

Beyond The Struggles:

Using social-developmental lenses
on the transition to clinical training

By:

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Beyond The Struggles:

Using social-developmental lenses on the transition to clinical training

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Statement of Authentication

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have only submitted this material, either in full or in part, to any other institution apart from Maastricht University and Western Sydney University. This thesis is the product of a **dual award (double degree)** at these institutions.

A solid black rectangular box used to redact the author's signature.

.....
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*"Change.
we don't like it,
we fear it,
but we can't stop it from coming.
We either adapt to change
or we get left behind.
And it hurts to grow,
anybody who tells you it doesn't is lying."*

***Dr. Meredith Grey,
General Surgery Attending
Grey's Anatomy Season 4***

ABSTRACT

Transitions are inevitable. Transition discourse often focuses on the stress associated with entering a new phase of training. Medical educators and researchers have sought to eliminate transition stress with limited success. Recent transition literature has called for new perspectives on the transition 'problem' to optimise students' adaptation to change. This thesis aimed to enhance our understanding of how undergraduate medical students navigate the transition from pre-clinical to clinical training using sociocultural lenses. We first conducted a scoping review (Chapter Two) exploring how researchers have approached the transition from pre-clinical to clinical training and identified the gaps in these approaches. Following the scoping review, we created two overarching questions that address to our research agenda. **1) In what ways does the transition from pre-clinical to clinical training contribute to medical students' professional and personal identity development? 2) What role do social relationships play in students' transition from pre-clinical to clinical training?**

Chapters Three through Five represent individual empirical studies and publications each conducted within the five-year Bachelor of Medicine, Bachelor of Surgery (MBBS) undergraduate medical programme at Western Sydney University in Australia between 2018 and 2020. Chapter Three is a qualitative longitudinal study in which nine pre-clinical students submitted regular audio diary entries and participated in two interviews as they transitioned to clinical training. Eight of these students also participated in qualitative social network research in Chapter Four. For this study, students mapped their social support networks in the first and fifth months of clinical training. Chapter Five is a mixed-methods study using surveys (n=200) and interviews (n=18) to explore proactive behaviour and its relationship to students' sense of social integration as they enter a new clerkship. For each study, we used sensitising concepts from different sociocultural lenses — landscapes of practice, social network theory and organisational socialisation.

Chapter Two, the scoping review, discovered that researchers view the transition to clinical training from an educational perspective, and mainly focussed on the gap in knowledge and skills needed for the next phase. Chapter Three showcases that students undergo identity development as they transition by taking charge of learning opportunities. They shape their self-image through becoming more engaged, identify role models and flexibly adapt to new clerkship norms by managing expectations and adopting a journey mindset. Next, Chapter Four found that students' social networks were diverse and dynamic; students deliberately finetune their social networks as they identify relationships that serve their development through emotional and instrumental functions. Chapter Five adds that negotiating tasks was a challenging proactive behaviour (PB) for clinical students entering a new clerkship. Individual factors like

personal interest and mental energy impacted whether students intended to be or felt like they were capable of PB. Students' networks also created a safe space where they felt motivated to be vulnerable as they practised lifelong skills (e.g., being proactive). Smartphones were a critical research tool to carry out our research in Chapter Three; hence, we critically appraised using smartphones for qualitative data collection in Chapter Six, a guide for researchers.

We conclude that the transition to clinical training is an opportunity for student identity and lifelong skill development (e.g. proactive behaviour); our explicit consideration of identity formation shows this. It occurs when students went from being pre-clinical students to becoming clinical students working and learning around patients. We also conclude that the transition to clinical training is an opportunity for students' social network development and utilisation. We found that students' networks are diverse—including family, peers, near-peers, doctors, academic staff, nurses; dynamic—they change significantly over time; and deliberate—students made choices about who was in their social support networks. We lastly conclude that the transition to clinical training is both a threat and an opportunity for learning and development; a developmental networking asset. Students' lived reality of this tension between opportunity and threat will depend on educators shifting their transition-related perspectives, and creating supportive environments for the transitioning student.

Keywords:

transition; clinical training; social networks; identity development; proactive behaviour; smartphones



General Introduction

Do you remember the first time you entered university? When you started your first job after university? The first time you started postgraduate training? Do you remember the emotions you felt, the challenges you had, and the knowledge and skills you learned?

In medicine, medical students and doctors experience numerous transitions during training, bringing changes in context, relationships and responsibility. A transition is not a moment, but 'a dynamic process in which the individual moves from one set of circumstances to another'¹; Kilminster aptly described transitions as critically intensive learning periods (CILPs)². One crucial transition in a medical trainee's life occurs during undergraduate training when a medical student moves from pre-clinical, classroom-based, to clinical training based around patient care. While initial transition literature focused on the negative associations with stress and anxiety³⁻⁵, researchers increasingly highlight the opportunities inherent in transition periods during medical training^{1,6,7}. So, are transitions an opportunity for, or a threat to, learning and development of medical trainees? Regardless, transitions during the medical continuum are inevitable and occur due to both healthcare systems and the educational continuum. This thesis aims to expand our understanding of how undergraduate medical students navigate the transition from pre-clinical to clinical training.

Why are there transitions during medical training?

Transitions are everywhere—in professional and everyday life; in nature and humankind. In medicine, following Abraham Flexner's landmark report in the United States and Canada, medical schools restructured medical education⁸. This restructuring meant that students first spend time learning in the classroom before learning through patient care⁸. Flexner propositioned that during medical school, the medical student must first develop analytical skills in basic sciences (e.g. histology and pharmacology) followed by clinical exposure in hospitals (e.g. surgery and paediatrics)⁸. Since Flexner's report, many medical schools started structuring training into pre-clinical training (mainly in the classroom) studying basic medical sciences and clinical training (mostly around patients) applying basic sciences to patient care. This model is still dominant today. Therefore, medical students experience a transition when they leave basic science training and enter clinical training.

Further, given the explosion of medical specialities over the past 100 years, medical schools seek to dip students in and out of as many speciality areas as is possible—rotation-based clinical training. Together, this creates the 'Flexnerian curriculum' of medical training with many transitions⁹. Recently, some medical schools are adjusting this traditional structure in two ways. First, some medical schools provide early clinical experiences and bring patients to the classroom while also taking basic sciences to clinical training^{5,10,11}. Next, some medical schools have abandoned rotation-based

clerkships favouring longitudinal clerkships where students experience one clinical environment for a prolonged period¹². These innovations resulted from evidence highlighting the threats to learning and development posed by the transition to clinical training³⁻⁵, and further so with frequent changes between clerkships¹³. This thesis specifically focuses on this transition from pre-clinical to clinical training, as this is the first transition within the medical education continuum. Further, authors suggest that transition skills— behaviours that allow an individual to navigate complex situational changes, including in higher education—can be learned¹⁴.

Transition to clinical training: a threat to- or an opportunity for learning and development?

Many medical educators and researchers frame the transition to clinical training as a problem to be eliminated. Research, primarily cross-sectional in origin, shows that many medical students struggle with fitting into the clinical environment once they enter clinical training^{3,15,16}; worsened in rotation-based clerkship curriculum models^{1,17,18}. Additionally, research suggests that this transition results in significant anxiety, and some students struggle to find their role and develop an identity that aligns well with role expectations in their new clinical environment¹⁹⁻²¹. With each new clerkship, students encounter a unique community of doctors, nurses and patients. Students learn clerkship norms from this community as they build relationships. Relationships between students and others in the clerkship community can influence how they adapt to a new environment²². These struggles are important to consider because some research suggests the associated emotional stress could negatively impact learning^{23,24}. Further, these threats prompted educators and researchers to see transitions as a struggle^{13,25-27}— transition as problematic perspective— and to find ways to deal with this problem and ‘smoothen’ transitions in training²⁸.

Researchers and educators in medicine have designed numerous curriculum innovations to optimise the transition to clinical training and minimise the threats this transition poses. These innovations are often didactic transition courses²⁹, lasting up to a few days, preparing students with the knowledge and skills for their new context and workplace norms⁽⁴⁾. These transition courses have, reduced anxiety⁴, improved confidence^{30,31} and learning^{4,32,33} but research still reports that students feel stressed and anxious about the transition^{4,20,29}. Transition courses are often at a group-level and classroom-based even though the clinical environment is social, dynamic and complex^{4,17,29}. Further, efforts to eliminate transitions indicate this will never be possible; transitions remain inevitable. This recently prompted a few researchers and educators in medicine consider the opportunities that the transition to clinical training brings^{1,34}.

A few authors highlight the benefits of empowering students through challenging transition periods^{22,26,35,36} or highlight the potential for stressful experiences to trigger personal and professional development³⁷. Guided, written narratives completed at the end of pre-clinical training allowed students to recognise aspects from pre-clinical training that helped their anxiety for the future clinical environment and allowed them to reflect on the type of doctor they wanted to be³⁵. Reflective interviews helped students assess their progress and critically evaluate how current experiences were essential to optimise work-based learning³³. Reflection using audio diaries were used longitudinally over nine months among postgraduate trainees as they became trained specialists and showed that formal and informal relationships are critical to helping trainees to transition⁶. Reflection is an area that has been minimally studied for its impact on the transition to clinical training but could be essential to help students recognise vital experiences³⁸ as they develop.

The lack of literature highlighting the opportunities inherent in transition periods is unfortunate as experiences, critical reflection and dialogue with others regarding stressful experiences can transform one's existing perspective of self, beliefs, and behaviours³⁷. Moreover, Wenger suggests that transitions bring new experiences and relationships and represent a critical point in identity formation³⁹.

What is missing?

Researchers recently recognise that there is a missing piece of the puzzle in how medical education transitions are framed⁷. Research in medical education infrequently explores identity formation during critical transition periods. Further, although transitions are dynamic with the potential to contribute to a medical students' development and growth, there have been few longitudinal approaches *across* any transition during the medical trajectory⁶, including the transition from pre-clinical to clinical training. There are increasing calls to advance educators' and researchers' approaches to transitions in general. Yardley and colleagues suggest that new outcomes beyond students' perceptions of confidence and anxiety are necessary to move transition research forward. As Yardley et al. remind us³⁸, our current views about transitions likely influence how we approach these critically intensive learning periods (CILPs)². Similarly, O'Brien suggests framing the transition to residency as a transformative process, an opportunity for development, rather than a problem to be solved⁷.

