning environment and career intentions were interpreted and representations were co-constructed with the views of the researcher.

2.3 Theoretical frameworks

2.3.1 Introduction to the theoretical frameworks used in the study

In this segment of the chapter, the conceptual framework that underpinned this study is presented. This is done by reviewing theoretical frameworks in the extant literature that had resonance with the major constructs of this study viz. the learning environment and the career choices of SA interns. Theories or perspectives in the medical education field are perceived of as deeply held values that medical educationists hold with regard to teaching and learning. [128] On a practical level, these theories can translate themes that describe and influence how educators see their roles and responsibilities. These themes are open to interrogation and reflection by researchers and allow for the building of a coherent body of evidence that can give a better insight and understanding of the learning process. [128]

In viewing the intern within the LE as a unit of analysis and linking this with the intern's career intentions within a social constructivist worldview, social learning theories found resonance. The social learning theories reflect the social and situated aspects of learning. Elements from three theories were drawn on to develop a conceptual framework to house this multidimensional study

2.3.2 Alienation and Engagement

The theory of alienation and engagement frames a relationship of power and hierarchy through which students within higher education can be viewed. [129] The student experience of being the 'other', the 'subject ' and the 'outsider' within a relationship has been variously used to describe such experiences in SA higher education. [129-131] The intern entering the world of medical practice is reflective of this experience and the theory of alienation and engagement can thus be used to understand findings that emanate from a study of this process.

The transformation of the SA medical practitioner community with regard to gender, ethnicity, geographical origin of and socio-economic background of its newly qualifying members is now being reflected amongst interns. [19] The changing demographic nature of interns within a hierarchy and system that is still however reflective of previous political dispensations carries obvious tensions. The lens of alienation and engagement thus has been recognized as an important factor in viewing the influence of the LE and socio-cultural influences on learning, especially in higher education in SA. [129] Alienation

defined as the 'absence of a relationship a learner might desire or expect to experience' and engagement seen as 'the presence of a connection or relationship' has frequently been viewed as an important aspect when evaluating the LE. [130,131] Workplace, socio–demographic factors, inter-professional relationships, support from supervisors, curriculum design and the teaching hospital environments have all been recognized as antecedents to students' viewing of the LE in an 'alienated' or 'engaged' frame. [131–133] Viewing the rapidly changed internship community in SA, through this lens, has not been sufficiently documented.

2.3.3 Communities of Practice (COP)

Lave and Wenger (1991) defined a community of practice 'as being a set of relations among persons, their activity and the relevant environment'**.** [134] The relationship develops over time and interfaces with other adjacent or tangential communities of practice. Learning and knowledge formation are best supported by the individuals' engagement in a COP developing competence and making meaning through active participation and by assuming an identity with other like-minded individuals in the COP. [55]

This theory can be viewed as a contemporary version of the 'apprenticeship' model and introduces concepts to frame the learning processes within internship**.** [43, 134] The vocabulary that the COP provides, allows analysis of what is important, what difficulties to expect and how to approach the problem of learning in internship. [55] Internship within the COP framework as first used by Lave and Wenger (1991) is viewed as moving beyond cognitive knowledge transmission and rather occurs through certain forms and types of social co-participation, which is embedded within both a social and physical environment. [134, 135]

The theoretical framework as provided by COP has relevance to the nature of the learning process of entry, participation and development within internship .This perspective resonates with the idea that learning processes occur where interns participate in 'learning by doing'. [43] The primary unit of analysis is not the individual intern but the 'community of practice' i.e. the socially contracted practice in which learning occurs. Learning and skill acquisition occur by actually engaging in the desired practice itself, within a participation framework, not only within the individual mind. Knowledge is distributed among the various individuals who are participating within this learning context, and the learning is often mediated by the differences of perspective. [135]

The evolution of the COP as a learning theory has been controversial and a number of criticisms have developed over the years. [136] **Table 2** illustrates a summary of the key points in the evolution of the theory of COP, which is relevant to internship as found in this study.

Table 2. Evolution of the core aspects of the Communities of Practice theory

No	Source and time*[1,2,3]	Major aim	Major concepts and focus	Terminology
1	(Lave and Wenger 1991)	To provide a template to examine learning among practitioners in a social environment	Journey of the 'newcomer' from legitimate peripheral participant to full participant, then 'expert'	'newcomer' 'legitimate peripheral participant'
2	(Wenger 1998)	Using concepts from education ,sociology and social theory to understand socialisation and learning	Outlines the individual interaction within COPs Importance of trajectories spontaneous emergence of COPs focus on day to day work Identity formation	'mutual engagement' 'joint enterprise' 'shared repertoire'
3	(Wenger, McDermott et al. 2002)	To use COP as a tool for organisations to manage 'knowledge workers'	Organisations can engineer COPs to enhance competitiveness COP as a means of innovation and creative problem solving 'leader or champion 'in a group 'facilitators'	'domain' 'community' 'practice'

*[1]Lave, J. and E. Wenger (1991). Situated Learning :Legitimate peripheral particpation Cambridge University Press
*[2]Wenger, E. (1998). Communities of practice: Learning, meaning, and identity, Cambridge university press.
*[3]Wenger, E., R. A. McDermott and W. Snyder (2002). Cultivating communities of practice: A guide to managing knowledge, Harvard Business Press.

Whilst there has been an evolution in the COP theory over time, the core concepts within the theory resonate well with the learning process within internship. The aspects of COP that relate to the journey of the newcomer from peripheral positions to full participation and identity formation resonated with the experiences of the intern during learning. The support for formal and informal learning, the trajectory of novices and interaction of experts, the investment in participation and the need to engender a sense of belonging all have relevance with internship. However, several criticisms within the theory highlights the lack of uniformity in the definition of what the structure and function of COP is. **(135,136)** The ubiquitous nature in which the COP is used has led to conflict between a COP and various other constructs such as communities of interest, formal departments etc. **(136)**

Further criticisms of the concept of COP reflect the concern that entrenched beliefs, ideas and cultures within existing COP's will be preserved despite them being contrary to creating an optimal LE.

Thus critics of COP warns about the influence of power relationships, 'group think', 'cliques', hierarchies that can be entrenched within a COP. [136,137] This has particular resonance with the persistence of gender and other biases persisting within staunchly hierarchical medical teaching units.

Whilst the framework of COP can be utilized to explain and theorise on the learning process within internship in SA, the relationship of context and outcomes in a COP have not been adequately addressed. Of relevance to internship within the SA context, is how the concept of a COP deals with the inevitable tension between the needs of the individual intern in learning and the interest of the health department in terms of service work. Within internship, this is reflected in the major tension between working and learning that had been previously noted. [137]

Whilst the concept of a COP claims that optimized creation and dissemination of knowledge when all the elements of a COP work well together, it is not clear how to foster these elements at an early stage in the career trajectory of individuals. [136] This relates to the essential component within a COP, Vygotsky's zone of proximal development and issues related to access and entry into communities of practice especially when socio-cultural factors are associated with power dynamics in a society as is the case in a transforming South Africa.

A further critique of the COP theory is related to the differing nature in which participation can occur and the theory is largely silent on the power differential and structural constraints, which can affect access and participation. [138] These gaps in the theory had bearing on the research question of the influence of the LE on career intentions of SA interns within the context of SA's stark inequity in health provision. This relates to the scarcity of research related especially to the concepts of communities of practice and career intentions within internship in resource-constrained contexts.

2.3.4 Social Cognitive Career Theory (SCCT).

Lent, Hackett and Brown in 1994 developed the SCCT theory. [139,140] based on Bandura's Social Cognitive Theory with its triadic reciprocal person-environment-behaviour perspective. [142] The SCCT drew on the social learning theory of career decision making of Krumbolts and Hackett as well as Betz's 1981 self–efficacy construct to create a unifying and integrative framework. [140,141] This theory attempts to trace some of the complex interplay of factors between individuals and their career related contexts, between cognitive and social-interpersonal factors and between self-directed versus externally imposed influences. [141] The SCCT frames the various contextual factors that play a role in influencing career decision making by organising these within discrete categories and timelines [139,140].This theory thus enables a clearer trajectory of the interaction of contextual factors on various aspects of career interest formation and career choice decision making .

Career choice theories have largely developed from the framework of 'trait–environment fit' since 1909. [139] The most dominant career choice theories since then have focused on these predictable traits in people as a means of assessing career choice. Hollands Typology of personality traits of 1985, one of the most influential models of career choice is based on this. [140] The other perspective to develop was

the development career theorists that focused on the 'less predictable' challenges people found in their environment**.** [(140)]

When evaluating external factors that may influence career intentions these are seen as contextual factors, which can act as barriers or enablers in the process of career interest or choice. These contextual factors influence the development of career self–efficacy and outcome expectations. [(140)] Career self–efficacy is seen as a central concept for individuals to set positive career goals, to organize and guide behaviours and encourage persistence in the face of setbacks**.** [(143)] Outcome expectations are seen as those personal beliefs about the consequences of one's actions, which can influence career intentions. [(142)] It is the development of career self–efficacy however, that is integral in the development of individuals career interests. [(140)] The underlying premise of the SCCT is that career choice may be guided less by personal interests but more by environmental factors, which influence career self–efficacy and outcome expectations. [(143)]

2.3.5 The role of self-efficacy in career intentions

Self-efficacy has typically been defined as an individual's own judgement of their capabilities to perform a particular task at a desired level in relation to a wide range of behaviour and with the view to attain certain outcomes. [(141,142)] Self–efficacy can be derived from performance accomplishments, vicarious experience, verbal exhortation and emotional factors and can thus vary according to the situation and with feedback from others in the social environment. [(141)] Self–efficacy has been found to be positively related to task performance across a variety of professions and poor self–efficacy has been associated with a failure to develop robust interests. [(143)]

2.4 Conclusion

In attempting to frame the interactions of the intern LE within the SA context with individual career intentions key concepts found in an array of social learning theories found resonance. The intern learning process was found to encompass concepts of access ,entry ,participation and the development of self-efficacy. These concepts coalesce within the intern LE and can thus form a framework within which the interactions of context on career intentions and learning experience can be studied. The framing of these complex concepts as constructed by interns themselves within a context dependant social environment is recognised as a platform in which an understanding of the interactions of the LE with career intentions within internship can be made.

In this chapter, social constructivism was introduced as the research paradigm through which this study was viewed. Elements from various social learning theories viz. Communities of Practice (COP) and Social Cognitive Careers Theory (SCCT) were drawn upon to develop a conceptual theoretical framework that underpinned the study. The alienation and engagement theory was also drawn upon to develop an understanding of the interplay of factors affecting intern's access and participation in communities of practice.

CHAPTER 3: METHODOLOGY

3.1 Introduction

The previous chapters introduced the study context, relevant literature and theoretical frameworks drawn on to answer the research objectives. It introduced the LE and career choice as two constructs central to this study. This chapter locates the study within the appropriate research paradigm and justifies the research design, and decisions relating to the data collection and analysis processes. Owing to the design of this thesis by manuscript, each manuscript describes the methods used as indicated in Chapters 4 to 8. This chapter therefore serves to provide an overview of the methodological decision that framed the overall study and assists in clarifying the concepts and parameters of this study. Quality inferences and ethical issues related to the research are dealt with. Finally, this chapter presents the reflexive positioning of the researcher.

3.2 Mixed methods

The exploratory nature of the research questions in this study posed a number of challenges including those posed by the complexity of the constructs identified for analysis. Deeper understanding of the 'how' and 'why' interns chose to behave in the way they did formed an integral component of this study. The overall aim of this study was to generate deeper understandings of the complex environment of the LE in internship and career interest formation amongst interns. This was done in order to inform knowledge related to the apparent discordance between aspirations of medical practitioner and country health needs. [144] The social constructivist framework resonated well with the need to understand perceptions of individual interns and recognition that meanings will be co-constructed and multiple. In addition, methodologies that align well with this interpretivist philosophy using methods such as focus groups data analysis have been shown to be suitable when evaluating complex human intentions and motivations. [145] However, the use of one framework to understand this complex construct is less likely to provide a holistic understanding to generate credible theories.

The worldview of the audience, which this study (health professionals and health planners) is aimed at, is largely situated in a positivist-based context. In addition, in keeping with much of health service related research dealing with complex constructs, multiple stakeholders and influences, using just one perspective would not have been adequate. [146] This research needed to address different questions in order to give a more comprehensive understanding thus it also combined multiple perspectives with regard to methodologies. [41] This adoption of both a positivist slant to the methodology involved the use of psychometric and correlational research traditions and a more interpretivist framework for focus group interaction and analysis.

Mixed methodologies have a 'methodological eclecticism' that resonated with this study whereby there is a certain degree of freedom to combine methods by choosing the best tools to answer the study questions. [146] In addition, the use of mixed methods approach enabled a more iterative, cyclical approach in this study allowing both an inductive and deductive perspectives within the same study. [149]

3.3 Controversies associated with mixed methods

Since the 1980's mixed methodologies derived from education, assessment, management, sociology and health sciences has grown rapidly and become highly popular, since the mixing of data collection using surveys and focus group data by Campbell and Fisk in 1959. [146] Whilst the field has developed dramatically significant challenges in using this methodology have been noted and were apparent in this study.

There has been considerable debate on what is being mixed and when. Mixing can occur with the methods, methodology, type of research or is it the stage at which mixing occurs? [146–150] In this study the definition adhered to for mixed methodology is that 'it is a type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches for the broad purposes of breadth and depth of understanding and corroboration'. [151]

The perspective of mixed methodology taken in this study followed very much that of Tashokkari et al. 2009, and Morse 2010, where the views taken that 'mixing' is from the 'methods' perspective onwards and not paradigmatic and the point of integration of quantitative and qualitative components occurs in the data analysis and narrative components. [152] The challenge in mixed methodologies and also experienced in this study was the conundrum of mixing the 'primary drives of the research' i.e. the philosophical assumptions of the study. [146,149]

The study accepted the concept of the use of multiple paradigms despite concerns expressed that there is 'inconsistency' at the paradigmatic level with mixing of paradigms. [147] In this study the social constructivist paradigm underpinned much of the research and a positivist approach to the quantitative components was accepted.

3.4 Rationale for using sequential explanatory mixed methodologies

In this study, a sequential explanatory mixed methodology was used which implied the collecting and analyzing of quantitative and then qualitative data that occurred in two consecutive phases within one study. [153,154] The qualitative (text) data was collected and analysed second in the sequence to help explain and elaborate on the quantitative results obtained initially. [154] The qualitative phase built on the quantitative phase and the two phases were integrated at various levels including analysis and synopsis. [155] The rationale for this approach was that the quantitative data and their subsequent analysis provided a general understanding of the research problem. The qualitative data and their analysis refined and explained statistical results by exploring participants' views in more depth. [155]

The advantages of using the sequential explanatory approach in mixed methodology included its straightforwardness and opportunities for the exploration of the quantitative results in more detail and resonated with the positivist bias of the primary researcher. [157] **Figure 2** visually displays the sequence of components that comprised this QUAN–qual study**.** [159]

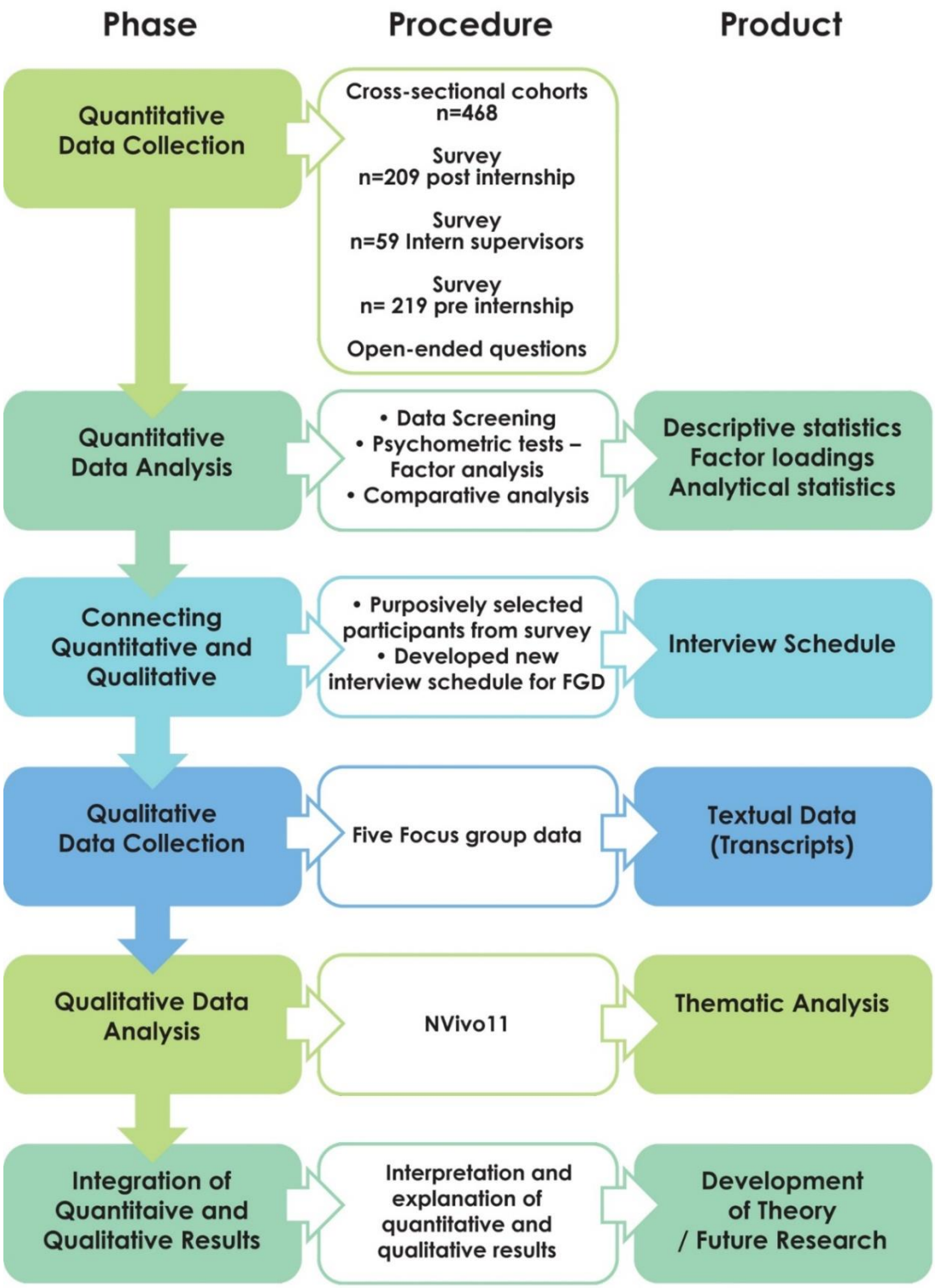

Figure 2. Diagrammatic (visual) presentation of Sequential explanatory mixed methods design of the study

As can be seen in **Figure 2**, the use of the multiple methods was not situational. This design reflected the use of different methods, which addressed different parts of the same overall research question with each stage designed as a seemingly self-contained and publishable unit. [(154)] There was integration however, at the following points: design phase where a predominant QUAN–qual sequence

was planned, data collection with open-ended questions being asked within the survey and at the data analysis phase where data from the open-ended questions in the survey influenced the questions and analysis of the main focus group data. In addition, all focus group participants were drawn from the participants who had completed the survey. Integration of data was essential in the synopsis of the study. The results of each method informed the emerging knowledge and conceptual model that developed with the synthesis aimed at showing the complementary relationship between the sets of findings, and in answering the overall question. [147,156–158]

3.5 Location of study

The study was conducted at four regional hospital complexes (compromising eight separate hospitals) in the two largest cities (Durban and Pietermaritzburg) in KwaZulu–Natal, South Africa. Both the geographical locations selected have the highest HIV antenatal seroprevalence rates in the world, very high TB rates as well as high rates of nutrition related diseases, non–communicable diseases and inter-personal violence. [6] **Figure 3** indicates the major disease rates in the health districts of South Africa by highlighting the high HIV rates in the populations served by all the hospitals that were sampled. [159]

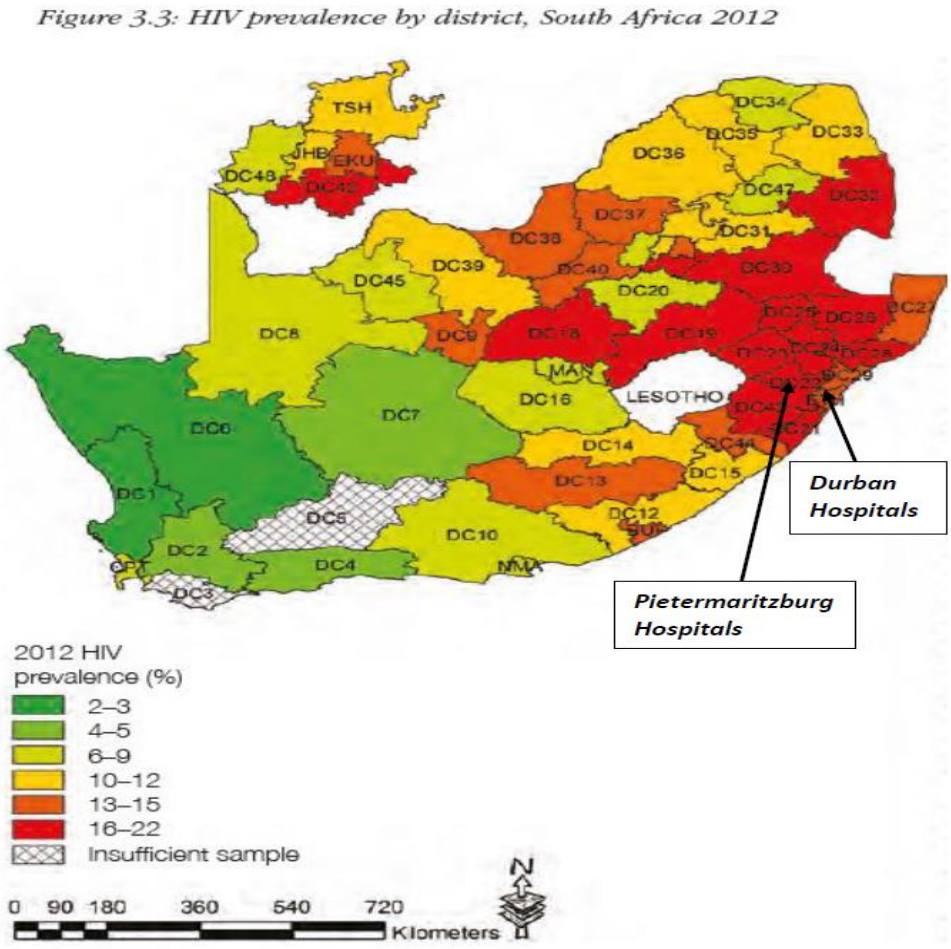

Figure 3. Map of the various health districts in SA highlighting high disease burden rates in the province KwaZulu-Natal. (Reference 159)

3.6 Study Participants

Table 3 indicates the distribution of all interns allocated to all the sampled hospitals by the national department of health during the sampled period 2015-2016. These hospital complexes are some of the largest in South Africa with the Pietermaritzburg hospital complex comprising three hospitals Greys, Edendale and Northdale Hospitals being the largest intern complex in the country. [(46)] Interns who had completed their Paediatric internship were designated to the post internship cohort. They compromised interns in both year 1 and year 2 of their overall internship.

The pre-internship cohort included all interns who had not commenced Paediatric internship thus representing a cohort who have had no exposure to the Paediatric LE.

Supervisors are present in all sites and they are made up of senior supervisors mainly specialists and junior supervisors mainly registrars (residents in training) from all hospital complexes.

Table 3. Actual envisaged numbers of interns in various hospitals and in Paediatrics for 2015–2016

Intern Numbers 2015-2016	Total	Number envisaged who have completed Paediatrics at time of sampling December 2015
Total KwaZulu-Natal	663	
Sampled hospitals/hospital complexes		
Pietermaritzburg Metropolitan Hospitals complex	216	
King Edward VIII	78	
Prince Mshyeni Memorial	93	
Addington/Mahatma Gandhi Memorial	118	
Totals for hospitals being sampled	505	**378**

3.7 Phases of the study

The study comprised of three phases within which there were five stages. **Table 4** illustrates the three main phases and five stages within these phases. The three phases were designated to indicate the preliminary, quantitative and qualitative components while the stages reflected the objectives set out in this study and corresponded with each of the manuscripts produced.

Table 4. Phases and stages of the research project

Phase	1 - Preliminary			2 - Quantitative			3 - Qualitative
Stage	1			2	3	4	5
Description of the stage	Literature review	Pilot	Assessment of face validity for local PHEEM and survey tool	1. Validation of PHEEM tool 2. Measurement of the LE 3. Measure Interns and Supervisors	Comparisons of the perceptions of the LE with demographic variables of interns	Comparisons of the perceptions of the LE with career intentions of interns	Exploration of perceptions of the LE and career intentions
Research Objective	Objective 1	N/A	N/A	Objective 2	Objective 3	Objective 4	Objective 5
Methodology	Interpretivist	Positivist	Interpretivist	Positivist			Interpretivist
Tools used	Literature review	Survey	Focus Group	Survey			Focus Group
Sample size	N/A	n= 42 interns doing paediatrics	n= 13 senior health managers	Total participants = 268 N = 59 Paediatric supervisors	Total participants = 209	Total participants = 412 n = 213 interns pre-internship cohort	Total participants = 33 n = 33 post internship interns
				n = 209 interns post Paediatric internship cohort Stages 2,3 and 4			
Data Analysis	Thematic Analysis	Quantitative Descriptive statistics		Descriptive Analytical statistics			Thematic Analysis
Chapter in thesis	4	3	3	5	6	7	8

Comparing International and South African Work-based Assessment of Medical Interns' Practice

The Learning Environment of Paediatric Interns in South Africa

The influence of individual factors in the learning environment of South African interns

Impact of the Learning Environment on Career Intentions of Paediatric Interns

Perceptions of the Learning Environment influence Intern Career Intentions

The initial preliminary phase was aimed at establishing the framework to study the LE and career intention constructs by exploring the literature on WBA in internship and the influences on this core aspect of internship. Input on data collection tools for both the survey and qualitative component was obtained from pilot intern studies and expert FGD. Stage 1a of the study consisted of a literature review, which is presented, in Chapter 4.

Phase 2 and 3 reflected the sequential explanatory mixed methodology design of the main study and Phase 2 involved the PHEEM survey with multiple cohorts. The post internship cohort n=209 was the main cohort being studied with the supervisor cohort and pre-internship cohorts chosen to determine any relationships between the groups.

3.8 Pilot study

The pilot study was conducted in two phases initially prior to the expert FGD at the Pietermaritzburg Hospital complex (PMB) and after the expert FGD at King Edward VIII Hospital. The PMB complex pilot study consisted of administering of a researcher developed survey to assess the LE which was based on a questionnaire developed by Hill et al [160] and included a focus group discussion on the evaluation of learning experiences in Paediatric Internship and career choice. Interns were asked to reflect on the user friendliness of the survey, how best to assess the LE and, on their Paediatric learning experiences and career intentions. A reflective journal was kept of the focus group discussion (FGD). Evaluation of both the survey results and FGD indicated the need to use a more standardized survey. In view of the poor face validity obtained at this stage it was decided to adapt the PHEEM tool for assessing perceptions of the LE instead of the initial pilot LE survey. In addition, upon analysis of the pilot FGD, it became clear of the need to sample supervisors as well as many participants held perceptions that their supervisors held differing views on the LE. Clarity was also obtained during the FGD on the wording of the survey items to assess demographic characteristics, previous educational exposure and career intentions to assess suitability and clarity of terms used. The robust discussion and interaction in the pilot FGD regarding intern experiences and career intentions confirmed the choice of focus group discussions as a preferred tool to obtain data on intern views. Subsequently to the Expert focus group discussion (which is discussed in section 3.9) the modified PHEEM tool was then piloted in a group of interns at King Edward VIII Hospital to assess face validity amongst an intern sample prior to its adoption in the main study

3.9 Expert Focus group discussion

The third component of the preliminary phase included the constitution of an expert FGD. This expert focus group included purposively selected senior managers in each of the hospitals from where interns were to be sampled. The thirteen members included all the clinical heads of Paediatrics at all regional hospitals in the KwaZulu-Natal province as well as the district Paediatric specialists (community Paediatrician) and the chief specialist of Paediatrics of the province.

This FGD had three aims viz. Firstly, to inform the managers of the research that was to be undertaken, secondly to validate the modified PHEEM tool to be used in local context and thirdly to gain input on the survey tool to assess individual demographic characteristics of interns (demography, previous educational experience) and career intentions. Face validity is a subjective judgement to ensure that an instrument has the feasibility, readability, clarity of language especially with the use of modified terms to measure what it set out to measure**.** [161] Modifications to the PHEEM and survey were done and a final version of the modified PHEEM tool and survey on demographic and educational characteristics were determined by consensus. As indicated earlier the modified PHEEM tool was piloted in a small group of interns at King Edward VIII Hospital prior to final adoption and use in the main survey of the study. The modified PHEEM survey tools developed through this consultative process are found attached to the relevant manuscripts and added as appendices number 26 and 27 in this thesis.

3.10 Data Collection

Table 5 indicates the various data collection methods tools and sampling strategies used as well as numbers of participant in each of the different stages in the study.

Table 5. Data collection methods and instruments used in various stages of the research study

Stage	Objective	Data collection	Data collection instrument	Sampling strategy	Participants
1a Literature review	To review on the influences of the LE on by comparing WBA in SA with international best practices	Literature review	Literature review	Scoping review literature 2000 till 2017	N/A
1b Pilot	*To gain insight on how to adequately assess the LE and career intentions*	Pilot survey and Focus Group discussion	Pilot survey tools 1.Modified Hill et al measure 2. Modified PHEEM	Purposive sampling	42 Interns at 2 sites
1c Senior Managers FGD	*To validate the PHEEM and survey instrument (face validation*	Focus Group Discussion (FGD)	Modified PHEEM tool and Survey instrument	Expert sampling	13 senior Paediatric managers and intern supervisors
2 Validation of PHEEM and LE assessment	Psychometric analysis of the modified SA PHEEM Assess the LE among interns and supervisors	Survey	Modified PHEEM tool	Cross-sectional Purposive sampling	209 interns post Paediatric internship and 59 intern supervisors
3 Influence of individual variables on LE perceptions	To determine influence of individual characteristics on LE perceptions	Survey	Modified PHEEM tool and Survey instrument	Cross-sectional Purposive sampling	209 post Paediatric interns
4 Relationship of the LE with Career Intentions	To determine the relationship of perceptions of the LE with Career intentions	Survey	Modified PHEEM tool and Survey instrument	Cross-sectional Purposive sampling	209 post Paediatric interns 213 pre Paediatric interns
5 Insights into LE and career intentions	To explore paediatric learning experiences of interns and their insights on their career intentions	Focus Groups discussions	Focus Group interview transcript Audiotaped interviews Reflective notes and journal	Purposive and convenient sampling	33 interns

Data was collected using both quantitative and qualitative methods. The use of multiple levels of data from varied sources is supported especially when complex constructs are being explored. In social science, different measurements require quantification of abstract, intangible constructs that may not be observable. [162] These measures serve as proxies for these constructs. [162] The construct being measured can be uni-dimensional or multidimensional and the measurement instrument being utilized to quantify it needs to consider this. [85,166]

In this study, we used the focus group discussion as the main strategy to collect qualitative data during the various stages. FGD are defined as a research technique that collects data through group interaction on a topic determined by the researcher. [164] FGDs are distinguished from the broader category of group interviews by the explicit use of the group interaction as research data and the ability to facilitate the research of 'ill-defined topics' requiring exploration. [165,166] The use of FGD to assess learning within a social context resonated with the social constructivist paradigm that underpinned the specific component of the study. The use of 5-10 participants per FGD with saturation being reached enabled an inductive approach to data collection. [167]

3.11 Sampling

Table 5 indicates the sampling strategies employed throughout the stages of the research project. Chapters four through eight address the sampling strategies as selected for each phase of the study.

For the survey, a cross-sectional cohort was sampled representing interns who have already experienced working in Paediatrics in the two-year internship. The total numbers of interns who were designated as having completed internship was calculated based on the rotational system. At any one point in time interns are rotating through various specialties (this includes rotating through various hospitals in a complex) and a certain percentage are on leave. In addition to those on leave a further percentage are at the clinical duty points to ensure an uninterrupted service and will thus be unable to attend group-administered surveys or participate in focus group discussions. This had implications for the study as a certain percentage of non-responders included those on leave and those who could not leave their respective clinical duty points. This component was made up of 20% of all potential respondents. Due to this an actual (55.3%) and an adjusted response rate (69.3%) was calculated in the cross sectional survey for the post internship cohort. This was done in order to recognise the nature of the non-responders in the survey.

The pre internship cohort was also a cross sectional cohort and was sampled largely to assess their career intentions and demographic characteristics. This was done at the start of the general internship thus ensuring that this cohort had not been exposed to the LE of Paediatric internship.

All supervisors at the sampled hospitals were invited to participate which occurred at the same time that as the post internship cohort was sampled.

For the focus group discussions, a purposive sampling process was followed. In keeping the sequential explanatory mixed methods, design all interns from the post internship cohort who

participated in the survey were invited to attend the FGD held 4- 6 weeks later. A convenience sample of interns on duty at five of the hospitals were sampled for the FGD. For the Pietermaritzburg complex, which compromises three hospitals through which interns rotate one focus group discussion, was held, as this was most convenient for interns. Separate FGD were held at each of the other hospitals where Paediatric interns were on duty.

3.12 Data Analysis

Figure 4 indicates the various data analysis techniques as relevant through each stage of the study. Chapters 4 through 8 presents the way in which data analysis had been handled in each stage. In order for a survey instrument to be usable in social sciences an important task is to determine its psychometric qualities and hence the need assess the reliability and validity measures of this instrument. [168] These psychometric properties of the modified PHEEM are presented in the relevant section of Chapter Five.

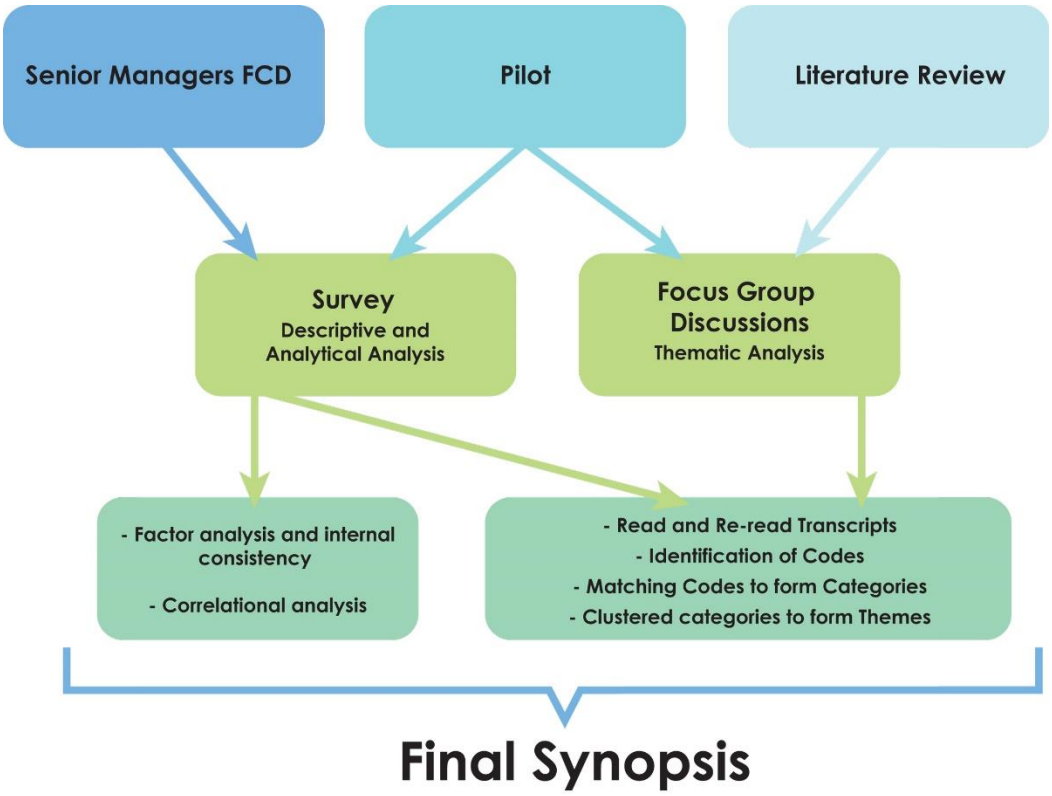

Figure 4. Data Analysis in various stages of the study

As the Likert scales formed the basis of the PHEEM tool it needs to be clarified that all Likert data were analyzed using means, standard deviations and tests commensurate with parametric data including the t-test and ANOVA. The sample size and normal distribution of the results on analysis confirmed the applicability to treat the Likert scale data as indicated. [169] It is now a well-established practice to use various parametric tests to analyse data obtained from Likert scale scores, despite previous controversies, which viewed the ordinal nature of data generated through Likert scales, as restrictive. [170]

3.13 Quality Inferences

Quality inferences relates to the rigour and robustness of the process of drawing conclusions from data obtained through various stages of the research and encompass all components including data collection through to analysis. [147] As this study used multiple methods, quality inference will speak to both the quantitative phase in terms of validity and reliability, and the qualitative phase in terms of trustworthiness, credibility and the triangulation of data. [147]. Issues related to generalization encompass both the quantitative (external validity) and qualitative (transferability).

3.13.1 Validity (Quantitative component)

In quantitative studies, validity refers to the degree to which a measurement measures what it purports to measure whilst reliability is defined as the degree to which results obtained by a measurement can be replicated. Face validity of the modified PHEEM tool and survey instrument on demographic characteristics and career intentions was assessed in the preliminary phase of the study in the expert FGD and pilot studies. Content validity was rigorously examined at this expert FGD with each item of the PHEEM tool and the survey tool reviewed by all experts and consensus sought for the final contents.

Construct validity was applied by using psychometric testing which is dealt with in Chapter Five. Issues related to the external validity of the quantitative component of the data are dealt with on the section of generalization later in this chapter.

3.13.2 Reliability (Quantitative component)

Reliability was tested by reviewing the PHEEM tools to determine to what extent the measurement procedure produces the same results on repeated trials i.e. the stability or consistency of scores over time and across raters. It was not possible to do trial-retrial reliability testing in this study due to the nature of the participants work profile, as it would have been very difficult to convene repeated surveys and obtain the same participants each time. Measures of internal consistency were applied to the PHEEM tool and this is dealt with in Chapter Five.

3.13.3 Trustworthiness (Qualitative component)

Lincoln and Guba's criteria for trustworthiness were used as a framework to ensure the study's worth. [171,172] Lincoln and Guba posit that trustworthiness of a research study is important in evaluating its worth. Trustworthiness involves establishing credibility - confidence in the 'truth' of the findings; dependability - showing that the findings are consistent and could be repeated and confirmability - a degree of neutrality or the extent to which the findings of a study are shaped by the respondents and not researcher bias, motivation, or interest. [171] By using multiple methods, we aimed at ensuring trustworthiness within the study. [153,157] In addition, the following aspects related to ensuring trustworthiness of the study.

3.13.3.1 Member checking and respondent validation

Member checking of the qualitative data occurred both during and at the end of each FGD to ensure data captured reflected the discussions. During the FGD, checking was done by regular paraphrasing and summarizing. After the completion of each FGD member checking was done to ensure clarity on emerging themes at this stage. In addition, themes that emerged from previous FGD were also discussed towards the end of each FGD. This proved very reflective and insightful to both the researcher and participants who were very enthusiastic about this review. It was soon evident that common themes were developing across all sites and saturation in data capturing was possible.

3.13.3.2 Debriefing (Peer Review) and Audit Trail

Throughout the process of data capturing and data analysis an additional investigator –the research supervisor, an educationist was brought in to critically assess the reflective process and review the themes developing to ensure lack of bias. This form of peer review assisted in preventing the researcher's bias at this stage. This process was continued through to the analysis and allowed a degree of reflexivity in the research. Throughout the research, an audit trail of all stages of the research was kept and constantly referenced.

3.13.4 Interpretive rigour

In order to ensure that the conclusions of the study were based on the findings the researcher ensured interpretive transparence by separating the stages of the study to describe the findings separately to ensure clarity at each stage [147]. In addition, the use of the thesis by manuscript route allowed each manuscript to have a specific focus as indicated by each study objective. By using one standard definition of the LE construct throughout the study, this assisted with interpretive consistency. A social constructivist paradigm underpinned the understanding of learning and the analysis of the perceptions and intensions measured among interns and their supervisors. This promoted the maintenance of theoretical consistency.

3.13.5 Triangulation

In order to overcome intrinsic biases that can arise with single researcher, a single theory or a single method study, the combining of researcher inputs, using multiple theories and multiple methods findings can be confirmed through the convergence of perspectives which can be termed triangulation. [173]

In this study multiple sources of data from survey data and FGD were retrieved (data triangulation) and, multiple investigators were used (investigator triangulation). The research uses both a positivist and interpretivist position when interpreting data (theoretical triangulation) and used multiple methods (methodological triangulation).

3.13.6 Generalization

Generalization, the act of reasoning that involves drawing inferences from particular observations is widely acknowledged as a quality standard in quantitative research while it remains a controversial

issue in qualitative research. [174] In an era of evidenced based practice, where improvements are needed the extrapolation of findings of all types of research is essential. Some researchers believe that qualitative research revealing higher-level concepts that are may not be unique to a particular participant or setting can be extrapolated to shape opinion on policy [175]

Using the three models of generalizations developed by Polit et al., viz. statistical generalization, analytical generalization and transferability as originally proposed by Lincoln and Guba this study was reviewed with regard to generalization. [171,174]

The geographic nature of the sampled hospitals, sample size, and demographic makeup of the survey samples reflect closely with the high disease burdened context and general intern population of SA. The position of this study based on the analysis of the survey data and review of literature, viewed these data thus as potentially generalizable.

Further factors to support the viewpoint that the findings of this study can be considered potentially generalizable included replicating sampling across different sites and using different methods. The analytical processes of using standard definitions for the LE construct and career intentions throughout the study together with the use of thick descriptions and integration of evidence also enabled potential generalizability.

3.14 Ethical issues

Basic principles of the Declaration of Helsinki were adhered to throughout this study. Participation was invited and for those who volunteered to participate and written informed consent was solicited at every stage of the study. All participants signed this informed consent after reading about the procedure of the study and indicating a willingness to participate in the study (Appendices 22-25 include the various informed consent forms used in the study). The consent forms highlighted the benefits and risks of the study, requested permission to use audio recording and the right to withdraw at any stage of the study process without prejudice. Anonymity was ensured throughout the study with no identifiable information being required for any part of the study.

Prior to the commencement of the study, the following ethical clearances and supporting actions were taken to ensure the study did not conflict with any ethical precepts.

The study protocol was peer reviewed through an open defense of the protocol. Ethical clearances were obtained from University of KwaZulu-Natal, Biomedical Research Ethics Committee South Africa and the KwaZulu–Natal Health Research and Knowledge Management Subcomponent of the KZN Department of Health (BE) (Appendices1-4) Permission was obtained from all participating hospital management structures (Appendices 5-10)

The researcher considered potential conflict of interest when planning the manuscripts to disseminate the findings. This was operationalized by acknowledging any conflict of interest, competing interest in the acknowledgement sections of the manuscripts.

Non-maleficence was ensured by negotiating the times and venue for the group administration and focus group discussions for the participant's convenience and to ensure that there was no cost to the participants. Further consultative processes with hospital managers, Paediatric department heads and hospital and intern curators took place before the surveys and FGD to ensure clinical services were not affected. It was noted that this process ensured that certain staff could avail themselves to both the surveys and focus group discussions. The researcher provided lunch and snacks at the FGD and survey group administrations at each site.

The following four principles of the Singapore Statement [176] on research integrity were incorporated. These include honesty in all aspects of the research, accountability in the conduct of the research, fairness in working with others. In this study, there was no fabrication or falsification of data in the reporting process, nor manipulation of research design and data collection techniques to ensure that the results support the researcher's point of view. All previous work was referenced to prevent plagiarism.

3.15 Reflexive statement

The need to be reflexive recognizes that meanings are made and the researcher influences the perspective of that meaning. [177] Within the categories of personal, interpersonal, institutional, pragmatic and emotional as presented by Mauthner et al., 2003, I hope to explain my reflexive positioning in this study. [177]

As a South African Paediatrician working in the country's public health system for the past 25 years since my own internship, I have and do play a number of roles that have influenced this research significantly. In addition my perspectives as an upper middle class, urban based male in a mid-management level within state employment and affiliated to an academic environment has influenced my views and the conduct of this study.

In my role as clinician and administrator, I am on a daily basis faced with the enormity of the health challenges faced by SA especially with relevance to Paediatrics and child health as well as the functioning and workforce deployment of all health professionals in the public health system. My experience as an outreach Paediatrician to the western half of KwaZulu Natal (encompassing some of the most socio-economically deprived and poorly resourced districts in SA) especially during the peak of the HIV/AIDS epidemic. This experience also put me in touch with glaring health disparities as well as the role and impact junior doctors, fresh out of internship, play in these situations. It was here that I recognised the critical importance of the junior doctor experience in SA and their value in resource-limited environments and in public health as well as the potential impact of this experience on their retention within the national health system.

In addition, my role as a lecturer, trainer and mentor to undergraduate medical students, postgraduate Paediatric registrars and as intern supervisor puts me in daily contact with teaching and learning in this time of knowledge transformation and demographic shifts in the SA medical community.

I also served as a complex intern curator for eight years developing the largest intern complex in SA in the Pietermaritzburg metropolitan complex between 2000 and 2008. It is in these roles that I came to recognize the scope, importance, challenges and potential that exist during the formative period of internship.

These experiences influenced my need to explore this phase of medical education and attempt to understand its role in the future sustainability of a public health system. My dealing with interns institutional management and the 'hierarchical world of medical practitioners' in which I am an 'insider' and 'expert' has galvanized my ideas of measuring the learning experiences of interns and trying to understand the impact of this on their career aspirations in SA. I recognized gaps in the educational process and hence the need to research this field. While recognizing the 'limits of how reflexive a researcher can be' and how far this understanding can happen at various stages in research I believe that 'insider biases' of being a specialist consultant and supervisor within this community holds both challenges to research rigour as well as advantages when also trying to understand a closed community. I do recognize my biases as a 'passionate participant' within a movement to ensure equitable health for all and the influences this worldview might hold.

The use of three researchers with differing backgrounds including an educationist and a full time academic, at all stages of the protocol development, questionnaire development, survey analysis and focus group data analysis was aimed at ensuring the blunting of these potential biases.

The power dynamic of being a senior 'expert' or part of the supervisor cohort with participants was identified and, acknowledged upfront with participants in an attempt to attenuate this bias. The use of five different sites including four where I have less influence was aimed to address potential bias.

As a researcher and health care practitioner with responsibility for Paediatric HIV care, I also recognize the influence of the discipline and its strong 'positivist' orientations on my research as evidenced in the choices, approaches and analytical lens applied in part of this study. This research has been a massive learning curve on so many levels and the shift from the 'positivist' mindset to one that accommodates a more interpretivist social constructivist understanding is one of the major movements that I recognized within this research journey and myself. This transformation of understanding, viewing and developing knowledge was recognized at all phases and the input of the team of researchers particularly the educationist was invaluable in reflecting on these personal developments. The insider positioning has a unique advantage to provide the insights to explore an important question that has significant implications on health care, by drawing on sociology, vocational psychology, workforce planning and education in an attempt to create new theoretical perspectives on the constructs under review.

3.16 Conclusion

This chapter delineates the multiple methodological positions taken in this study and provides a rationale for the choices in methodology. Whilst the detail of methodologies specific to each component

of the study are dealt with in the manuscripts in Chapter 4 to 8, this chapter provides an overview and clarification on aspects of importance. The phases and stages of the study as linked to each research objective are presented and clarification provided on various aspects of the data collection, data analysis as well as measures taken to ensure rigour. Ethical considerations and methodological challenges were also presented. The chapter finally ends with the reflexive positioning of the researcher.

CHAPTER 4: THE LEARNING ENVIRONMENT AND WORK-BASED ASSESSMENT OF INTERNS IN SOUTH AFRICA

'Comparing International and South African Work-based Assessment of Medical Interns' Practice'

4.1 Introduction

The assessment and certification of interns is a core function of the internship period. [46] This activity involves work-based assessments (WBA) aimed a assessing the highest competency of Miller's pyramid as interns are assessed on their clinical work in authentic work practice settings. [178] This stage of the study was undertaken to assess and compare literature reporting the range of WBA strategies, as used in SA internship settings, as opposed to those reported as best practices used internationally. This stage of the study was also undertaken to establish the influence of contextual factors related to the learning environment on WBA in the SA context.

The recognition and remediation in relation to 'at risk' or under-performing interns is a core feature of WBA during internship and remains an important mechanism to ensure patient safety and appropriate standards of care in a health system. [179] Directly observed WBA that involves credible feedback with facilitated coaching whereby intern's strengths and weaknesses are attended to have been shown to enhance learning and practice. [180] In this study the evaluation of the state of WBA in SA served as a gauge of the quality of the internship programme.

4.2 Publication details

Title:	**Comparing International and South African Work-based assessment of Medical Interns' Practice**
Authors:	**Naidoo, Kimesh L,** **Van Wyk Jacqueline M** **Adhikari, Miriam**
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4.2.1 Journal Information

AJHPE is an online, bi-annual, peer-reviewed journal that covers matters related to education for health professionals. It carries research articles and letters, editorials, education practice, personal

opinion and other topics related to education for health professionals. It also carries related African education-related news, obituaries and general correspondence.

4.2.2 Publication Record

The article was initially submitted to the journal on the 24th February 2017 and it was accepted on 15th August 2017.

4.2.3 Contribution record

The candidate conceptualized the paper and was the main author. Dr Van Wyk and Professor Adhikari contributed towards the reviewing of the paper.

4.3 Manuscript

TITLE: COMPARING INTERNATIONAL AND SOUTH AFRICAN WORK-BASED ASSESSMENT OF MEDICAL INTERNS' PRACTICE

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ABSTRACT

Background: Resource constraints and a high disease burden impacts on the work-based assessment (WBA) of medical interns in South Africa (SA).

Aim: To review the use of workplace based assessment frameworks in intern practice in SA and to compare these with international practices.

Methods: A systematic, review using a thematic analysis was performed to analyze 97 articles selected from an initial scoping of 360 sources of evidence on WBA in internship between 2000 and 2017. This process informed a synthesis of descriptive and analytic themes related to competency based assessment practices relevant to internship in SA.

Results: There was an overall dearth of studies on assessment amongst medical interns in Lower middle-income countries (LMIC).

The context in which assessment of interns in SA occurs has many challenges related to resources, workload and supervision. Assessment amongst SA interns was largely focused on the core clinical competency and this occurred in the absence of using competency-based frameworks. This was reflected in the finding that most studies in SA dealt with the assessment of core procedural skills related to acute clinical care. The assessment of non-clinical competencies and non-procedural skills was poorly addressed. Self-assessment by interns was the predominant strategy of use in the SA context. The review revealed limitations in the use of multiple assessment strategies and direct observation in the local context in contrast to practices in most high-income countries.

Conclusions: A change to assess both procedural and non-procedural skills within a competency-based framework is advocated for SA internship together with the use of multiple assessment tools and strategies that rely on direct observation of performance.

Keywords: Interns; Work-Based Assessment; South Africa

INTRODUCTION

Internship is an essential period, following graduation, for junior doctors to develop their skills and to apply their knowledge in the context of the local health system. Newly qualified medical doctors in South Africa enter a supervised two year internship period requiring learning and service delivery to occur concurrently in a work-based setting. Work-based assessment (WBA) during internship is integral to recognise under-performance and to inform decisions regarding certification for

independent, unsupervised practice. [1] WBA is a complex process that should include the assessment of multiple competencies using validated methods and tools that accurately reflect performance. The assessment process aims to ensure that doctors are performing as competent, ethical practitioners who have 'globally connected, locally responsive, attributes that are population and patient-centred'. [2] Research into effective WBA practices has led to advances in optimal ways to assess interns. [3] Many of these innovations in WBA have, however not yet been translated into practice in many lower middle income countries (LMIC) such as South Africa. [4]

Internship training in South Africa, as in many other LMIC, occurs within a resource-constrained workplace setting where high patient–doctor ratios are the norm. [2] The high rate of needle stick injuries in a HIV burdened context coupled with long working hours have resulted in high levels of stress and burnout among interns in South Africa. [5] Additional factors impacting negatively on intern training include poor institutional leadership and an inability to recruit, retain and develop appropriate staff. [6,7] Increasing reports of over-burdened and inadequately experienced supervisors also influence on the quality of internship training across institutions in SA. [8,9] The concurrent impact of inadequate supervision within poor working conditions have raised concerns about the quality of assessments of interns in this context. [5,8]

The Health Professionals Council of South Africa (HPCSA) is the regulatory body responsible for the accreditation of institutions, supervisors, curricula and assessment practices for internship. [1] The HPCSA undertakes twice annual accreditation visits to each institution to evaluate and ensure adherence to mandated requirements for adequate for training. [1] Whilst a graduate competency framework derived from the CanMEDS (Royal College of Physicians and Surgeons of Canada physician competency framework) has been adopted by most undergraduate and many postgraduate medical training programmes in South Africa this has not been vigorously applied to the internship period. [10]

WBA in internship in South Africa consists of a logbook that includes discipline-specific competencies focusing on procedural skills and some non-procedural skills including medical ethics. Checklists that rely on self-assessment by interns and inputs by their supervisors with regard to performance is included in the logbook for each discipline. [1]

This study was conducted to analyze assessment practices within a competency-based framework in a resource-limited environment. This process can help to identify weaknesses, benchmark practices and inform decisions to improve the assessment of interns in South Africa and in other LMIC.

Aim of the review

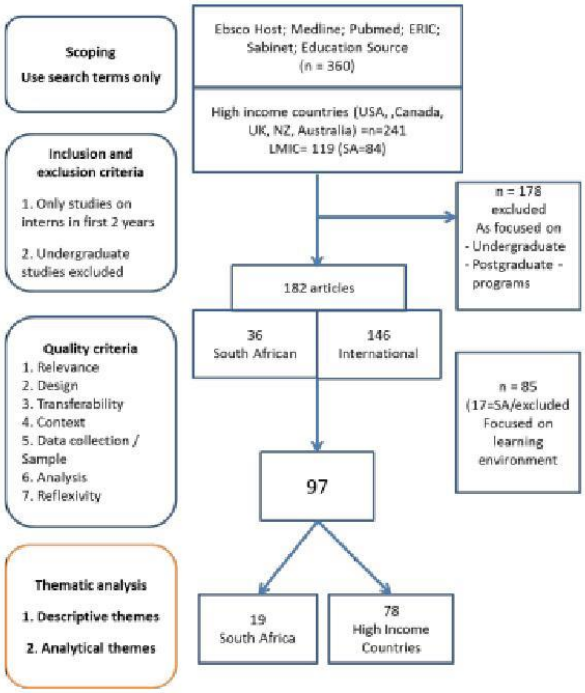
To compare South African work based assessment frameworks of medical interns with relevant international ones.

METHODOLOGY

This literature review used a thematic analysis to synthesize findings on assessment practices within a competency-based framework amongst interns in SA compared with international practice. Thematic analysis is often used to analyze data in primary qualitative research and can be used in systematic reviews to bring together and integrate the findings of multiple qualitative studies. [11] A thematic analysis was undertaken to review the studies, which included many diverse approaches to research. The aim of this research synthesis was to identify and highlight 'key concepts' from literature sources and to recognise and compare the same concept in other studies. [12]

Search strategy

The initial scoping of the literature involved searches on electronic databases by the primary author and an assistant. The databases searched included: EBSCO HOST; Medline; PubMed; ERIC (Education Resources Information Centre); SABINET (South African Bibliographic Information Network) and Education Source. The terminology to describe the medical intern i.e. the doctor in the first two years following undergraduate medical qualification varies greatly. The terms commonly used includes, "medical interns"; "foundation year doctors"; "pre-registration house officers" and "junior doctors". In all databases searched, these terms, were used as the primary search terms. The key words "assessment", "assessment tools", "competency" and "competency framework" were used in conjunction with the primary search terms. In addition to peer-reviewed literature, articles were selected based on manual searches of references cited in key articles. Policy reviews, reports relating to assessment and evaluation of national intern programmes, stakeholder analyses, theses and conference proceedings were included in the secondary search. **Figure 1** indicates the process followed in the systematic literature review.



Inclusion and exclusion criteria

English language articles, published between 2000 and 2017 were included for review. The date of the last search was at the end of January 2017. Articles for inclusion focused only on WBA of junior doctors in the first two-year post qualification (interns). Literature that included undergraduate medical students was excluded. Articles describing the assessment of first year residents in specialty programmes in the United States were included whilst those that focused on specialty programmes whose participants were largely in the later years of specialization (second year residents onwards) were excluded.

Quality criteria

Assessing the quality of largely qualitative research studies that were identified is needed to avoid drawing unreliable conclusions. [11] In our review we assessed studies according to seven broad criteria. [13,14] These criteria assessed the relevance of the study to the review question, appropriateness of study design, transferability, context to enable comparability of findings to interns in SA, data collection, analysis and finally an account of reflexivity. [14]

Data extraction

All articles identified from the initial scoping of the literature were reviewed by the main author using the inclusion criteria stipulated. Those studies identified after this process were subjected to a

quality assessment as indicated. Those studies that were identified following the quality assessment were scanned for 'key concepts' which were inductively coded and tabulated.
A second independent investigator, a professional health educator, then reviewed the inductive codes to ensure concordance with the primary sources. The individually derived codes were subsequently discussed between the researchers to reach consensus on the final descriptive themes.

Data synthesis

The synthesis took the form of three stages: line-by-line coding of the findings of primary studies; organisation of these 'free codes' into related areas to construct 'descriptive themes' and the development of 'analytical themes'. A multidisciplinary review team consisting of the main author (intern supervisor and clinician), the second author (professional health educationist) and the third author (academic experienced in postgraduate training) reviewed the data obtained to ensure relevance and robustness to fulfilling the objectives of the review. The analytical themes were refined through a cyclical process with the primary author developing the first draft of inductive codes and two co-authors contributing to the refining and identification of the final themes. The final themes, as agreed to by consensus, were sufficiently comprehensive to describe the categories and to answer the primary objective of the review. [11,12]

Results

The results from the literature searches indicated that the number and quality of research evidence on WBA during internship differed significantly between international and SA sources. Sixty seven percent of the initial 360 articles sourced from the primary searches were from high-income countries i.e. the United Kingdom, North America (USA and Canada), Western Europe, Australia and New Zealand.

Considering the inclusion and exclusion criteria and selecting only studies, involving newly qualified doctors in their first two years following graduation (interns) rendered 182 articles. One hundred and forty-six articles of these articles were from high-income countries and 36 from South Africa. An application of the quality criteria revealed a large number of studies that did not meet the criteria as it was not relevant to the research question. [13,14] As indicated in **Figure 1**, many studies identified in our search on assessment amongst interns dealt largely with factors in the environment and not assessment within a competency framework.

Only 19 South African articles had a primary focus on WBA in interns, while 78 articles from high-income countries focused on the objectives of the review. Ninety-seven articles were thus finally included for analysis to identify definitive themes. (**See Figure 1**)

The review aimed to extract and synthesize findings relating to the use of competency based assessment frameworks among interns in South Africa. There was a lack of studies on competency-based assessments amongst interns in South Africa in comparison with the studies from high-income countries. The aim of the study was thus to compare and report on similarities and differences in workplace based assessment of medical interns across the two contexts.
Tables 1 to 4 depict the major descriptive themes identified from the inductive codes, which were derived from the primary sources of literature, and the four analytical themes developed by consensus. These themes include the "lack of competency based frameworks in accrediting interns in SA", the "emphasis on assessing only clinical procedural skills instead of both clinical and non-procedural skills", the "use of self-assessment instead of direct observed assessment" and the "influence of the learning environment on internship".

TABLE 1. FIRST MAJOR ANALYTICAL THEME: LACK OF COMPETENCY BASED FRAMEWORKS

Inductive codes from primary sources	Major descriptive themes	Analytical themes
1. Defining competency based systems 2. Reasons for shifting towards a competency based system 3. Validation of competency tools using factor analysis and other methods 4. Defining specific competencies required by junior doctors 5. Limitations in competency based assessments 6. A shift to the use of 'Entrustable professional activities' and 'milestones'	**The use of a competency based framework**	**Lack of competency based frameworks**
7. Rates of underperformance 8. Factors affecting underperformance amongst interns 9. Innovative and new methods of assessing 'at risk' interns	**Recognition of underperformance**	

TABLE 2. SECOND MAJOR ANALYTICAL THEME: EMPHASIS ON ASSESSING CLINICAL PROCEDURAL SKILLS

Inductive codes from primary sources	Major descriptive themes	Analytical themes
1. **Procedural skills assessed:** • Resuscitation • Obstetric and anaesthetic skills • Paediatrics • Surgical and related disciplines skills 2. **Non procedural skills:** • Prescribing skills • Documentation of clinical events and procedures • Radiological assessment • Mental state examinations	**Type of skills being assessed**	**Emphasis on assessing clinical procedural skills**

TABLE 3. THIRD MAJOR ANALYTICAL THEME: SELF-ASSESSMENT INSTEAD OF DIRECT OBSERVED ASSESSMENT

Inductive codes from primary sources	Major descriptive themes	Analytical themes
• Evidence of the poor reliability of self-assessment tools • Poorly performing interns have poor ability in self -assessment • Aggregate self-assessment valid for program evaluation • The use of log books or tick lists not a reliable tool for assessment • Portfolios are useful in assessing interns	**The use of self-assessment**	**Self-assessment instead of direct observed assessment**
• Multi-source feedback tools used successfully amongst interns • The use of Mini-CEX (Clinical Evaluation Exercise) • The use of the Mini -PAT (Peer Assessment Tool) • The use of the DOPS(Directly Observed Procedural Skills) • The use of peer review tools	**The use of directly observed assessments**	

TABLE 4: FOURTH MAJOR ANALYTICAL THEME: IMPACT OF THE LEARNING ENVIRONMENT

Inductive codes from primary sources	Major descriptive themes	Analytical themes
• Constant change as a norm of the intern working environment • Disease burdens of LMIC countries • Burnout • Workload as an aggravating factor in internship • Work hours in internship • Availability of resources in internship learning environment	**Challenges in the learning environment**	
• Critical gaps in supervisor interaction • Duration and engagement of supervision • Quality of supervision • Subjectivity of supervision • Training of supervisors • Support provided for supervisors	**Supervisor interaction**	**Impact of the Learning Environment**
• Duration of feedback to interns • Quality of feedback to interns • Benefits of feedback during internship	**Feedback**	
• Reliability and relevance of measuring intern preparedness • Trends in preparedness across disciplines and institutions • Factors influencing preparedness of interns • Linkages of preparedness with undergraduate training	**Preparedness studies in internship**	

DISCUSSION

Clear differences were identified in various aspects of WBA across the international and SA settings. The first and most obvious difference was noticeable in the number of studies and research reporting on issues relating to WBA during internship. The second difference related to the dearth of studies conducted in the field of medical and health professions education in LMIC and in SA. The limited number of reported research projects in medical education from Sub-Saharan African countries has been documented before. [15-17] This review confirms the previous observation and confirms the discrepancy in literature relating to research on WBA amongst interns.

The review of the literature relating to WBA in high-income countries showed a clear focus on assessing the knowledge, skills and attitudes of interns by using a competency-based assessment framework. The two broad areas of competency focused on the assessment of core clinical skills and non-clinical competencies, including communication and professionalism. [18, 19] The analysis of the international literature also indicated a shift towards the use of 'entrustable professional activities (EPA)' as a possible framework to measure activities of trainees in specific workplace settings. The use of these 'concrete critical activities which infer the presence of multiple competencies help bridge the gap between the theories of competency based education and clinical practice. These EPAs should be 'independently executable, observable and measurable,' and an example of which is executing a patient handover. [21]

The concept of 'milestones', as introduced in best evidence international practice provides greater clarity and understanding of the incremental development of competencies in junior doctors with time.[20-22]

South African studies however, did not report on the use of competency based frameworks, EPA's or any other time-based indicators (mile stones) to measure progress of interns in the work based setting.[20] The main focus in SA literature was the assessment of core procedural skills in acute emergency and clinical situations. South African studies indicated the suboptimal performance of interns in Paediatric resuscitation, obstetric practice, anesthesia, orthopedics, intubation, circumcision and appendectomies. [9,15,23,24] The emphasis on procedural skills in acute emergencies possibly reflects the narrow interpretation of the role expected from SA interns within institutional hierarchical systems and the disregard to assess

their competence in knowledge, attitudes and non-clinical functions. The lack of studies on non-procedural skills in SA identifies clear gaps in the assessment methods of interns in SA. Gaps in the assessment of non-procedural skills like prescribing medication, communication and mental state examinations were also identified in a systematic review of non-technical skills in LMIC countries, which highlighted the lack of tools to assess non–procedural skills. [16] These gaps indicate a need for SA to align intern training and assessment frameworks with undergraduate and postgraduate practice, which frame curricula and assessment practices within frameworks such as the CanMEDS. [25] The use and benefits of 'entrustable professional activities' specific to each discipline, may make the acceptance and measuring of competencies much easier. [19]

Literature from high-income countries reflected a trend away from relying on self-assessment as the sole means of determining intern performance. Self-assessment is shown to have a poor correlation with other modes of evaluation. [26-28] Interns were unable to judge their own performance. [29] The least skilled intern seems to have the poorest ability to self-assess which often are less correctable even with support. [26] Aggregated self-assessment was more useful for tracking cohorts and for programme evaluation. [30]

South African practice largely emphasizes self-reported assessments of interns. [1] Some SA studies also indicated that poorly skilled interns were unduly optimistic of their own performance [31] and that interns' perceptions of competence were unrelated to the assessments of their performance. [32] This may strengthen the move towards the use of multiple methods of assessments instead of the reliance on self-assessment, as practiced in the SA setting.