Framing this work

The limited literature acknowledging the contextual aspects of the transition to clinical training and other shifts in the medical continuum led us to situate this thesis in theoretical concepts from sociocultural lenses— the landscapes of practice model, social network theory and organisational socialisation theory. Wenger developed the

concept of landscapes of practice³⁹ by revisiting his earlier work on communities of practice (CoP)³⁹. Wenger and colleagues note that people build complex relations across a dynamic *landscape when learning in a profession* and slowly become knowledgeable and competent in the profession over time. Thus, Wenger suggests that both knowledgeability and competence are social, and not individual, constructs³⁹. When individuals join and leave a community of practice, Wenger describes a significant *boundary* that is crossed⁴⁰, this correlates to what we have been discussing as a *transition*. When traversing a professional landscape, learning is not just acquiring knowledge but also about the becoming of the person entering and functioning in a new landscape³⁹. *Boundary crossing* and navigating multiple CoPs over time influences identity development⁴⁰. This thesis used sensitising concepts from landscapes of practice to explore undergraduate medical students' identity development transitioning to the clinical environment.

The influence of others on newcomers' development, especially during transition periods is underexplored in medical education research. Social network theory offers us concepts and a methodology to explore this social influence and unpack the structure and function of social relationships relevant to a transition period. We used sensitising concepts, and an approach grounded in social network theory to explore the 'others' that influence students transitioning to the clinical environment.

Lastly, organisational socialisation theory considers the role of the organisation in influencing socialisation of newcomers to the workplace^{17,41} and the antecedents for true integration when entering a new work environment. For example, newcomers who are proactive and organisations that use intentional tactics to promote socialisation result in newcomers becoming a functioning member of the workplace while developing mastery of work tasks⁴². In medicine, medical students enter a new workplace when they begin learning from patients to develop clinical skills; thus, notions from organisational socialisation become relevant. Faculty in medical education often desire proactive students and proactive behaviour is an individual tactic that can help students develop a sense of social integration into the clinical environment. Therefore, we used sensitising concepts from organisational socialisation to explore proactivity in a medical education context.

Toward a research agenda and specific research questions

Much research in HPE related to transitions, including that from pre-clinical to clinical training, uses narrow conceptualisations of the term *transition*⁷. We have argued above that transitions during medical training are both a threat *and* an opportunity for medical students and doctors' learning and identity development. However, it is also clear that new perspectives and approaches to the transition to clinical training

are necessary to inform new strategies to help medical students and trainees adapt to change. New perspectives can be stimulated by looking to new theoretical frames. New perspectives can also be encouraged by considering how we approach transition research both practically and methodologically. Thus, we set out to address a research agenda that sought to highlight new perspectives to the transition from pre-clinical to clinical training in medical education and provides suggestions to move this field forward in a meaningful way.

Therefore, this PhD thesis has one overarching aim: **to enhance our understanding of how undergraduate medical students navigate the transition from pre-clinical to clinical training using sociocultural lenses.** To meet this aim, we first conducted a scoping review exploring how researchers have approached the transition from pre-clinical to clinical training and identified the gaps in these approaches. From this review, we determined what empirical studies were necessary and created a research agenda to advance evidence and contribute meaningful strategies to help students navigate change. This first step was essential before building on existing literature as it was not yet clear, what gaps exist in the field's approaches to transitions. This scoping review (Chapter Two) revealed that medical education researchers mainly approach the transition to clinical training from an educational perspective of what knowledge and skills the medical students bring to the clinical environment and what they lack. As all other chapters build on information in both this current chapter and Chapter Two, we created two overarching questions for the other empirical chapters in this thesis that address our research agenda.

1) In what ways does the transition from pre-clinical to clinical training contribute to medical students' professional and personal identity development? Chapters Three and Five contributed to this first question. The scoping review highlighted that research from a developmental perspective was limited. These authors focused on empowering students with lifelong learning skills—adaptation and being self-directed. Students completed audio-diary recordings during the research in Chapter Three as they transitioned from pre-clinical to clinical training, allowing us to explore their lived reality and identity formation. Further, in Chapter Five, we explored a specific developmental behaviour — individual students' proactive behaviours — and the extent to which proactivity influenced their transition experiences and sense of social integration in a clerkship. **2) What role do social relationships play in students' transition from pre-clinical to clinical training?** Chapters Four and Five contributed to this question. The scoping review highlighted that social perspectives to the transition to clinical training were limited and that social relationships could influence newcomer experiences and development. In Chapter Four, we explored a transition from a social perspective by unpacking students' social support networks as they transitioned from pre-clinical to

clinical training. Further, in Chapter Five, we describe findings that social context affects students' ability to exhibit proactive behaviour.

In our background reading, research team conversations and the scoping review, we recognised that most transition literature used similar research approaches, often cross-sectional— surveys, interviews and focus groups. Researchers admitted the limitations and potential for recall bias given that they collected data before or after students had 'transitioned' to a new environment. Therefore, we added to our research agenda, the need to contribute a longitudinal exploration of the transition from pre-clinical to clinical training. We deemed it essential to use data collection methods that aligned with a need to collect students' experience and perspectives *while* transitioning. Collecting data *during* students' transition experiences was fruitful by minimising recall bias as previously described; students could provide insights *as* their experiences were occurring. As we fine-tuned our research protocols, we made evidenced-based decisions on the opportunities and drawbacks of using smartphones to collect data. Chapter Six is an appraisal of using technology— smartphones— to collect data given that other fields found this had the potential to provide 'just-in-time' information to researchers studying specific processes.

Context

We conducted all studies in this dissertation within the five-year Bachelor in medicine; Bachelor in Surgery (MBBS) undergraduate medical programme at Western Sydney University in Australia with cohorts of up to 130 medical students between 2018 and 2020. These cohorts comprise mostly school-leavers, and cohorts are often diverse, with 30% international students. In this programme, undergraduate students spend two years in pre-clinical training with a problem-based learning component. Students experience a transition day during their second year, shadowing a third-year student on the wards. Students then enter clinical training in their third year where they rotate through clerkships, in groups of approximately 20, at sites across New South Wales. Three times per year, each year group attends a week of on-campus large-group teaching sessions, where all students in the cohort receive didactic lectures and tutorials on clinical skills and specific knowledge to aid their transition to clinical environments.

Thesis Overview

This thesis presents four empirical studies that contribute to our understanding of the transition's social and developmental aspects of clinical training. Table one summarises the titles, research questions, study design theoretical framework and data sources for each chapter that follows. In Chapter Six, we offer an appraisal of using smartphones to collect qualitative data. In Chapter Seven, we synthesise findings to answer our overarching research questions, and discuss the implications of our findings and

Table 1: PhD Thesis Overview for all empirical chapters

	CHAPTER TWO	CHAPTER THREE	CHAPTER FOUR	CHAPTER FIVE	CHAPTER SIX
TITLE	Beyond the struggles: a scoping review on the transition to undergraduate clinical training	Journey to becoming: Exploring students' lived reality and identity formation across the transition to clinical training	Students' social networks are diverse, dynamic and deliberate when transitioning to clinical training	Socialisation tactics when entering a new clinical clerkship: a mixed-methods study of proactivity	Appraising the use of smartphones and apps when conducting qualitative medical education research: AMEE Guide No. 130
RESEARCH QUESTIONS/AIM	RQ: How have researchers approached the transition within medical school from pre-clinical to clinical training, and what are the gaps in these approaches?	AIM: To explore how students narrate their navigation of the transition from pre-clinical to clinical training and their process of identification	RQ: Who are in the social networks of undergraduate students transitioning to the clinical environment? RQ: To what extent do undergraduate students' networks change as they transition to the clinical environment? What are the mechanisms behind these changes?	AIM: To assess reported proactive behaviors and their association with social integration AIM: To explore enabling and inhibiting factors for proactive behavior	AIM: Provide readers with a critical appraisal of using smart- phones as a research tool within qualitative medical education research (MER) through highlighting the opportunities and drawbacks that using smartphones may provide in qualitative MER.
STUDY DESIGN	Scoping Review	Qualitative Study using narrative inquiry	Qualitative Social Network Analysis	Mixed Methods Study	Literature review and recommendations
THEORETICAL FRAMEWORK	Constructivist paradigm	Landscapes of Practice Theory	Social Network Theory & Landscapes of Practice Theory	Organisational socialisation theory	Constructivist paradigm
PARTICIPANTS+ DATA SOURCES	45 research articles	Nine 2nd year medical students providing audio-diaries and interviews that yielded transcripts	Eight 3rd year medical students participating in interviews that yielding transcripts, social network maps and video recordings	200 clinical students and 18 clinical students participating in a survey and interviews, respectively leading to a database and transcripts	The literature and research team experiences

acknowledge both the strengths and weaknesses in our procedures. Lastly, an impact paragraph describes the scientific and societal impact these findings can and have had on real-life issues. Since this thesis constitutes published journal articles, some repetition is unavoidable. Additionally, each journal dictated its English type (e.g. British or American English) and citation style (e.g. Vancouver); we maintained journals' formats in each published chapter, so some inconsistencies in these areas are expected.

Reflexivity

Reflexivity is critical in qualitative inquiry⁴³. I used qualitative inquiry throughout this entire thesis. In this section, I hope to bring awareness to myself and my readers regarding my role in the co-construction of the knowledge within this thesis. In this section, I will refer to in the first-person singular given the very personal introspection necessary. All other sections will use first-person plural terms given the collective efforts by myself with my research '*A-team*'. This research programme explored the transition that medical students experience as they go from pre-clinical to clinical training. We used multiple data sources and theoretical perspectives but always toward a constructive paradigm. As a researcher situating herself towards the constructive side of research paradigms, I recognise the importance of researcher reflexivity⁴⁴. Therefore, below I briefly describe how my historical, biographical and social perspectives could have shaped my decisions as I conducted, refined and present this research.

I am a Black female from a small island— Barbados. I grew up in a middle-class family with both parents. I entered pre-clinical years of medical school as a layperson in a close-by, but a very different, country— Jamaica. I then returned to Barbados to complete the clinical years of medical school. I exited medical school a health professional. I soon left clinical practice behind in favour of public health and medical education research, ultimately falling in love with education. This PhD trajectory uprooted me once again from Barbados. I temporarily lived in The Netherlands, a country that primarily speaks a language I previously never heard. In Australia, I was over 18,000km away from home, where I experienced a few instances of racial tension. Therefore, I, am the product of multiple life and career transitions and have been trying to fit into numerous communities of practice across the world, in multiple disciplines and in various countries where people that looked like me were in the vast minority. Therefore, my interest in transitions is not surprising, but it does mean I have some preconceived notions about this topic. Through my experiences and prior research, I believed transitions threatened learning and development as many medical trainees experience anxiety and stress when experiencing shifts in physical spaces. By reflecting, discussing findings and the literature with my team and writing an evidence-based scoping review, I became aware of and acknowledged my preconceived notions. I now recognise, appreciate and hope to unpack the opportunities that critical periods of change can provide to individuals once they are in supportive environments.