Innovations in WBA from developed countries feature the use and validation of tools that use direct observation. These tools, used either alone or in combination with other modes of assessment are often centrally developed for a country or district and do require significant human resources and administration. The use of Mini CEX (Clinical Evaluation Exercise), mini PAT (Peer Assessment Tool) and DOPS (Directly Observed Procedural Skills) systems were reported in the international literature reflecting the use of multiple tools of assessment amongst interns in high-income countries. The 360 degree, Multi-Source Feedback (MSF) assessment process was found to have robustness and feasibility in the first year of internship. [33] MSF tools were well received, well aligned to the job and improvements became evident

due to the use of the MSF strategy. [34] The MSF were regarded as a viable strategy to assess a large number of doctors. [35]

SA literature did not feature articles on the use of directly observed tools for WBA reflecting a major gap with the reporting, validation and use of efficient assessment tools in interns. In South Africa it is likely that inclusion of all categories of staff including middle grade medical, allied health professionals and nursing staff in assessments could promote integration, teamwork and assessment of non-core skills in communication and professionalism, all of which are currently lacking in the assessment system. The lack of multiple directly observed tools of assessment for interns in SA reflects the current status of assessment, challenges and, the inadequacy of sufficiently experienced supervisors. [7,8]

Various factors were documented in the literature to indicate the challenges faced by internship training in SA and LMIC. This context is noted to have high workloads, resource limitations and inadequate supervisor support and training. Consequences of this constrained environment of sub-optimal supervision is compromised in patient safety especially with poorly skilled and trained interns. International research amongst interns does reflect on assessment of practices to ensure that 'patient safety' is prioritized. [36] In SA hospitals there is lack of emphasis on assessing interns on practices that ensure patient safety despite identification that the excessive workload and workhours compromise patient care. [8,37] Despite the challenges experienced, proven innovations and developments in assessment processes, from high income countries, however need to adapted and explored within the context of SA and LMIC in order to optimize the training of interns.

RECOMMENDATIONS

1. Assessment of interns in South Africa needs to adopt a broad competency based framework that encompasses assessment of knowledge, skills and attitudes. Linking internship with the graduate competency based frameworks of undergraduate and postgraduate will assist in this.
2. Both procedural and non-procedural skills need to be assessed. Non-procedural skills in internship including skills regarding communication, prescribing, mental state evaluations and documentation among other 'soft skills needs to be given adequate place when assessing interns in SA

3. There is a need to recognize the 'novice to expert' trajectory amongst interns over a 2-year period. Use of milestones should be incorporated within this framework as well as the use of clearly defined discipline specific 'endurable professional activities' that can be easily measurable to determine competencies.
4. Multiple tools of assessment need to be used that focus on direct observation as well as elements of self-assessment.
5. Intern assessment needs to include tools that focus on patient safety.
6. The Multi-Source Feedback tool is practical, usable for large numbers and will enable teamwork. This process will enable an equitable emphasis on skills such as communication and professionalism that are currently neglected.
7. Further research on the use of directly observed tools of assessment that assess all types of skills and competencies within a resource challenged context needs to be done.

Strengths and limitations

1. Despite the differences in the quantity of studies emanating from LMIC countries as compared with high-income countries this review attempted to identify significant differences in assessment practice and propose recommendations to improve WBA.
2. This review was restricted to articles published in English over the last 17 years.
3. Literature included reports, guidelines theses, policy reviews and stakeholder analyses. Abstracts presented at conferences relating to the assessment of medical interns were not included for analysis, if they could not be found via an electronic database.
4. Studies of first year residents in the US context were included whilst studies with defined internship periods elsewhere were focused on.

CONCLUSIONS

In South Africa, the focus in WBA amongst interns is on assessing core procedural skills without a competency based framework. This occurs to the detriment of assessing non–procedural skills, non-clinical competencies and fails to consider milestones in this process. Self-assessment methodologies that are proving to be inadequate in assessing interns predominate in SA. The use of multiple methods of assessments for interns that included tools which incorporate direct observation are being implemented in most high income countries and need to be evaluated for use in SA. Use of multi-source feedback is proving efficient for large numbers of doctors. Many developments in WBA within high-income

countries are relevant to the South African context and their adaptation or adoption within a resource-constrained context can be explored to overcome gaps identified in intern training.

DECLARATIONS

Consent for publication

Not applicable

Competing interests

The authors declare no conflict of interest.

Availability of data and material

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

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Authors' contributions

KLN was responsible for study design, data collection, data analysis and drafting the manuscript

JVW was responsible for supervision of the entire work, study design and manuscript review

MA was responsible for supervision of the entire work and manuscript review

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4.4 Key findings and contribution of this manuscript to the thesis

By comparing the literature on WBA during internship between the SA and the international contexts this study highlighted significant gaps in the assessment practices of SA interns. This study highlighted the failure in the SA system of using innovations in assessment and international best assessment practices in medical education. This discrepancy between SA and international best practices in WBA can be largely attributed to factors within the learning environment that play a significant role in influencing the nature of WBA being adopted in SA. The LE and its impact on internship in SA was identified as an all-pervasive construct in much of the literature. Poor intern–supervisor interactions, which were exacerbated by a heavy disease burden and workloads, was found to be a significant factor in the LE that impacted on the type of WBA methods being used in SA.

This study provided the preliminary platform to recognise that the learning environment is a critical factor in internship and that it needed defining and quantifying if an understanding of the interplay of factors within its multidimensional construct was to be understood.

In order to measure a complex multi-dimensional construct, the use of a validated instrument, adapted to the specific context is required. This then allows monitoring of the LE to ultimately improve patient care. Importantly the challenges in the relationship between interns and supervisors, highlighted in the literature, needed to be investigated including determining how these groups viewed the learning environment they shared. This process of defining the construct of the LE, and validating a tool to measure the LE in Paediatric interns and their supervisors in SA, follows in Chapter Five.

CHAPTER 5: EVALUATING THE LEARNING ENVIRONMENT

'The Learning Environment of Paediatric Interns'

5.1 Introduction

In the previous chapter, the learning environment of SA interns was identified as an important factor that influenced a core aspect of the internship experience viz. assessment practices. External structural factors related to national disease patterns, health system challenges and internal factors associated with the relationships of interns to their supervisor coalesce in influencing practices related to learning, assessment and supervision. In line with the research objective that set out to investigate the perceptions of the learning environment among Paediatric interns this part of the study included the assessment of the psychometric qualities of a local version of the Postgraduate Hospital Educational Environment Measure (PHEEM).

This manuscript defined the LE and validated a local version of the PHEEM as an instrument to quantify it. This study also measured the LE by assessing interns within a specific context that is unique to many developing countries viz. a high disease burdened clinical environment. In view of the dissonance noted between interns and their supervisors within the literature review, in the previous study, the perceptions of the LE were investigated in both interns and their supervisors.

5.2 Publication details

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The candidate conceptualized the paper and was the main author. Dr Van Wyk and Professor Adhikari contributed towards the reviewing of the paper.

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RESEARCH ARTICLE Open Access

The learning environment of paediatric interns in South Africa

Kimesh L. Naidoo[1*], Jacqueline M. Van Wyk[2] and Miriam Adhikari[3]

Abstract

Background: South African (SA) paediatric interns (recently qualified medical graduates) work in a high disease burdened and resource deficient environment for two years, prior to independent practice. Perceptions of this learning environment (LE) influences their approaches to training as well as the outcomes of this period of development. Obstacles to creating a supportive LE and supervisor interaction affects the quality of this training. Measuring perceptions of the LE with validated instruments can help inform improvements in learning during this crucial period of medical education.

Methods: The aims of this study was to determine the psychometric qualities of the Postgraduate Hospital Educational Environment Measure (PHEEM) amongst paediatric interns across four hospital complexes in South Africa and to measure the LE as perceived by both interns and their supervisors. Construct validity was tested using factor analysis and internal consistency was measured with Cronbach's alpha.

Results: A total of 209 interns and 60 supervisors (69% intern response rate) responded to the questionnaire. The PHEEM was found to be very reliable with an overall Cronbach's alpha of 0.943 and 0.874 for intern and supervisors respectively. Factor analysis using a 3-factor solution accounted for 42% of the variance with the teaching subscale having the best fit compared with the other sub-scales of the original tool. Most interns perceived the learning environment as being more positive than negative however, their perceptions differed significantly from that of their supervisors. Poor infrastructural support from institutions, excessive workloads and inadequate supervision were factors preventing optimal training of paediatric interns.

Conclusions: The SA version of the PHEEM tool used was found to be a reliable and valid instrument for use in interns amongst high disease burdened contexts. Various obstacles to creating an ideal learning environment for paediatric interns were identified to be in need of urgent review. Key differences in perceptions of an ideal learning environment between interns and their supervisors need to be fully explored as these may result in sub-optimal supervision and mentoring.

Keywords: Internship, Medical education, Learning environment, Work-based learning, Graduate, Lower middle income countries (LMIC), Psychometrics, Evaluation studies, South Africa, Postgraduate hospital educational environment measure (PHEEM)

Background

The South African (SA) medical internship program occurs in an environment of high neonatal, infant and child mortality reflecting the multiple disease burdens of HIV/AIDS and Tuberculosis within the poor socio-economic context of sub-Saharan Africa [1–4]. High patient to doctor ratios and challenges with the provision of quality medical education, confound this context for the newly qualified intern [5–7]. Studies of intern training in South Africa reflects high levels of stress [8] and burnout [9–11]. It is in this environment that there is a need to effectively train medical practitioners to care for children.

The learning environment (LE) has been defined as a 'set of factors that describe a learners' experience within an organization' [12]. It has been seen to consist of three parts. The first part entails a physical component which

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encompasses the provision of food, shelter and comfort, which has been described as being under 'external regulation'. The second part entails an emotional component including aspects of support, feedback as well as the extent of harassment, which is viewed as a 'beneficial affective climate'. The third part, an intellectual component, refers to evidence based practice, learning with patients, structured education and instilling motivation which encompasses the 'learning content and coaching' [13, 14]. The LE influences trainee's approaches to learning and the quality of their learning outcomes [15, 16]. Satisfaction with the LE plays a critical role in the success of trainees future achievements [17, 18]. The Postgraduate Hospital Educational Environment Measure (PHEEM) is a well-recognized instrument to assess the learning environment of postgraduate medicine [19]. It has been used internationally, in hospital settings and among interns to assess the learning environments in postgraduate medicine [12, 20–26]. The PHEEM has been shown to have the ability to identify strengths and weaknesses in the LE and scores have a significant negative correlation with burnout levels of those assessed [21]. Structural and cultural differences that exist in the high disease burdened environment of SA may affect the reliability and validity of a tool developed in a very different context. In order for the PHEEM to be used in the SA context it's psychometric qualities needs to be assessed.

Understanding the learning environment of an educational program is fundamental to managing educational development and change [27]. It is also important to measure the perceptions of the LE amongst both paediatric interns and their supervisors, as both can have very differing perceptions of an ideal LE [17, 28]. This added insight will improve evaluations of the LE. By monitoring and evaluating perceptions of the learning environment, improvements can be made to the quality of training in an informed way.

The aims of this study were to:

- Determine the reliability and validity of the Postgraduate Hospital Educational Environment Measure (PHEEM) as a useful tool to measure the learning environment of interns in SA; and
- Assess the learning environment of interns doing paediatrics in a SA setting and to compare the perceptions of the learning environment between interns and their supervisors.

Method

Research design

The study was a cross-sectional cohort study.

Setting

The SA internship program encompasses a 24-month training period in various specialties including 4 months in paediatrics. Internship in SA is the responsibility of the national government through provincial departments of health using the platform of regional hospitals in each province. The Health Professionals Council of South Africa (HPCSA) is the professional regulatory body is responsible for the oversight and accreditation of curricula, supervisors and the regional hospitals where interns train. Supervisors are usually specialists employed by the regional hospitals and residents working with these specialists. Many supervisors have an affiliation to a medical university however the university structures do not have a formal responsibility in internship training [29].

Subjects

In order to assess the LE in a high disease burdened context, four major regional hospital complexes in Durban and Pietermaritzburg, in KwaZulu-Natal (KZN) Province, SA were chosen. These hospitals account for 76% of all intern training in SA's second most populous province where the HIV/TB disease burdens are amongst the highest in the country [30]. Across these four hospital complexes there were 89 senior (specialists) and junior (residents) supervisors who were responsible for the training, mentoring and assessment of interns during the paediatric rotation [30].

Each of the 40 items on the PHEEM questionnaire is scored on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Three subscales related to teaching, role autonomy and social support were proposed by the original developers of the instrument following qualitative and quantitative methods of research [19].

Minor changes to accommodate differences in terminology and for use in South Africa and in a paediatrics specialty were made to the original instrument [19], and it was then piloted with a group of interns at one intern complex and senior intern supervisors across the province in a focus group in order to ensure face validity. The same modified questionnaire used for interns was adapted to use with supervisors to facilitate comparisons across these groups. Additional file 1: Appendix A and Additional file 2: Appendix B reflect the outcomes of this process.

Procedure

Ethical approval for the study was obtained from the University of KwaZulu-Natal Biomedical Research Ethics Committee and permission granted from the various institutions as well as the Health Research and Knowledge Management Subcomponent of the Department of Health in the province of KZN.

The PHEEM questionnaire was group administered by the primary author to interns on site at each of the hospitals in December 2015. All interns and intern supervisors were informed of the study and invited to participate. Written consent was required for participation. Participants were informed of their rights and could withdraw at any stage. The supervisors completed the questionnaire individually (i.e. a self-administered format). This was done within the same time–period used to survey the interns at each hospital. The questionnaire took approximately 15 min to complete.

Sample size

The total sample size needed to be representative of the general intern pool in the province as well as greater than 100 for the factor analysis for a 40–item instrument [31]. The achieved sample sizes of 209 interns and 60 supervisors corresponded to a power of 92% when comparing PHEEM scores between two groups using an independent samples t–test for the detection of a medium effect size (Cohen's d = 0.5) with 80% power at the 5% significance level. Sample size calculations were carried out in G*Power [32].

Statistical analysis

The original PHEEM questionnaire used a 0–4 scoring range [19] whilst we followed a more conventional 1–5 range as used by some authors [17, 33]. Items 7,8,11 and 13 were reverse-scored.

In order to validate the use of the PHEEM in our setting we studied the psychometric characteristics and internal consistency of the version used in our study. To investigate the internal structure of the PHEEM, especially the construct validity of the original three subscales, we applied factor analysis with varix (orthogonal) rotation to determine the underlying dimensions in the data. The Kaser-Gutmann Eigenvalue criterion of > 1; the Cattell criterion of accepting factors above point of inflexion on the scree plot, and the proportion of the total variance explained (60%) were used to determine the number of underlying factors. Factor loadings above 0.4 were interpreted. Cronbach's alpha coefficient was used to assess reliability and internal consistency.

Descriptive statistics were calculated of the overall score and that of the three subscales. Continuous variables were summarized by the mean with standard deviation and median with interquartile ranges. The overall PHEEM scale and sub-scale scores were calculated for each participant. Where there was missing data, means were computed based on data for available items, provided this did not exceed 20% of the items. The overall score was computed as the average of all 40 items.

Each item on the PHEEM questionnaire was compared between the interns and the supervisors treating the scores as a continuous measure and comparisons made using the student t–test provided the data met the assumptions for this test. The strength of the associations was measured by the Cohen's d for parametric tests. As examining the means of the responses may fail to highlight extent of problems elicited especially the perceptions of interns and supervisors on individual items e.g. perceptions of racism, gender bias or a 'blame culture' we further categorized each item as 'strongly disagree' or 'other', in order to determine the extent of difference in these items between interns and supervisors. Data analysis was carried out using SAS Version 9.4 for Windows. The 5% significance level was used throughout (p-values < 0.05 indicating significant results).

Results

Participants

Two hundred and nine completed questionnaires were returned of 378 interns who had completed paediatrics by the sampling date. Interns perform substantial shift work, and as a result 20% of all eligible interns were not available at the time of the group administration of the survey. The corrected response rate was calculated at 69.2% (209/302 available interns). Figure 1 indicates the distribution of participants from each of the regional hospitals and compares this with the distribution of interns working in each hospital.

Females comprised 55% of the intern sample and all participants were aged 23–37 (mean 26.2, standard deviation 2.6). The response rate of the supervisors was 67% (60/89). The supervisors were 61% female and consisted of 50% senior supervisors (mean age 43 years) and 50% junior supervisors with a mean age of 29 years.

Factor analysis

Factor analysis (FA) was only performed on the data obtained from the group of 209 interns. The FA on all 40 factors suggested ten factors using the Eigenvalue criterion or nine factors (percentage variance explained aiming at

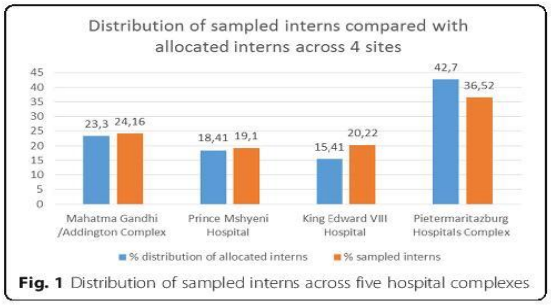

Fig. 1 Distribution of sampled interns across five hospital complexes

60%) or two or three factors using the inflexion point on the screen plot (See Fig. 2).

With the PHEEM instrument having 40 items in its inventory the scree plot inflexion point is considered an acceptable way to establish the number of factors [28]. The solutions with large number of factors had many factors with fewer than three items with loadings > 0.5.

The two– and three–factor solutions were evaluated and these explained 38% and 42% of the total variance respectively (See Table 1).

A one–factor solution was evaluated and 33% of total variance could be explained by this solution. The three–factor solution had all factors having at least three items each with a loading of > 4. Four items had loadings that were < 0.4. Factor one included the majority of items originally allocated to the teaching subscale (13 out of 21 items). The rest of the items came from the original role autonomy subscale (6 out of 21) and from the social support sub-scale (2 out of 21). The items allocated to factor two belonged to the perceptions of teaching subscale (4 out of 11), social support (2 out of 11) and the largest number from the perceptions of role autonomy (5 out of 11). The third factor included items from the original role autonomy (2 out of 7) and social support subscales (5 out of 7).

Internal consistency

For the intern group, the Cronbach's alpha to assess internal consistency was 0,943 for the overall scale. Cronbach's alpha for the autonomy, teaching and social support subscales are tabulated in Table 2 and were also above 0.7. We ran a Cronbach's alpha for the supervisor group and the overall Cronbach's alpha was 0,874. The teaching subscale for both the larger intern group and the supervisor group was above 0,8.

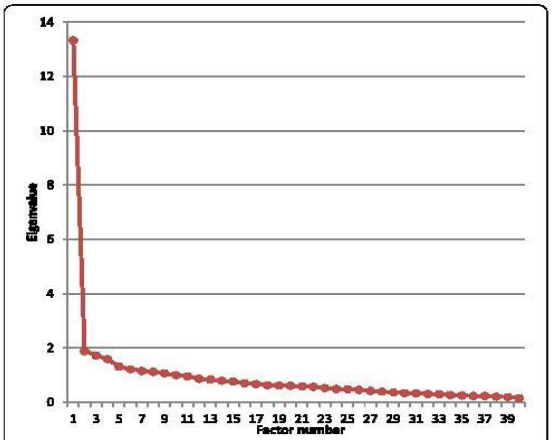

Fig. 2 Scree plot of the eigenvalues of the factors Reliability

Comparison of intern and supervisor perceptions of the learning environment

Subsequent analysis was based on the original subscales and not those from the factor analysis. The means and the standard deviations were calculated for each item and their overall and subscale means were compared.

The overall and subscale scores were then compared between the interns and their supervisors (See Fig. 3).

There was a significant difference in the overall scores between the interns and the supervisors with the supervisors perceiving the learning environment more positively. The means of the interns sub-scores for the perceptions of teaching and autonomy was significantly lower than their supervisors.

Table 3 illustrates those individual items where the differences between intern and supervisor perceptions were significant.

The key items accounting for differences between interns and supervisors in the Teaching sub-scale related to lack of feedback from seniors, clinical supervision, and access to appropriate educational programmes.

The key items accounting for differences between interns and supervisors in the Autonomy sub-scale related to perceptions of overtime hours done, amount of workload, performing inappropriate tasks, lack of continuity of care, and lack of mutual respect. The key items accounting for differences between interns and supervisors in the Social Support sub-scale related to lack of a 'no-blame' culture, presence of racism and gender discrimination.

Discussion

The PHEEM instrument was validated within a high disease burdened context in SA with significant differences being noted in how interns and their supervisors perceived the LE in this context. The interns sampled adequately reflected their distribution across various hospitals and the response rate was in keeping with similar surveys that utilized PHEEM elsewhere [22, 23, 26].

The modified PHEEM used established a good internal consistency as reflected by a high Cronbach's alpha value. The overall reliability was good particularly for the teaching subscale across both intern and supervisors' surveys and the high value was similar to that found in other studies [28, 34]. The high Cronbach's alpha however suggests that one underlying construct seen as the 'overall educational environment' is being reliably measured using the modified PHEEM in this setting [17, 22].

Construct validity

When comparing the factor analysis performed to the existing scales of the original instrument, the correspondence was not a clear fit. The teaching subscale performed much better than the other two scales. Whilst there was less of a clear fit with the original role

Table 1 Factor analysis of PHEEM data

	Factor loadings of the 3-factor solution *				
		Assigned scale	Factor 1	Factor 2	Factor 3
1	I have a contract of employment that provides information about hours of work	Autonomy		0,419	
4	I had an informative induction/orientation programme	Autonomy		0,499	
5	I have the appropriate level of responsibility in this post	Autonomy		0,548	
8	*I have to perform inappropriate tasks*	Autonomy		0,407	
9	There is an informative paediatric handbook for interns	Autonomy			
11	*I am bleeped(called) inappropriately in paediatrics*	Autonomy			
14	There are clear clinical protocols in paediatrics	Autonomy	0,518		
17	My hours on duty including my overtime hours conform with the Labour laws of South Africa	Autonomy			0,523
8	I have the opportunity to provide continuity of care	Autonomy	0,441		0,435
29	I feel part of the team when working in Paediatrics	Autonomy	0,626		
30	I have opportunities to acquire the appropriate practical procedures for my grade	Autonomy	0,462		
32	My workload is this job is fine	Autonomy		0,536	
34	The training in this post makes me feel ready to be a community service officer in South Africa	Autonomy	0,568		
40	My clinical teachers promote an atmosphere of mutual respect	Autonomy	0,855		
7	*There is racism in this job*	Social support		0,407	
13	*There is gender discrimination in this job*	Social support			
16	I have good collaboration with other doctors in my grade	Social support		0,498	
19	I have suitable access to careers advice	Social support	0,495		0,518
20	The hospital I did Paediatrics in has good quality accommodation for interns when on call	Social support			0,503
24	I feel physically safe within the hospital environment	Social support			0,557
25	There is a no-blame culture in paediatric internship	Social support			
26	There are adequate catering facilities when I am on call	Social support			0,545
35	My clinical teachers have good mentoring skills	Social support	0,808		
36	I get a lot of enjoyment out of my present job	Social support			
38	There are good counselling opportunities for interns who fail to complete their training satisfac	Social support			0,449
2	My clinical teachers set clear expectations	Teaching	0,412	0,558	
3	I have protected educational time in this post	Teaching		0,545	
6	I had good clinical supervision at all times	Teaching		0,592	
10	My clinical teachers had good communication skills	Teaching	0,874		
12	I am able to participate actively in educational events	Teaching	0,497		
15	My clinical teachers are enthusiastic	Teaching	0,709		
21	There is access to an educational programme relevant to my needs	Teaching	0,554	0,426	
22	I get regular feedback from seniors	Teaching	0,541		
23	My clinical teachers are well organised	Teaching	0,894		
27	I have enough clinical learning opportunities for my needs	Teaching	0,667		
28	My clinical teachers have good teaching skills	Teaching	0,740		
31	My clinical teachers are accessible	Teaching	0,805		
33	Senior staff utilise learning opportunities effectively	Teaching	0,689		
37	My clinical teachers encourage me to be an independent learner	Teaching	0,508		
39	The clinical teachers provide me with good feedback on my strengths and weaknesses	Teaching	0,574		
	* only loadings >0.4 indicated				
	Negatively worded items are in Italics				

autonomy and social support sub-scales, the second factor dealt mainly with the contractual and governance aspects of internship, orientation, contracts on work hours, type of tasks and responsibility. This seemed to corroborate with the original role autonomy scale of the original instrument. The third factor related loosely for support of the intern indicated by items relating to accommodation, safety, career advice, and support of 'at risk' interns. This factor can be seen to corroborate with the original subscale on social support. Some studies indicate the unidimensionality of the PHEEM scale [17, 34, 35] whilst others support its multi-dimensionality [22, 28]. In a demographically divergent intern group in SA, across different hospitals, the PHEEM did not clearly perform as a multidimensional tool. Further enquiry into how these individual characteristics of interns may affect differing

Table 2 PHEEM scores with Cronbach's alpha results for Intern and Supervisor groups

The means, standard deviations, Cronbach's alpha and *p*-values for the overall and subscale PHEEM scores for interns and their supervisors

Score type	Interns $n = 209$			Supervisors $n = 60$			*P* –value
	Mean	Standard deviation	Cronbach's alpha	Mean	Standard deviation	Cronbach's alpha	
Overall PHEEM score	3.51	0.51	0.943	3.79	0.32	0.874	0.0001
Teaching subscale	3.57	0.6	0.815	3.85	0.4	0.804	0.0007
Role autonomy subscale	3.64	0.48	0.920	3.98	0.34	0.699[a]	<0.001
Social Support Subscale	3.3	0.54	0.760	3.47	0.41	0.675[b]	0.032

[a]0.71 on removal of items 1 and 32
[b]no improvement with removal of any item

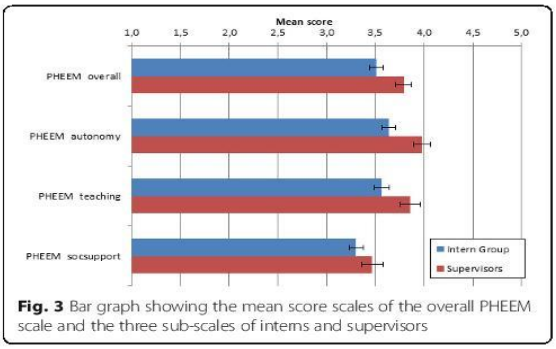

Fig. 3 Bar graph showing the mean score scales of the overall PHEEM scale and the three sub-scales of interns and supervisors

perceptions of the LE and the use of the PHEEM is needed in the SA context.

The use of the PHEEM tool with the three original subscales has been noted to be convenient for summarising and comparing results [22, 28]. Using the interpretation proposed by the developers of the original PHEEM, interns across the four sampled hospital complexes perceived the LE in paediatrics as more positive than negative however with 'room for improvement' being noted [19]. This finding is similar to evaluations conducted internationally [22, 26, 28, 33, 36–38]. This finding also resonates with various studies in other provinces in SA, indicating reasonable adequacy in how internship prepares interns for later practice with significant challenges still being noted [39–42].

Issues to be addressed

The three major challenges noted included issues related to infrastructure and institutional management; workload issues and issues relating to the quality of supervision. Institutional infrastructural challenges for interns related mainly to poor catering and accommodation. Whilst international PHEEM evaluations from well-resourced countries highlighted similar issues with catering and accommodation [36, 43], in the SA context this challenge in institutional management has been associated with the overall poor governance of public hospitals. This issue has been shown to greatly add to demotivation among interns [44, 45].

Over a third of the intern respondents indicated that they felt the workload, working hours and type of tasks as excessive or inappropriate for interns in paediatrics. An excessive workload and work hours posed major challenges to SA interns and has been shown to infringe on labor laws [46]. Excessive work hours and workload are well documented as major contributors of high levels of stress and burnout in junior doctors in SA [8–10]. Adherence to existing legislative frameworks need to be applied urgently to ensure that excessive work hours do not compromise the safety, health and occupational functioning of interns or patients. Oversight by accreditation bodies is required to ensure that these frameworks are adhered to. The third cause for concern in the teaching and learning environment is related to the adequacy of mentoring and supervision during internship. More than a quarter of interns indicated the presence of a 'blame culture' in paediatrics and insufficient feedback especially for 'at risk' interns.

Table 3 Ranking of key items where interns and supervisors significantly differ in perceptions

PHEEM item	Key items where the differences between interns and supervisors was significant[a] *(based on % Interns who disagree[b] with PHEEM item statement "highest to lowest")*	% Disagree: interns	% Disagree: supervisors	*p*-value	Subscale
17	My hours on duty including my overtime hours conform with the Labour laws of South Africa	50,2	7,0	< 0.0001	Autonomy
25	There is a no-blame culture in paediatric internship	39,0	22,0	0,020	Social support
32	My workload is this job is fine	33,8	15,3	0,0059	Autonomy
22	I get regular feedback from seniors	26,8	12,3	0,023	Teaching
7	*There is racism in this job*	26,2	5,1	0,0002	Social support
8	I have to perform inappropriate tasks	24,0	3,5	0,0002	Autonomy
6	I had good clinical supervision at all times	21,5	6,8	0,012	Teaching
18	I have the opportunity to provide continuity of care	21,2	7,0	0,012	Autonomy
21	There is access to an educational programme relevant to my needs	18,3	7,0	0,041	Teaching
13	*There is gender discrimination in this job*	17,0	3,5	0,0087	Social support
40	My clinical teachers promote an atmosphere of mutual respect	16,1	5,1	0,031	Autonomy
11	*I am bleeped(called) inappropriately in paediatrics*	15,6	1,8	0.00029	Autonomy

[a]with all other items the difference between interns and supervisors who disagree(*or agree in reverse scored items*) with statements did not reach statistical significance
[b]*or agree with reverse scored item*

A lack of dedicated education time, inadequate guidance and career advice was also noted. An additional concern, noted by nearly a quarter of interns, related to a perceived culture of racism and gender discrimination in the LE. This is of significance noting the rapid changes in the demographic composition of SA's newly qualified interns.

Of further concern however was the differences in perceptions on many of these issues between interns and supervisors. The significant differences found between the overall PHEEM and subscales scores relating to teaching and role autonomy between interns and their supervisors clearly points to this mismatch.

While supervisors recognize deficiencies in infrastructural challenges that concur with intern's perceptions, aspects related to teaching and working, seem to differ. A clear understanding of roles and responsibilities needs to be identified and consensus must be developed between interns and supervisors related to working and learning. This process needs to commence at orientation programs and through the training period for both interns and supervisors. It is likely that perceptions of supervision are influenced by the experiences of busy, inadequately trained and poorly motivated supervisors [47]. The disconnect between interns and their supervisors reflect sub-optimal supervision with poor communication, inadequate mentoring with lack of quality assessment practices being in place. Our findings corroborate that of various other studies on internship in SA which call into question the quality and quantity of direct supervision and on-going assessment by adequately trained staff [47, 48]. Improving supervision and assessment has been noted to be a major factor that can improve internship in S.A [43]. These issues of' work versus learning and the attitude of supervisors and their expected roles as 'evaluators and coaches' have been highlighted as the major tensions of internship [49]. In SA this underlying tension must also be contextualized in the rapidly changing demography of recently qualified medical students in comparison with the supervisor cohort and this need to be examined further as a potential reason for this schism [50]. Discrepancies between the supervisors' and interns' perceptions of the learning environment could also be explained by the difference concerning the views of trainers and trainees of the ideal training environment [17, 28]. Understanding the expectations of interns in achieving expected competencies and the role of assessment towards these ends, needs to be defined and evaluated in the SA context. The discrepant perceptions among supervisors and interns of the same LE indicates a need to improve our understanding of the 'community of practice' (COP) within the internship setting [51]. Further research and more qualitative insight into this 'community of practice' during internship will likely improve our understanding and is required especially in high disease burdened and resource constrained contexts.

The dissemination of regular evaluations of the LE using validated, standardized tools such as the PHEEM, to the accrediting bodies (HPCSA), health departments and directly to intern supervisors to ensure informed feedback can occur can serve as a means monitoring, comparing and improving the training of interns across hospitals and disciplines.

Limitations

While the PHEEM was developed mainly to assess the educational environment of postgraduate students in hospital settings that is especially residents, various authors have reported on its use with interns [22–26]. It is unlikely that the factor structure would differ substantially between interns and postgraduates given the similarity of the workplace [14].

The interns were sampled only in one province and the study was not replicated in other provinces to compare how a moderate or inadequate supply of resources impacted on the LE. We are however confident that the KZN province closely represents the South African situation with its high disease burden and resource poor regional public hospitals.

The intern response rate was 69% and could have been higher if further sampling occurred with interns who were on leave or had to attend to on call duties at the time of the survey.

Our assessment focused only on the domain of paediatrics but it did so across different hospital complexes and across two cities in KZN. Significant differences in the educational environment between different specialties and hospitals have been noted possibly indicating the importance of the general climate at the training hospital and the internal climate within each department as having a significant effect on the quality of the educational environment [24].

Conclusion

This study demonstrated that the PHEEM had good internal consistency and thus serves as a valid tool to assess the learning environment of interns in a high disease-burdened context like KZN, SA.

While paediatric interns in KZN perceived the learning environment as satisfactory, significant obstacles were observed in the development of an ideal learning environment. Poor infrastructural support at institutional level, excessive patient loads, excessive work hours and sub-optimal supervisor interaction for mentoring and ongoing assessment impacted on the notion

of an ideal learning environment. These factors have been implicated as major contributors for high stress and burnout among interns in SA and need to be urgently reviewed. The significant differences observed in the perceptions of the learning environment between interns and their supervisor's requires further insight into this relationship.

Additional files

Additional file 1: Appendix A: Modified PHEEM for Interns in South Africa. (XLSX 11 kb)

Additional file 2: Appendix B: Modified PHEEM for Intern-superviors in South Africa. (XLSX 11 kb)

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Availability of data and materials
The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Authors' contributions
KLN was responsible for study design, data collection, data analysis and drafting the manuscript. JVW was responsible for supervision of the entire work, study design and manuscript review. MA was responsible for supervision of the entire work and manuscript review. All authors read and approved the final manuscript.