Chapter 1

I drew on five years of medical education research experience when I started this research programme. I had a choice of my topic of study and my research stance. Even though in biomedical science, objective measures are the gold standard according to many, this was at odds with my inner perspective that subjectivity is beautiful and the only objective truth I believed was that reality is different for everyone. Therefore, I sought methodologies and research approaches aligning with my perspective which led me to participatory data collection methods such as using participants' phones to collect in-the-moment data and actively creating research data with participants. In this way, I affected my study design choices. I will present reflexivity on other aspects in the research process—data analysis, interpretation and presentation— in Chapter Seven toward the end of the discussion. I do this to offer readers a chance to engage in all other chapters before reading my own reflexive choices that resulted in the data presented.

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Beyond the struggles: A scoping review on the transition to undergraduate clinical training

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ABSTRACT

Context

The transition to clinical training within medical school is often seen as a struggle and students remain in distress despite numerous efforts to minimise threats. Efforts to change this may be misdirected if they are based on narrow conceptualisations of transitions. The authors conducted a scoping review to explore existing conceptual perspectives regarding the transition within medical school from pre-clinical training to clinical training to suggest a research agenda and practical implications.

Methods

Between October 2017 and February 2018 the authors searched PubMed, MEDLINE, ERIC, PsycINFO, Web of Science and CINAHL for English language literature with no date limits and retrieved 1582 articles; 45 were included in this review. Two reviewers independently screened articles and extracted data. Data were then charted, analysed and discussed with the research team.

Results

The transition to clinical training was often described negatively as 'difficult', 'a problem' and 'a struggle'. Our analysis found that researchers in medical education conducted studies on the transition to clinical training from three conceptual perspectives: educational; social, and developmental. Most research approached the transition to clinical training as a problem to be addressed from an educational perspective through transition to clerkship courses and curriculum innovations. Some research was conducted from a social perspective, focusing on building relationships. Regarding development, authors found a few articles highlighting opportunities for personal and professional development by nurturing transferrable learning strategies and reflection.

Conclusions

This review provides an empirical base on which future research can be built to better understand and support medical students' ability to navigate change. Finding new perspectives to approach the transition to clinical training could allow researchers to look beyond preparing students for struggles.

INTRODUCTION

Medical professionals are repeatedly exposed to changes in contexts and responsibilities from undergraduate to postgraduate training as they traverse the medical education continuum. Medical training steers students through pre-clinical training, to clinical training, to being a newly practising doctor, to specialty training and ultimately to a consultant or specialist. This continuum is punctuated with prolonged, dynamic transition periods as a newcomer adjusts to a new environment.¹⁻⁴ Changing from primarily being in a 'pre-clinical' classroom environment to mainly being in a 'clinical' patient-focused environment is the first of many transition periods that medical trainees will encounter once they have begun medical training and are on a trajectory to being a doctor. This scoping review will focus on medical students transitioning from pre-clinical to clinical training.

There is a large focus on increasing students' preparedness and reducing the gap in knowledge and skills between pre-clinical and clinical training.⁵⁻⁸ A previous systematic review found that many aspects related to perceived preparedness during the transition from pre-clinical to clinical training can be addressed in curricula.⁹ Such curricula changes include facilitating early patient contact¹⁰ and problem-based learning.¹¹ These interventions try to reduce the gap between preclinical and clinical training, making the distinctions less apparent. However, despite these interventions, students still feel stressed and anxious,^{8,12,13} and as if they are 'thrown into the deep end'¹⁴ when entering the clinical environment.

A previous scoping review by Yardley et al. provides a practical approach to transitions in medical education by describing the 'dos, don'ts and don't knows' of supporting trainees towards progressive independence during medical education. Yardley's review proposes moving beyond student perceptions when evaluating the impact of any transition,³ and further suggests that the lack of outcomes beyond students' perceptions could 'have influenced the existent literature on the concept of transitions ...'³ This suggestion is likely to refer to the current framing, and thus focus, of transitions in the literature and it remains unclear what this constitutes. Although this review by Yardley et al. yielded practical suggestions for improving support during transitions, it did not explore the conceptualisations of transitions innate in the current understanding of transitions in medical education literature.³

In a recent commentary on the transition to postgraduate residency, O'Brien suggests that perhaps something is missing from the way transitions in medical education are framed and proposes a shift to framing this transition as a transformative process as opposed to a problem.¹⁵ The transition to clinical training within medical school might

also benefit from a similar reframing of how it is currently perceived and conceptualised in medical education. Analysing existing conceptualisations could shed light on what current framings of the transition to undergraduate clinical training help us to understand, and what these conceptualisations prevent us from recognising. Such a synthesis could support future research on the transition to undergraduate clinical training. The authors conduct this review on the assumption that different interpretations of what transitions are and how they should be addressed are likely to influence research and practice, and we seek to set a baseline understanding. We therefore conducted a scoping review of the published literature on the transition to undergraduate clinical training to identify the conceptual perspectives taken when addressing the transition to undergraduate clinical training, as well as simultaneously identifying gaps in these perspectives.

METHODS

We conducted a scoping review following five stages as described by Levac et al.: (i) identifying the research questions; (ii) identifying the relevant studies; (iii) study selection; (iv) charting the data, and (v) collating, summarising and reporting results.¹⁶ Peters et al. describe that

'... beyond preceding systematic reviews, scoping reviews are independently used to explore broad areas to identify gaps in the literature, clarify key concepts and report on the types of evidence that address and inform practice'.¹⁷

As such, scoping reviews are valuable for mapping the key concepts within a research area.¹⁸ Therefore, we conducted a scoping review in order to identify current conceptual perspectives taken in the literature regarding the transition to undergraduate clinical training and highlight gaps, in order to suggest a research agenda with some practical implications.

Identifying the research question

This scoping review focused on the following research question: How have researchers approached the transition within medical school from pre-clinical to clinical training and what are the gaps in these approaches? We did not seek to develop recommendations on how to improve current interventions relevant to this transition.

Box 1: Search strategy for PubMed

transition[All Fields] AND (((("clinical clerkship"[MeSH Terms] OR "clinical preceptorship"[All Fields]) OR "clinical clerkship"[MeSH Terms]) OR "clinical rotation"[All Fields]) OR "preceptorship"[MeSH Terms]) AND (((("medical student"[All Fields] OR "undergraduate"[All Fields]) OR "medical school"[All Fields]) OR "clinical student"[All Fields])

MeSH= Medical Subject Headings

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Identifying relevant studies

We determined the search strategy through team discussion and consulting the university librarian. We searched PubMed, MEDLINE, ERIC, PsycINFO, Web of Science and CINAHL. A sample search strategy for PubMed is seen in Box 1 below, which yielded 52 articles. We used no date limits and included articles published online ahead of print. We conducted the initial search on 26 October 2017 and issued citation alerts until 28 February 2018.

Study selection

EndNote X8 (Clarivate Analytics, Philadelphia, PA, USA) was used to download the bibliographic details of studies yielded from the database searches and duplicates were deleted. Researchers AA and SA independently screened article titles and abstracts to determine eligibility for full-text review against the inclusion criteria (Box 2). Any discrepancies were discussed until consensus. After this initial screening, AA and SA read full texts of articles to determine eligibility for inclusion. This scoping review included and excluded articles as per criteria in Box 2. Figure 1 shows a flowchart indicating this search and selection process. Our initial search was systematic in order to obtain a broad scope of the literature, with an aim to be inclusive in our review. Our scope of the literature yielded 1582 articles from six databases and 17 from reference screening and citation alerts. Following screening and full-text review, 45 articles were included in this review.

Box 2: Inclusion and exclusion criteria for this scoping review

Inclusion criteria:

The following articles were included in this scoping review:

- 1) Published in English
- 2) Focused on medical students, trainees or junior doctors (NOT dental, pharmacy, physiotherapy, nursing or other professions)
- 3) Discussed the transition to clinical training by:
 - a. describing or evaluating a support strategy that assists new undergraduate students in their transition to clinical training,
 - b. describing students' experiences during this transition as this was thought to yield insight into useful support strategies.
- 4) Was a review article including an exploration of the transition into clinical training
- 5) Was a theoretical article including an exploration the transition into clinical training

Exclusion criteria:

The following articles were excluded from this scoping review:

- 1) Perspective articles not substantiated on theory.
- 2) Those without full text.
- 3) Those exploring the transition to a single, specific undergraduate clerkship that was not the first clerkship as students experiencing a second clerkship would have some previous full-time experience within the clinical environment
- 4) Those evaluating transitions in patient care.

Charting the data

The first author (AA) developed a data charting form (see Appendix S1) to extract data, including author, publication year, journal, study aim, study design, theoretical framework, data collection methods, year of data collection, summary of key findings, description of a specific support strategy and relevant references. Another author (SA) reviewed full-text articles against the data extraction to check for completeness and any discrepancies were discussed. The extraction process was iterative and was refined based on discussions between the first author (AA) and the rest of the research team (DD, WH, IH, SA and PWT).

Collating, summarising and reporting results

The first author (AA) thematically analysed the data with SA and extracted data to answer the research question and meet the objectives of this scoping review. SA and AA discussed findings, which were then discussed with the rest of the research team (DD, WH, IH and PWT). ATLAS.ti Version 8.1.29.0 (ATLAS.ti Scientific Software Development GmbH, Berlin, Germany) was used to help manage articles and any coding and synthesis of articles. This process was also iterative and bolstered by team discussions. Our team consists of a combination of clinicians, medical educators with doctorates and a current PhD candidate in medical education with previous research experience. Our syntheses

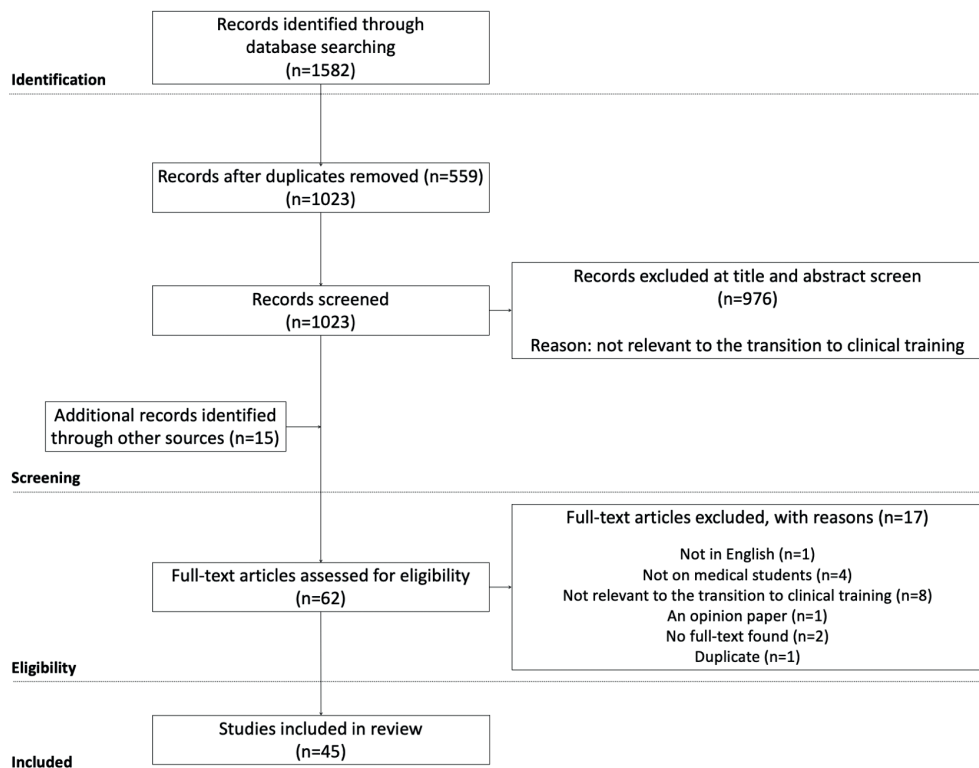


Figure 1: Flowchart of the search process and results for this scoping review

of researchers' perspectives were not explicitly described by researchers but instead represent our interpretations and reanalysis of existing research.

RESULTS

Descriptive summary

Included studies were from the USA ($n = 21$), Europe ($n = 11$), UK ($n = 8$), Canada ($n = 3$) and Australia ($n = 2$). There were 12 qualitative studies,^{10,11,14,19–27} 11 cross-sectional surveys,^{6–8,13,28–34} eight descriptive case studies^{5,35–41} (two of which were related, using the same participants and intervention),^{36,37} seven longitudinal studies,^{42–48} three descriptive comparative studies,^{12,49,50} three review papers^{1,3,9} and one concept paper.⁵¹

Conceptual perspectives

Our analysis found that researchers in medical education conducted studies on the transition to clinical training from three conceptual perspectives: educational, social and developmental. We do not suggest that these synthesised categories are mutually

exclusive, but indicate the main focus of the articles in these categories. Allocation to a category is thus based on the implicit views of the transition from pre-clinical to clinical training inherent in researchers' discourse, interventions, choices of outcomes and suggestions. We will describe what we mean by these three perspectives, followed by details on the studies that were conducted from each perspective and what each one reveals regarding the transition to clinical training.

Box 3 shows a short description of our interpretations of these perspectives. Table 1 summarises these perspectives with regard to associated terminology, strategies used to approach the transition and annotations on a study that exemplifies each perspective.

Box 3: Three conceptual perspectives used to approach the transition from pre-clinical to clinical training

Educational perspective

Implicit in this perspective was how researchers addressed students' struggles by trying to narrow the gap between pre-clinical and clinical training often through courses and curriculum innovations to facilitate learning knowledge and skills.

Social perspective

Implicit in this perspective was how researchers addressed undergraduate students' struggles when transitioning from pre-clinical to clinical training by focusing on relationships and developing a nurturing learning environment⁵³ between staff and students and between students themselves.

Developmental perspective

Implicit in this perspective was how researchers recognized that undergraduate students will always have challenges when transitioning from pre-clinical to clinical training, but aimed to empower them by facilitating reflection and transferrable learning strategies.

Educational perspective

Researchers often portrayed the transition to clinical training negatively, describing it as difficult,^{6,39,50} stressful,^{8,12,13,19,21,23,28,35,37,47,49} anxiety generating^{8,12,13,32-34,36,37} and a struggle.^{7,26,27,44} Some studies started from a stance that there was a need to eliminate a variety of struggles, including students: feeling like they lacked the required knowledge and skills,^{6,11,13,19,27,34} feeling unprepared,^{11,28,30,32} feeling burdened by the demands of clinical training,^{11,19,28,42} not meeting faculty members' expectations,^{9,33} and stressed by frequent changes in context.²⁷

Table 1: Perspectives taken to transition to clinical training in the literature

	Frequently used associated transition terms	Focused on	Strategies to improve the transition	Summary of one example in the literature
Educational	<ul style="list-style-type: none"> • Struggle • Difficult • Anxiety • Stressful 	<ul style="list-style-type: none"> • Narrowing the gap between pre-clinical and clinical training • What students should know and be able to do 	<ul style="list-style-type: none"> • Transition to clerkship courses or orientations • Problem-based learning • Early patient contact • Targets knowledge, skills, logistics, assessment details 	<p>Chittenden et al 12 conducted a descriptive comparative study with 155 students who underwent a 7-day, low stakes, high fidelity transition to clerkship course and compared perceived preparedness (in six skill sets), course satisfaction, performance in first clerkship and preceptor satisfaction to 147 controls who received a standard preparation for clerkships. Students felt more prepared for two of six skills, felt more confident and there was no difference in performance between groups.</p>
Social	<ul style="list-style-type: none"> • Struggle • Difficult • Anxiety • Stressful 	<ul style="list-style-type: none"> • Cultural norms and fitting in • Developing relationships with others 	<ul style="list-style-type: none"> • Introduction to staff to gain familiarity during orientations • Targets students fitting in to the clinical team and peer and near-peer relationships 	<p>Knobloch et al 49 described mixed methods, descriptive case study with a historical cohort for comparison. They created a near-peer led transition to clerkship seminar within a transition course. The seminar was 155 minutes and focused on integrating into teams, creating a study plan and a general question and answer session. In total 7-10 students were paired with two to three instructors. Students felt more prepared in the domains focused on immediately after the session and 6 months after.</p>
Developmental	<ul style="list-style-type: none"> • Challenging • Opportunity • Empowerment • Trajectory 	<ul style="list-style-type: none"> • Personal and professional development • Learning strategies and reflection 	<ul style="list-style-type: none"> • Portfolios • Reflective interviews • Targets learning strategies and promoting reflection 	<p>Pitkala and Mantyranta⁴² introduced a one-year portfolio in the first clinical year, which focused on learning diaries, narratives, logbooks, self-evaluations and feedback from staff. Students reflected on feeling stressed and intimidated at the beginning but eventually enjoyed their student-doctor role. This strategy helped students to reflect and recognize key experiences and supported professional development</p>

The tendency to address a gap in knowledge or skills led to researchers focusing on preparing students and reducing this gap. Researchers sought to 'prepare students to excel as learners in clinical settings'⁴⁹ by strengthening 'students' basic proficiency in oral patient presentations ... basic skills in phlebotomy, arterial blood gases and suturing ...'¹² Some research assumes that the aforementioned struggles will 'stifle progress.'^{28,34} This assumption is not supported by Van Hell et al.,⁶ who showed that perceived difficulty with the transition did not predict performance. Conceptualising the transition to clinical training from an educational perspective has influenced the creation of strategies aimed to 'ease students' transition from the pre-clinical to clinical years.'⁴² These strategies include the development of specific transition to clerkship courses^{5,7,8,12,35-37,39,40,42,49,50} and evaluating pre-clinical curriculum innovations and their impact on students' transition experiences.^{6,10,11,14,22-24,28,29,32,33,46} Curriculum innovations in the literature include pre-clinical problem-based learning (PBL) curricula,^{6,11,24,28,29,32} creating space for early patient contact^{10,14,33} and development of longitudinal integrated clerkships (LIC) during clinical training.²²

The aforementioned studies evaluated the transition to clinical training and relevant interventions with outcomes such as: student satisfaction with a particular strategy,^{5,12,37,39,40} measuring impact on anxiety¹² and confidence^{35,42} and calculating change in knowledge, skills or behaviour.^{12,35-37,39} These outcomes all reflect a focus on measuring the educational impact of a transition and related interventions. Some articles showed that transition-to-clerkship courses and curriculum innovations increased students' perceived preparedness for clinical training,^{12,39,49} increased confidence,^{9,29,35,42} reflection and transferrable learning strategies. reduced anxiety¹² and motivated students.²⁴ However, some students still struggled with socialisation.^{10,23}

Most literature on the transition to clinical training was from an educational perspective, which sees the transition as a struggle due to the knowledge and skill deficits that students have. Consequently, interventions were designed to address these deficits with pre-clinical courses and inductions. As a result, studies focus on outcomes such as student satisfaction and perceived preparedness, with some showing increased preparedness and student satisfaction. We recognised a second perspective with a shared concern for students' struggles when entering clinical training but a different approach to managing their difficulties.

Social perspective

Again, researchers described the transition to clinical training in negative terms and highlighted a need to eliminate a variety of struggles, including students: trying to fit in with insiders,^{32,46,48} feeling intimidated by others,^{32,34} being unsure of their role,^{9,27} and learning the cultural norms of the clinical environment.²⁷ Studies suggest that

students were 'unfamiliar with learning within the workplace and uncertain about how to navigate and engage within teams and culture they have not come to understand'.⁴³ As a result, students often placed a significant focus on fitting in with the clinical team as opposed to learning.⁴⁶

Addressing students' integration led to a focus on peer-peer and peer-team relationships. Researchers thought it was important to make explicit 'the hidden knowledge that students need to become effective team members'²⁵ and to create strategies that would 'describe the roles and expectations ... routines and logistics' relevant to the clinical environment.¹² It therefore was important to facilitate meaningful interactions and relationship building with others.^{25,43,48} Examples of these social strategies included initiating peer groups,²⁵ nearpeer teaching sessions,⁴⁸ facilitating students sharing experiences,⁴³ and creating peer learning communities.⁴⁵ Additionally, to promote student-staff relationships in the clinical environment, some researchers reported on the use of multidisciplinary approaches to educational inductions and including residents in these orientations.^{12,39} Regarding measuring outcomes, increased social support was likely to reduce stress¹⁹ and, in one study, increased students' perceptions of preparedness as it related to integrating into the clinical team.⁴⁸

Literature on the transition to clinical training conducted from a social perspective still sees the transition as a struggle as a result of students trying to fit into the new environment and not being familiar with existing cultural norms and how to build relationships. The approach was therefore to develop activities that familiarise students with others (professionals and peers) in the clinical environment. As a result, studies focused on outcomes related to fitting into the clinical team.