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Ethics approval and consent to participate
The Biomedical Research Ethics Committee (BREC) of the University of KwaZulu Natal approved the research (BE177/15).
All participants provided written, informed consent to participate in this study.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Publisher's Note

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Modified PHEEM – Supervisor Survey attached as Appendix 26
Modified PHEEM – Intern Survey attached as Appendix 27

5.4 Key findings and contribution of this manuscript to the thesis

In this study the LE, viewed as a multidimensional construct that encompasses various factors, was investigated. The PHEEM instrument was validated for this setting by using psychometric tests including assessing construct validity with confirmatory factor analysis. The instrument was found to be a reliable test with a high Cronbach's alpha indicating a high internal consistency and valid to assess perceptions of the LE within the SA context. Using the PHEEM, SA interns who had completed the Paediatric rotation were shown to have perceived the LE as satisfactory but they noted significant challenges in critical areas. In addition, some of these factors in the LE were perceived very differently between interns and their supervisors indicating the potential challenges in the integral relationships within the community of practice.

In measuring the LE based on the intern's perceptions, this phase of the study highlighted the need to consider individual characteristics of interns as factors that may influence these perceptions. In addition the stark differences in how interns perceive aspects of the LE related to teaching (feedback, supervision, access to educational programmes), working (workload, workhours, type of tasks and mutual respect) as well as support (evidence of racism, gender bias or a blame-culture), can be attributed to various demographic and other factors that differentiate interns from their supervisors.

In the context of SA, there has been a rapid change in the demographic composition of interns, with more female and Black African interns who are now qualifying. This transformation in the demographic characteristics of SA interns has occurred following policy changes in enrolment at universities. Additionally, in order to align intern distribution with the demographic composition of the country, there is a mandatory spread of interns of various universities and backgrounds that are placed at hospitals for internship. This process of placement of interns is managed by the national department of health in conjunction with various provinces .The extent to which these individual demographic, socio-economic and educational differences possibly influenced interns' perceptions was therefore unclear and needed to be investigated. The interface between interns and access to or participation in communities of practice could possibly be compromised due to their specific individual characteristics, which could also translate into the differences in perceptions as found between the interns and their supervisors. These associations were further examined in the next phase of the study and are reported in Chapter Six.

CHAPTER 6: THE INFLUENCE OF INDIVIDUAL FACTORS IN THE LEARNING ENVIRONMENT OF SOUTH AFRICAN INTERNS

6.1 Introduction

In the previous chapters the significant influence of the LE on internship in SA was identified. Despite the multi-dimensional nature of the LE and the difficulty quantifying this construct, the PHEEM as a data collection tool was validated for the local SA context. In addition, the PHEEM was used to measure the perceptions of interns who had completed Paediatrics in high childhood disease burdened settings. While interns reported satisfactory overall perceptions of the LE, significant differences were seen in how they the perceived the LE as compared with their supervisors. In a previous study, albeit under different circumstances, the factors associated with the external environment and the supervision processes themselves were identified as possible reasons for this dissonance, which adds to the work-learning tension during internship. [137] In developing the conceptual construct of the LE and attempting to identify possible antecedents within the LE that influence how interns perceive this construct the difference between external and individual factors needs to be clarified especially in the context of SA's dynamic landscape.

In line with research objectives that set out to identify the influence of individual factors on perceptions of the learning environment this study was aimed at the investigation of various demographic factors and individual characteristics including previous educational exposure and experience in internship.

6.2 Publication details

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6.2.1 Journal Information

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6.2.2 Publication Record

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6.3 Manuscript

TITLE: 'Sense of Belonging': The influence of individual factors in the learning environment of South African interns

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ABSTRACT

Background

Focus has been on organizational issues when reporting factors influencing the perceptions of South African medical interns towards their learning environment (LE). Individual demographic factors are being recognized as being just as important, in influencing these perceptions.

Objective

To determine whether individual demographic factors influence interns' perceptions of the LE during Paediatrics, in high disease burdened hospitals in South Africa.

Methods

Perceptions of the LE amongst interns in KwaZulu-Natal, SA, were assessed in December 2015, using a validated version of the Postgraduate Hospital Educational Environmental Measure (PHEEM). Overall and subscale PHEEM scores were calculated from Likert scales. The association of these scores with various socio-cultural factors relevant to the SA context, previous educational exposure and year of internship were examined using ANOVA or student t–tests.

Results

A total of 209 interns were sampled. The ethnic breakdown of sampled interns reflected the changing demographic profile amongst SA junior doctors with an increase in Black African and female doctors. Statistically significant associations of overall and teaching sub-scale PHEEM scores were found with ethnicity (p=0.024), geographical origin (p=0.023), year of internship (p=0.0047) and university origin (p=0.015). These factors corroborated with characteristics that reflect both past disadvantage in the SA context and those of being an 'outsider' in an established group

Conclusions

Intern training programs in South Africa need to recognize that individual demographic factors influence intern's perceptions in the context of teaching and mentoring in a discipline. With rapid changes in the demographic profiles of junior doctors, SA intern trainers need to enable a 'sense of belonging' in learning environments

INTRODUCTION

The learning environment (LE) refers to a 'set of factors' that describes the experiences of the trainee within an organization. [1] These factors can be divided into the three components. Firstly, the 'physical environment' (facilities, comfort, safety and food) which can be referred to as the organisational aspects. Work load and work hours would relate to this aspect [2] The second component is the 'intellectual environment' which includes support provided for scholarly activities during training, learning with patients and using evidence based knowledge and skills[2]. Thirdly is the 'emotional environment ' referring to the social support provided, the levels of harassment experienced by the trainee and the trainee's characteristics that may facilitate or hinder access to support including that offered by a supervisor. [2] The effect of the LE appears to be mediated by the trainees' own perceptions thereof and it has been shown to be an important determinant of attitude, satisfaction and achievements. [3,4] An optimally functioning clinical learning environment, with medical interns perceiving it as such, is important for successful training in any platform to develop competent physicians.[5]

Emphasis has been placed on evaluating the organisational aspects of these training platforms. [6-7] The environment in which South African (SA) medical interns train has been associated with excessive workloads, long hours, high stress-levels, burnout and reports of sub-optimal supervision. [8-10] Whilst these organisational aspects form a significant part of the factors affecting perceptions of the learning environment, the influence of individual demographic factors also needs to be explored and understood. [11]

The legacy of 'apartheid' policies and persistent social inequity in SA has continued to manifest in society, including in education. [12] The characteristics linked to social inequity such as gender, ethnicity, socio-economic status, geographical origin and previous educational exposure have persisted and remain useful, as criteria to measure previous disadvantage. Geographical origin still reflects racial and socioeconomic divisions and plays

an important role in access to and success in higher education. [12] In the SA context, previous educational experiences are considered important contextual factors in learning as huge disparities exist between the education offered by fee-paying compared with non-fee-paying schools. [13]

In the higher education climate, including health professions education in SA, calls are being made to challenge and dismantle the colonial curricula mind-sets, that perpetuates the ideological framework that allows one culture to dominate that of others. [14] Whilst these calls for 'decolonization' include aspirations for the 'creation of a humanizing culture of practice that is not at odds with lived practice', education processes are still noted to have a 'mandated ignorance' with learning environments seemingly blind to issues of race and difference. [14,15]

Demographic factors are being recognized as important indicators to redress inequity and most SA medical schools have amended their undergraduate selection criteria towards transformation norms. [13] This has seen a rapid change in the demographic composition of interns in SA. There is a signficant change in the dempographic composistion of medical practitioners in SA. An increase in Black African and female medical graduates from a previous predominant white and male medical establishment is occurring. Resulting from these changes, interns of differing socio-economic and educational backgrounds are allocated to work and learn together in regional hospitals throughout the country for a two-year internship.

The internship programme includes all major medical specialties including Paediatrics. [16] It is not clear how the changes in the composition of newly qualified doctors are impacting on their perceptions of the learning environment especially in Paediatrics. An improved understanding of these changes would facilitate the improvement of training to junior doctors. The Postgraduate Hospital Educational Environmental Measure (PHEEM) is a well-recognised instrument used internationally to assess the learning environment in post-graduate medicine. [17-19] A local SA version of the PHEEM instrument was validated amongst a cohort of Paediatric interns in four hospital complexes in Durban and Pietermaritzburg, KwaZulu-Natal. [18]

Whilst organisational and institutional factors were identified to be obstacles to creating an ideal LE, significant differences were noted in the way interns and their supervisors perceived the LE especially with regard to supervision and mentoring. [18] In this study the influence of individual demographic factors on perceptions of the LE amongst this cohort are reported on. This study was thus conducted to:

1. Determine whether individual demographic factors influence interns perceptions of their experiences in the learning environment in Paediatrics;
2. To compare the perceptions of first and second year interns of the learning environment in the paediatric rotation; and
3. Determine the influence of previous educational experiences on interns' perceptions of their learning environment

METHODS

Research Design

This was an observational, cross- sectional cohort study.

Ethical approval

Ethical approval for the study was obtained from the University of KwaZulu-Natal Biomedical Research Ethics Committee and gatekeepers' permission was granted from the various institutions as well as the Health Research and Knowledge Management Subcomponent of the Department of Health in the province of KZN. The study population consisting of all eligible interns were informed of the study and invited to participate. Participants were informed of their rights and could withdraw at any stage. Participation in the study was voluntary and the anonymity and confidentiality of respondents were assured. The surveys were group administered at pre-existing intern meetings and the primary researcher was blinded to the individual responses as no identifiable details were required.

The instrument

The PHEEM has been used to assess the LE among interns throughout the world. [17] The PHEEM used in our study had eight minor changes to the original 40 items to accommodate terminology relevant to the South Africa and Paediatric setting. (see **Annexure A).** [18] Each participant was scored each item on a five-point Likert scale, where 1 indicated 'strongly disagree' and 5 represented a 'strongly agree' response. The original questionnaire used a 0-4

scale whilst we followed a more conventional scale of 1-5 as used by some authors in clinical settings. [3]

Procedure

The sample population included all interns who had completed Paediatrics at four hospital complexes (comprising eight hospitals) in both major cities of the KZN province in December 2015. Demographic data including, gender, ethnicity, home language, geographical origin and the highest educational level of a 'parental figure' were obtained. Geographical origin was defined as consisting of three categories namely: urban (mainly city and suburban neighbourhoods); semi-urban (reflecting mainly 'township' neighbourhoods); and rural origin (mainly living outside of an urban city or semi-urban area). These distinctly different areas reflect significant racial and socioeconomic divisions in the SA context. [12] Prior educational exposure was solicited by gathering data on: the type of high school attended (whether fee-paying or non-fee paying school), university attended for undergraduate medical training (whether the local university or university which was situated outside province or country) and final year undergraduate paediatric performance.

Sample size

A sample size calculation was based on the comparison of the PHEEM scores between the intern group and various demographic variables. Using a one-way ANOVA with up to four groups, a sample size of 209 interns was adequate as 180 was required to achieve 80% power at a 5% significance level. [20]

Data analysis

The overall PHEEM scale and sub-scale scores were calculated for each participant. Where there was missing data, means were computed based on data for available items, provided this did not exceed 20% of the items. The overall score was computed as the average of all 40 items. The negatively worded items 7,8,11 and 13 were reverse-scored.

For the descriptive analysis, categorical variables were summarized by frequency and percentage tabulation. Continuous variables were summarized by mean, standard deviation, median and interquartile range. The association between the various demographic variables, year of internship and the factors associated with previous educational experiences, with overall PHEEM score as well as the three subscale PHEEM scores, was determined by the t-test or ANOVA (for more than two categories). The strengths of the association were

measured by Cohen's d. The following scale of interpretation was used: 0.8 and above=large effect; 0.5 to 0.79=moderate effect; 0.2 to 0.49=small effect. Data analysis was carried out using SAS Version 9.4 for Windows. The 5% significance level was used throughout.

RESULTS

The response rates were calculated based on those available interns who had completed Paediatrics. The adjusted response rate was 69.2%(209/302)* of available interns taking into account interns who were on duty or on leave. At the time of study 35.8% of all the interns assessed were in their first year, 63.8% were in their second year of internship and 55% were female with a mean age of 26.2 years (standard deviation (SD)=2.6 and range 20-37yrs.). A number of factors were examined to investigate the influence of previous disadvantage on perceptions. **Table 1** presents the socio-cultural characteristics of the sampled interns.

Table 1: Sociocultural characteristics of sampled interns

Socio-cultural factors		
Demographic variable	**Category**	**N (%)**
Gender (n=202)	Male	91 (45.05)
	Female	111 (54.95)
Ethnicity(n=190)	White	53 (27.89)
	Indian	64 (33.68)
	African Black	60 (31.58)
	Mixed Race	13 (6.84)
Home Province(n=168)	KZN	112 (66.67)
	Gauteng	27 (16.07)
	Western Cape	23 (13.69)
	Eastern Cape	6 (3.57)
Geographical origin(n=202)	Urban(city and suburbs)	119 (58.91)
	Semi –Urban (township)	63 (31.19)
	Rural (any area outside urban or semi urban)	20 (9.90)
Home Language(n=167)	English	105 (62.87)
	Afrikaans	29 (17.37)
	Zulu	25 (14.97)
	Xhosa	8 (4.79)
Highest achieved educational level of parent/caregiver in intern's household (n=199)	Less than High school Completion	15 (7.54)
	High school complete	17 (8.54)
	Post high school (non-university)	33 (16.58)
	University	134 (67.34)

Table 2 shows the composition of sampled interns with regard to variables chosen to indicate previous educational experiences.

Table 2: Previous educational experience of sampled interns

Previous Educational Experience		**Interns**
Variable	**Category**	**N (%)**
High school type (n=200)	Government (non-fee paying school)	87 (43.5)
	Partly Private (fee-paying Government school)	63 (31.5)
	Private (Non-government)	50 (25)
SA Undergraduate university (n=203)	Local (UKZN)	60 (29.56)
	Non–local	143 (70.44)
Outside SA qualified (n=200)	SA University	162 (81)
	Foreign university	38 (19)
Undergraduate Paediatric performance (n=201)	<60% pass	19 (9.45)
	60-70% pass	112 (55.72)
	>70% pass	70 (34.83)

An examination of the influence of various demographic factors on the overall PHEEM scores indicated a number of significant findings. **Table 3** depicts the relationship between all the individual demographic variables including socio-economic factors, factors indicating previous educational experience and internship year with the overall PHEEM score.

Table 3: Comparisons of the overall PHEEM scores with all demographic variables

Socio-cultural factors				p value
Gender	**N**	**Mean**	**Std Dev**	
Male	90	3.48	0.48	0,59
Female	109	3.52	0.52	
Ethnicity	**N**	**Mean**	**Std Dev**	
African Black	57	3.37	0.,55	0.024
Mixed race	13	3.78	0.27	
Indian	64	3.55	0.55	
White	53	3.57	0.36	
Home Province	**N**	**Mean**	**Std Dev**	
Eastern Cape	6	3.46	0.34	0,68
Gauteng	26	3.64	0.26	
KZN	110	3.52	0.54	
Western Cape	23	3.50	0.38	
Geographical Origin	**N**	**Mean**	**Std Dev**	
Urban(suburban)	117	3.59	0.45	0.023
Semi-urban(Township)	62	3.37	0.6	
Rural	20	3.5	0.44	
Home language	**N**	**Mean**	**Std Dev**	
Afrikaans	29	3.64	0.35	0.16
English	105	3.55	0.48	
Xhosa	8	3.29	0.48	
Zulu	24	3.40	0.59	
Highest level of education of parent	**N**	**Mean**	**Std Dev**	
Less than matric	15	3.43	0.81	0.66
Matric	17	3.40	0.50	
Tertiary but not University	32	3.51	0.50	
University	133	3.54	0.48	
Internship year				
Year paediatrics done	**N**	**Mean**	**Std Dev**	
Second year intern	126	3.58	0.47	0.0047
First Year Intern	72	3.37	0.56	
Previous educational experience				
High School attended				
Non-fee-paying government funded	85	3.49	0,55	0,61
Fee-paying government school	62	3.49	0,51	
Fee-paying private school	50	3.57	0,48	
SA undergraduate university				
non-local	141	3.45	0,49	0,015
Local university	59	3, 64	0,56	
Overseas University	**N**	**Mean**	**Std Dev**	
SA university	160	3.54	0.50	0.094
Foreign (Outside undergrad univ.)	37	3.38	0.53	
Undergraduate paediatric performance	**N**	**Mean**	**Std Dev**	
>70%	69	3.51	0.45	0,99
60-70%	110	3.50	0.55	
<60%	19	3.50	0.54	

Table 4: Comparison of PHEEM teaching subscale scores with all demographic variables

Socio-cultural factors				p value
Gender(n=209)	N	Mean	Std Dev	
Male	90	3.56	0.55	0,91
Female	110	3.57	0.62	
Ethnicity(n=188)	N	Mean	Std Dev	
African Black	58	3.36	0.,66	
Mixed race	13	3.89	0.30	0.0026
Indian	64	3.68	0.65	
White	53	3.62	0.38	
Home Province(n=166)	N	Mean	Std Dev	
Eastern Cape	6	3.47	0.51	
Gauteng	27	3.67	0.29	0,81
KZN	110	3.60	0.64	
Western Cape	23	3.55	0.42	
Geographical Origin(n=200)	N	Mean	Std Dev	
Urban	117	3.65	0.53	
Semi-urban(Township)	63	3.42	0.68	0.032*
Rural	20	3.52	0.52	
Home language(n=166)	N	Mean	Std Dev	
Afrikaans	29	3.69	0.33	
English	105	3.65	0.57	0.032
Xhosa	8	3.22	0.61	
Zulu	24	3.38	0.70	
Highest level of education of parental figure (n=198)	N	Mean	Std Dev	
Less than matric	15	3.35	0.94	
Matric	17	3.42	0.53	0.32
Tertiary but not univ.	33	3.58	0.58	
University	133	3.61	0.57	
Internship year				
Year paediatrics done(n=199)	N	Mean	Std Dev	
Second year intern	127	3.64	0.56	0.0083†
First Year Intern	72	3.41	0.64	
Previous educational experience				
High School attended(n=198)				
Non fee-paying government funded	86	3.54	0.66	
Fee-paying government school	62	3.51	0.57	0.30
Fee-paying private school	50	3.68	0.54	
SA undergraduate university(n=201)				
non-local	142	3.49	0.56	0,0068
Local university	59	3.74	0.67	
Overseas University *(n=198)	N	Mean	Std Dev	
SA university	161	3.59	0.59	0.19‡
Foreign university (outside SA)	37	3.45	0.60	
Undergraduate paediatric performance(n=199)	N	Mean	Std Dev	
>70%	70	3.56	0.55	
60-70%	110	3.56	0.63	>0,99
<60%	19	3.56	0.67	

***on role autonomy sub-scale p=0.013 † on role autonomy sub-scale p=0.00089 ‡ on social sub-scale p= 0.047**

Socio–cultural variables

There was a significant association between ethnicity and the overall PHEEM score. Interns who had self-identified as Black African had lower mean PHEEM scores as compared to their white, Indian or mixed race colleagues. This finding was reiterated when comparing ethnicity with PHEEM scores on the teaching subscale (p=0.0026) (**Table 4**). The effect size was large when comparing the scores of mixed race (d=0.88) and Indian (d=0.5) with Black African interns.

There was a significant association between the mean PHEEM score and geographical origin with those who indicated coming from a semi-urban (mainly referring to a 'township' area) environment scoring the overall PHEEM lower than those form urban (city or suburbs) or those raised in a rural area. (**Table 3**) There were statistically significant associations between geographic origin and the mean PHEEM score on the teaching subscale (p= 0.032) and the PHEEM score on the role autonomy subscale (p=0.013). (See **Table 4)**.

Table 4 depicts the mean PHEEM teaching sub-scale scores compared with the major languages spoken by interns which also showed a significant association (p=0.032).

We found no statistically significant relationship with gender, home province, or the highest educational level of intern's parental figure, when comparing overall PHEEM scores and all sub-scale scores with these socio-cultural variables. There were no significant associations when we compared the PHEEM subscale scores on the social support scales with all socio-cultural variables.

Internship year

The mean PHEEM score for interns in their first year was significantly lower that interns in their second year of internship. This significant difference between year 1 and 2 interns was seen when comparing PHEEM scores on the teaching subscale (p= 0.0083) (**Table 4)** as well as on the PHEEM role autonomy subscale scores (p=0.0089).

Prior educational exposure

Table 4 indicates that interns who had graduated at the local university had significantly higher perceptions of the LE than interns who graduated from outside the province. There was a significant association between the mean PHEEM scores of interns who studied overseas compared with SA trained interns on the social support subscale score. The type of high school attended or undergraduate performance in Paediatrics did not show any

statistically significant relationship with overall PHEEM or PHEEM scores on the teaching, role autonomy and social support scales.

DISCUSSION

In this study, individual demographic factors are shown to have a major impact in influencing perceptions of the LE of interns. These characteristics have been largely neglected as factors to consider in influencing internship whilst organisational factors like work-hours and the state of physical infrastructure of the LE have been focused on.

The good response rate in our sample was in keeping with surveys using the PHEEM instrument elsewhere [17] and the distribution of sampled interns closely represented the allocation of interns across the hospital complexes. The 2015 cohort shows an increasing representation of female and Black African newly qualified doctors than previously and is beginning to reflect the implementation of amended selection criteria at SA medical schools.[13] However, evaluating the demographic characteristics of the sampled interns revealed that the newly qualified doctors are still largely drawn from middle class backgrounds, with nearly 60 % of interns originating from urban areas, attending fee-paying schools and over 60% from homes with at least one parental figure having obtained a university qualification.

In this study ethnicity, language and geographical origin were identified as factors that are significantly associated with the lower perceptions of the LE in internship. These relationships corroborate the notion that interns from previously disadvantaged communities have poorer perceptions of the LE than most of their peers in internship. Gender was not identified as a factor impacting on perceptions of the LE. Paediatrics is generally a discipline with a larger female composition and thus probably reflects a more gender-sensitive environnment. Various other studies have shown the influence of gender on the overall PHEEM scores, especially in disciplines with an underrepresentation of female doctors such as general surgery and intensive care. [21,22]

This study showed a clear difference in the perceptions of interns who were in their first year as compared with those in the second year of internship. Various studies internationally corroborate this finding with juniors having lower perceptions of the LE than senior trainees. [23] Interns who did not graduate from the university supporting the internship training platform and those who graduated from outside of SA also displayed poorer perceptions of

LE. These findings are consistent with findings of studies, which reported higher levels of stress amongst interns at hospitals in SA who graduated from non–local universities. [9]

The findings show that whilst indices of socio-economic disadvantage especially ethnicity and geographic origin did influence interns' perceptions of the learning environment, these were not the only factors. The combination of factors significantly influenced the perceptions of the LE relate to characteristics of being 'new' or 'different' to the established norm or 'culture'. The factors can furthermore be categorized as individual characteristics that seemingly add to perceptions of marginalization or 'alienation' in interns who experienced their training as 'being isolated from a group activity in which they should be involved'. [24] This apparent difficulty in developing a 'sense of belonging' is of concern especially as learning within the clinical environment relies heavily on participation within a 'community of practice. [25]

Learning in internship occurs within the context of 'legitimate, peripheral participation' within a social context and is an increasingly communal and negotiated contract. [25,26] This learning whilst understood at an individual level occurs at group level and involves the acquisition of knowledge, skills, attributes, values and competencies and 'participation in social processes' where learning is inextricably linked to and embedded in its context. [27]

The interaction of supervisors and interns occurs within a historic context in S.A and possibly reflects a 'colonized' milieu where the relationship of dominance creates the concept of the 'outsider' [28] and new incumbents a notion of being the 'other' or not being welcome in an already established setting which does not recognise his/her presence. These unequal power relations and marginalisation may contribute in a failure to ensure all interns are brought into full participation. [14] The learning climate in this context may thus be difficult for interns who experience it as 'outsiders' or 'others' and they are unlikely to seek or initiate a search for effective mentorship, a situation which further compromises the supervision opportunity.

These findings, which are of relevance to all health professionals and undergraduate universities, indicate the need for efforts to ensure that all interns develop a 'sense of belonging' in their training platform. The impact of this finding on policy includes the recognition by intern accreditation bodies of the role of individual intern characteristics as important factors to consider when developing intern training curricula and oversight

frameworks. This can translate into processes to mandate the development of welcoming environments that facilitate the integration of interns from the start so that they commence as a team respecting and appreciating each other's contexts and diversity. The calls to work as a collective to 'decolonize' and humanize training has resonance here. [14] Intern programmes and curricula need to change to evaluate intern and supervisor interactions to ensure all interns are experiencing optimal supervision and that consideration is made of individual demographic factors.

As the SA medical community transforms to reflect the true demography of the country, efforts should be made to ensure the inclusion and support for 'engagement' of junior doctors within hierarchical and 'established' communities of practice. Individual demographic factors in the LE can no longer be regarded as minor factors in the learning process and more work is needed to understand how they impact on successful orientation and learning especially in the formative period of internship.

Challenges

The sample only included interns linked to hospitals in one province and the possibility exists that findings could reflect a regional bias. However, the large number of interns sampled, good response rate and the choice of large hospitals with known high disease burdens is thought to be adequately representative of the South African internship programme and adds confidence that the findings would likely represent those of others including other health professionals in the SA setting.

The PHEEM instrument was originally created for postgraduate registrars, however we believe that the learning environment of interns' work resembles that of the postgraduate registrar trainees and therefore highly relevant.

This study did not explore the training received or the previous clinical experience of supervisors which would influence the relationship in this setting.

This study used quantitative methods to assess the LE and to fully understand the learning environment in depth, a qualitative evaluation of intern's perceptions of the LE is needed.

CONCLUSION

Whilst organisational factors have been noted to affect the LE of interns in SA, our research indicates that individual demographic factors are important. Perceptions of the LE as

measured by validated and reliable tools like the PHEEM are influenced by various demographic and individual factors. First year interns, who have not graduated from the local university and who are from previously disadvantaged socio-economic groups in SA are more likely to perceive a poorer LE than their peers. These factors affecting a 'sense of belonging' will become apparent in challenged situations where there is inadequate supervision and mentoring and within the rapidly transforming demographic environment in SA as it attempts to 'decolonize 'its practices.

Efforts must be made to ensure that medical intern and all health professional training policies and practices recognise that these factors must be considered during teaching, mentoring and supervision. Further qualitative studies into these relationships are needed to improve our understanding in clinical settings as we aim to train competent health professionals for effective practice in transformed settings.

DECLARATIONS

Ethics

The Ethics approval letter BE177/15 is attached as **Annexure B**

Consent for publication

Not applicable

Competing interests

The authors declare no conflict of interest.

Availability of data and material

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

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Authors' contributions

KLN was responsible for study design, data collection, data analysis and drafting the manuscript.

JVW was responsible for supervision of the entire work, study design and manuscript review.

MA was responsible for supervision of the entire work and manuscript review.

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ANNEXURE A: Modified PHEEM Questionnaire

Number	PHEEM ITEM indicating changes to original instrument as developed by Roff et al 2005 Paediatric intern survey SA version
1	I have a contract of employment that provides information about hours of work
2	My clinical teachers set clear expectations
3	I have protected educational time in this post
4	I had an informative induction/***"orientation"*** programme
5	I have the appropriate level of responsibility in this post
6	I had good clinical supervision at all times
7	There is racism in this job
8	I have to perform inappropriate tasks
9	There is an informative ***"paediatric handbook for interns" original = Junior doctors handbook***
10	My clinical teachers had good communication skills
11	I am bleeped**(called)** inappropriately in paediatrics
12	I am able to participate actively in educational events
13	There is gender discrimination in this job
14	There are clear clinical protocols in paediatrics
15	My clinical teachers are enthusiastic
16	I have good collaboration with other doctors in my grade
17	My hours*" on duty including my overtime hours conform with the Labour laws of South Africa" original =My hours conform to the New Deal*
18	I have the opportunity to provide continuity of care
19	I have suitable access to careers advice
20	The hospital ***I did Paediatrics*** in has good quality accommodation for interns when on call
21	There is access to an educational programme relevant to my needs
22	I get regular feedback from seniors
23	My clinical teachers are well organised
24	I feel physically safe within the hospital environment
25	There is a no-blame culture in paediatric internship
26	There are adequate catering facilities when I am on call
27	I have enough clinical learning opportunities for my needs
28	My clinical teachers have good teaching skills
29	I feel part of the team ***"when working in Paediatrics"***
30	I have opportunities to acquire the appropriate practical procedures for my grade
31	My clinical teachers are accessible
32	My workload is this job is fine
33	Senior staff utilise learning opportunities effectively
34	The training in this post makes me feel ready to be a ***"community service officer in South Africa" original = Specialist Registrar/Consultant***
35	My clinical teachers have good mentoring skills
36	I get a lot of enjoyment out of my ***paediatric intern job***
37	My clinical teachers encourage me to be an independent learner
38	There are good counselling opportunities for ***"interns"*** who fail to complete their training satisfactorily ***original = junior doctors***
39	The clinical teachers provide me with good feedback on my strengths and weaknesses
40	My clinical teachers promote an atmosphere of mutual respect
	* **bolded are the changes to the original questionnaire**

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05 August 2015

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Protocol: Working is learning: An exploration of work-based learning amongst Paediatric interns in kwaZulu-Natal.
Degree: PhD
BREC reference number: BE177/15

EXPEDITED APPLICATION

A sub-committee of the Biomedical Research Ethics Committee has considered and noted your application received on 14 April 2015.

The study was provisionally approved pending appropriate responses to queries raised. Your responses dated 29 July 2015 to queries raised on 15 June 2015 have been noted by a sub-committee of the Biomedical Research Ethics Committee. The conditions have now been met and the study is given full ethics approval.

This approval is valid for one year from **05 August 2015.** To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2015), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be RATIFIED by a full Committee at its meeting taking place on **08 September 2015**

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely

[redacted]

Professor J Tsoka-Gwegweni
Chair: Biomedical Research Ethics Committee

6.4 Key findings and contribution of this manuscript to the thesis

The paper highlighted findings into a multitude of factors that interplay and influence interns' perceptions of the LE. Whilst environmental factors, which can be viewed as external (extra-person) factors have been identified as major factors that influence perceptions of the LE, this paper highlighted the importance of specific individual factors that are influential.

The demographic factors, including socio-economic characteristics of race and economic background are shown to be significantly important in how interns, perceive their LE. These factors furthermore are shown to be related to perceiving oneself as a 'newcomer' in efforts to gain access to a community of practice. First year interns who had completed their undergraduate medical training and obtained their MBChB qualification at institutions other that the one where they had enrolled for internship were also found to have had poorer perceptions of the LE reiterating the 'newcomer' status as a factor that acts as an alienating influence, which restricted access into established communities.

The paper provided the platform whereby factors can be seen as experiences that influenced interns and possibly added to their failure to engage in a group. This possible explanation resonates with theories of alienation and engagement that have been used to explain issues of access and barriers to higher education. In the context of entrenched power imbalances that characterizes hierarchical communities of practice this is an important factor to consider. In the SA context of post-apartheid change, the failure to 'decolonize' previously held hegemonies is an important factor when developing mechanisms to ensure transformation and equitable access and participation in internship.

Whilst this chapter highlighted the interplay of factors associated with how interns perceive their LE, the question of the sustainability of these communities of practice in internship, is raised amidst the various changes noted. Integral to COPs is the ability of these communities to reproduce their membership by the same processes that sees newcomers gaining access and participating in these units. [55] This is a vital step in the medical trajectory as the ability to sustain the community of practice is integral to the process of learning in internship and thus sustainability of the health system and specifically the public health system. Career intentions of interns can be used as surrogate markers to gauge the ability of the COP to recreate and sustain itself. Thus understanding the relationship between perceptions of the LE and career intentions of interns in important to determine the sustainability and future directions of health systems. Chapter Seven compares perceptions of the LE and individual characteristics of interns with their career intentions

CHAPTER 7: IMPACT OF THE LEARNING ENVIRONMENT ON CAREER INTENTIONS OF PAEDIATRIC INTERNS

7.1 Introduction

This chapter reviewed the career aspirations of interns and investigated the relationship between their career intentions and the recreation of the communities of practice that constitute the LE. This study compared interns' perceptions prior to exposure to the Paediatric LE with the perceptions of interns who already had gained experience in the Paediatric LE. Interns' career intentions related to national health priorities were evaluated specifically regarding intentions to remain in the country, the public health system and to serve in areas of priority such as primary health care and child health. In the previous chapters the influence of both external ('extra-person') factors and individual characteristics were identified as factors that influenced the perceptions of the LE. In this chapter the same factors were investigated to examine their influence on career intentions.

In line with research objective that set out to determine the relationships of the LE and career intentions amongst Paediatric interns, this study was aimed at the investigation of the careers intentions of interns towards caring for children in the public health system of SA

7.2 Publication details

Title:	**Impact of the Learning Environment on Career intentions of Paediatric Interns**
Authors:	**Naidoo, Kimesh L Naidoo** **Van Wyk, Jacqueline M** **Adhikari, Miriam**
Journal:	**South African Medical Journal**
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7.3 Manuscript

SAMJ RESEARCH

Impact of the learning environment on career intentions of paediatric interns

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Background. High childhood disease burdens in South Africa (SA) prioritise the need for careers in paediatrics. Experiences of junior doctors during internship may influence career trajectories in a direction that is discordant with national health priorities.
Objective. To explore the influence of the learning environment and demography on career intentions of SA paediatric interns.
Methods. This cross-sectional study involved sampling intern groups at the start and completion of internship in paediatrics to determine their career intentions. A validated version of the Postgraduate Hospital Educational Environmental Measure was used to measure perceptions of the learning environment (LE) in the post-paediatric internship cohort. Measures of the LE in combination with demographic factors were compared with career intentions. Associations were determined by *t*-tests or analysis of variance and χ^2 tests.
Results. A total sample size of 422 was obtained from two separate cohorts, which were demographically similar except for age. Most interns (88.4%) intended to remain in SA, with 72.6% indicating an intention to practise in the public healthcare sector. There was a high intention to specialise (85.9%), and 60.2% were keen on a career that involved children. Previous educational exposure and demographic factors other than gender did not significantly influence career intentions. Perceptions of the LE significantly influenced decisions to stay in SA's public sector and to care for children. The decision to specialise, however, was not influenced by demographic variables or perceptions of the LE.
Conclusions. Paediatric interns from diverse sociocultural and educational backgrounds had similar career intentions. Most interns were keen to work with children in SA's public sector. However, learning experiences during internship significantly influence these intentions and have the potential to drive young doctors away from SA, its public health service and paediatric care. Ensuring that training and support of interns are optimised is essential if SA is to align its healthcare needs with the aspirations of its future healthcare workers.

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The mismatch between the number of medical practitioners in the public healthcare sector and disease burden is most evident in sub-Saharan African (SSA) countries.[1,2] Despite efforts to increase the number of medical practitioners, high migration from SSA countries and the shift towards private healthcare have perpetuated this inequity.[3] Newly qualified doctors usually start their careers in the public sector, but the odds of their leaving this sector increases with time.[4] These patterns of career choice highlight the mismatch between the intentions of most African medical students and the health workforce needs of the continent.[3] A similar pattern is evident in the South African (SA) setting, with inequitable doctor-patient ratios between private and public healthcare and rural and urban practice, and high aspirations on the part of junior doctors to work abroad.[5] Within-country trends further indicate the continued preference for private rather than public health service among practitioners.[6]

While the undergraduate training period serves as an important influence on career choice, the experience immediately after graduation is becoming increasingly critical in these decisions.[7,8] Career directions seem to be decided early in junior doctors' postgraduate years.[9,10] SA medical doctors enter a 2-year internship immediately after graduation. This formative period includes four major and four minor disciplines. Paediatrics was introduced as a major discipline concurrent with the implementation of the 2-year internship,[11] and is a relatively recent addition to the internship rotation compared with the other major disciplines of surgery, internal medicine and obstetrics. In addition, demographic shifts in the composition of interns have occurred following changes in the recruitment policies of most SA medical schools, in attempts to redress the inequities of apartheid.[12] Little is known about the influence of internship training on career intentions, specifically in terms of paediatrics, in a transforming medical community.

SA paediatric interns work in an environment with a high disease burden. High neonatal, infant and under-five mortality rates reflect multiple burdens of disease, with HIV, tuberculosis and socioeconomic deprivation influencing childhood disease patterns.[13] Excessive workloads, high levels of stress and burnout are constantly being reported among all junior doctors, including interns.[14] In addition, poor supervision and institutional challenges with regard to poor infrastructure and management add further dimensions to an already challenging learning environment (LE) for interns.

The LE has been defined as a 'set of factors that describe a learner's experience within an organization'.[15] The clinical LE has been described as consisting of three parts.[16] The first part includes the provision of shelter, comfort and food, and refers to the infrastructure and physical facilities interns work in. The second part relates to support and feedback and includes the levels of harassment interns experience in the LE. The third part refers to the structured training, supervision, coaching and

learning required to develop the professional expertise of the intern.[16,17] The LE has been shown to influence trainees' learning processes and outcomes,[18,19] and satisfaction with the LE influences future achievements of trainees.[20,21] The Postgraduate Hospital Educational Environmental Measure (PHEEM) is a well-recognised instrument used internationally to assess the LE in postgraduate medicine, including medical internship.[22,23]

Attempts to determine the factors that influence the decisions of medical practitioners to care for children in areas with a high childhood disease burden require an understanding of the experiences and career intentions of interns who are already serving this need. The internship period offers a window of opportunity to influence long-term career choices.[24] To align national health priorities and to optimise healthcare would require identification of strategies to target medical practitioners early in their careers.[3]

Objective

To explore the influence of the LE in internship and demographic factors on the career intentions of interns with regard to paediatrics in an environment with a high disease burden by: (*i*) exploring the intentions of a cohort of SA medical interns in terms of future careers involving caring for children in the public health system; (*ii*) comparing career intentions before and after exposure to the paediatric internship LE; and (*iii*) investigating the influence of demographic factors and perceptions of the LE on interns' career intentions.

Methods

Research design

This was a cross-sectional cohort study.

Procedure

The sample population included two cohorts of interns sampled at two different times from four hospital complexes (comprising eight hospitals) in both major cities of KwaZulu-Natal (KZN) Province, SA. All four hospital complexes include large regional hospitals with high childhood disease burdens.

The primary cohort consisted of interns who had completed their internship in paediatrics and so had experienced the LE in this domain in an institution with a high disease burden. This cohort was sampled at the end of December 2015 and is referred to as the post-internship cohort. The second cohort, sampled in January 2016, consisted of new interns who were about to start their internship and had not had any exposure to the LE of internship in paediatrics. All eligible interns were informed of the study and invited to participate. Participants were informed of their rights and could withdraw at any stage.

The survey instrument

The primary author (KLN) used a survey instrument that comprised three segments. This instrument was part of a larger study on learning experiences of interns in KZN. The first segment of the survey instrument collected data on demographic variables related to sociocultural factors and prior educational exposure. Sociocultural variables assessed were gender, self-identified ethnicity, geographical location of the intern's home, and parental educational level. Geographical location was defined as consisting of three categories, namely urban (mainly city and suburban neighbourhoods), semi-urban (mainly 'township' neighbourhoods outside the main cities or towns) and rural (growing up on a farm). These distinctly different areas reflect significant racial and socioeconomic divisions in the SA context.[25] Prior educational exposure was determined by gathering data on the type of high school attended (whether a fee-paying or non-fee-paying school) and university attended for undergraduate medical training (whether the local university or a university outside the province or country).[26] These variables are recognised as important criteria in redressing inequity, and most SA medical schools have amended their undergraduate selection criteria based on these factors.[12] Self-reported undergraduate performance in paediatrics in the final year was used as a marker of undergraduate interest in paediatrics and was assessed to determine any relationship with career intention.

The second segment of the instrument collected data relating to perceptions of the LE as measured by the PHEEM. The original developers of the instrument, following qualitative and quantitative methods of research, proposed three subscales related to teaching, role autonomy and social support.[22] A local SA version of the PHEEM instrument was validated in a cohort of paediatric interns in four hospital complexes in Durban and Pietermaritzburg.[26] Cronbach's alpha to assess internal consistency of the local PHEEM was 0.943 for the overall scale. Cronbach's alpha for the teaching, autonomy, and social support subscales was 0.920, 0.815 and 0.760, indicating good reliability. Construct validity was measured with a factor analysis that indicated that a scale with three factors had 42% of the total variance explained. The three subscales based on the original tool were used to assess the LE.[26]

The PHEEM used in our study had eight minor changes to the original 40 items to accommodate terminology relevant to SA and paediatrics. Each participant scored each item on a five-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. The original questionnaire used a scale of 0 - 4, while we followed a more conventional scale of 1 - 5 as used by some authors.[20] The LE was measured only in the post-internship cohort who had completed their internship in paediatrics in December 2015.

The third segment of the survey instrument collected data on career intentions of interns in terms of their long-term future. This included working in or outside SA, and if the decision was to work in SA, whether this would be in the public or the private health sector. Information was also obtained on the intention to enter a medical specialty or general medical practice, and the likelihood of caring for children in whatever future career the respondent intended to pursue.

The questionnaire was group-administered by the primary author at each hospital. The group-administrative procedure ensured an improved response rate and immediate response to queries.

Sample size

A sample size calculation was based on the comparison of demographic variables and career intentions with PHEEM scores. Using a one-way analysis of variance (ANOVA) with up to four groups, the detection of a medium effect size (Cohen's *d*), at 80% power and the 5% significance level, a sample size of 180 was required.[27]

Data analysis

The overall PHEEM scale and subscale scores were calculated for each participant. The negatively worded items (7, 8, 11 and 13) were reverse-scored. Where there were missing data, means were computed based on data for available items, provided this did not exceed 20% of the items. The χ^2 test was used to assess the relationships between demographic variables and career intentions, and between these variables and intern group. Fisher's exact test was used for 2×2 tables or where the requirements for the χ^2 test could not be met. The relationship between age, PHEEM scores and demographic variables and career intentions was assessed by the *t*-test (or ANOVA for more than two categories). Where the data did not meet the assumptions of these tests, a non-parametric alternative, the Wilcoxon rank sum test (or the Kruskal-Wallis test for more than two categories) was

used. Data analysis was carried out using SAS version 9.4 for Windows (SAS Institute, USA). The 5% significance level was used.

Ethical approval

Ethical approval for the study was obtained from the University of KwaZulu-Natal Biomedical Research Ethics Committee (ref. no. BE177.15). Permission was also granted by the various institutions, as well as the Health Research and Knowledge Management Subcomponent of the KZN Department of Health (ref no. NHRD:KZ_2015RP30_226).

Results

Sample size and response rates

The total sample size of 422 respondents was adequate for the purposes of the study. The 2015 post-internship cohort (n=209) represented a response rate of 55.3%, and the 2016 pre-internship cohort (n=213) a response rate of 86.9%.

Demographic factors

As expected, there was a significant age difference (p<0.0001) between the pre- and post-internship cohorts. The median age of the pre-internship cohort was 24 (interquartile range (IQR) 24 - 25) years, as opposed to the median of 26 (IQR 25 - 27) years for the post-internship cohort.

Table 1 sets out the other demographic characteristics of the two cohorts of interns surveyed. With regard to gender, ethnicity, geographical location of the intern's home, parental educational level, high school attended and self-reported final-year marks in paediatrics, the differences between the cohorts surveyed were not statistically significant. Most of the interns sampled (87.5%) had completed their undergraduate studies at medical schools in SA, with 12.5% having graduated from non-SA medical schools. Fig. 1 illustrates the distribution of interns sampled who had attended various SA medical schools. The largest proportion had obtained their undergraduate medical qualification from the University of KwaZulu-Natal (29.4%), followed by the University of Pretoria (13.8%), Stellenbosch University (13.4%), the University of the Witwatersrand (13.1%) and the University of Cape Town (11.9%).

Table 2 sets out the career intentions of all the interns sampled and compares the pre-internship and post-internship cohorts.

Preferred location of practice

The majority (88.4%) of all interns indicated an intention to practise in SA. Overall, 72.6% of the interns intending to practise in SA indicated a preference for public sector service. However, almost a third of the post-internship cohort (32.7%) indicated a preference for private sector practice. This

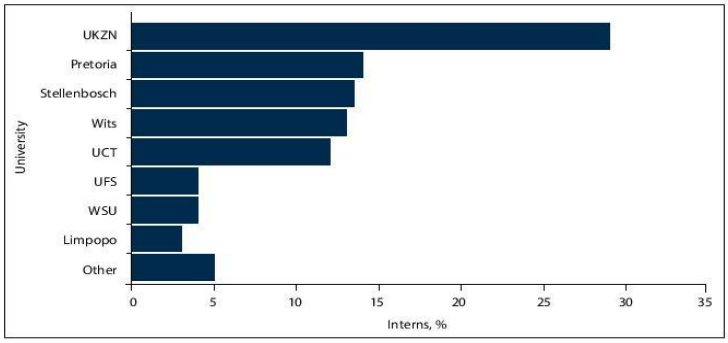

Fig. 1. Distribution of the interns sampled (N=411) in respect of South African medical schools attended. (UKZN = University of KwaZulu-Natal; Pretoria = University of Pretoria; Stellenbosch = Stellenbosch University; Wits = University of the Witwatersrand; UCT = University of Cape Town; UFS = University of the Free State; WSU = Walter Sisulu University; Limpopo = University of Limpopo.)

Table 1. Comparison of demographic characteristics of the pre- and post-internship cohorts of interns surveyed

Category	Overall, *n* (%)	Pre-internship, *n* (%)	Post-internship, *n* (%)	*p*-value for between-group test
Gender (*N*=411)				0.072
Male	166 (40.4)	75 (35.9)	91 (45.1)	
Female	245 (59.6)	134 (64.1)	111 (54.9)	
Ethnicity (*N*=392)				0.22
White	129 (32.9)	76 (37.6)	53 (27.9)	
Indian	122 (31.1)	58 (28.7)	64 (33.7)	
Black African	114 (29.1)	54 (26.7)	60 (31.5)	
Coloured	27 (6.9)	14 (7.0)	13 (6.9)	
Geographical location (*N*=409)				0.31
Urban	250 (61.1)	131 (63.3)	119 (58.9)	
Township	114 (27.9)	51 (24.6)	63 (31.2)	
Rural	45 (11.0)	25 (12.1)	20 (9.9)	
Parental education level (*N*=406)				0.26
Non-university	122 (30.0)	57 (27.5)	65 (32.6)	
University	284 (70.0)	150 (72.5)	134 (67.3)	
High-school type (*N*=409)				0.075
Non-fee	160 (39.1)	73 (34.9)	87 (43.5)	
Fee paying	249 (60.9)	136 (65.1)	113 (56.5)	
Final-year paediatrics mark (*N*=404)				0.23
<60%	30 (7.4)	11 (5.4)	19 (9.5)	
≥60%	374 (92.5)	192 (94.6)	182 (90.5)	

Table 2. Career intentions of the pre- and post-internship cohorts

Category	Overall (*N*=422), *n* (%)	Pre-internship (*N*=213), *n* (%)	Post-internship (*N*=209), *n* (%)	*p*-value for between-group test
Stay in SA	343 (88.4)	178 (94.0)	165 (87.3)	0.51
Leave SA	45 (11.6)	21 (10.6)	24 (12.7)	
Private sector	94 (27.4)	40 (22.5)	54 (32.7)	0.03*
Public sector	249 (72.6)	138 (77.5)	111 (67.3)	
Will care for children	248 (60.2)	128 (61.8)	120 (58.5)	0.49
Prefer not to care for children	164 (39.8)	79. (38.2)	85 (41.5)	
Specialise	354 (85.9)	176 (85)	178 (86.8)	0.13
General practice	50 (12.3)	31 (14.9)	19 (9.6)	

SA = South Africa.
*Significant at $p<0.05$.

was a percentage significantly higher than the 22.5% reported in the pre-internship cohort who indicated a preference for private sector practice.

Intention to care for children and intention to specialise

When asked about the likelihood of caring for children in their future careers (whether in general practice or in their chosen specialty), 60.2% intended to care for children. This percentage was similar across the cohorts. The majority of interns (85.9%) intended to specialise in the future. This figure was not significantly different in the two cohorts sampled.

Influence of demographic and educational factors on career intentions

Table 3 shows the relationships between demographic variables and previous educational exposure with career intentions of the interns.

Ethnicity, family educational level, geographical location of the intern's home and type of high school attended did not significantly influence intentions to practise in SA or or to practise in the public or private sectors. These sociocultural factors were also not found to be significant in influencing intentions to specialise among the sampled interns.

Significant associations were found between gender and intentions to practice in the private sector and to care for children. A higher proportion of male interns (44.4% of all male interns) than female interns (16.6% of all female interns) indicated an intention to move to the private sector. A higher proportion of female interns (64.4% of all female interns) than male interns (only 45.3%) indicated an intention to care for children in the future. Significant associations were found between ethnicity, the geographical location of the intern's home and their intention to care for children. More interns who self-identified as black African (71.7%) indicated a preference for paediatric service compared with Indian (60.0%) and white (54.3%) interns and those of mixed race (40.7%). A higher proportion of interns from rural areas (82.2%) than interns from urban (58.0%) and semi-urban (57.0%) locations intended to care for children.

Educational factors and career intentions

The intentions of interns to practise in SA, to specialise and to work with children were not significantly associated with the medical school they graduated from or their performance in the final year of their undergraduate paediatric studies.

An intention to stay in the public sector in their future careers (among those who indicated that they intended to practise in SA) was significantly associated with whether an intern had graduated in SA or in another country, and with performance in the final year of undergraduate paediatric studies. A higher proportion of non-SA-graduated interns (44.7%) than locally graduated interns (25.3%) indicated an intention to work in the private sector.

Compared with interns who indicated that they had obtained ≥60% in final-year paediatrics, a higher proportion of interns who had scored <60% indicated a preference to work in the private sector (23.9% v. 44.0%).

Association between perceptions of the LE and career intentions

The relationship between the overall PHEEM scores and the three subscale scores measuring interns' perception of their LE and career intentions is summarised in Table 4.

Significant associations were found between the overall PHEEM score and career intentions of interns following the paediatric internship. There was a significant association between the mean PHEEM score and intention to practise in SA. The mean score (standard deviation (SD)) for interns intending to leave SA (3.07 (0.65)) was significantly lower than that for interns intending to practise in the SA private sector (3.50 (0.54)) and in the SA public sector (3.62 (0.43)) (Fig. 2). Similar relationships were seen across all three of the PHEEM subscales of teaching, role autonomy and social support. There was a significant relationship between the overall PHEEM score and intention to pursue paediatric practice in the future. Interns who indicated an intention to care for children scored significantly higher on the PHEEM (3.59 (0.44)) than those who

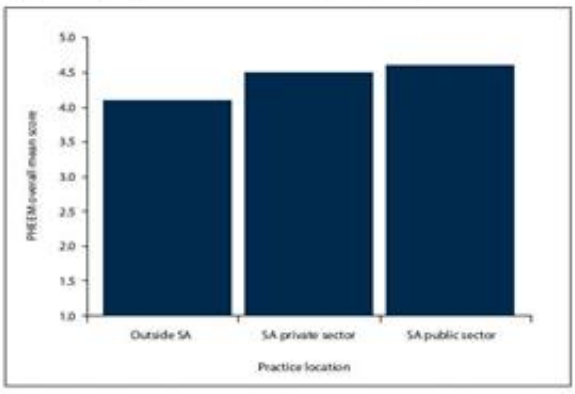

Fig. 2. Association between PHEEM score and intention to practise in SA, and in the private or the public sector. (SA = South Africa; PHEEM = Postgraduate Hospital Educational Environmental Measure.)

Table 3. Relationship between demographic variables and prior educational experience with career intentions

	Area of practice				Intention to care for children		Intention to specialise	
Category	Stay in SA	Leave SA	Private sector	Public sector	Will care for children	Prefer not to care for children	Specialise	General practice
Gender								
Male	88.2	11.8	44.5	55.6	45.3	54.7	86.5	13.5
Female	89.5	10.5	16.6	83.4	64.4	35.6	13.5	87.3
Total, % (*n*)	89.0 (340)	11.0 (42)	27.7 (94)	72.3 (246)	60.5 (245)	39.5 (160)	86.9 (341)	13.1 (51)
p-value	0.69		<0.0001*		<0.05*		0.81	
Ethnicity								
Black African	91.5	8.4	28.5	71.4	71.7	28.3	90.5	9.4
Mixed race	88.5	11.5	17.4	82.6	40.7	59.3	86.9	23.1
Indian	88.8	11.2	21.4	78.6	60.0	40.0	89.8	10.2
White	89.7	10.3	35.2	64.8	54.3	45.7	82.4	17.6
Total, % (*n*)	89.9 (329)	10.1 (37)	27.7 (91)	72.3 (238)	60.2 (233)	39.8 (154)	86.7 (325)	13.3 (50)
p-value	0.91		0.09		0.006*		0.08	
Parental education level								
University	89.7	10.3	29.1	70.9	60.3	39.7	88.9	11.1
Non-university	87.2	12.8	23.5	76.5	62.1	37.9	83.9	16.1
Total, % (*n*)	88.9 (336)	11.1 (42)	27.4 (92)	72.6 (244)	60.8 (244)	39.2 (157)	87.4 (334)	12.6 (49)
p-value	0.48		0.29		0.72		0.17	
Geographical location								
Urban	87.9	12.2	27.1	72.9	58.0	42.0	86.2	13.8
Semi-urban	88.6	11.4	30.1	69.9	57.0	43.0	87.5	12.5
Rural	95.6	4.4	25.6	74.4	82.2	17.8	90	10.0
Total, % (*n*)	89.0	11.0	27.7 (94)	72.3 (245)	60.4 (244)	39.6 (160)	87 (340)	13.0 (51)
p-value	0.32		0.82		0.006*		0.787	
High school type								
Fee paying	84.2	15.8	30.1	69.9	59.4	40.6	87.2	12.8
Non-fee	89.3	10.7	23.9	76.1	62.0	38.0	86.8	13.2
Total, % (*n*)	86.6 (278)	13.4 (43)	27.6 (94)	72.4 (246)	60.4 (246)	39.6 (161)	87.1	12.9 (51)
p-value	0.18		0.21		0.6		0.92	
Where undergraduate studies done								
SA	85.8	14.2	25.3	74.7	59.2	40.8	86.5	13.5
Non-SA	88.0	12.0	44.7	55.3	71.4	28.6	92.0	8.0
Total, % (*n*)	86.1 (261)	13.9 (42)	32.7 (93)	86.3 (245)	60.6 (245)	39.4	87.2 (342)	12.8 (50)
p-value	0.69		0.01*		0.09		0.28	
Final-year paediatrics mark								
≥60%	90.8	9.2	23.9	76.1	58.5	41.5	87.4	12.6
<60%	96.1	3.9	44.0	66.0	66.7	33.0	83.4	16.6
Total, % (*n*)	91.2 (332)	8.8 (32)	25.5 (82)	74.5 (240)	59.1 (230)	40.9 (159)	87.1 (337)	12.9 (50)
p-value	0.35		0.026*		0.38		0.52	

SA = South Africa.
*Significant at $p<0.05$.

preferred not to care for children (3.42 (0.56)). A similar relationship was found in the teaching and role autonomy subscales. There was no significant relationship between the intention to specialise and perceptions of the LE as measured by the PHEEM instrument.

Discussion

This study has shown that perceptions of the LE in which interns work significantly affect their career intentions, while most of the demographic factors analysed were not found to influence these intentions.

The good responses obtained with the group administration are similar to other studies in which the PHEEM was used to measure the LE.[23,28] Apart from the expected age difference, the demographic similiarities between the pre- and post-internship cohorts allowed for the comparison of career intentions across the groups as representing either interns with experience in the paediatric LE during internship or those without experience.

The demographic composition of the interns in these cohorts reflected changes in undergraduate recruitment and admission policies. This sample included an increasing number of black African and female newly qualified doctors in both cohorts, which reflects the overall changes in the medical practitioner community in SA. Although the majority of interns came from urban homes with

Table 4. PHEEM scores v. career intentions of paediatric interns

	Overall		Teaching subscale		Role autonomy subscale		Social support	
Category	*n*	Mean (SD)	*n*	Mean (SD)	*n*	Mean (SD)	*n*	Mean (SD)
Area of practice								
Leave SA	24	3.07 (0.65)	24	3.12 (0.79)	20	3.26 (0.54)	22	2.82 (0.59)
SA private sector	53	3.50 (0.54)	53	3.54 (0.65)	53	3.60 (0.51)	54	3.31 (0.52)
SA public sector	109	3.62 (0.43)	110	3.67 (0.51)	105	3.74 (0.42	109	3.4 (0.51)
p-value		<0.0001*		0.0002*		0.0003*		<0.0001*
Intention to care for children								
Will care for children	117	3.59 (0.44)	118	3.66 (0.50)	111	3.73 (0.42)	118	3.36 (0.52)
Prefer not to care for children	85	3.42 (0.56)	85	3.46 (0.67)	83	3.52 (0.51)	84	3.23 (0.56)
p-value		0.016*		0.02*		0.0019*		0.098
Intention to specialise								
Prefer to specialise	175	3.51 (0.52)	176	3.57 (0.60)	168	3.64 (0.48)	176	3.30 (0.54)
Prefer general practice	19	3.45 (0.40)	19	3.51 (0.46)	18	3.51 (0.46)	18	3.19 (0.41)
p-value		0.60		0.64		0.83		0.41

PHEEM = Postgraduate Hospital Educational Environmental Measure; SD = standard deviation; SA = South Africa.
*Significant at $p<0.05$.

university-educated parents, over a third came from semi-urban or rural homes and nearly a third from families in which neither of the parents had obtained a tertiary qualification.

Practice preference for SA's public sector service

In this study, only 11.6% of the interns indicated an intention to leave SA after completion of their internship and community service. This figure is similar to reports from previous SA studies.[5,29] The proportion of medical practitioners intending to emigrate is much higher among cohorts sampled in other SSA countries, reflecting an advantage for SA, possibly owing to its relatively better-resourced postgraduate training infrastructure than other SSA countries.[3,4] This positive trend of the bulk of junior doctors intending to remain in SA provides an opportunity to harness their potential and align it to national priorities. A further positive finding was that over two-thirds (67.3 - 77.5%) of interns intended to work in the public sector. However, the proportion of respondents who intended to work in the public sector dropped after internship, possibly reflecting the influence of the LE on the decision to move from SA's public to private healthcare sector. The trend towards leaving the public sector for the private sector mirrors findings in the rest of SSA,[4] where the odds of doing so increase each year. The figures also support those in a study where a third of junior doctors indicated a preference to practise in the private healthcare sector.[3]

The finding that ethnicity, family educational background and geographical location of an intern's home had no significant role in decisions to leave SA or to work in the public sector indicates that most newly qualified SA doctors have very similar career intentions. Career intentions seem similiar across universities in SA, and in this study, individual self-reported undergraduate performance was shown not to have any association with career choice. The preference of non-SA-trained graduates to work in the private health sector needs further exploration with larger samples. It is possible that graduates who trained eslewhere are keen to work in SA specifically so that they can enter the lucrative private sector.

Intention to specialise

The high proportion of respondents intending to specialise in a branch of medicine (>85%) is similar to other reports on career choice among junior doctors.[3,5,30] It is diffcult to determine when this decision is actually being made. The high intention to specialise in both the pre- and post-internship cohorts suggests that undergraduates may nurture the idea of specialising, and the internship period, with its modular approach of four major and four minor specialties, serves to entrench the idea further. Demographic factors were not shown to influence the decision to specialise, reinforcing the finding that aspirations were similar among most qualifying interns.

The high proportion of respondents intending to specialise raises concern, especially in view of the fact that national priorities strive to create a strong primary healthcare infrastructure and workforce. Findings that over half of all doctors in developed countries will become general practitioners reflect this discrepancy between junior doctor career intentions and national requirements.[31] Long-term studies have indicated that half of those who intended to specialise were in fact working in general practice when tracked within 10 years after qualification.[9] These findings may suggest that the aspirations to specialise that are firmly entrenched following medical school and internship are incongruent with the actual healthcare needs of most countries. The observation that most medical doctors who originally intended to specialise enter general practice needs further exploration in the SA context, where a strong primary healthcare foundation is integral to national plans to ensure more equitable healthcare delivery.

Intention to care for children

With the burden of child health remaining high in SA, a major strategy towards improving paediatric care is to ensure the training of healthcare workers who are competent in and passionate about caring for children. Our finding that ~60% of interns intended to care for children represents another opportunity to harness these desires in the early post-qualification years by mentoring, supporting and encouraging careers in paediatrics and child health during this period. Gender has been recognised as a factor in choosing paediatric care, and this study supports this finding.[32,33] The finding that higher proportions of black Africans and interns from rural areas favoured careers in which they would care for children needs further exploration, especially in the context of the transforming demographics in the medical practioner population.

Influence of the LE on career intentions

The significant influence of interns' perceptions of the LE on decisions to work in SA, in the public sector and with children clearly indicates the importance of the internship LE in shaping

career intentions. With the teaching subscale scores in the PHEEM showing signifcant influences on career intentions of respondents who had completed their internship in paediatrics, it is evident that the role of supervisors and the quality of mentoring and training in this environment highly influence career intentions of junior doctors.

This study further indicates that negative influences in the LE steer interns away from careers that would support national health priorities such as caring for children in the public sector. Given the reported challenges in ensuring quality training and optimal standards of care at institutions where interns work, the importance of the internship accreditation processes needs to be re-emphasised to ensure successful learning in an optimal LE.[34-36] Ensuring an optimal LE in internship has the potential to significantly affect long-term health workforce planning.

Study limitations

This study analysed data from two separate cohorts, as opposed to documenting the changing intentions in one cohort over time. Interns in only one province of SA were sampled, representing the LE of only one provincial health department. Furthermore, the study focused on one specific discipline during internship and may not be representative of other specialties. No qualitative data were collected, and only quantitative measures of self-reported intern perceptions are presented.

Conclusion

In this study, most newly qualified medical doctors indicated an intention to work in SA's public healthcare sector and a desire to care for children. Apart from gender, other demographic factors did not appear to influence these decisions significantly. However, internship was shown to be a critical phase, as perceptions of the LE signficantly influenced interns' career decisions, with negative experiences potentially steering them away from working with children in SA's public health system. The study shows that the impact of the LE must be considered when designing and accrediting training programmes for junior doctors.

To tackle SA's high childhood disease burden, increased efforts to understand and improve the training environment during paediatric internship are required. Further qualitative studies and investigations across more disciplines and provincial settings are needed to fully understand the roles of factors in training and the LE on future workforce predictions and career trajectories. This brief but critical period in junior doctors' training may be the only opportunity we have to align the aspirations of newly qualified medical practitioners with national healthcare needs.

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Conflicts of interest. None.

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7.4 Key findings and contribution of this manuscript to the thesis

Results from this study showed a relationship between interns' perceptions of the LE and their career intentions. This was corroborated when comparing the results of the career intentions of intern groups before and after internship exposure.

The findings that the perceptions of the LE during internship influenced decisions to migrate from SA's public health sector and from opportunities to care for children entrenched the importance of internship as a formative period for career decision-making. This study provided information to understand the reality seen in many SSA countries where the chances of health practitioners leaving the public sector increases with time after qualification. [104]

The study highlighted the impact of gender on career intentions whilst indicating that interns irrespective of ethnicity, or university or socio-economic background had similar career intentions. In addition the strong inclination towards career futures that included specialisation, indicated a divergence from national plans for producing primary health care practitioners.

The interplay of factors within the LE are thus important considerations in career decision making amongst interns and needed to be understood with greater depth. Whilst this study confirmed the influence of perceptions of the LE on intern career decisions, the differences noted between supervisor and intern perceptions and the impact of individual demographic factors on perceptions of the LE required further exploration. In order to understand the interplay of these factors on career intentions and the impact on national health priorities required the use of further qualitative methods for its ability to add depth from strategies such as the focus group discussion. This qualitative exploration into the reasons for the relationships between the perceptions of the LE and career intentions was subsequently conducted and the findings are presented in Chapter Eight.

CHAPTER 8: HOW DO INTERNS' PERCEPTIONS OF THE LEARNING ENVIRONMENT INFLUENCE THEIR CAREER INTENTIONS?

8.1 Introduction

The qualitative nature of this stage of the study, aimed to provide greater insight into the findings highlighted in Chapters 5 to 7. Whilst the findings are presented in a standalone format for a publication, the integrated nature of the chapter to the rest of the studies must be noted. This is in keeping with the sequential explanatory mixed-methods design of the study. The qualitative thematic analysis of the narrative data generated from the open ended questions in the survey was thematically analysed and supplemented the qualitative data generated during the focus group discussions

In line with the research objective that set out to explore the views of interns on their experiences in their LE and the relationship of these experiences to career intentions, this study was aimed at the investigating why Paediatric interns experienced the LE in the way they did, and how those factors associated with LE, influenced intern career intentions towards care in SA's public health system. This chapter presents the analysis of the focus group data discussions on the background of the relationships already reported on based on the survey results (Chapters 5-7).

8.2 Publication details

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8.2.1 Journal Information

The African Journal of Primary Health Care & Family Medicine (PHCFM) welcomes submissions that encourage scholarly exchange between family medicine and primary health care researchers and practitioners across Africa and the developing world, whilst providing a contextual and holistic view of family medicine as practiced across the continent. The journal is indispensable for primary health care practitioners, family medicine specialists and academics from both the developing and developed worlds, and offers an engaging insight into the growth of these disciplines from a distinctly African and developing world perspective.

8.2.2 Publication Record

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8.2.3 Contribution record

The candidate conceptualized the paper and was the main author. Dr Van Wyk supervised the study and contributed towards the review of the paper.

8.3 Manuscript

Title: Perceptions of the Learning Environment influence Intern Career Intentions

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ABSTRACT:

Introduction:

Priority health needs in South Africa (SA) advocate for primary care medical practitioners within public health facilities who are capable and committed to caring for children. Poor perceptions of the clinical learning environment (LE) amongst interns (newly qualified medical practitioners in the first two year following graduation) correlate with the migration of practitioners from SA's public health service. In order to develop strategies to ensure a reliable workforce for paediatrics and child health there must be an understanding of the career intentions of interns in SA.

Methods:

A social constructivist paradigm framed the methodology of this study. Interns in major hospitals in KwaZulu–Natal were sampled in 2015 to explore their perceptions of their learning environment and its relation to their career intentions. Five focus groups were held across five high childhood disease burdened hospitals to gather data on paediatric intern experiences. Qualitative data, from focus group discussions were coded and themed using a combination of manual and computer assisted methods (NVivo 11 software).

Results:

A high disease burden, poor support and failure of full participation within 'communities of practice' in hospital-based specialist units led to interns failing to identify with roles in primary care and child health. Interns instead favoured specialization and express hesitancy in caring for children.