This social perspective alone does not seem to recognise the importance of students' self-awareness and reflection to minimise the impact that negative role modelling could have on novice students. We recognised a third conceptualisation of the transition to clinical training that differs from the first two in that it doesn't problematise students' struggles.

Developmental perspective

Unique to this perspective, researchers reported the transition to clinical training as challenging.^{1,5,7,9,36-38,43,44,50} This terminology differs to that of the other two perspectives and could be considered a positive cognitive appraisal by researchers highlighting the potential for students' growth.^{52,53} Research within this perspective allows the discussion to shift away from a stance of minimising particular struggles that students experience during the transition to clinical training and towards recognising the need for students to be able to cope with change.

Conceptualising the transition to clinical training from a developmental perspective has led to the creation of strategies aimed at empowerment. By contrast with researchers' focus on problems from educational and social perspectives, when taking a developmental perspective, researchers mentioned the desire 'to empower third-year undergraduate medical students to recognize learning opportunities in their clinical placements and to proactively use them to develop their understanding and practice'.⁴³ Empowering students promotes personal and professional development by optimising learning strategies and encouraging reflection.^{38,41,43,44,50}

The literature provides some examples of how researchers approached development during the transition to clinical training. The transition to clinical training requires that students adapt their learning strategies to learn in a self-directed way but this does not automatically develop.⁴⁴ Additionally, the clinical environment could have a negative impact on self-regulated learning skills⁴⁴ by increasing extrinsic goal orientation when decreasing metacognitive self-regulation.⁴⁴ Optimising clinical learning strategies is therefore important for new clinical students. Additionally, reflection in the form of portfolios⁴¹ and narratives towards the end of pre-clinical training³⁸ facilitated students recognising key experiences,^{38,39,41} promoted professional development⁴¹ and reframed their experiences towards becoming the type of doctor they wanted to be.³⁸

There was comparatively less research carried out from a social and developmental perspective. However, researchers are increasingly recognising a need to explore the opportunities that the transition to clinical training can provide.^{1,30,44}

DISCUSSION

This scoping review demonstrates that the transition from pre-clinical to clinical training is conceptualised from three perspectives: educational, social and developmental. Most research was undertaken from an educational perspective as compared to social and developmental approaches. Here we explore what these three perspectives say and do not say about the transition to clinical training. Then, we will briefly describe practical implications of our findings and suggest a research agenda.

Having an educational perspective primarily focuses researchers on reducing the gap between preclinical and clinical training and produces a desire to increase students' knowledge and skills so that students experience a smaller gap between these training stages. In this light, a 'good' transition from an educational perspective, is likely to be one where students feel prepared, have all the knowledge and skills required to start clinical training and do not feel overwhelmed by the amount of learning to cover. However, it is not enough for students to feel prepared^{3,54} nor should we expect that we can adequately

prepare them for the dynamics of a new environment, which itself is unstable. This is not to suggest that educational preparation is not important; however, this is not the sole factor. Kilminster described transitions in postgraduate training to be critically intensive learning periods.⁵⁴ Even though the concept was in a postgraduate setting, using this conceptualisation within medical school is likely to be useful for minimising the focus on preparedness and, instead, promoting the transition as a dynamic period in which students learn and establish relationships.

A social perspective on the transition to clinical training fills the gaps in taking a solely educational perspective by reducing the expectation that students need to be knowledgeable and skilled, thus allowing a focus on building relationships with staff, peers or near-peers. Cultivating a nurturing medical environment where students are not intimidated can encourage team building and student engagement.⁵⁵ Most research has focused on targeting students and very rarely explicitly focuses on training staff to help students to integrate within clinical teams.^{39,50} Students still experience academic bullying and negative role modelling during the transition to clinical training^{56,57}, so it is likely that the clerkship culture and environment need to adapt with newly arriving clinical students to create a new community functioning with newcomers. This would require the newcomers to be integrated into the daily work of the environment, which could promote learning and motivation and could even add value to the community.⁵⁸ A 'good' transition from a social perspective is likely to be one where students integrate into the community of practice of the clerkship environment and gain legitimate access to learning opportunities through participation. This perspective, however, might be overlooking the usefulness of social support being used alongside self-reflection to help students decipher which behaviours should be imitated.⁵⁹

A developmental perspective fills gaps in both the educational and social perspectives on the transition to clinical training by promoting student reflection on learning and integration experiences. Taking this developmental perspective empowers students and provides them with the tools for ownership of their learning and transition experience through reflection and optimising transferrable learning skills. Transitions provide opportunities to offer proactive and reactive support and learn coping skills, which are imperative for future learning as medical trainees.⁶⁰ Amongst interns (recent medical school graduates), Liu et al.⁶¹ found that using selfdirected learning as a coping strategy led to motivation and learning as compared to emotionbased strategies such as avoidance. This highlights that sometimes 'struggles' could serve as motivation for learning.⁶¹ Proactive support strategies, as opposed to reactive strategies occurring when difficulties already exist, are likely to be particularly useful to help trainees learn to deal with stressful change, which is highly likely in their career.⁶⁰ Promoting developmental skills such as reflection, self-regulated learning skills and other skills such as resilience, could help students adapt to change.^{2,3,60} A 'good' transition from a developmental

perspective might start from a stance where researchers understand that the transition is challenging but can be harnessed to provide motivation for learning.

We have illustrated how a particular perspective could influence approaches, outcomes and perceptions of what is a 'good transition'. In practice, it could be beneficial to combine elements of educational, social and developmental perspectives. This combination could result in students' education prior to the transition period being appropriate, so they can integrate socially and utilise developmental competencies of reflection and resilience.

A new research agenda

Our findings highlight areas that may be overlooked by research that adopts single conceptualisations of the transition to clinical training. There is comparatively less research from social and developmental perspectives. We suggest that research from a social or developmental perspective could still be useful in order to inform combined social and developmental approaches to the transition to clinical training. Research from a social perspective could ask: How do relationships with others aid students' transition experiences and learning when entering the clinical environment? From a developmental perspective, it could be useful to understand: Which procedures for reflection during the transition would be most beneficial to students' experiences? Lastly from a combined perspective one might explore: How could reflection influence students' relationships during the transition to clinical training? Methodologically, longitudinal research might be informative from a developmental perspective to allow researchers to understand the process of professional and personal growth during challenging transition periods such as entering clinical training.

Existing research rarely showed researchers explicitly reflecting on their potential biases and assumptions when conducting research on the transition to clinical training. Future research could benefit from researchers critically considering from which perspective they are approaching the transition to clinical training and the impact this might have on their methodology, findings and interpretations.

Combining researcher reflexivity with underpinning empirical research with theory could be powerful next steps in researching the transition to clinical training. For example, stressful experiences can trigger transformative learning, which Mezirow suggests requires experiences, critical reflection and dialogue with others in order to transform individuals' existing perspectives of themselves, their beliefs and their behaviours.⁶² Future researchers could conceptualise the transition to clinical training as a transformational experience, thereby combining educational, social and developmental perspectives. O'Brien posits that medical educators should recognise that the transition is 'an adaptable learning process'¹⁵ and speaks to the potential for

transformative learning⁶² during the postgraduate transition to residency; this could be transferrable to medical school experiences,³ as well as priming postgraduates for future careers. Future research could, therefore, explore what a transformative transition would look like and how this could be evaluated. Focusing on a new conceptualisation of the transition to clinical training – being a transformative experience – could allow new outcomes for research in this area to be considered and researchers might decrypt what a successful transition might look like, what outcomes are important, how to measure them, and effective ways to support students' transitions.

This scoping review also provides evidence that the scales currently tip towards the fact that researchers consider the transition to clinical training to be a threat. Lazarus and Folkman suggest that feelings of threat and challenge may occur simultaneously as students transition into clinical training and, although related, challenge and threat may not be on the same continuum, but instead are separate constructs.⁵³ There is much research on the transition as a threat but less on transition as a developmental challenge.

Limitations

Additional databases may have yielded more articles. Non-English articles might have been overlooked. Additionally, we made the decision to exclude grey literature. The focus of our scoping review was on the scholarly conceptualisations of the phenomenon of transitioning to clinical training. Our results may be helpful for reflecting on the grey literature as well and we suspect there is a strong focus on the educational perspective, for example, through educational innovation reports. The first author (AENA) has had an interest in transitions for over 5 years, which might have led to the development of preconceived notions surrounding the transition to clinical training and influenced interpretations of data. However, discussions with the research team are likely to have reduced this bias.

CONCLUSIONS

This scoping review provides insight into perspectives found in the literature on the transition from pre-clinical to clinical training within medical school. This transition is primarily seen as a maladaptive struggle, with many researchers addressing the transition from an educational perspective by focusing on increasing preparedness with relevant knowledge and skills. However, the challenge associated with the transition to clinical training can be motivating and be an important, critically intensive learning period for new clinical students. Future research on the transition to clinical training from social and developmental perspectives (individual and combined) is likely to stimulate opportunities to advance students' adaptations to the clinical environment.

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Appendix S1. Data charting form.

1. Author(s):
2. Year of publication:
3. Journal:
4. Study aim:
5. Study design:
6. Theoretical framework used for methods or to interpret results:
7. Data collection methods:
8. Year of data collection
9. Summary of key findings:
10. Description of a specific support strategy:
11. References that could be included:

2

3

**Journey to becoming:
Exploring students' lived
reality and identity formation
across the transition to
clinical training**

Under Review

ABSTRACT

Transitions are critical periods that can lead to growth and/or distress. Transitions are a sociocultural process and sociocultural approaches to learning can unlock the importance of identity development as a part of learning. Thus far, *student identity formation* (as opposed to professional identity formation) is not well explored. We aimed to explore how students narrate their navigation of the transition from pre-clinical to clinical training and especially their student identity development. Nine 2nd year students generated 61 entries comprising of audio-diary (or typed) reflections over nine months (starting three months before clinical clerkships began) and two interviews. We used *research poems* (transcripts reframed as poetry) to help us construct a meaningful, emotive elicitation of our longitudinal data and analysed data using sensitising concepts from Wenger's modes of identification: *engagement*, *imagination* and *alignment*. Students described their transition as a journey filled with positive and negative emotions and uncertainty about their current and future career. Students navigated the transition using three mechanisms: 1) becoming more engaged through taking charge, 2) shaping their image of self through engagement and finding role models; and 3) learning to flexibly adapt to clerkship norms by managing expectations and adopting a journey mindset. Students largely accepted the ups and downs they experienced and noted that reflecting in this study was beneficial to their experiences. Thus, instead of seeking smooth transitions, transitions should be lived, reflected on and supported. In so doing, we can legitimise the *student identity* as they slowly develop their professional identities in a supported fashion.