Conclusion:

Challenging environmental factors especially dysfunctional 'communities of practice' in hospital settings, foster conditions that interns perceive as barriers to or identifying with careers in primary care and child health. Changes to the LE including alignment of intern curricula to national child health priorities, improved training and support to interns may hold the potential to align career intentions of SA interns with national health needs.

Introduction

The South African (SA)National Department of Health Strategic plan 2014-2019 [1] and the National Health Insurance (NHI) white paper of 2017[2] prioritize the need for productive and retainable primary care medical practitioners which includes a commitment to child health. The career intentions of interns, should ideally be focused towards strengthening primary health care in public health facilities with a willingness to care for children. Research into the

career choices in Africa, however indicate an increasing trend among medical practitioners to abandon the public health sector resulting in a general failure to address key national health priorities. [3, 4] Little is known of the experiences and perceptions of SA interns working in high childhood disease burdened environments and how these environments influence career intentions especially regarding to working in the public health sector, in primary health care that included children.

The context in which interns practice can be defined as the clinical learning environment (LE) and their perceptions of that environment are used to gauge assessments of the quality of such training. [5] The LE consists of the 'physical environment' (facilities, comfort, safety and work-hours); the 'intellectual environment' (support for training, learning with patients, use of evidence based knowledge), and the 'emotional environment' (social support, the levels of harassment experienced). [6] Their perceptions are shown to influence the career intentions of junior doctors. [5] Validated tools like the Postgraduate Hospital Educational Environmental Measure (PHEEM) are useful to assess perceptions of the LE. [7] In a recent study, Naidoo KL, Van Wyk JM,2017 et al demonstrated that low PHEEM scores indicating poor perceptions of the LE were significantly associated with the intentions of interns to leave SA, its public health system[and to care for children[8]. Analysis of the qualitative data of the open-ended questions on career intentions study revealed multiple themes that were used in formulating the focus group interview schedule. This study further highlighted the need for greater qualitative data to fully understand the reasons for the poor perceptions which interns had of the LE [8]. Theoretical models are used in educational studies to frame the understanding of interactions of learning and propose possible solutions to challenges noted. The 'communities of practice' theory views learning situated in co-participation whereby the intern as a 'newcomer ' within a clinical unit such as a department, ward or clinic enters a trajectory to full 'membership 'in this unit of practice [9]. The Social Cognitive Career Theory (SCCT) is presented as a possible way to understand the processes through which interns within these 'communities of practice' form career interests [10]

This study was thus conducted to explore the factors present in high childhood disease burdened LEs which influence interns' perceptions to care for children in the South African public health system. In particular, this study explored the experiences of paediatric interns of their LE and further explored insights into the influence of factors associated with the LE on the career intentions of the interns.

Methodology

Given the nature of the study was to explore and understand the factors influencing the perceptions of interns of the LE on their career intentions, this study was conducted within a social constructivist paradigm. Interns are viewed as learners who are active participants in their own learning. The paradigm was selected for its suitability to emphasise the importance of social engagement in the intern's learning process and for accommodating multiple realities based on social and experiential constructions of interns.

Interns in five large hospitals serving high childhood disease burdened populations in Durban and Pietermaritzburg in KwaZulu-Natal were purposively invited to participate in focus groups discussions in December 2015

Ethical approval for the study was obtained from the University of KwaZulu–Natal Biomedical Research Ethics Committee Participants were informed of the study through their respective intern coordinators and they were informed of their right to withdraw at any stage. Written informed consent was obtained from all participants. Participation in the study was voluntary with the anonymity and confidentiality of respondents being assured.

The focus groups were conducted during an allocated time during the day and interns participating in the focus groups were provided with lunch. The primary researcher facilitated all focus group discussions using a semi-structured interviewer guide. The focus group discussion questions were used as a guide to explore the interns' experiences in the paediatric rotation, their career intentions following internship and their prospects to work with children in the SA public health system.

Figure 1: Focus group Interviewer guide

Focus group interview schedule:
1. Tell us about your experiences whilst working in paediatrics and child health during your internship?
2. Tell us about your long term career intentions?
3. What do you feel about a future career in the South African public heath system?
4. What do you feel about looking after children in which ever future career you intend following?
5. Why do you think you feel the way you do about your future career intentions?

Data Analysis

The focus group data were audio-recorded and transcribed verbatim. The transcripts were read by the primary researcher and a research assistant for accuracy. The primary researcher re-read the transcripts on multiple occasions to familiarize himself with the data before the inductive coding process. The primary researcher used NVivo 11 to enter transcribed data and to create and categorise codes and themes. A second independent investigator (a professional health educationist) verified the codes derived from the data by cross-checking these against the original transcripts. This process was conducted independently to enhance the credibility and trustworthiness of the data. [11] A list of major descriptive themes was developed by each coder. Data saturation was identified by referencing quotes from all the focus groups to the emergent themes. Consensus was obtained after an iterative process to define the final themes. [11]

Trustworthiness

We applied the general criteria for trustworthiness of qualitative research of Lincoln and Guba. [12, 13] Triangulation of data was enabled by having five different focus groups across different sites which allowed the pooling of a wide variety of views. This process assisted in gathering a range of 'thick descriptions' to understand the context. [14] Reflexive bias was decreased through data analysis involving an additional investigator an educationist who was not involved in intern training, as the primary researcher is a paediatrician involved with intern training at one of the sites.

Results

The demographic characteristics of the participants of the focus group discussions are indicated in Table 1.

Table 1. Characteristics of the participants in the focus groups n (%)

Characteristics(#)		Focus groups n=33 (%)
Gender	Male(M)	14 (42)
	Female(F)	19 (58)
Ethnicity	Black African(B)	14 (42)
	Mixed Race(M)	3 (9)
	Indian(I)	9 (27)
	White(W)	7 (21)
Hospital FG 1-6(#)	Addington	7 (21)
	King Edward VIII	5 (15)
	Mahatma Gandhi	6 (18)
	Pietermaritzburg complex Edendale, Grey's and Northdale Hospitals	8 (24)
	Prince Mshyeni	7 (21)

(#) Code for quotations e.g. M, B: FG 1= male participant (M), Black African (B) from Data source Focus Group 1(FG1)

The major analytical and descriptive themes with their respective inductive codes are presented in Table 2. All themes were consistently articulated in all focus groups. Perspectives associated with the themes are presented and quotations included for verification. Quotations are coded for gender, ethnicity and which focus group to highlight the spread across diverse participants and sites.

Table 2. List of inductive codes, descriptive themes and major analytical themes.

Inductive codes	Descriptive themes	Major analytical themes
1. Institutional challenges in hospitals 2. Disease burden 3. Social circumstances of patients	**External barriers that influence career intentions**	**The LE negatively influences intern career intentions in the SA public health system**
4. Restrictive approach to participation within clinical units 5. Influence of role models on careers intentions	**Barriers to participation within clinical units**	
6. Perceived coercion to generalist (primary)care from national authorities 7. Emotional burden and increased stress associated with paediatric care	**Reluctance to provide priority health services**	**Discordance between intern's career intentions and national health priorities**
8. Positive personal outcomes seen with specialization 9. Concerns with access to specialize	**Strong agenda to specialise**	

Influences of the Learning environment on career intentions

It is evident that the experiences gained during internship, serve as a major factor when interns contemplated their long-term career intentions.

"Internship opens your mind...because in medical school your life is still about reading from a book, and then in internship, you enter to the real world" (M2, B: FG3)

Contextual barriers to career intentions in Public health care

Interns articulated a number of challenges in the LE. Institutional challenges noted included resource constraints affecting care of patients on a daily basis (lack of daily needed consumables, nurses and intensive care unit beds) and poor support to clinicians in the provision of resources by perceived inefficient management.

"The lack of resources, like when you see patient dying. Where's the ICU? Where's the high care in this hospital? Whose is going to survive a heart attack?" (F1, B: FG3)

"I don't want to ask someone ten times to be efficient ...this is often the struggle ...struggling makes your work environment very unpleasant" (M1, W: FG2)

"I was thinking I would never go into private but when you are running around in the middle of the night looking for (IV lines), things that should not be a problem, you get frustrated" (F3, I: FG2)

Disease burden

The impact of a high mortality especially due to HIV/AIDS and Tuberculosis (TB) especially in paediatrics coupled with a fear of needle stick injuries and contracting TB steered many interns away from identifying with future roles in these fields in the SA public sector. Some interns saw the exposure to a high disease burden as means to develop experience, for their future.

"If it comes to internal medicine then you just don't care ....when it's the ninetieth HIV/TB patient ...." (M4, M: FG4)

"If I do internal medicine or paediatrics, I wouldn't do it in SA, I don't want to be a specialist in HIV and TB..." (F2, W: FG4)

"The heavy workload makes you a better doctor with more capacity for later practice" (F3, W: FG5)

Social circumstances of patients

There was an antagonism and apparent lack of empathy expressed by interns towards patients and the contexts they came from. Late presentation of illness, poor patient compliance to medication, child neglect, rampant inter-personal violence and abuse were viewed as barriers to a future in the public health system and paediatrics rather than challenges to be overcome within the public health system. Interns indicated that unrealistic expectations from patients further strained relationships with their patients.

> *"I cannot believe how parents choose to treat their children and how people treat children" (F3, W: FG5)*
>
> *"When you see babies who are HIV positive, I mean it's just not right - you think there's some element of parental irresponsibility" (M2,B:FG5)*
>
> *"Just because I am a doctor, does not automatically mean, I have to be compassionate and all self-sacrificing" (F3, I: FG1)*

Restrictive approach to participation of interns in clinical units

The interaction that occurs within a unit (clinical department, ward, or clinic) where interns worked was highly influential of perceptions of the LE. Interns perceived themselves as being seen as 'pawns' within strict, unrelenting hierarchies that prevented their full participation in shared work. The importance of feedback, approachability and support was also highlighted. The strength of a unit was seen in its ability to support participation by having an organised structure, teamwork and leadership in place.

> *"I also feel like you know when you do internship, you feel like you are at the bottom of the food chain 'and that's a given!" (M1, B: FG3)*
>
> *"Interns are treated as the work-horses" (M1, I: FG3)*
>
> *"If you are going into ward rounds whereby you know you won't be part of it, you just go there and just wait for them to tell you what to do... You don't care now" (M1, B: FG5)*
>
> *"Very often that consultants tend to speak to you like you're an idiot ...they don't want to include you in the ward discussion" (F3, W: FG5)*

"Nobody is willing to listen to you when you are in internship" (M3, I: FG1)

Interns indicated that the experiences of registrars and medical officers with whom they worked closely, had significant influence on their career intentions.

"In terms of job satisfaction look at your seniors, it gets honest at 2am in the morning and they are honest enough to give you advice and tell things that no one else will tell you" (M1,W:FG2)

"When you look at them (registrars) and they're all worn out …it makes you wonder because I put myself right in their shoes" (F1, B: FG2)

Discordance of intern career intentions with national health priorities

There was an expressed reluctance by many interns toward careers in primary health care, working with children and rural health. There was a widespread perception that the state was coercing medical doctors into accepting careers focused on primary health care in poorly resourced rural facilities by restricting access to specialization. Interns proposed alternative models of rotation through rural areas and use of clinical associates as solutions to address inequities and inefficiencies within the health sector. The negative perceptions of public health systems were entrenched by experiences of inefficient intern and community service placement processes.

"There's no give and take, it's just take, take, take …it's from government to consultants and all the way down" (M2, I: FG1)

"I can understand it from their (government) point of view, I wouldn't mind going to a rural areas for a while, not perpetually, but I don't want to be forced into doing it" (F2, B: FG1)

"To make a difference, it needs to be small things that happen quickly; clinical associates, rotation systems, incentives …" (F3, W: FG1)

Emotional burden and increased stress associated with caring for children

The emotional burden of coping with death, children suffering and perceptions that paediatric care is associated with greater stress and constant worry limited the intentions of many interns from a possible future that included the care of children.

"I don't know if I will be able to handle the emotional burden in looking after sick children ..And another thing there's very little room for error .So you really can't make any mistake, as that can cost a child's life" (F2,B:FG5)

"Paediatrics it really kills me -you don't learn how to cope with death and loss; it's stressful doing lumbar punctures and repeat blood draws on children" (M1, I: FG1)

"In Paediatrics I find myself more stressed than I've been and you take that stress home with you ... ...it takes its toll on you" (M4,M:FG5)

Agenda to specialize

There were also many expressions of indecision about career intentions, however there was widespread agreement that the future should include a decision regarding specialisation. The choice of a specialist field received much greater consideration than a career as a primary care medical practitioner. Ambivalence with making career intentions was ascribed to tiredness associated with internship, the desire to raise a family especially amongst female interns, the period of time required for specialization and concerns over perceived poor access to specialty programs in SA.

"I always thought I had a plan...like finish medical school and internship then start with specialization because you get bored with doing the same thing over and over ...now internship has been too hectic, I can't wait to take time off" (F2,W:FG4)

"Internship also helped me to realize that I would never, not for all the money in the world, do certain specialities" (M2, I: FG1)

"I like surgery, but after marriage, I am having second thoughts about it. Once you have a family, being a female then you want to give equal time to both (career and family)" (F3, I: FG2)

"I think it used to be a lot easier to get into a specialty. Within a year or two you were generally in the program I think based on the cut in registrar numbers it's so competitive now" (M2,W:FG2)

Primary care practice in public health facilities were seen as less popular careers intentions compared with various specialities. The perceptions that only specialist practice provided an intellectual challenge and a better lifestyle later in life led many to see this as the most favoured career intention.

> *"You personally want to better yourself, you want something better, and you want to be driven, that why I want to specialize" (M3, I: FG1)*

> *"For me, the main thing determining what I want to do eventually is quality of life. That's what's driving my decisions at the moment. I'm looking at my life at 45, and 50. I don't want to be doing 24 hour calls at the hospital as a general doctor" (M4, M: FG5)*

Discussion

The intern's perceptions of the LE was shown in this study to be influenced by multiple factors. These factors included the relationships between interns and their seniors within clinical units. A discordance with national health priorities was evident with intern's reluctance to opt for primary care based careers in public hospitals.

Various studies have identified the impact of the LE on career intentions. [15, 16] In this study, multiple challenges are shown to coalesce in the intern LE which created barriers for participation of interns within clinical units of practice.

Intern training curricula of individual specialist units often do not prioritize primary health care, child health or rural health but rather have a narrow specialist focus. [17] Poor training with a lack of focus on social accountability and support from appropriate role models contributes to a failure to develop an interest amongst interns to manage the health care challenges posed by the SA health care landscape. [17, 18] The lack of appropriate support and mentoring leads to an inability to develop adequate resilience amongst interns within the milieu of high patient mortality and social challenges which plague SA society. [18] Interns experienced a lack of inclusive, co-participation or 'mutual engagement' within clinical units, which should function as 'communities of practice'. [19] Despite their position as 'legitimate

peripheral participants' in these 'communities of practice', interns are generally not included in the development of the 'joint enterprise' within these teams. [8,19,20] This marginal position in which interns are placed in and their 'alienation' within these often dysfunctional 'communities of practice' stymies the development of their self-efficacy as competent medical practitioners. [10, 19, 20] This is associated with a failure to fully develop an identity where they can see themselves in roles to manage various national health challenges facing SA. [8, 10]

In addition, when interns perceive poor support and antagonism from national health authorities, these perceptions entrench their feelings of 'alienation and 'disinterest' in a future within the public health system. This exacerbates poor participation and relationships with seniors within 'communities of practice' and this leads to increased stress and burnout among interns. [20,] The high levels of burnout can be seen to be manifested in the 'depersonalized' views expressed by interns towards society and their patients. [21]

The overwhelming need to specialize as indicated by the majority of interns is a finding reflected in many parts of the world. [9, 22, 23] The reality is that most medical practitioners would enter primary care practice despite their aspirations to specialize. [22] There is a widely held perception that specialists enjoy a better work-life balance than non-specialist staff in public hospitals as these stereotypes have been perpetuated from undergraduate training to internship in SA. [22] The need for a better work-life balance and gender specific concerns, to cater for a lifestyle that allows one to rear a family, are well described in literature and reported in other disciplines. [24-27] However in the SA context these factors further exacerbate the decisions to exit the public health system.

The role of factors in the LE as either career barriers or catalysts that influence career intentions, is recognised as significant factors in various theoretical models on career choice. [10,22] The previously described factors that affect the LE can be seen as contextual barriers for interns to develop the necessary self-efficacy and positive outcome expectations for the fields of primary care, paediatrics and child health which then results in interns not favouring careers in these fields that are needed in terms of SA health care priorities [9,22]. The proposition then is that, if factors within the LE, can be modified, the LE can act as a catalyst to influence career aspirations towards addressing national needs.

An expansive framework of participation [28] should be the aim of intern supervisors and clinical units in which interns work with an explicit recognition of the intern as a full member within a 'community of practice' thus allowing interns to develop the self-efficacy and extended identities where they see positive outcomes with future careers in managing the priority health needs of their country.

Factors in the LE which can be improved relate to improving the relationships of interns and their seniors within clinical units during internship. Changes with regard to curricula modification should echo calls for a focus on social accountability, [29] national priority diseases, and a focus away from only specialist care to include competencies in primary care. Ensuring interns are supported emotionally when caring for ill children and receive adequate bereavement counselling, when dealing with death needs to be formalised within intern curricula. Further ensuring well–managed public health systems with recognition of the role and future need to retain interns are necessary requirements in creating a supportive LE for interns. These changes thus hold the potential to enable interns to develop the skills, social accountability, resilience and ultimately the vision to see primary care practice in public hospitals in SA and caring for children as a priority.

Study limitations

The study was carried out in one province and in one discipline and translation to other disciplines and centres will be needed**.** The bias and power imbalances of the primary researcher as a supervisor and the use of only focus group discussions could restrict the depth and breadth of data obtained. The use of multiple investigators and in-depth interviews in future studies could thus add further value. This study evaluated career intentions and was not in a position to study career choice behaviour which a prospective longitudinal follow-up study would be able to determine.

Conclusion

Perspectives from this study highlight the role of the clinical LE as being a highly influential construct in career intentions amongst SA interns. Within the framework of COP and SCCT contextual factors are viewed as influential antecedents to career intentions. Challenging environmental factors complicated by dysfunctional 'communities of practice' for interns foster conditions that do not favour interns' developing career intentions related to primary care in public hospitals or priority areas like caring for children. Changes within the LE with

regard to the roles, training and participation of interns within these environments may hold the potential to align intern career intentions with national health needs This study highlights the need to regularly evaluate the LE of internship and to review participatory frameworks within clinical units in accredited intern training hospitals. Future longitudinal studies documenting career choice behaviour are needed in the SA context to ensure a changes within internship training align interns with priority health needs of the country

Declarations

Ethics

The Ethics approval letter BE177/15 is attached as Annexure A

Consent for publication

Not applicable

Competing interests

The authors declare no conflict of interest.

Availability of data and material

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

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Authors' contributions

KLN was responsible for study design, data collection, data analysis and drafting the manuscript.

JVW was responsible for supervision of the entire work, study design and manuscript review.

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8.4 Key findings and contribution of this manuscript to the thesis

In this chapter the confluence of both external factors in the LE such as the disease burden, workload and social milieu and 'internal 'factors specific to the relationships within clinical units, interns work in, was shown to be highly influential on intern career intentions. **Figure 5** illustrates the broad relationships between the intern, career intentions and the learning environment that was identified in this study.

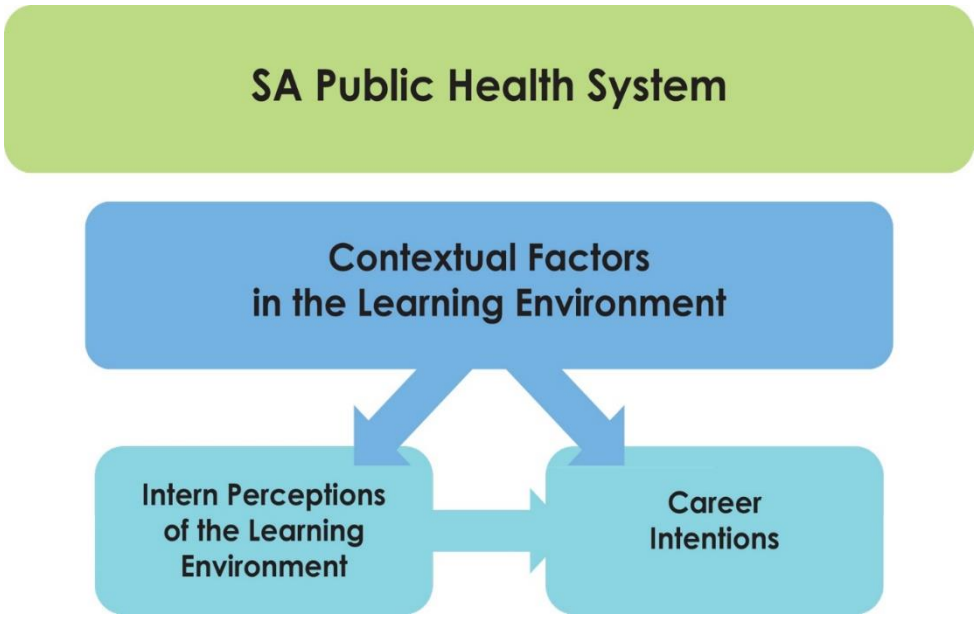

Figure 5. Schematic depiction of relationship of impact of Contextual factors on Career intentions

Importantly the interaction and relationship of interns with their supervisors were found to be suboptimal and created poorly functioning communities of practice. The divergence in perceptions of the same LE by supervisors and interns identified in Chapter Four together with the dysfunctional nature of participation indicated from the FGD clearly indicate that external factors in the learning environment are not the only reasons for the poor perceptions amongst interns of the LE. This interplay of both external and internal factors were shown to then influence career intentions and specifically those who aim to recreate or sustain the LE.

This study highlighted that discordance between national priority health needs and career intentions of interns and identified both the LE of internship as well as the trajectory of medical education as factors that influenced these findings. The decisions to specialise rather than to serve in a primary care practice, to work within the private sector rather than the public sector were evidence of the interplay of these multiple factors.

CHAPTER 9: SYNTHESIS

9.1 Introduction

This chapter summarises the findings from each of the manuscripts in relation to the research objectives of the study. It attempts to demonstrate how each manuscript adds insight to address the overall aim of the study to explore the Learning Environment (LE) and career intentions of Paediatric interns in KwaZulu–Natal (KZN) hospitals in SA. Firstly, the chapter provides a response to each research objective from the study and secondly it synthesizes the responses to draw a synopsis at a descriptive, evaluative and theoretical level. Thirdly, a philosophical viewpoint is then proposed including a conceptual model that provides input into implications for internship and recommendations for future research. Finally the chapter deals with limitations of this study.

9.2 Summary of main findings

In this study in medical education the relationship of an educational intervention on patient outcomes was reflected in the aim of exploring internship (representing the educational intervention) through the construct of the learning environment and its relationship with career intentions (representing a sustainable public health system that impacts positively on patient outcomes). This study was thus developed based on a number of core assumptions, which are noted:

1. National health career priorities in SA were viewed as the need for primary health care clinicians with an interest in child health working within the public health system.
2. Internship was represented by the multidimensional construct of the learning environment.
3. The internship period in Paediatrics at hospital complexes in KwaZulu Natal, South Africa was taken to represent a typical a high disease burdened, resource limited context.
4. Learning was viewed within a social constructivist worldview using social learning theories to frame the understanding of learning and identity formation in interns.
5. The construct of the learning environment was measured by eliciting perceptions of the LE by Paediatric interns in KZN in 2015-2016.
6. Career intentions were measured as an indicator of intern career interest.
7. The antecedents to the development of career self-efficacy were restricted to the influence of environmental factors.

This study was thus conducted as an explorative, mixed methods study to investigate of the relationship of the learning environment and the career intentions of Paediatric interns in KwaZulu–Natal. The study was located within a social constructivist worldview as it was deemed necessary to accept the multiple perceptions and views of participants together with researchers viewpoints to co-construct of the findings of the study. Three theories proved valuable to frame and interpret the findings. The social learning theories of Communities of Practice (COP) together with the Social Cognitive Career

Theory (SCCT) were used to frame an understanding of the findings and the theory of Alienation and Engagement were used as an additional lens through which findings in this study could be interpreted.

The context and problem statement as introduced in Chapter One highlighted gaps in knowledge of internship and career intentions especially in disease burdened, resource challenged environments. These gaps in knowledge are seen to have translated into the failure by both higher education authorities and national health departments to include the internship period in strategies to address the inequities in health care. The failure to use the internship window to obtain greater understanding into factors that impact on intern career decisions needed addressing. The creation of knowledge in this area was thus seen as vital in the quest to address inequities specifically in the distribution of medical practitioners between private and public health care and within primary health care and child health.

Consequently, the research questions in this study explored:

1. The influence of the LE on intern WBA assessments by comparing the literature on WBA practices of interns in SA with international best practices.
2. The perceptions of the LE of Paediatric interns and their supervisors using a locally validated instrument.
3. The influence of individual characteristics of interns on their perceptions of the LE.
4. The career intentions of interns and the influence of their perceptions of the LE on these intentions.
5. The views of interns on their experiences in Paediatric internships and career intentions in SA, the public health system, primary health care and child health.

The literature reviewed in Chapter One traced the history of internship from apprenticeship through to current perspectives on a participatory and social nature of learning which enables identity formation of interns within communities of practice. The LE as a measurable, multidimensional construct in internship was introduced and the use of tools such as the PHEEM to assess perceptions of the LE discussed. The literature on career aspirations amongst interns and its impact especially in SSA emphasised the discordance between national health needs and career intentions of medical practitioners. The influence of multiple contextual factors on both perceptions of the LE and career intentions was highlighted and the need to understand this interplay was emphasised.

In Chapter Two the social learning theories that provided a conceptual framework to understand the findings in this study were highlighted. The overarching theory described the view of internship as a process where interns as 'newcomers' within legitimate positions as a peripheral participants should logically be inducted into full participation. The Communities of Practice theory provided a context in which findings in this study were interpreted. Criticisms of this theory highlighted in this chapter related to understanding the ease of entry of 'newcomers' into these communities of practice and the extent of participation in practice especially in systems with multiple contextual challenges and where entrenched hierarchies of power persist between newcomers and old-timers. The recreation of these communities

of practice was viewed with the lens of the Social Cognitive Career theory which provided a platform to understand the interplay and influence of contextual factors, which seemingly served as barriers to the development of career self-efficacy and hence had an influence on career intentions.

Chapter Three described the process of data collection and analysis used in this study. The rationale for using a sequential explanatory mixed methods study design in order to collect, analyse and synthesise both quantitative survey data and qualitative focus group discussion data was provided. Issues of ethics were also addressed.

Chapter's Four to Eight highlighted the findings in the form of manuscripts. **Table 6** provides a summary of how each specific research objective had been addressed in the appropriate manuscript and summarised the contribution of each manuscript towards the achievement of the overall aim of the study.

Table 6. Contributions of Manuscripts and Alignment to Research objectives

No	Objectives	Manuscript	Contributions to the study
1	To explore the influence of the LE on intern WBA assessments by comparing the literature on intern assessments in SA with international best practices	Chapter 4 Comparing International and South African Work-based assessment of Medical Interns' Practice	This paper described significant gaps in the assessment practices in SA interns compared with international best practices. Multiple factors in the learning environment of interns in SA were noted to influence the lack of using multiple, directly observed assessments of interns within a competency framework that included both procedural and non-procedural skills. The learning environment was found to be an integral factor influencing internship practices including work-based assessments A heavy disease burden, high workload and challenges with supervisor–intern interaction and supervisor feedback influenced the adoption of WBA that were not in keeping with innovative, international best practices.
2	To explore the perceptions of the LE of Paediatric interns and their supervisors using a validated instrument	Chapter 5 The Learning Environment of Paediatric Interns in South Africa	The paper described the psychometric characteristics of a modified PHEEM tool to measure perceptions of the LE amongst SA interns. Perceptions of the learning environment of participants were shown to be satisfactory however significant challenges related to teaching, supervisor interaction, infrastructure and institutional support were noted. The perceptions of the LE differed significantly between interns and their supervisors especially with regard to supervisor interaction, feedback and aspects related to mutual respect including the presence of a blame culture, gender and racial discrimination in the LE. Perceptions of workload, workhours and appropriateness of tasks also differed significantly.
3	To explore the influence of individual characteristics of interns on their perceptions of the LE	Chapter 6 The influence of individual factors in the learning environment of South African interns	This paper highlighted multiple individual characteristics that negatively influenced perceptions of the LE. These factors amongst the participants included race, socio-economic status, previous educational background, university origin and internship year which were associated with interns having poorer perceptions of the LE. These factors were of significance to the transforming nature of SA interns. These factors were viewed as leading to a sense of alienation amongst interns impairing access and participation into communities of practice. This study recognises that both external factors as well individual factors influenced perceptions of the LE.

4	To explore the influence of the perceptions of the LE on career intentions of interns	Chapter 7 Impact of the Learning Environment on Career intentions of Paediatric Interns	This paper identified perceptions of the LE as important factor that influenced career intentions of interns towards future careers in SA, its public health sector and working with children. Apart from gender all other individual characteristics do not seem to significantly influence intern career intentions. This study confirmed that exposure to the LE in internship for Paediatric interns negatively influenced them to work long term, within the SA public health system and with children. The influence of the LE did not extend to the intention to specialise which was a strong aspiration amongst interns.
5	To explore the views of interns on their experiences in Paediatric internship and how their views influence their career intentions towards working in the SA public health system, primary health care and child health?	Chapter 8 How the perceptions of the Learning Environment influence Intern Career Intentions	This paper provided insight into the reasons the LE negatively influenced career intentions of interns away from SA's public health system and child health. The heavy disease burden, institutional challenges including resource constraints and management challenges as well as the social milieu of patients in SA, were external factors that contributed to influencing interns away from future careers in the public health system, primary health care and child health. The strongest factor to influence career intentions was barriers to access and participation in communities of practice due to poor interaction of interns with their supervisors. This impacted on the failure of interns to develop an identity and career self-efficacy that synchronised with a future career in the public health system or primary health care. This paper highlighted discordance between the national needs for increased numbers of clinicians to serve in primary health care within public hospitals compared with intern career intentions which predominantly favoured specialisation and private medical care. This discordance also extended to child health.

9.3 Main insights of the study

The following key insights emerged:

- Insights into the multifactorial nature of the learning environment and its influences on internship
- Insights into access and participation of interns in the LE
- Insights into the role of contextual factors within the LE that act as barriers and enablers to career intentions

9.3.1 The internship learning environment has a multifactorial nature with an interplay of contextual factors.

International reviews of internship programmes have identified concerns about the lack of a clearly articulated and generally accepted purpose for interns and confusion about the role of the intern. [181] The tension between work and learning in internship and the risk of the long term educational mission of internship being inappropriately dominated by short term service requirements has been expressed by previous authors in relatively well resourced contexts. [137,181] In South Africa however, the added burden of external factors creates a climate where internship has developed entrenched patterns of hierarchical, work-orientated structures that have devalued the role of interns to 'work-bodies; work-horses' resulting in the perceptions by interns of themselves as 'pawns in the system' as indicated in the qualitative comments reported in Chapter 8.

The construct of the LE remains poorly defined in the literature with its value largely dependent on its quantification and utility for monitoring. [68] In this study the internship LE which was the construct being studied clearly demonstrated a multifactorial nature. These multiple factors were viewed as contextual factors categorised either as external to the intern or related directly to the intern. In this study we thus categorised these contextual factors as external-(extra-person) factors or individual (person)-related factors. Table **7** tabulates the various contextual factors identified through the various studies that influence the internship LE.

Table 7. Contextual factors identified within the Learning environment

Contextual factors in the Internship Learning Environment	
External (Extra-person) factors	**Individual (Person) related factors**
1. Disease Burden • Multiple disease burdens • HIV/AIDS, Tuberculosis pandemic **2. Socio-economic Challenges** • Poverty • Malnutrition • Inter-personal violence and trauma	**1. Intern–supervisor interaction** • Poor feedback • Poor assessment methods • Lack of mentoring • Poor clinical supervision • Lack of mutual respect • 'Blame' culture • Gender and racial discrimination
3. Resource Availability • **Resource Challenges** ❖ Essential health care provisions (infrastructural equipment, consumables, medication) ❖ Human resources in all health sectors ❖ Accommodation for interns ❖ On call facilities ❖ Catering facilities ❖ Security and safety on site in hospitals • **Management of Resources** ❖ Institutional management of facilities ❖ Provincial health authorities management ▪ Access to postgraduate training programmes ❖ National health legislation and policy ▪ Working hours regulation including overtime regulation ▪ Internship and community service placement processes	**2. Individual Characteristics of Interns** • Race • Gender • Socio-economic background • Previous educational background • Length of time in internship

This categorisation was done to highlight the differences between external (extra-person) factors related to the disease burden and associated workload together with resource availability and management, which are specifically important in the contexts of the study. The importance of external contextual factors were constant findings in both the quantitative and qualitative components of this study and suggested that, in resource limited contexts, these factors play a critical role in the LE of interns.

An analysis of the differences in perceptions of the LE between interns and supervisors found that these two groups perceived these external contextual factors in a similar way. This confirmed the understanding that these factors were often viewed as being beyond the control of both interns and most supervisors and represented structural and endemic challenges in the SA health system. The findings of this study therefore confirmed findings of other studies and reviews on the health care system in SA which recognised the structural aspects of health systems as having significant challenges which are impacting on health care delivery. [7, 27] These external factors related often to resource limitations in the setting and impacted on learning, supervision and assessment thereby compromising internship. However it is the contention of this study that these external environmental factors remain contextual and not central to the process of participatory learning in internship and learning will not improve simply by making most of these resources available. [65]

An important finding from the study hinged on the importance of the individual (person) specific factors within the LE. These factors included the quality of intern-supervisor interactions within the situated context of learning in a community of practice. The literature reviewed, identified critical gaps in the quality and duration of supervisor interaction. [26, 27,182] In addition this included the quality and duration of feedback which was also proved challenging in this setting. [40,180] These factors were found to impact significantly on assessment practices of interns in SA as indicated in Chapter 4.

The reliance on self-assessment as opposed to direct observation, the use of tick lists as opposed to multiple assessors with guided feedback reflected the poor quality of the supervisor–intern interaction. Findings from the PHEEM survey on the perceptions of the LE corroborated the experiences of many interns of poor supervisor –intern interactions. The variance between interns and supervisor perceptions related largely to the extent of feedback and supervision, and the promotion of mutual respect and a discriminatory culture within the LE. The concern is that for, supervisors and interns to have such different perceptions on clinical supervision and feedback indicates deep seated challenges in the internship programmes related to intern–supervisor interaction. This also indicates very differing views between interns and their supervisors of the understandings of the role, function and status of interns within the clinical community of practice.

In addition to these factors individual characteristics related to the demography and other factors were found to have influenced interns' perceptions of the LE. These were also categorised as individual contextual factors and they reflected factors that influenced how interns perceived the LE. The mechanism of how these factors influenced perceptions related to the concepts of alienation and engagement influencing access and participation within hierarchical and dysfunctional communities of practice. **Figure 6** illustrates a conceptual model that integrates the roles of both external and internal factors within the LE and their impact on the intern learning processes within communities of practice. This model further integrates the findings of this study with regard to influences on career intentions with the influences on the LE.

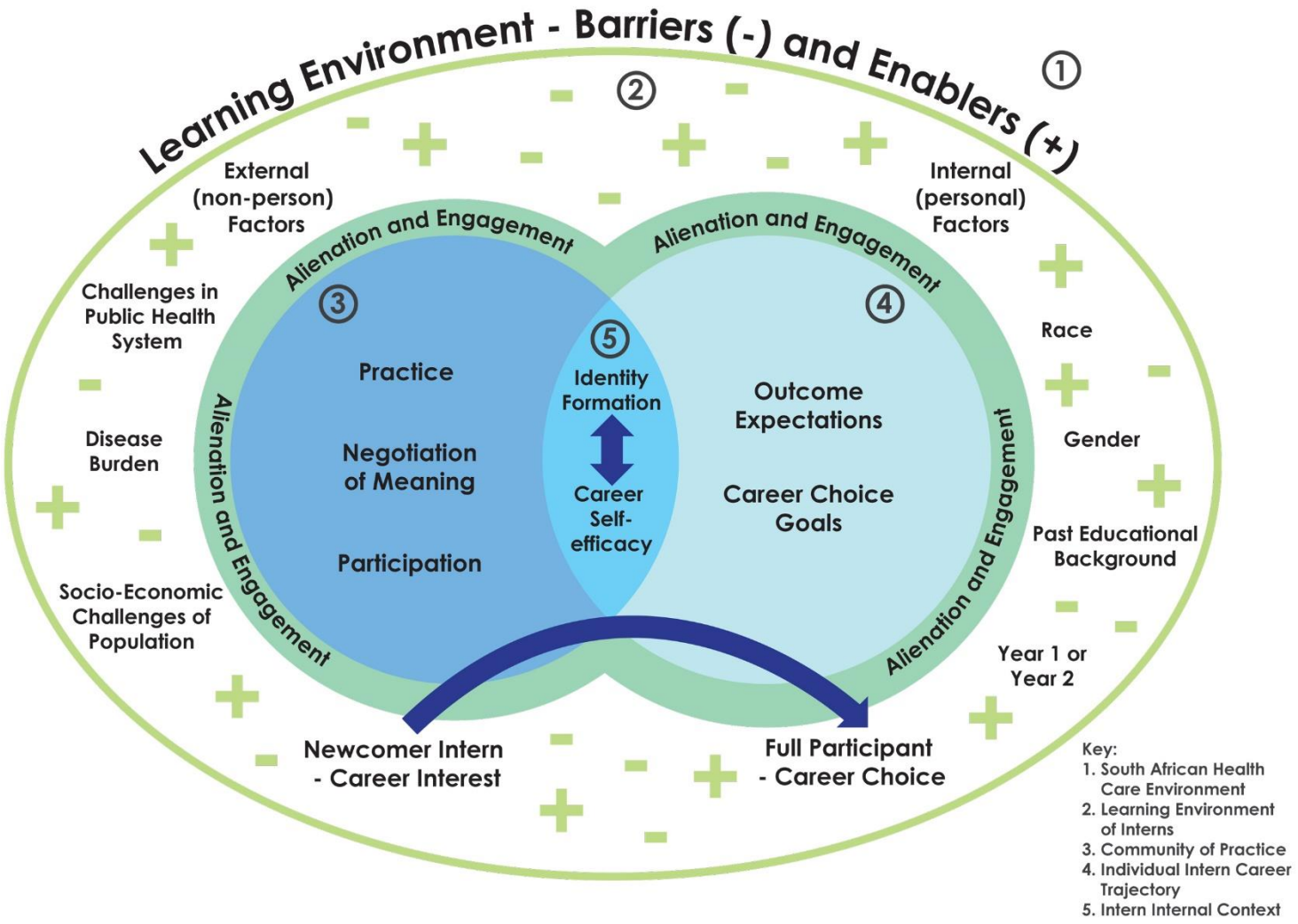

Figure 6. Conceptual model of the Influences of the Learning environment on career development of interns within a community of practice

9.3.2 Access and participation of interns in the learning environment

In this study participation of interns was viewed as central to learning process. Drawing on Lave and Wenger's 'communities of practice' learning in internship was viewed as situated, social and reliant on participation and mutual engagement to be effective. [134] Insights from both quantitative and qualitative data indicated that access into communities of practice posed significant challenges to interns. Various contextual factors related to individual characteristics served as barriers in the LE that influenced this access and entry into communities of practice. Drawing on the theory of alienation and engagement the study highlighted the perpetuation of hierarchical power dynamics in the LE that characterised medical communities of practice in SA and showed how individual characteristics placed 'newcomer interns' in lower positions or even outside or not party to the dominant group. Interns from ethnicities, socio-economic groups, and educational backgrounds different to the dominant group, in such an unfair training platform, thus had much poorer perceptions of the LE. This differing perception of the LE extended to first year interns as compared with second year interns suggesting that these individual (person related -factors) related to being an 'outsider'. These poorer perceptions lead to interns thus failing to develop a sense of belonging within the LE. These findings within the context of a rapidly transforming SA intern community indicated that many interns had difficulty engaging within communities of practice. The findings that contextual factors acted either as an 'alienating' or 'engaging' interface towards access and then participation into communities of practice added an additional dimension to Wenger's theory of COP by clarifying these elements in the early stages of the learning trajectory. [55,134,136] **Figure 6** illustrates these relationships in the context of the LE and communities of practice. The criticism that COP does not address the early stage of newcomers, within their position as a legitimate peripheral participant, finds resonance with these theoretical understandings that stemmed from the study's findings in a resource challenged context. Thus this study proposed that access into COP within the context of multiple challenging factors in the LE can be explained with reference to the theory of alienation and engagement which has implications for various aspects of internship training.

An important insight from the study related to the process of participation within communities of practice. The interpretation of the qualitative and quantitative data identified intern challenges with access and extent of their participation within internship. It was clear that interns perceived a lack of mutual respect, a failure to engage with seniors and were often excluded from activities. The interns were rather viewed as peripheral work bodies with little chance of participating in full clinical duties which would of strengthened their identity as part of the clinical team. The findings of this study reflected that SA interns in this context had a restrictive form of participation as opposed to an expansive form of participation. [138] This restricted participation limited access to 'learning by doing'. This restricted intern's exposure in terms of tasks, knowledge and scope, with a resultant focus of WBA in

the LE that was linked only to procedural tasks associated with the clinical competency with little emphasis on assessing multiple competencies and non-procedural skills.

Restricted participation often followed a narrow specialist hospital centric focus which was determined by both workload in specialist units and the narrow views of supervisors of the role of interns. Interns were thus often not exposed to or allowed to develop interests in public health care, the primary health care approach or child health that aimed to address national health priorities. A cardinal feature of restrictive participation was limited opportunities for identity formation specifically towards public healthcare practitioners. In this way interns become disenfranchised, from developing an identity that placed them in the context of a primary care practitioner in the public health system, who is to be valued as a potential national resource to manage the health care challenges in the country. This poor identity formation of interns can explain the failure of interns to align themselves with other public health care professionals in the country who should tackle national health challenges of SA.

9.3.3 The role of contextual factors within the LE as barriers and affordances to career intentions

This study highlighted the impact of the LE on internship through the influence of both external and individual focused contextual factors. Drawing on the SCCT framework, the identification and understanding of the antecedents to the formation of career self-efficacy formed an integral aspect of understanding the interplay of contextual factors with career intentions. [140, 143] It is within this framework that contextual factors both external and internal were viewed either as barriers or enablers to career intentions.

The findings from a large number of interns indicating a wish to stay in SA and its public health system were important. It showed the value and potential opportunity presented by the internship period for optimal learning and workforce planning. The most salient finding in this study however was that interns' intentions to stay within SA, its public health care system and to care for children diminished with exposure to the influences in the LE. This finding corroborated the trend seen in SSA countries where most medical practitioners make long term career choices that see them working outside of the public health system, the primary health care field or child health, exacerbating shortages in the most resource challenged contexts, and thus impacting on patient outcomes

In trying to understand how the LE influences intern career intentions, findings from both the quantitative and qualitative data indicated that factors in the external environmental created a milieu of disenfranchisement and antagonism among many interns. These factors acted as barriers to develop career interests among interns as this crucial juncture. For this to change requires attention to structural changes in how hospitals are managed, review of health policies and legislation relating to interns.

Many contextual barriers including the disease burden can act as barriers to career intentions, disadvantaging public health care and primary health care as possible career options. However, some contextual factors acted as enablers to promote existing aspirations. The findings that perceptions of the LE in internship did not impact on career intentions to specialise suggested that the aspirations to

specialise probably emanated from the modular system of undergraduate training which was simply perpetuated during internship. This study proposed that this occurs largely as a result of a failure of internship to develop frameworks of participation, interest and learning for interns that has a focus on the national health needs of producing primary health care clinicians for the public health system. In the absence of a career pathing in the public health system aspirations for specialisation will persist and further entrench the discordance already visible with actual national health career needs.

Further, negative vicarious experiences interns had whilst working with role models like their registrar (resident-specialists in training) colleagues were shown, to have further exacerbated poor impressions of a future in public health. Emotional factors played an important role in the development of career self-efficacy and the persistence of a 'blame culture' or racial and gender discriminatory practices within internship had negative consequences for the development of career self-efficacy.

In addition to the environmental factors, it was also evident that individual factors of supervisor – intern's interaction relating to feedback and mentoring also played a role as drivers in the development of career self-efficacy. In this way the failure for interns to fully engage in certain activities or to be mentored and supported in activities related to national health needs of primary health care, child health and priority diseases prevented interns from reaching performance accomplishments and building confidence that were key to develop career self-efficacy. Interns instead are often relegated to finite procedural tasks within specialist focused activities which fail to equip them to develop a holistic picture of the healthcare challenges in SA and this emphasizes the lack of a sense of camaraderie to work to alleviate these challenges.

9.3.4 Theoretical and philosophical analysis

In this study three theories informed the conceptual framework to understand the relationships between the complex constructs of the LE and intern career intentions. The complex interplay of contextual factors that influenced perceptions of the LE was also found to have similarly influenced career intentions. It thus became prudent to integrate the ideas in relation to the frameworks. In this newly developed conceptual model the unique challenges that characterises resource limited LE were considered and the concept of a community of practice that was optimally functioning and averse to the dynamic interplay of factors within the context was replaced. Instead this research informed a more interactive model of the communities of practice where aspects of access and participation of newcomers were more clearly designated and respondent to context. The interface of COPs with external contextual factors was viewed through the filter of alienation and engagement as illustrated in **Figure 6**. In this context, the model developed of the COP extended itself in this study to relate to the processes associated with career choice. This was done from the view that COPs by nature have to be recreated as 'newcomers' join, participate and eventually replace 'old timers'. Aspects of the SCCT were drawn on to show the linkages of the COP with career interest development amongst newcomers. Contextual factors in the environment thus acted as alienating or engaging influences for access and participation within COPs and also served as barriers or enablers to career interest development. The concepts of

identity development within COPs and the development of career self-efficacy are thus viewed as parallel, integrated processes within the internship world.

The utility of the model lies in its ability to frame the positioning of the multiple contextual factors with regard to the interns entering a COP and simultaneously developing career interests. By positioning these contextual factors it helps to increase our understanding of the interplay of these factors as well as allowing the quantification, measuring and monitoring of attempted changes in some of the factors through scoring tools. This models thus lends itself to monitor manipulated changes in contextual factors which can then be monitored to review aspects such as identify formation and career self-efficacy and the impact on career interest.

An additional utility of the model recognises the interface of contextual factors with participation in learning communities and development of career interest through the lens of alienating influences/barriers or engaging influences/enablers. This elevates the importance of the role these various contextual factors plays in internship. Thus factors such as demographic characteristics and supervisor engagement are recognised as important as they form the foundation of internship training and influence future career development decisions of interns.

The conceptual model this study proposes of internship learning in a resource challenged and disease burdened context provides a framework for clinician–supervisors, work-force planners and health administrators as well as interns to recognise that internship involves the start of recreating of a community of practice as newcomers enter a trajectory to full participation.

This cycle however can only be sustained if interns as newcomers perceive themselves as potentially full participants in long term future positions in these COPs. Interns at the four hospital complexes in KZN did not fully see a long term vision of themselves within the public health system involved in primary health care and child health. In order for this to change, however, the finding of a number of recommendations can be made using the newly developed conceptual model.

9.4 Implications of the study

The emergent data from this study spans multiple facets of the internship learning experience. It is the understanding of the interaction or interplay of these various factors that constitute the findings that provide knowledge to make changes within this field of medical education. A broad range of implications from the various aspects of the study are presented in terms of context, policy, practice and theory.

The overwhelming data that permeates both the quantitative and qualitative phases of the study and is corroborated by both interns and supervisors relates to external contextual factors within the infrastructural and institutional governance of health facilities. These structural factors whilst external to both the interns and their supervisors have major implications for internship in the SA context. Policy factors relate mainly to the data that emerges from the discordant relationships between interns and supervisors that emerged strongly in this study. The position, power relationship and formal legislation

that governs this relationship is found to be challenging and the implications from this can positively impact on the future directions of medical education within internship. The data from both the PHEEM studies and FGD provided insights for changes relating to monitoring, on-site practice specifically related to paediatric care and on how to access and improve participation of interns are to be negotiated. Extrapolation of the findings from this study through the lens of the COP, SCCT and the theory of alienation and engagement provide knowledge on how identity formation amongst interns is both unique and susceptible within this transitory phase of medical education. The implications of this are presented.

9.4.1 Structural changes in terms of context

A number of structural changes to resource provision and resource management are urgently required as these relate to internship. Those structural changes that relate specifically to interns are largely within the ambit of institutional management and include the provision of infrastructure to ensure adequate on-site security, accommodation, catering, and optimal facilities for learning. Many of these required structural changes are also essential for the general health system improvement required in SA. This study advocates for a well-resourced health system to enable optimal training of interns and provides evidence of how a poor external learning environment impacts on sub-optimal intern assessment, training, supervision and importantly on the ability to deliver a sustainable public health system impacting on the future.

9.4.2 Policy changes

Review of policy must clearly articulate the role and position of interns as qualified medical practitioners within clinical units of practice. Intern supervision needs to be formally recognised within health systems with clear guidelines, oversight, training and support being provided for supervisors. Intern supervision needs to be an accredited process with supervisors being provided with the skills, knowledge and attitude to assess, mentor and support interns. Significant challenges were noted with the supervisor –intern relationship and this disconnect impacts on both learning and career development amongst interns.

The study highlighted, the inefficient system of intern and community service placement managed by the national health departments that fed into the negative view of national health policy and management. The implication thus is that these placement policies be revised, to ensure greater involvement from interns in its implementation.

The regulation of work hours needs to be standardised in relation to labour laws of the country and the implementation of these laws must be ensured and monitored by HPCSA through regular accreditation and monitored at institutional level by supervisors. This study highlighted a discordance in perceptions of work hours and workload between interns and supervisors which impacts both on supervision and ultimately on workplace-based learning.

This study highlights the need for significant changes to workplace-based-assessments of interns in SA. Chapter Four highlights these changes and recommendations flowing from this study which have

already been incorporated into proposals into changing the current HPCSA assessment policies and processes. The major changes recommended that flow from this study relate to the move to directly observed, multiple assessments that include all competencies and both procedural and non-procedural skills. The use of a multiple source feedback (MSF) in future can enable the inclusion of all members of the health care team which would ultimately strengthen patient care.

9.4.3 Practice changes

These study findings have a number of implications for internship training with regard to practice. The use of a validated tool for routine monitoring of perceptions of the learning environment should become standard practice as part of routine quality assurance practices. These perceptions of the LE can serve as means of both monitoring and improvement. This monitoring and review system can feedback into current HPCSA review mechanisms. This study validates one such tool to gauge perceptions for local conditions and provides the framework and evidence to show how perceptions of the LE impact both on learning and career intentions. This study provides added evidence of the importance of recognising and measuring the LE construct within internship and medical education.

This study provides evidence for the importance of managing diversity within the medical community. Entrenched and recalcitrant hierarchies of power within medical communities of learning are shown to be destructive to interns entering such systems. By impairing their access and restricting participation this study highlights the link with the breakdown and poor sustainability of these communities of practice in public health systems. An essential part of this process is to of recognise the importance of ethnicity, gender, socio-economic status, previous educational background and experience as factors that must be considered in supervision, mentoring and feedback. This finding has relevance to the transforming nature of the SA medical community and needs to be made explicit in training practices in internship.

The need for bereavement counselling, became evident with relevance to the ‘blame culture’ as well as significant stress and anxiety expressed by interns working with children especially when dealing with death, painful and distressing procedures and emotionally distressing situations. The creation of a supportive, inclusive management process within internship will also help interns develop resilience with dealing with emotionally distressing aspects of care.

This study highlighted the importance of the internship period as a crucial window in which career intentions are made or reinforced. The need for career advice is thus imperative and is severely wanting in the SA context. There is a need for interns to understand the context and their role in social accountability of the profession. Input and feedback from interns in this process should be sought.

Currently the restricted participation of intern’s often leads to a narrow specialist focus with little exposure to generalist primary care, priority disease challenges and child health. The curriculum in internship needs to be broadened to include all aspects of care. National health priorities including the need for a competency framework in primary health care and child health should thus be emphasised

rather than the focus on procedural tasks related to specific specialties. It is argued that that a shift to a more generalist curriculum for internship will prioritise interns as primary health care practitioners. It is the view of this study that this process needs to be formalised within internship and possibilities for greater exposure to generalist care in internship.

9.4.4 Theoretical implications

This study adds new knowledge on the contextual nature of workplace-based learning within the important context of internship and the interplay of factors which underpin internship. These contextual factors achieve significance and need to be taken into consideration as factors that act both as causes of alienation to restrict access and participation, and barriers to the development of career interest. There must be a need to ensure that the multiple contextual factors support engagement in participation in WBL in internship and positively influence career interests.

Importantly this study theorises on the basis and means of access and participation of interns within communities of practice. It proposes that both identity formation within internship and career self-efficacy are formal concepts fundamental in the context of the development of career decisions in the internship process.

This study provides evidence of the disconnect between the need for greater primary health care clinicians within public health institutions and intern aspirations which stems from influences in their learning environment and how positive changes within this construct can ensure a sustainable public health care system.

9.5 Limitations of the study

Limitations specific to each study that informed the specific objectives have been reported in each manuscript and general limitations of the overall study are discussed here.

The focus of this study measured career intentions and not behavior. Longitudinal cohort follow-up studies are the ideal research designs to study career intentions amongst interns as these studies corroborate intentions with behaviour. Such studies however requires significant resources and logistic support. In addition these studies have to negotiate a dynamic environment where drivers of career trajectories are often changing. Whilst the focus in this current study was career intentions a key feature was the need to understand the antecedents to career intentions as these influences serve as factors that could be amenable to change.

There are three main stakeholders within the learning environment reflecting the triadic relationship in medical education of learners–interns, teachers–supervisors and patients. This study had a learner-centred approach and with no input from patients and allied health workers as this was beyond the scope of this study.

This study focused largely on intern perceptions of the LE and did not assess nursing and allied health professional perceptions of the LE.

Whilst perceptions of the LE were solicited from supervisors no further investigation was done to fully understand supervisor perspectives. Further in-depth qualitative methods using structured interviews and FGD would have provided an increased depth of knowledge from the supervisor's perspective.

There are multiple factors that are postulated to influence career interest, choice and behaviour. In this study the focus was on environmental contextual factors whilst the influence of personality types, learning styles and factors such student debt were not evaluated.

The study was conducted in one province and in one specific discipline and findings would be largely specific for this context.

9.5 Future research directions

In order to develop a fuller understanding of the LE and career intentions comprehensive longitudinal cohort studies that span geographical areas, disciplines and involve all health care professionals are needed in resource constrained contexts.

Studies that involve direct observation of intern-supervisor interactions and include in-depth qualitative methods of supervisors are needed to fully understand this crucial relationship in internship.

Studies that measure the influence of changes made in contextual factors with measures of career self-efficacy are recommended to fully understand the impact of context on career interest and career choice development.

Studies that evaluate the impact of the use of competency frameworks that focus on primary health care in internship on future career aspirations are recommended in light of the findings in this study.

Further studies that include the role of personality types in career intentions amongst SA interns is recommended.

9.6 Conclusion

This study has contributed to new knowledge on internship and its role in career choice within an important and neglected component of medical education. Extant knowledge on the LE construct within medical education is challenged by insights into the interplay of contextual factors on career interest formation within internship in a resource constrained context. This has implications especially for areas of the world that struggle with significant inequity in health care such as evident in Sub-Saharan Africa. The positioning of internship within medical education needs a major overhaul to enable greater oversight, improved assessment to optimise learning during this crucial phase. Equal importance should be given, especially in resource challenged contexts, to this phase of workplace-based training as is given to undergraduate and postgraduate medical education.

A conceptual model that builds on the Communities of Practice model of learning is developed to relate to the impact of environment both at a broader external and an individual level on access and participation in internship as well as this relationship with career interest. Changes to the role, importance, access and participatory dynamic of internship within medical hierarchical communities

holds the key to ensure that the future maintenance and growth of these very communities. This is especially relevant in contexts where the health care needs and career aspiration need to be aligned.

This knowledge hold many implications for internship and opens new avenues of longitudinal based research amongst interns in the context of SA and many other resource challenged countries.

CHAPTER 10: CONSOLIDATED REFERENCES

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APPENDICES

APPENDIX 1: APPROVAL FROM THE UKZN BIOMEDICAL RESEARCH ETHICS COMMITTEE

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

05 August 2015

Dr KL Naidoo
Paediatrics
School of Clinical Medicine
naidook9@ukzn.ac.za

Protocol: Working is learning: An exploration of work-based learning amongst Paediatric interns in kwaZulu-Natal.
Degree: PhD
BREC reference number: BE177/15

EXPEDITED APPLICATION

A sub-committee of the Biomedical Research Ethics Committee has considered and noted your application received on 14 April 2015.

The study was provisionally approved pending appropriate responses to queries raised. Your responses dated 29 July 2015 to queries raised on 15 June 2015 have been noted by a sub-committee of the Biomedical Research Ethics Committee. The conditions have now been met and the study is given full ethics approval.

This approval is valid for one year from 05 August 2015. To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2015), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be RATIFIED by a full Committee at its meeting taking place on 08 September 2015

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely

[redacted]

Professor J Tsoka-Gwegweni
Chair: Biomedical Research Ethics Committee

APPENDIX 2: AMENDED APPROVAL FROM THE UKZN BIOMEDICAL RESEARCH ETHICS COMMITTEE

UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI
RESEARCH OFFICE
BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604769 - Fax: 27 31 260-4609
Email: BREC@ukzn.ac.za
Website: http://research.ukzn.ac.za/ResearchEthics/BiomedicalResearchEthics.aspx

18 November 2015

Dr KL Naidoo
Paediatrics
School of Clinical Medicine
naidook9@ukzn.ac.za

Protocol: Working is learning: An exploration of work-based learning amongst Paediatric interns in kwaZulu-Natal.
Degree: PhD
BREC reference number: BE177/15

Your letter received 09 November 2015 requesting approval of Amendments (addition of two sites and utilization of focus groups in methodology) in relation to the above study has been noted and **provisionally approved** by a subcommittee of the Biomedical Research Ethics Committee subject to:

1. KZN Department of Health permission for inclusion of Addington Hospital.
2. Focus Group Data guide submission to BREC.

Yours sincerely

[redacted]

Mrs A Marimuthu
Senior Administrator: Biomedical Research Ethics

APPENDIX 3: APPROVAL FROM THE KZN DEPARTMENT OF HEALTH

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management sub-component
10 – 103 Natalia Building, 330 Langalibalele Street
Private Bag x9051
Pietermaritzburg
3200
Tel.: 033 – 3953189
Fax.: 033 – 394 3782
Email.: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference : HRKM 129/15
NHRD: KZ_2015RP30_226
Enquiries : Mr X Xaba
Tel : 033 – 395 2805

Dear Dr K. Naidoo

Subject: Approval of a Research Proposal

1. The research proposal titled **'Working is learning: An exploration of work-based learning amongst paediatric interns in KwaZulu- Natal. A mixed-methods study in junior doctors'** was reviewed by the KwaZulu-Natal Department of Health.

   The proposal is hereby **approved** for research to be undertaken at King Edward VIII, Prince Mshiyeni, Edendale and Grey's Hospital.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

[redacted]
Dr E Lutge
Chairperson, Health Research Committee
Date: 28/07/15

APPENDIX 4: APPROVAL FROM THE KZN DEPARTMENT OF HEALTH (EXTENDED)

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

DIRECTORATE:
Health Research & Knowledge Management

Physical Address: 330 Langalibalele Street, Pietermaritburg
Postal Address: Private Bag X9051
Tel: 033 395 2805/ 3189/ 3123 Fax: 033 394 3782
Email: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference: 129/15
KZ_2015RP30_226

Date: 13 November 2015

Dear Dr K. Naidoo
(University of KwaZulu)
Email: Naidook9@ukzn.ac.za

Approval of research

1. The research proposal titled **'Working is learning: An exploration of work-based learning amongst paediatric interns in KwaZulu- Natal. A mixed-methods study in junior doctors'** was reviewed by the KwaZulu-Natal Department of Health.

   The proposal is hereby **approved** for research to be undertaken at King Edward VIII, Prince Mshiyeni, Edendale, Grey's, Addington and Mahatma Gandhi Memorial Hospital.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

[redacted]

Dr E Lutge

Chairperson, Health Research Committee

Date: 16/11/15

APPENDIX 5: GATEKEEPER APPROVAL FROM ADDINGTON HOSPITAL

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

P.O. BOX 977
DURBAN
4000
Tel: 031-327-2970 Email: reshma.boodhai@kznhealth.gov.za
www.kznhealth.gov.za

ADDINGTON HOSPITAL
OFFICE OF THE CHIEF EXECUTIVE OFFICER

Reference:AD/9/2/3/R

Date: 16th October 2015

Principal Investigator:
- **Dr KL Naidoo**

PERMISSION TO CONDUCT RESEARCH AT ADDINGTON HOSPITAL: "WORKING IS LEARNING: AN EXPLORATION OF WORK-BASED LEARNING AMONGST PAEDIATRIC INTERNS IN KWAZULU-NATAL "

I have pleasure in informing you that permission has been granted to you by Addington Hospital Management to conduct the above research.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure this office is informed before you commence your research.
4. Addington Hospital will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to Addington Hospital.

[redacted]

DR M NDLANGISA
HOSPITAL MANAGER
ADDINGTON HOSPITAL

APPENDIX 6: GATEKEEPER APPROVAL EDENDALE HOSPITAL

Department:
Health
PROVINCE OF KWAZULU-NATAL

Edendale Hospital
Private Bag X 509, Plessislaer, 3216
Tel.: 033 395 4039, Fax: 033 395 4087
email:princess.gasela@kznhealth.gov.za
www.kznhealth.gov.za

OFFICE OF THE CHIEF EXECUTIVE OFFICER

Reference No: 33/5/1
Date: 02 July 2015
Enquiries: Ms. H.G Grace

Dr. K. L Naidoo
Clinical Head of Unit Paediatrics
King Edward VIII Hospital

Dear Dr. Naidoo

RE: REQUEST TO CONDUCT A RESEARCH: "AN EXPLORATION OF WORK-BASED LEARNING AMONGST PAEDIATRIC INTERNS IN KZN". A MIXED METHODS STUDY ON WORK-BASED LEARNING IN JUNIOR DOCTORS.

Your request regarding "to conduct a research on the above is acknowledged and refers.

I have pleasure in informing you that permission has been granted to you by Edendale Hospital to conduct research.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure this office is informed before you commence your research.
4. The Hospital will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to Edendale Hospital.

Thank you

Yours Sincerely

[redacted]

MRS Z.S.I NDWANDWE
CHIEF EXECUTIVE OFFICER
EDENDALE HOSPITAL

APPENDIX 7: GATEKEEPER APPROVAL FROM GREYS HOSPITAL

health

Department:
Health
PROVINCE OF KWAZULU-NATAL

GREYS HOSPITAL
OFFICE OF THE CEO
Private Bag X 9001, Pietermaritzburg, 3200
Town Bush Road, Chase Valley, Pietermaritzburg, 3201
Tel.:033 – 897 3321 Fax.: 033 - 8973398
www.kznhealth.gov.za

To:	**Dr. K. L. Naidoo** **Head of Clinical Unit: Paediatrics** **King Edward VIII Hospital**
From:	**Mrs. K.T. McKenzie** **Acting CEO - Greys Hospital**
Date:	**2 July 2015**
Re:	**Request for permission to conduct research at Grey's Hospital:** ***An exploration of work-based learning amongst Paediatric interns in KwaZulu-Natal***

Dear Dr. Naidoo

Your request to conduct research at Grey's Hospital refers.
Permission to conduct the above study is hereby granted under the following conditions:

- Your provisional ethics approval and research protocol are assumed to be valid and final ethics approval is a prerequisite for conducting your study at our hospital. Once obtained, please submit a copy of the full ethics approval;
- You are also required to obtain approval from the Provincial Department of Health KZN Health Research Unit prior to commencing your study at Grey's Hospital. You will find more information on their website: *http://www.kznhealth.gov.za/hrkm.htm*
- Confidentiality of hospital information, including staff and patient medical and/or contact information, must be kept at all times;
- You are to ensure that your data collection process will not interfere with the routine services at the hospital;
- You are to ensure that hospital resources are not used to manage your data collection, e.g. hospital staff collating data; photocopying; telephone; facsimile, etc.;
- Informed consent is to be obtained from all participants in your study, if applicable;
- Policies, guidelines and protocols of the Department of Health and Grey's Hospital must be adhered to at all times;
- Professional attitude and behaviour whilst dealing with research participants must be exhibited;
- The Department of Health, hospital and its staff will not be held responsible for any negative incidents and/or consequences, including injuries and illnesses that may be contracted on site, litigation matters, etc. that may arise as a result of your study or your presence on site;
- You are required to submit to this office a summary of study findings upon completion of your research.
- You are requested to make contact with the hospital intern curator, **Dr. J.H. Ramnath**, at Grey's Hospital once you are ready to commence data collection.

Recommended by:

[redacted]

Dr L. Naidoo
Senior Manager: Medical Services

Approved by:

[redacted]

Mrs. K.T. McKenzie
Acting CEO

APPENDIX 8: GATEKEEPER APPROVAL FROM KING EDWARD VIII HOSPITAL

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

OFFICE OF THE HOSPITAL CEO
KING EDWARD VIII HOSPITAL
Private Bag X02, CONGELLA, 4013
Corner of Rick Turner & Sydney Road
Tel.031-3603853/3015; Fax.031-2061457;
Email.rejoice.khuzwayo@kznhealth.gov.za;
www.kznhealth.gov.za

Ref.: KE 2/7/1/ (35/2015)
Enq.: Mrs. R. Sibiya
Research Programming

22 July 2015

Dr. KL Naidoo
Department of Paediatrics and Child Health
Nelson R. Mandela –School of Clinical Medicine
UNIVERSITY OF KWAZULU-NATAL

Dear Naidoo

Protocol: Working is learning: An exploration of work-based learning amongst Paediatric interns in KwaZulu-Natal

Permission to conduct research at King Edward VIII Hospital is provisionally granted, pending approval by the Provincial Health Research Committee, KZN Department of Health.

Kindly note the following:-

- The research will only commence once confirmation from the Provincial Health Research Committee in the KZN Department of Health has been received.
- Signing of an indemnity form at Room 8, CEO Complex before commencement with your study.
- King Edward VIII Hospital received full acknowledgment in the study on all Publications and reports and also kindly present a copy of the publication or report on completion.

The Management of King Edward VIII Hospital reserves the right to terminate the permission for the study should circumstances so dictate.