INTRODUCTION

Transitions are critical periods that can lead to growth and/or distress¹⁻⁶. Transitions in medical training are boundary-crossing periods— e.g. when new clinical students enter a landscape with unique communities in each clerkship experience⁷. When medical students begin clerkships (also called placements or rotations), this inevitable change can be confronting; students perceive they lack the required knowledge to function in new environments and can struggle with building relationships and learning clerkship norms^{8,9}. Most institutions try to 'smoothen' this transition by preparing students for a new phase via transition courses to address knowledge and skill gaps¹⁰. Increasingly, researchers urge educators to acknowledge and address the social and developmental aspects of transitions^{1,6-8,11}.

Sociocultural approaches to learning in health professions education are increasing, recognising that learning is also a matter of socialising into one's environment¹². Wenger and others go further to highlight that developing an identity is also an integral part of learning¹³⁻¹⁵, thereby recognising the developmental aspects at play when newcomers navigate change^{1,7,12,14}. Wenger-Trayer describes three *modes of identification* that describe how newcomers develop an identity as they participate in a new learning environment—engagement, imagination and alignment⁷. *Engagement* relates to the extent to which a newcomer is included in every-day practice. *Imagination* fosters the newcomer's thoughts of self in the past, present and future within the wider world, and *alignment* considers how a newcomer connects to existing perceptions, norms and competence in a new learning and working space⁷. Importantly, a students' identity is separate and distinct from the professional identity they are ultimately striving for^{16,17}. Yet, most health professions education literature is skewed toward exploring professional identity formation leaving a gap in what student identity formation looks like. We however do know that social interactions with others is critical to students' identity formation^{17,18}.

Through socialisation, identity is formed¹⁷. Therefore, by exploring the socialisation of students as they transform from lay public to a professional¹⁷, we can gain insight into students' developing identities. We believe that a transition is a social and developmental process¹ and we were interested in how students narrated their lived reality of navigating the transition from pre-clinical to clinical training and their process of identification during this time. By understanding students' lived realities of navigating new environments and how they experience their developing identities effective support transition solutions can be suggested.^{11,16}

METHOD

This was a qualitative longitudinal study using Wenger's *modes of identification* as a sensitising concept. We operated with an interpretivist paradigm assuming there is no single truth, that reality is socially constructed and is interpreted in different ways¹⁹. Within this paradigm, reality is assumed to be accessible through language and shared meaning²⁰. Our methodology was narrative inquiry. Narrative inquiry is a way of understanding experiences²¹ and allowed us access to participants' language and meaning-making processes as they narrated and made sense of their lived reality^{22,23}. We invited medical students to record audiodiary reflections as they transitioned from the pre-clinical to the clinical environment. We also interviewed them twice to expand on audiodiary content. Further, we used research poems— transcripts reframed as poetry²⁴— in our analysis procedures and to re-story participants' narratives. In so doing, we preserved participants' emotion in their narratives and privileged the longitudinal nature of our data.

Participants

We conducted this study within a five-year medical programme at an Australian university where students spend two years in primarily classroom-based education and then transition to three years in rotation-based clerkships/placements/attachments (lasting between 4 and 10 weeks).

AA asked all 2nd year undergraduate medical students, soon commencing 3rd year clerkships, to participate in this study during scheduled educational sessions and via social media pages. AA also placed flyers in populated physical locations. We enrolled ten participants. To be included, students needed to have a smart phone. One female student dropped out prior to any active study participation, while still in their 2nd year, due to anticipated study burden. We followed nine participants (see Table 1) from pre-clinical training as they experienced three to four clerkships (e.g. Emergency Medicine, Internal Medicine and Colorectal Surgery, among others). In this paper, we replace names with pseudonyms and avoid identifying descriptions in quotes. Our participants came from backgrounds including: Malaysian, middle eastern, Indigenous, Indian, Chinese, Caucasia and Bengali. We do not identify any individual by ethnicity in order to preserve anonymity; our participants were from diverse backgrounds (see Table 1). Four students were international; they did not live in Australia prior to medical school— three females and one male.

Table 1: Participants' descriptions

Pseudonym	Gender	Age
David	Male	22
Kendi	Female	19
Nicole	Female	21
Kenneth	Male	24
Tyrell	Male	19
Keo	Female	24
Sonita	Female	21
Greg	Male	20
Elizabeth	Female	20

3

Data collection

AA conducted a pre-study briefing where participants gave written consent, provided demographic details and trialled the smartphone app for the study. We used smartphones as they fit our theoretical and methodological grounding due to given the just-in-time capabilities to reduce recall bias^{25,26} and provide 'lived reality' data.

From the end of their second year, students were prompted to record an audio-diary entry into a smartphone app every two to three weeks for nine months; they started clerkships three months into the study. Students were provided with prompts that focused on our aim of how students narrate their navigation from pre-clinical to clinical training (Figure 1). Students were not given restrictions on a duration for their reflections but were advised to do it in a quiet, private area if possible. See Table 2 for sample prompts which guided audio-diary reflections, sample interview questions used during two interviews; see Appendix for more. Students were free to reflect outside of our prompts if desired. Two students eventually reflected by typed prose due to personal preference. Figure 1 summarises our data collection procedures over nine months. All methods were piloted on students outside the sampling frame. No significant changes were made as a result of piloting.

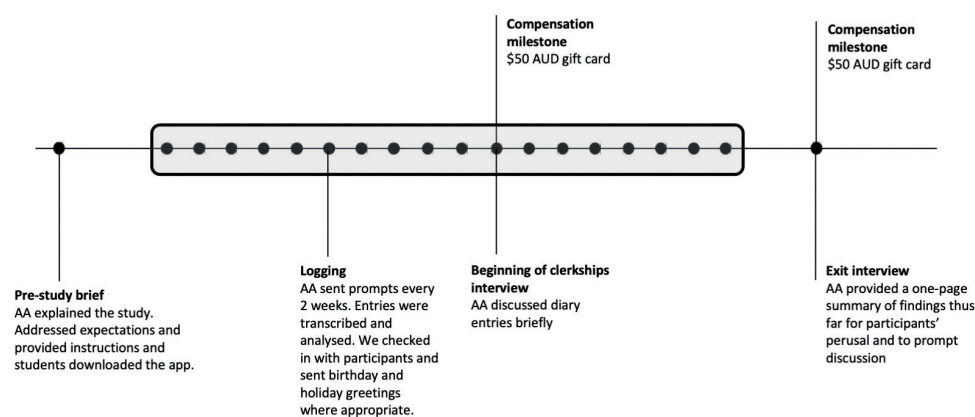


Figure 1: Data collection procedures for this paper

Note: The dots represent the frequency of prompts for students to log an audio-recording entry and all procedures occurred over nine-months. Students were prompted every two to three weeks.

Our research programme led us to investigate related but distinctively different research questions. In another study we explored the meaningful relationships influencing students' transition to clerkships²⁷. In the current study, we focused on students' lived experience of navigating the transition from pre-clinical to clinical training and the process of identification. We collected data for the other study and the current study together during two interviews for logistical reasons and to minimise our encroachment on students' time.

AA invited students to participate in one interview at the beginning of clerkships and another at the end of the study period where the content of their audio diaries was further discussed and explored (See Table 2). For the exit interview, AA provided a one-page summary of students' audio-recordings as a starting point for discussion (See Table 2). These one-pagers represented our interim interpretations and this process served as member-checking²⁸ as students assessed our provisional analyses of their audio-diary content. To end the exit interview, we discussed with students how and to what extent participating in our study impacted their transition experiences.

Nine participants generated a body of data comprising of 61 entries (7.4 per participant over nine months). Forty audio recordings ranged between two and 14 minutes and five typed diary entries ranged from 50 and 545 words. In total we interviewed eight participants for 64 minutes on two occasions (toward months four and nine of the study).

Table 2: Sample prompts, sample questions from interview guides and timing within the study period

	Month into study period	Samples
Sample prompt	Months 1-3 (before clerkships)	Are there any specific experiences that you have had thus far that you think will help your transition to the clinical year?
Sample prompt	Months 4-9 (during clerkships)	Describe any aspect of your clinical experience over the past week that impacted your transition to this placement in any way.
Sample interview question	Month 4 (beginning of clerkships)	[To Nicole] how did you deal with not having a stable team? how do you 'begin anew' everyday? can you give an example of what that means?
Sample exit interview question	Month 9	What did reading that one-page summary of your experiences thus far mean for you? What do you think about it?

3

In order to immerse herself into the data, AA transcribed the first audio-diary recordings of all participants and the first two interviews. AA listened to all recordings and made notes. Then, a professional entity transcribed all other recordings verbatim. We offered transcripts to students all of whom agreed that the transcripts represented their recordings. AA de-identified all transcripts and gave each participant a pseudonym which did not reflect their background; we were careful not to use ethnically-suggestive names given the variation in ethnic background of the student body.

Data analysis

Data analysis was performed throughout data collection. AA openly coded transcripts followed by axial coding²⁹ to put the fragments back together using the sensitising concept of *modes of identification*⁷. Wenger notes that newcomers may use these modes across boundaries or transitions as their unique identity is formed³⁰. We therefore expected that our participants' use of these modes would be heightened as they found their footing in a new environment. We used constant comparison to refine codes and find consistencies and differences in participants' stories³¹; this allowed us to compare emerging findings on participants' lived realities to previous stories.

We then subsequently wanted to better understand participants' stories as a whole rather than simply as categories. To explore longitudinal threads in the data, we used time-ordered matrices³² and created research poems to re-story participants' narratives and enhance our analysis. Creating research poems allowed our participants' stories to be considered as a whole while making visible relationships between themes and sensitising concepts^{33,34} by focusing on the over-arching narrative plot of participants' stories. We were simultaneously interested in students' experiences and processes of transitioning to clerkships and identity development but also we wanted to know how these experiences and processes compared across the group of participants³⁵.

AA discussed brewing findings with DD and PWT followed by the whole research team after the first three months of collected data, and then iteratively. AA managed this data set in Atlas.ti version 8 (Berlin, Germany) which facilitated effective analysis and tracking codes across time.

Creating research poems

Poems can be used in qualitative research and medical education literature to both analyse and represent data^{32,36-38}. We created research poems, using verbatim quotes as lines in the text, that reflected the essence of each participant's journey, over time, in their own words³⁹; these poems were important in our analysis and interpretation of participants' narratives. As AA read transcripts and listened to audio files; she looked for and highlighted words, phrases and sentences in each participant's dataset and listened to the rhythm in their speech³⁹. AA used a free verse format for all poems which does not use constant patterns or rhyme but instead followed the natural speech allowing her to stay true to participants' voices⁴⁰. Saying poems outloud was a part of this process. Verse breaks in poems represent either a new recording/interview or a critical change in perspective. Research poems aided the understanding of the complex, longitudinal phenomenon of transitioning while retaining the emotive participant voice resounding in transcripts.

DD reviewed one participants' dataset and research poem to confirm that the poem maintained the essence of the participants' experience when transitioning to clinical training while showcasing the common threads of modes of identification⁷. In keeping with research poetry conventions, we did not add any words or phrases of our own⁴¹. Since we are focused on narratives of students' *lived realities* of our participants, our research poems followed chronologically; words and phrases have not been taken out of order. AA sent research poems to participants as an additional member-checking exercise and asked them the extent to which the poems represented their various trajectories. DD read one poem alongside the dataset of that participant and agreed the poem accurately represented themes and concepts in his data. Participants were excited and intrigued but some were embarrassed on reading their journey and how they felt during that time period; participants felt they were significantly changed at the time of reading the poem. We thus grounded poems in the data making our findings trustworthy.

Ethical considerations

We obtained approval from the University's Human Ethics Committee ID H9989. In all procedures from recruitment to manuscript, we maintained anonymity and data security.

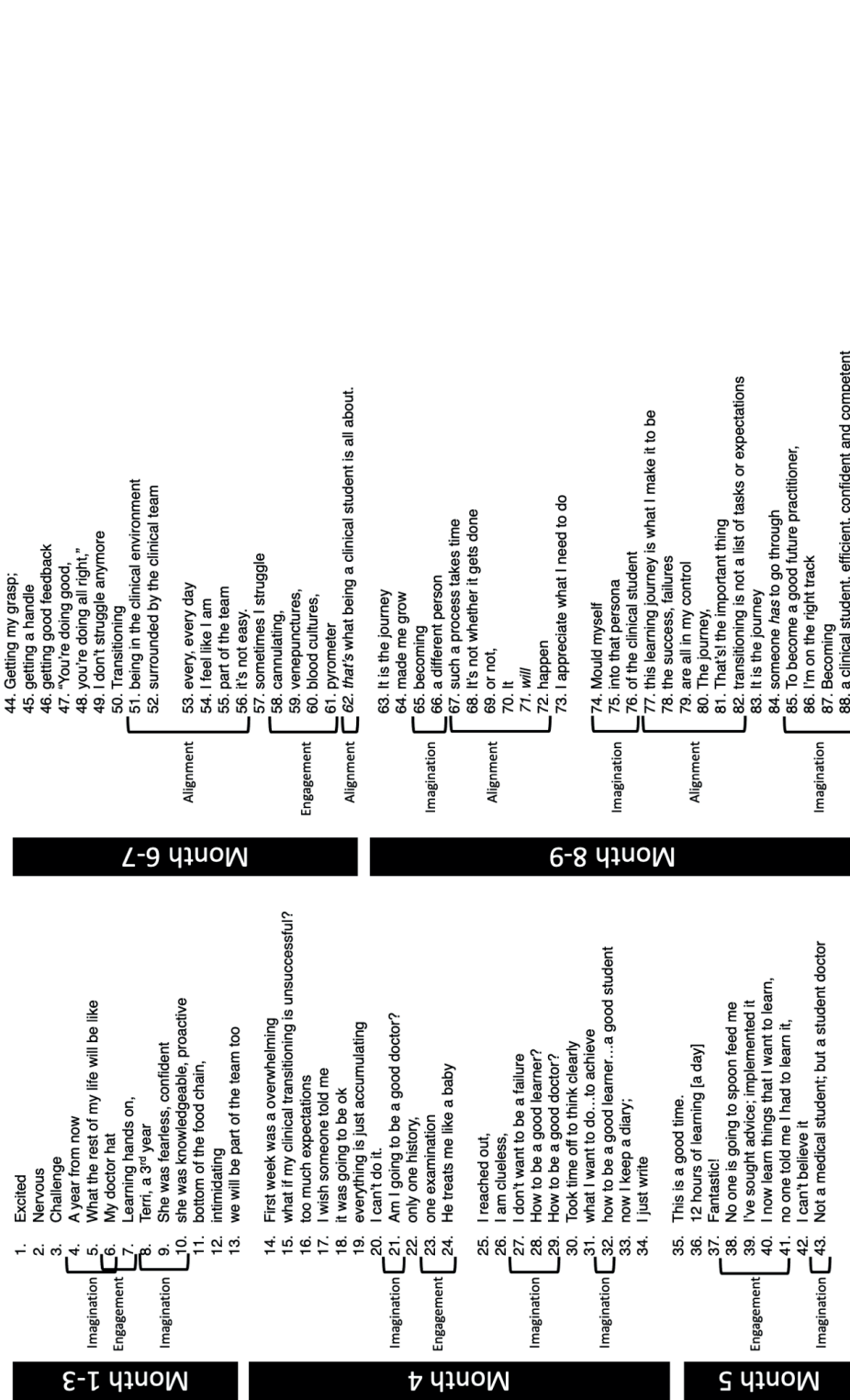


Figure 2: Annotated Research Poem of David entitled “Becoming” – annotations indicate presence of engagement, imagination and alignment. This poem is based on David’s entire dataset over a nine-month period. Months 1-3 are prior to entering clinical training. Months 4-9 are during clinical training as David transitions between clerkships.

Positioning and reflexivity

AA was not involved in participants' teaching or assessment. AA kept reflective field and analysis journals and an audit trail of these and supervisor meetings was kept. AA is a PhD candidate trained as a medical doctor. Some of us are clinicians (PWT, IH, WH, AA); DD is an educational scientist and we are all medical education researchers with qualitative research experience in Australia, The Netherlands and Barbados. Discussion with peers and supervisors helped interpretations and implications come to fruition.

FINDINGS

We first display a research poem for participant, David, based on his entire dataset (Figure 2) This poem encompasses our interpretations as students' transitioned to clinical training. The poem allows us to share David's entire journey, in an authentic, emotive way, using his voice and vulnerability. Through this poem we also indicate lines that showcase Wenger's three modes of identification at play (Figure 2). In this study, transitioning to clinical training was filled with positive and negative emotions and uncertainty around their current and future careers for most participants. David initially had mixed emotions ('excited' and 'nervous' — lines 1-2; Figure 2). Once in the clinical space this turned to anxiety due to many being overwhelmed with disappointment and uncertainty. David told us in his exit interview: *'I was just running around being all anxious and not knowing what to do...'*. Eventually we see David shrieking *'fantastic!'* (line 37 in Figure 2) once he had experienced a critical turning point five months into the study.

To understand these emotional *'ups and downs'*, we now delve further into participants' journey and outline three mechanisms that helped them to navigate these emotions and their experiences. We will illustrate these mechanisms using parts of the poem in Figure 2 but also with quotes from other participants' audiodiaries and interviews. For reference, any audiodiary quote occurring in month one was the beginning of the study when students were still in classroom-based training; interview and audiodiary quotes in months four to five occur at the beginning of clinical training and interview and audiodiary quotes from months eight to nine is at the end of the study period.

Becoming engaged by learning to take charge

"no one is going to spoon-feed me

...

I learn things I want to learn"

-David's audio-diary, month five + research poem, lines 38 & 40

3

On entry to clerkships, all students were confronted with the lived reality that the engagement they experienced at their respective workplaces was low. This led to frustration and confusion. During the first week of clinical training, students looked for, and depended on, invitations from doctors to become engaged. David's poem (line 22-24) showed how little he was able to participate initially: "...only one history, one examination, he treats me like a baby" [David, interview, month four]. This was also true for Greg: "I feel like for the most part I'm kind of just a fly on the wall." [Greg, audio-diary, month four]

Between months five and six of the study period, participants learned the primary mechanism to enhance engagement— learning to take charge of their clerkship experiences and initiated finding opportunities to meaningfully engage. David realized '*...no one is going to spoon-feed me*'. However, taking charge was more innate to some students than others and it took some participants less time than others to make this shift. Kendi reflected:

"...on the third or fourth day I realised I have to start talking to them a lot, actively asking questions to make me seem like I'm really keen for knowledge so that they will teach me."

Kendi, female, 19 years, audio-diary, month five

After making the decision to take ownership of their learning by forcing engagement, most participants began to showcase all the practices that they were now a part of— *cannulations, venepunctures, blood cultures, pyrometers* (line 58-61; Figure 2). Similarly, Kendi now recounted:

"... I did a few things like helping them to take bloods and ABG's and stuff which is pretty cool and sometimes I run down to pathology to grab something ... I feel like I'm actually helping the team in a way."

Kendi, female, 19 years, audio-diary, month six

Above we showed that students initially were disappointed that they were not actually engaged, they soon learned that by showing initiative and initiating interactions with the clinical team, they received invitations to become more engaged and felt more positive.

Shaping their image of self through engaging in team tasks and reflecting on role-models

"...not a medical student but a student doctor"
-David's research poem, audio-diary, month five + research poem line 43

Prior to commencing clerkships, participants were already thinking of the future and how clinical training could support their upcoming career. David looked forward to *'what the rest of my life will be like'* (line 4; Figure 2). However, once clerkships began, participants initially struggled to identify their roles; we see David questioning his future: *'...am I going to be a good doctor?'* (line 21; Figure 2). Similarly, Nicole described an experience where she felt unable to fulfil clinical tasks; this shook her image of her role on the team:

"...I was asked by my team, ah, to take some cannulas. The first time I tried, I was unsuccessful, and so was the second time. I was feeling quite down and disappointed... cannulation is one of the big ways that you can make your contribution to the team and actually help out, and I was starting to think that I was never going to be able to do it..."
Nicole, female, 21 years, audio-diary, month five

As time passed, most students started to recreate a specific image of who they could be as a doctor in the future. Five months into clerkships we note David seeing himself differently: *'...not as a medical student but a student doctor...becoming a different person. (figure 2 lines 43 & 65)'* By the end of the study some participants reflected on what skills they hoped to attain that were relevant to their future. Nicole recorded:

"... acquiring the qualities necessary to make a good doctor. I've realised that I (hopefully) don't have very long to go before I graduate and enter the workforce - I have to focus on both gaining the critical knowledge and skills necessary, but also crucial traits such as patience and empathy..."
Nicole, female, 21 years, audiodiary, month eight

The primary mechanism through which students recreated their image of current and future was through role modelling. David found a role model in a near-peer student, Terri, he admired and sought to emulate four qualities he saw *'..fearless, confident... knowledgeable, proactive'* (lines 9 and 10; Figure 2). Over time, students also identified behaviours they did not want to absorb from negative role models. Kenneth reflected:

"...a lot of the things that I see myself becoming, are influenced by behaviours that I don't want to have, so like when I see a doctor not own up to a mistake or behave rudely to another health professional or to the patient, I feel like a lot of my inspiration of how I want to behave comes from what I don't want to be mirrored in other people rather than being inspired..."
Kenneth, male, 24 years, audiodiary, month five

Above we exhibited how students' image of self changed over their journeys and how their journey took them from excited visions of themselves as doctors, to managing doubts just when they entered clerkships. We showed how they recreated and 'moulded' their image of current and future self by engaging in team tasks and finding role models.