Yours faithfully

SUPPORTED/NOT SUPPORTED

[redacted]

CHIEF EXECUTIVE OFFICER

22/7/2015
DATE

APPENDIX 9: APPROVAL FROM THE MAHATMA GANDHI MEMORIAL HOSPITAL

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

MAHATMA GANDHI MEMORIAL HOSPITAL

Physical Address: 100 Phoenix Highway, Phoenix
Postal Address: Private Bag X 3, Mount Edgecombe 4300
Tel: 0315021719 ext 2012 Fax: 086 5707 6612 Email: [illegible]@kznhealth.gov.za
www.kznhealth.gov.za

Reference: Research

4 November 2015

DR K. NAIDOO

RE: PERMISSION TO CONDUCT RESEARCH: AN EXPLORATION OF WORK-BASED LEARNING AMONGST PAEDIATRIC INTERNS IN KWAZULU NATAL

I wish to inform you that permission is hereby granted for you to conduct the above mentioned research at Mahatma Gandhi Memorial Hospital.

Kindly contact Dr K. Chinniah on 0315021719 make the necessary arrangements.

Yours faithfully,

[redacted]

DR BGPB NDIMANDE
ACTING MEDICAL MANAGER
MAHATMA GANDHI MEMORIAL HOSPITAL

Fighting Disease, Fighting Poverty, Giving Hope

APPENDIX 10: APPROVAL FROM PRINCE MSHYENI MEMORIAL HOSPITAL

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

PRINCE MSHIYENI MEMORIAL HOSPITAL
OFFICE OF THE CEO
Dr Sandile Tshabalala
Private Bag X07
MOBENI, 4060
Tel: 031 907 8506 Fax: 031 906 1044
Email:Pmmh.ceo@kznhealth.gov.za
www.kznhealth.gov.za

Ref: 27/06/2015
Enquiries: Ms N. Ngcobo
15 July 2015

Dr Kimesh Naidoo
Clinical Head of Unit Paediatrics
King Edward VIII Hospital

Re: Application for permission to conduct Research in Prince Mshiyeni Memorial Hospital

Your request to conduct research at Prince Mshiyeni Memorial Hospital "Working is learning: An Exploration of Work-based learning amongst Paediatric Interns in KwaZulu-Natal" has been approved.

You're requested to liaise with the Senior Medical Manager Dr Myint Aung prior to commencement of the research on 031 907 8304 and Email: Myint.Aung@kznhealth.gov.za

Should you have any enquiries you can contact the office on the above contact details

Thank you

Dr Sandile C. Tshabalala
Chief Executive Officer
Prince Mshiyeni Memorial Hospital

APPENDIX 11: SOUTH AFRICAN ASSOCIATION OF HEALTH EDUCATIONALISTS, 2017 – ORAL PRESENTATION

SAAHE
South African Association of Health Educationalists

Certificate of Participation

THIS IS TO CONFIRM THAT

Kimesh Naidoo

Has contributed to the SAAHE 2017 Conference in Potchefstroom with an Oral Presentation

10th
SAAHE

GERDA M REITSMA
Chair: 2017 Conference Committee

BIANCA PETERSON
Conference Secretariat

APPENDIX 12: SOUTH AFRICAN ASSOCIATION OF HEALTH EDUCATIONALISTS, 2017 – POSTER PRESENTATION

SAAHE

South African Association of Health Educationalists

Certificate of Participation

THIS IS TO CONFIRM THAT

Kimesh Naidoo

Has contributed to the SAAHE 2017 Conference in Potchefstroom with a Poster Presentation

10th SAAHE

GERDA M REITSMA
Chair: 2017 Conference Committee

BIANCA PETERSON
Conference Secretariat

APPENDIX 13: INTERNATIONAL ASSOCIATION FOR MEDICAL EDUCATION, 2017 – POSTER PRESENTATION

APPENDIX 14: 10TH ANNUAL TEACHING IN HIGHER EDUCATION CONFERENCE, 2017 – ORAL PRESENTATION

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

CERTIFICATE OF PRESENTATION

Ukubonga ukuthi

KL. Naidoo; J. Van Wyk & MA. Adhikari

Presented / Wethule inkulumo

Preparedness for Practice: Pilot Study into Changing Competencies Among Recently Qualified Medical Graduates

At:

the University of KwaZulu-Natal's
10th Annual Teaching and Learning in Higher Education Conference

eNyuvesi yaKwaZulu-Natali
Engqungqutheleni Yeshumi Yaminyaka yonke yezokuFunda nokuFundisa kwezeMfundo Ephakeme

20-22 September 2016/ 20-22 kuMandulo 2016
Elangeni, Durban

[redacted]

Dr/ Dkt Rubby Dhunpath
Conference Chairperson/ uSihlalo weNgqungquthela

INSPIRING GREATNESS

APPENDIX 15: OTTAWA ICME JOINT CONFERENCE, 2018 – ORAL PRESENTATION

JOINT CONFERENCE
OTTAWA 2018 - ICME 2018
March 10-14, 2018
ABU DHABI, UAE

15 November 2017

Submitter ID: 730
Submitter Name: Kimesh Naidoo

Dear Dr. Kimesh Naidoo,
Thank you for submitting an abstract for Ottawa-ICME 2018. We are very pleased to inform that your submitted abstracts has been accepted as per below.

Abstract Status

Title	Comparing Work-based Assessment amongst South African Interns with International best practices.
Paper Number	695
Paper Status	Accepted as Oral Presentation
Stream - Topic	OTTAWA 2018 - Work Place Based Assessment

This presentation is offered to you as (submitter/presenter) of the abstract as per your submission record. Due to potential programme conflicts, it is not possible to transfer the presentation to someone else.
A condition of acceptance of the abstract is that you will register for the conference and pay the registration fee within 10 days of issue of this letter.
Please log in to your Presenter Portal and follow the instructions to confirm your participation.
Please note that we are unable to indicate the date and time of your presentation, and you should be available to present at any time between 12-14 March. If you have been allocated more than one presentation we will ensure that you do not have a timing conflict. The final programme will be on the website by (January 14, 2018).
We would be grateful if you could confirm your participation within one week of issuance of this letter by following the instructions in the presenter portal provided.

Best wishes

[redacted]

Prof. Masood Anwar
Chairman Organizing Committee
Ottawa-ICME 2018

Conference Secretariat:
RAK College of Dental Sciences (RAKCODS), RAK Medical & Health Sciences University
P.O. Box: 12973, Ras Al Khaimah, UAE Tel: +971-7-222-2593 Fax: +971-7-222-2634
ottawa-icme2018@rakcods.com | www.icme2018.com | www.ottawa2018.com

APPENDIX 16: LETTER FROM HPCSA –INTERN SUBCOMMITEE MEETING

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

COLLEGE OF HEALTH SCIENCES

Attention: Dr Jacqueline Van Wyk
Clinical Professional Education
School of Clinical Medicine
College of Health Sciences

23rd November 2017

Dear Dr Van Wyk

Re: Contribution of PhD study findings to development of electronic HPCSA Intern Logbook.

Study: Exploration of the Learning Environment and Career Intentions. A Mixed methods study of Paediatric Interns

This is to confirm that Dr KL Naidoo gave a presentation to representatives of the Intern subcommittee of the HPCSA on the 26th May 2017 about the findings from his PhD research. The internship subcommittee is currently in the process of developing an electronic logbook which will replace the paper based logbook which is presently being used in South Africa. As the internship logbook is an extremely important record of intern activities and competencies, the transition from a hardcopy to an electronic copy provides an opportunity for the logbook to be redesigned from a 'book of recordings' to a 'recording of learning'. It was for this reason that the subcommittee was interested in hearing about Dr Naidoos research findings, his assessment strategies and his ideas about how the logbook could be adapted to become a 'recording of learnings'.

We want to thank Dr.Naidoo for his input which was found to be extremely relevant to the assessment of interns. Ideas and inputs generated from the presentation were forwarded to the team working on the electronic logbook and we trust that this will contribute to a better process for accessing the competencies of interns currently working and training in South Africa.

Yours sincerely

Prof.Andrew Ross
MBChB, DCh, MMed (Family Medicine), FCFP, PhD, GCOB
Principal Specialist
Department Family Medicine, Private Bag 7 Congella 4013 , South Africa
Telephone +27(0)31 2604485
Email: rossa@ukzn.ac.za

APPENDIX 17: ACCEPTED JOURNAL ARTICLE: AFRICAN JOURNAL OF HEALTH PROFESSIONS EDUCATION (AJHPE955R1)

C: vanwykj2@ukzn.ac.za, adhikari@ukzn.ac.za

Ref.: AJHPE955R1
Comparing International and South African Work-based Assessment of Medical Interns' Practice
African Journal of Health Professions Education

Dear Dr Naidoo,

We are pleased to tell you that your work has now been accepted for publication in African Journal of Health Professions Education.

Thank you for submitting your work to the journal.

Best wishes

Claudia Naidu, MSocSci
Managing Editor
African Journal of Health Professions Education

Reviewers' comments:

Reviewer's Responses to Questions

Relevance to HPE audience – Broad interest to all health professionals

Reviewer #1: A very valuable unique piece of information. Giving an opportunity for the readers to understand how South African Work-based Assessment of Medical Intern's practice can be compared with international standards.

Reviewer #2: This study is highly relevant in a South African context.

Scientific rigour – Appropriate design, methods, instruments and data analysis procedures; explicit ethical review board approval; accurate, appropriate and complete results

Reviewer #1: The study adopted a qualitative descriptive approach. A thematic analysis was used to identify and highlight ‘key concept’ from literature resources to recognise and compare the work-based assessments of south African medical interns with international ones.

A scoping review with a thematic analysis was explained. The study ultimately reviewed 97 articles The results show that assessment of interns in SA has many challenges related to resources, workload and supervision. Since the study is based on literature search the ethical consideration may not have been applicable

Reviewer #2: The methods used appears to be appropriate given the objective of the study.

Novel – Did you learn anything new?
(New knowledge, new application, new method)

Reviewer #1: Yes, the study explains several challenges which should be taken up and find solutions. It has reported that the assessment of non-clinical competencies and non-procedural skills are poorly addressed. This should be considered as a cause for concern and should be tabled in the right forum.

Reviewer #2: The author (for the first time in literature) formalised the long-term status of WBA in a South African context.

Quality of academic writing - Language, grammar, spelling

Reviewer #1: Good. well written. This is the second review. All the suggested corrections have been done satisfactorily.

Reviewer #2: Besides for two punctuation errors the language, grammar and spelling are very good. (See bottom of page 3 and line 263 on page 13 for minor corrections)

Reviewer #1: The Author has satisfied all the expectations relating to this article and is commended for the good work. I am sure, the readers will enjoy the message coming out of this paper. keep up the good work.

APPENDIX 18: ACCEPTED JOURNAL ARTICLE: BMC MEDICAL EDUCATION (MEED-D-17-00055R2)

Date:	20 Nov 2017
To:	"Kimesh Naidoo" naidook9@ukzn.ac.za
From:	"BMC Medical Education Editorial Office" jose.maisa@springer.com
Subject:	Decision on your Submission to BMC Medical Education - MEED-D-17-00055R2

MEED-D-17-00055R2
The Learning Environment of Paediatric Interns in South Africa
Kimesh Naidoo; Jacqueline Van Wyk; Miriam Adhikari
BMC Medical Education

Dear Dr Naidoo,

I am pleased to inform you that your manuscript "The Learning Environment of Paediatric Interns in South Africa" (MEED-D-17-00055R2) has been accepted for publication in BMC Medical Education.

Before publication, our production team will also check the format of your manuscript to ensure that it conforms to the standards of the journal. They will be in touch shortly to request any necessary changes, or to confirm that none are needed.

Please do not hesitate to contact us if you have any questions regarding your manuscript and I hope that you will consider BMC Medical Education again in the future.

Best wishes,

Gerard Clunn
BMC Medical Education
https://bmcmededuc.biomedcentral.com/

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Please also take a moment to check our website at https://bmcmededuc.biomedcentral.com/

BMC Medical Education operates a policy of open peer review, which means that you will be able to see the names of the reviewers who provided the reports via the online peer review system. We encourage you to also view the reports there, via the action links on the left-hand side of the page, to see the names of the reviewers.

APPENDIX 19: ACCEPTED JOURNAL ARTICLE: AFRICAN JOURNAL OF HEALTH PROFESSIONS EDUCATION (AJHPE953R1)

m.ajhpe.0.554036.392e9ca9@editorialmanager.com
on behalf of
AJHPE <em@editorialmanager.com>

Wed 08-16, 11:09 AM

CC: vanwykj2@ukzn.ac.za, adhikari@ukzn.ac.za

Ref.: AJHPE953R1
'Sense of Belonging': The influence of individual factors in the learning environment of South African interns
African Journal of Health Professions Education

Dear Dr Naidoo

We are pleased to tell you that your work has now been accepted for publication in African Journal of Health Professions Education, subject to lines 76-78 in the section under "the instrument" being edited and clarified.

Thank you for submitting your work to the journal.

Best wishes

Trish McInerney, PhD
Associate Editor
African Journal of Health Professions Education

APPENDIX 20: ACCEPTED JOURNAL ARTICLE FROM THE SOUTH AFRICAN MEDICAL JOURNAL

em.samj.0.53d808.fb1a660c@editorialmanager.com
on behalf of
SAMJ <em@editorialmanager.com>

Tue 06-13, 10:25 AM

CC: vanwyk2@ukzn.ac.za, adhikari@ukzn.ac.za

Ref.: SAMJ12589
Impact of the Learning Environment on Career Intentions of Paediatric Interns
South African Medical Journal

Dear Dr naidoo,

We are pleased to tell you that your work has now been accepted for publication in South African Medical Journal.

Before we send your manuscript to the production team, please would you check/correct the following:
1. Figures should be supplied in jpeg or pdf format. For fig 1, include axis label for institutions; For fig 2., provide axis label for practice location.
2. Include author qualifications on title page.
3. Please note that annexures will not be published. Please remove any references to the annexure from the text.

Also note that as per the author guidelines, page-fee charges have been implemented since March 2017 for all research articles. Please find payment form attached herewith. As soon as proof of payment and the completed form have been received, we will send your article into production. (Please note that we are unable to process American Express card payments).

Thank you for submitting your work to the journal.

Best wishes

Bridget Farham, PhD
Deputy Editor
South African Medical Journal

APPENDIX 21: PROOF OF SUBMISSION TO AFRICAN JOURNAL OF PRIMARY HEALTH AND FAMILY MEDICINE CARE

PHCFM Submission - 1688: Confirming Receipt

AP

AOSIS Publishing <submissions@phcfm.org>

Reply all

Today, 03:34 PM

Kimesh Naidoo

You are receiving this email on behalf of the African Journal of Primary Health Care & Family Medicine. In the event of a requested response, you may respond directly to this email.

Dear Kimesh Loganathan Naidoo, Jacqueline M Van Wyk

Ref. No.: 1688
Title: Perceptions of the Learning Environment influence Intern Career Intentions
Journal: African Journal of Primary Health Care & Family Medicine

We confirm and thank you for submitting your manuscript. Please use the manuscript reference number given above in all future correspondence.

With the online journal management system that we are using, you will be able to track progress of the manuscript through the editorial process by logging into the journal's website:

Manuscript URL: http://phcfm.org/index.php/phcfm/author/submission/1688
Username: kimeshnaidoo

Your new submission will undergo a preliminary review by the editor to assess whether the article is within the focus of the journal.
Thank you for considering this journal to publish your work. If you have any questions, please do not hesitate to contact me.

Kind regards
AOSIS Publishing
African Journal of Primary Health Care & Family Medicine

African Journal of Primary Health Care & Family Medicine
This journal is available at http://www.phcfm.org
If you require immediate assistance, please contact the AOSIS Publishing:

Tel: RSA: 0861000381 - Intnl: +27 (0)21 975 2602
Fax: +27 (0)86 5004 974
Support email: publishing@aosis.co.za
Business hours are weekdays between 8:00am-16:30pm
Confidentiality: The information contained in and attached to this email is confidential and for use of the intended recipient. This email adheres to the email disclaimer described on www.aosis.co.za.

APPENDIX 22: INFORMED CONSENT – PILOT STUDY

UKZN BIOMEDICAL RESEARCH ETHICS COMMITTEE

APPLICATION FOR ETHICS APPROVAL

For research with human participants (Biomedical)

Information Sheet and Consent to Participate in Research

Date: August 2015

My name is Dr Kimesh L Naidoo. I am a Paediatrician and based at King Edward VIII Hospital and Honorary Clinical Tutor based at the Department of Paediatrics and Child Health, 4th Floor, Nelson R Mandela School of Medicine, University of Kwa Zulu Natal, 716 Umbilo Road, Congella, Durban. My telephone numbers are 0837760560 and 031 2604350.My email is naidook9@ukzn.ac.za

You are being invited to consider participating in a study that involves research into work-based learning amongst paediatric interns at hospitals in KwaZulu-Natal.

The title of this study is: *Working is learning: An Exploration of Work-based learning amongst Interns in Kwa Zulu Natal*. **A mixed methods study in junior doctors.**

The purpose of this research is to explore work-based l earning (WBL) in interns working in a high childhood disease burden area, KwaZulu-Natal (KZN), South Africa.This is a pilot phase and we are keen on validating a questionnaire on Intern learning environment

You are being invited to participate in this study in terms of phase 1 of this study.

SURVEY and

A FOCUS GROUP

This consultation consists of two parts

1. Completion of a survey into the Intern learning environment
2. Focus group discussion on the survey questionnaire and on future careers intentions and experiences in internship

The study involves minimal risk. Participation in this research is voluntary and participants may withdraw participation at any point. There are no specific reimbursements for participation in the study. About one hour of your time will be utilized. Breakfast will be provided for all participants Confidentiality of personal information will be maintained at all times. No names, addresses or identification numbers will be required. **The focus group discussions will be recorded**

This study has been ethically reviewed and approved by the UKZN Biomedical research Ethics Committee (BE 177/15)In the event of any problems or concerns/questions you may contact the researcher at Department of Paediatrics and Child Health, 4th Floor, Nelson R Mandela School of Medicine, University of Kwa Zulu Natal, 716 Umbilo Road, Congella, Durban.

Telephone numbers are 0837760560 and 031 2604350 and email naidook9@ukzn.ac.za

Or the UKZN Biomedical Research Ethics Committee, contact details as follows:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001
Durban, 4000, KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604769 - Fax: 27 31 2604609

Email: BREC@ukzn.ac.za

CONSENT

I …… Have been informed about the study entitled *Working is learning: An Exploration of Work-based learning amongst Interns in KwaZulu-Natal*. **A mixed methods study in junior Doctors,** by Dr Kimesh Naidoo

I understand the purpose and procedures of the study.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any treatment or care that I would usually be entitled to.

I have been informed about any available compensation occurs to me as a result of study-related procedures.

I am aware that the discussions of this focus group will be audio recorded and I consent to this

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at Department of Paediatrics and Child Health, 4th Floor, Nelson R Mandela School of Medicine, University of Kwa Zulu Natal, 716 Umbilor Road, Congella, Durban.

Telephone numbers are 0837760560 and 031 2604350 and email naidook9@ukzn.ac.za

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001
Durban
4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604769 - Fax: 27 31 2604609

Email: BREC@ukzn.ac.za

APPENDIX 23: INFORMED CONSENT EXPERT FOCUS GROUP

UKZN BIOMEDICAL RESEARCH ETHICS COMMITTEE

APPLICATION FOR ETHICS APPROVAL
For research with human participants (Biomedical)

Information Sheet and Consent to Participate in Research

Date: 14 October 2015
My name is Dr Kimesh L Naidoo. I am a Paediatrician and based at King Edward VIII Hospital and Honorary Clinical Tutor based at the Department of Paediatrics and Child Health, 4th Floor, Nelson R Mandela School of Medicine, University of Kwa Zulu Natal, 716 Umbilo Road, Congella, Durban. My telephone numbers are 0837760560 and 031 2604350.My email is naidook9@ukzn.ac.za

You are being invited to consider participating in a study that involves research into work-based learning amongst paediatric interns at hospitals in KwaZulu-Natal.
The title of this study is: *Working is learning: An Exploration of Work-based learning amongst Interns in Kwa Zulu Natal*

The purpose of this research is to explore work-based l earning (WBL) and career intentions of interns working in a high childhood disease burden area, KwaZulu-Natal (KZN), South Africa.

You are being invited to participate in this study in terms of phase 1 of this study. A FOCUS GROUP

This consultation consists of two parts

1. Face Validation of a learning environment tool I hope to use
2. Focus group discussion on the intern training program in institutions in KwaZulu-Natal

The study involves minimal risk. Participation in this research is voluntary and participants may withdraw participation at any point.. There are no specific reimbursements for participation in the study. About one hour of your time will be utilized .Lunch and tea will be provided for all participants Confidentiality of personal information will be maintained at all times .No names, addresses or identification numbers will be required .**The focus group discussions will be recorded using an audio recorder. The recordings of this discussion will be transcribed.**

This study has been ethically reviewed and approved by the UKZN Biomedical research Ethics Committee (BE 177/15)In the event of any problems or concerns/questions you may contact the researcher at Department of Paediatrics and Child Health, 4th Floor, Nelson R Mandela School of Medicine, University of Kwa Zulu Natal, 716 Umbilo Road, Congella, Durban.
Telephone numbers are 0837760560 and 031 2604350 and email naidook9@ukzn.ac.za

Or the UKZN Biomedical Research Ethics Committee, contact details as follows:
BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban, 4000, KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604769 - Fax: 27 31 2604609
Email: BREC@ukzn.ac.za

APPENDIX 24: INFORMED CONSENT – INTERN SURVEY

UKZN BIOMEDICAL RESEARCH ETHICS COMMITTEE

APPLICATION FOR ETHICS APPROVAL
For research with human participants (Biomedical)

Information Sheet and Consent to Participate in Research

Dear Intern

My name is Dr Kimesh L Naidoo.

I am a Paediatrician and based at King Edward VIII Hospital and Honorary Clinical Tutor based at the Department of Paediatrics and Child Health, 4th Floor, Nelson R Mandela School of Medicine, University of Kwa Zulu Natal, 716 Umbilor Road, Congella, Durban.
My telephone numbers are 0837760560 and 031 2604350.
My email is naidook9@ukzn.ac.za

You are being invited to consider participating in a study that involves research into learning experiences amongst paediatric interns at hospitals in Kwa Zulu Natal).This research is being conducted for my doctoral studies at the University of Kwa Zulu Natal.

The title of this study is : *Working is learning: An Exploration of Work-based learning amongst Paediatric Interns in Kwa Zulu Natal*.A mixed methods study amongst junior Doctors in a high disease burden context.

The participants will be expected to participate in a paper based questionnaire which will take about 30-45 minutes to complete.
Participation in this research is voluntary and that participants may withdraw participation at any point, and that in the event of refusal/withdrawal of participation the participants will not incur

There are no costs that will be incurred by participants as a result of participation in the study. There are no specific reimbursements for participation in the study.
Confidentiality of personal information will be maintained at all times .No names, addresses or identification numbers will be required.
This study has been ethically reviewed and approved by the UKZN Biomedical research Ethics Committee (approval number BE 177/15).

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
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KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604769 - Fax: 27 31 2604609
Email: BREC@ukzn.ac.za

CONSENT

I ..... have been informed about the study entitled *Working is learning: An Exploration of Work-based learning amongst Paediatric interns in Kwa Zulu Natal*. A mixed methods study amongst junior Doctors in a high disease burden context, by Dr Kimesh Naidoo

I understand the purpose and procedures of the study.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any treatment or care that I would usually be entitled to.

I have been informed about any available compensation occurs to me as a result of study-related procedures.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at Department of Paediatrics and Child Health , 4th Floor , Nelson R Mandela School of Medicine, University of Kwa Zulu Natal ,716 Umbilor Road , Congella , Durban .
Telephone numbers are 0837760560 and 031 2604350 and email naidook9@ukzn.ac.za

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604769 - Fax: 27 31 2604609
Email: BREC@ukzn.ac.za

_____ _____
Signature of Participant Date

APPENDIX 25: INFORMED CONSENT – FOCUS GROUP DISCUSSION –INTERNS

UKZN BIOMEDICAL RESEARCH ETHICS COMMITTEE

APPLICATION FOR ETHICS APPROVAL
For research with human participants (Biomedical)

Information Sheet and Consent to Participate in Research

Date:

Dear Intern

My name is Dr Kimesh L Naidoo.

I am a Paediatrician and based at King Edward VIII Hospital and Honorary Clinical Tutor based at the Department of Paediatrics and Child Health, 4th Floor, Nelson R Mandela School of Medicine, University of Kwa Zulu Natal, 716 Umbilor Road, Congella, Durban.
My telephone numbers are 0837760560 and 031 2604350.
My email is naidook9@ukzn.ac.za

You are being invited to consider participating in a study that involves a research into work-based learning amongst paediatric interns at hospitals in Kwa Zulu Natal).

The title of this study is : *Working is learning: An Exploration of Work-based learning amongst Paediatric Interns in Kwa Zulu Natal*.A mixed methods study amongst junior Doctors in a high disease burden context.

The purpose of this research is to explore work-based l earning (WBL) in Paediatric interns working in a high childhood disease burden area, Kwa Zulu Natal (KZN), South Africa.

This consent form is specific for the focus group component of the research project.

The study is funded by seed funding from the Medical Education Partnership Initiative (MEPI) REMETH programme. This study is part of my postgraduate doctorate study at the University of Kwa Zulu Natal.

The study involves minimal risk. The Focus group discussions will be audio-taped in order for transcription to ensure no incorrect information is recorded.

No identifiable names will be used at in any of the notes.

It is hoped that the study will improve the knowledge on learning during the internship period as well as learning in the workplace specifically in pediatrics in high disease burden areas. It is hoped that this knowledge will be used to improve the training of interns in Paediatrics in internship in South Africa and other countries with similar disease burdens .It is hoped that the knowledge gained from this study will also inform undergraduate training in South Africa with regard to work-based learning. There are no direct benefits to the you in this study.

Participation in this research is voluntary and that participants may withdraw participation at any point, and that in the event of refusal/withdrawal of participation the participants will not incur

There are no costs that will be incurred by participants as a result of participation in the study.
There are no specific reimbursements for participation.

Confidentiality of personal information will be maintained at all times .No names, addresses or identification numbers will be required.
All audio tapes will be stored safely by the principal researcher for five years and then destroyed as per the rules and regulations of the University of Kwa Zulu Natal

This study has been ethically reviewed and approved by the UKZN Biomedical research Ethics Committee (approval number BE 177/15).

In the event of any problems or concerns/questions you may contact the researcher at Department of Paediatrics and Child Health, 4th Floor, Nelson R Mandela School of Medicine, University of Kwa Zulu Natal, 716 Umbilor Road, Congella, Durban.
Telephone numbers are 0837760560 and 031 2604350 and email naidook9@ukzn.ac.za

Or the UKZN Biomedical Research Ethics Committee, contact details as follows:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604769 - Fax: 27 31 2604609
Email: BREC@ukzn.ac.za

CONSENT

I ..... Have been informed about the study entitled *Working is learning: An Exploration of Work-based learning amongst Paediatric Interns in Kwa Zulu Natal*. A mixed methods amongst in junior Doctors in a high disease burden context.by Dr Kimesh Naidoo

I understand the purpose and procedures of the study.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any treatment or care that I would usually be entitled to.

I have been informed about any available compensation occurs to me as a result of study-related procedures.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at Department of Paediatrics and Child Health , 4th Floor , Nelson R Mandela School of Medicine, University of Kwa Zulu Natal ,716 Umbilo Road , Congella , Durban .
Telephone numbers are 0837760560 and 031 2604350 and email naidook3@ukzn.ac.za

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604769 - Fax: 27 31 2604609
Email: BREC@ukzn.ac.za

_____ _____
Signature of Participant Date

Additional consent

I hereby provide consent to:

Audio-record my interview YES / NO

_____ _____
Signature of Participant Date

APPENDIX 26: MODIFIED PHEEM – SUPERVISOR SURVEY

Number	PHEEM ITEM indicating changes to original instrument as developed by Roff et al 2005 SA intern supervisor version
1	***Paediatric Interns*** have a contract of employment that provides information about hours of work
2	***Paediatric*** clinical teachers set clear expectations
3	***Paediarics*** has protected educational time in this post
4	***Paediatrics*** had an informative induction/"***orientation"*** programme
5	***Interns in paediatrics*** have the appropriate level of responsibility in this post
6	***Paediatrics*** had good clinical supervision at all times
7	There is racism in ***paediatric internship***
8	***Paediatric interns*** have to perform inappropriate tasks
9	There is an informative "***paediatric handbook for interns"***
10	***Paediatric*** clinical teachers had good communication skills
11	***Paediatric Interns*** am bleeped**(called)** inappropriately in paediatrics
12	***Paediatric interns*** are able to participate actively in educational events
13	There is gender discrimination in
14	There are clear clinical protocols in ***paediatrics***
15	***Paediatric*** **c**linical teachers are enthusiastic
16	***Paediatric intern*** s have good collaboration with other doctors in my grade
17	**Paediatric intern's on duty including their overtime hours conform with the Labour laws of South Africa**
18	***Paediatric interns*** have the opportunity to provide continuity of care
19	***Paediatrics*** have suitable access to careers advice
20	***The hospital has good*** quality accommodation for interns when on call
21	There is access to an educational programme relevant to ***the needs of Paediatric interns***
22	***Paediatric interns*** get regular feedback from seniors
23	***Paediatric*** clinical teachers are well organised
24	***Paediatric interns are*** physically safe within the hospital environment
25	There is a no-blame culture in paediatric internship
26	There are adequate catering facilities when ***Paediatric interns*** are on call
27	***Paediatric interns*** have enough clinical learning opportunities for my needs
28	***Paediatric*** clinical teachers have good teaching skills
29	***Interns*** feel part of the team "***when working in Paediatrics"***
30	***Interns in paediatrics*** have opportunities to acquire the appropriate practical procedures for my grade
31	***Paediatric*** clinical teachers are accessible
32	The ***workload for Paediatric interns is fine***
33	***Paediatric*** Senior staff utilise learning opportunities effectively
34	***The training in paediatric internship makes interns feel ready to be a community service officer in South Africa***
35	***Paediatric clinical teachers*** have good mentoring skills
36	***Interns in Paediatrics*** get a lot of enjoyment out of ***their paediatric intern job***
37	***Paediatric*** clinical teachers encourage ***interns*** to be an independent ***learners***
38	There are good counselling opportunities for "***interns"*** who fail to complete their training satisfactorily ***original = junior doctors***
39	The clinical teachers provide ***interns*** with good feedback on ***their*** strengths and weaknesses
40	***Paediatric*** clinical teachers promote an atmosphere of mutual respect
	***bolded text indicates changes to the original questionnaire**

APPENDIX 27: MODIFIED PHEEM – INTERN SURVEY

Number	PHEEM ITEM indicating changes to original instrument as developed by Roff et al 2005 Paediatric intern survey SA version
1	I have a contract of employment that provides information about hours of work
2	My clinical teachers set clear expectations
3	I have protected educational time in this post
4	I had an informative induction/"***orientation"*** programme
5	I have the appropriate level of responsibility in this post
6	I had good clinical supervision at all times
7	There is racism in this job
8	I have to perform inappropriate tasks
9	There is an informative "***paediatric handbook for interns" original = Junior doctors handbook***
10	My clinical teachers had good communication skills
11	I am bleeped**(called)** inappropriately in paediatrics
12	I am able to participate actively in educational events
13	There is gender discrimination in this job
14	There are clear clinical protocols in paediatrics
15	My clinical teachers are enthusiastic
16	I have good collaboration with other doctors in my grade
17	My hours" ***on duty including my overtime hours conform with the Labour laws of South Africa" original =My hours conform to the New Deal***
18	I have the opportunity to provide continuity of care
19	I have suitable access to careers advice
20	The hospital ***I did Paediatrics*** in has good quality accommodation for interns when on call
21	There is access to an educational programme relevant to my needs
22	I get regular feedback from seniors
23	My clinical teachers are well organised
24	I feel physically safe within the hospital environment
25	There is a no-blame culture in paediatric internship
26	There are adequate catering facilities when I am on call
27	I have enough clinical learning opportunities for my needs
28	My clinical teachers have good teaching skills
29	I feel part of the team "***when working in Paediatrics"***
30	I have opportunities to acquire the appropriate practical procedures for my grade
31	My clinical teachers are accessible
32	My workload is this job is fine
33	Senior staff utilise learning opportunities effectively
34	The training in this post makes me feel ready to be a ***"community service officer in South Africa" original = Specialist Registrar/Consultant***
35	My clinical teachers have good mentoring skills
36	I get a lot of enjoyment out of my ***paediatric intern job***
37	My clinical teachers encourage me to be an independent learner
38	There are good counselling opportunities for "***interns"*** who fail to complete their training satisfactorily ***original = junior doctors***
39	The clinical teachers provide me with good feedback on my strengths and weaknesses
40	My clinical teachers promote an atmosphere of mutual respect
	*** bolded are the changes to the original questionnaire**

APPENDIX 28: DR KL NAIDOO EDITING LETTER DD 07 DECEMBER 2017

Angela Bryan & Associates

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07 December 2017

To whom it may concern

This is to certify that the Doctoral Thesis: An Exploration of the Learning Environment and Career Intentions, A Mixed Methods Study of Paediatric Interns in KwaZulu-Natal written by Dr Kimesh Naidoo has been edited by me for language.

Please contact me should you require any further information.

Kind Regards

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