Adapting flexibly to clerkship norms by managing expectations and adopting a journey mindset

3

*"...the journey,
that's! the most important thing"*
David, audio-diary, month 8 + research poem lines 86 & 87

On starting clerkships, many students' expectations for starting clinical training did not align with their reality. Students encountered the lived reality of being at the 'bottom of the food chain' (line 11; Figure 2) and the medical hierarchy. Further, David, and others, expected to be engaged and became overwhelmed by a clerkship where he was minimally engaged leading him to believe: '...I can't do it' (line 20; Figure 2). Encountering the reality of frequent changes in students' supervision interfered with their desire for guidance. This frequent supervisory rotation led some students feeling a constant need to 'start again' daily and not feeling integrated in the clinical space. Nicole reflected:

"The doctors are generally nice and encouraging but I'm sent off with different registrars every shift and I feel like I have to "start again" every day. Every doctor has different expectations of a student...That's something I've had to quickly figure out with each doctor every shift and had to work around it...the best way to manage this is to be confident and put myself out there."
Nicole, female, 21 years, typed diary, month seven

Exposure to mal-alignment of expectations to reality led to students learning that the primary mechanism to align their behaviour and expectations with clerkship norms was first to have low expectations, this allowed them to be more open to their lived experiences. Most students then figured out they had to be flexible and adopt a journey mindset where they accepted the ups and downs as a part of their experiences. In David's research poem, we see a visible mindset shift; 'It will happen, I appreciate what I need to do'...this learning journey is what I make it to be, the success, failures are in my control' (lines 77-79; Figure 2). Similarly, toward the end of the study Nicole reflected:

"I feel that the key to transitioning is adapting your mindset ... a lot of it also comes down to being adaptable and flexible with what you've been given. Sometimes a doctor can be indifferent, there can be poor teaching, unreasonable expectations in terms of attendance, etc. The key skill to learn here is to not let that overwhelm you and to go out of your way to find opportunities for learning...So I believe I have transitioned successfully - through the support I have received, and also through adapting my approach to Medicine."

Nicole, female, 21 years, typed diary, month eight

Above we indicate how students flexibly aligned with clerkship norms by managing expectations, adopting a journey mindset.

DISCUSSION

Over nine months, we saw our participants develop positive and negative emotions, as they navigated the transition from pre-clinical to clinical training, and developed an identity based on their interactions, experiences and reflections. Students became more engaged over time by learning to take charge, they shaped their image of self through engaging in team activities and reflecting on role models; and flexibly adapted to clerkship norms by managing expectations and adopting a journey mindset.

How do our conclusions fit with earlier studies? Like in other studies, some of our novice undergraduate students sometimes found it difficult to manage emotions^{42,43}. When participants perceived they were outsiders, this led to negative emotions and doubts. Secondly, we agree with other authors that role models are a powerful influence on students' identity formation^{17,18}. In this study, through reflections, students were able to navigate tensions when they encountered negative role modelling. Like Adema et al, we found social interactions to be intricately linked with students' identity formation¹⁸. Further, Adema et al found the modes of imagination and alignment to be lacking in undergraduate medical students¹⁸. Our students learned how to negotiate mal-alignment between their expectations and lived reality. Such negotiation of alignment is a skill which is a part of learning⁴⁴⁻⁴⁶. Thus, this study was able to shed light on student identity formation over time by having students story their experiences as their identities were created through the lens of modes of identification⁷.

We found the three modes of identification are intertwined and do not exist in isolation⁷. Increased engagement led to the identity of a being an active participant in the clinical space. Having an image of self was important in helping students flexibly adapt their behaviour and mindset to their identified goals and clerkship norms. Thus, as engagement fueled imagination, imagination was a stimulus for alignment. We show how these modes of identification change over time in a medical context.

Strengths and limitations

Our use of Wenger's modes of identification ground our findings in theory. We collected longitudinal data about a transition in the medical training continuum which is previously lacking in our field^{1,2,42}. Using research poems to analyse and present our findings is novel and allowed us to minimize the loss of the longitudinal nature of our data that can occur sometimes in longitudinal qualitative research if data is coded as one unit without allowance for how codes change with the passing of time⁴⁷. Lastly, we reduced recall bias by having participants continuously reflect in the moment as their transition experiences and identity were developing.

However, this study took place at a single institution which could limit transferability although our findings could have relevance for other health professions experiencing similar transition challenges^{48,49}. The researcher-participant relationship could be both a strength and a limitation as AA developed a close relationship with the participants. Though some participants might have felt compelled to continue participation due to this bond, in reality, many participants saw AA as a role model or 'big sister' leading participants comfortable to be vulnerable. Being presented with their poems and previous diary entries and reflecting on them could in fact have impacted participants' developing mindset and identity. Thus we inadvertently could have conducted a type of participatory action research⁵⁰.

Suggestions for future research

We found that being proactive and taking charge was a strong mechanism for engagement. Proactivity was more innate in some students than others. Further exploration of being proactive and how to predict proactivity could be useful. Some participants used their transcripts in their personal e-portfolios and exploring how reflections impact on transitions is an area for future research⁶. Lastly, we collected self-report data only, an observational study could be beneficial to uncover true processes and outcomes of transitions and identification.

Suggestions for future practice

We found that by encouraging participants to reflect, they became active participants in their own identity formation^{17,51}. Having students reflect using audio-diaries could be a powerful "boundary crossing activity"⁷. Boundaries can be learning assets and there should be no expectation that they are to be smooth⁷. Instead of seeking smooth transitions, transitions should be lived, reflected on and supported. Participants appreciated the rocky journey; the ups and downs. Indeed, previous literature shows that the stress associated with transitioning can be motivating, *if* in a supportive environment^{1,52,53}. Therefore, instead of 'cookie cutter' interventions (e.g. inductions) to smooth transitions by bridging the knowledge and skill gap between phases,

future strategies should focus on support for example through longterm mentorship, scaffolding⁵⁴ and coaching¹⁸ that supports students *while* transitioning to a new learning environment. In so doing, we can legitimise the *student identity*⁵⁴ as they slowly develop their professional identities in a supported fashion.

We conclude with a short poem summarizing our main messages, created with words and phrases from this paper.

*Lived reality
Their own words
Turning points
Their journey
Boundary crossing
Across the landscape
Part of the team
Their identity
Finding opportunities
Becoming
Shifting mindsets
Not medical students,
but student doctors
...
Becoming*

APPENDIX

Table 1: Audio-diary prompts

Months 1-3 *Remember we are focusing on your experiences as you transition into the clinical environment. Comment on the issues below. You can talk in as little or as much detail as you would like. Some of these questions may be more relevant to others than you; you might spend more time on some prompts than others.*

1. Besides this prompt, have you thought about the upcoming clinical year?
2. What comes to mind as you think about entering next year?
 - a. Do you have any specific expectations?
3. Are there any specific experiences that you think will be useful to help you transition to the clinical year? How so?
4. Are there any specific experiences that you have had thus far that you think will help your transition to the clinical year? How so?
5. Anything else you would like to talk about?

Months 4-9 *Remember we are focusing on your experiences as you transition into the clinical environment. Comment on the issues below. You can talk in as little or as much detail as you would like. Some of these questions may be more relevant to others than you; you might spend more time on some prompts than others.*

1. Describe any aspect of your clinical experience over the past week that impacted your transition to this placement.
2. How much support do you get from those around you? Explain
3. Were there any specific experiences in the past week that influenced your transition to this clerkship in any way? Can you tell me more?
4. How easily have you fitted into your role as a new clinical student? Explain
5. How are your experiences thus far affecting you? Explain
6. Is there anything else that would have helped? Explain
7. Anything else you would like to talk about?

Box 1: Interview schedule

1. How well did you think you are coping with the transition to clinical training?
2. How do you think you have changed from the beginning until now?
 - a. What led to those changes?
3. Looking back are there any specific factors that you think helped your transition to this phase?
4. What educational activities had the most impact on your transition and adjusting to the clinical year? Tell me more about the impact of these activities
5. Which people had an impact on your transition and adjusting to the clinical year? Which persons and in what way? Tell me more about the impact.
6. Apart from the audio-recordings in this study, can you remember any time as you transitioned to the clinical year when you reflected on your transition experiences?
 - a. What prompted that reflection?
 - b. Following that reflection what happened?
7. How is this study influencing your experiences transitioning?
 - a. Did it have any impact on your relationships?
 - b. Did it have any impact on your learning? How so?
8. Could you see yourself using audio diaries in the future for reflection?

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Chapter 3

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4

Students' social networks are diverse, dynamic and deliberate when transitioning to clinical training

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ABSTRACT

Context

Transitions in medical education are dynamic, emotional and complex yet, unavoidable. Relationships matter, especially in times of transition. Using qualitative, social network research methods, we explored social relationships and social support as medical students transitioned from pre-clinical to clinical training.

Methods

Eight medical students completed a social network map during a semistructured interview within two weeks of beginning their clinical clerkships (T_0) and then again four months later (T_1). They indicated meaningful interactions that influenced their transition from pre-clinical to clinical training and discussed how these relationships impacted their transition. We conducted mixed-methods analysis on this data.

Results

At T_0 , eight participants described the influence of 128 people in their social support networks; this marginally increased to 134 at T_1 . People from within and beyond the clinical space made up participants' social networks. As new relationships were created (eg with peers and doctors), old relationships were kept (eg with doctors and family) or dissolved over time (eg with near-peers and nurses). Participants deliberately created, kept or dissolved relationships over time dependent on whether they provided emotional support (eg they could trust them) or instrumental support (eg they provided academic guidance).

Conclusions

This is the first social networks analysis paper to explore social networks in transitioning students in medicine. We found that undergraduate medical students' social support networks were diverse, dynamic and deliberate as they transitioned to clerkships. Participants created and kept relationships with those they trusted and who provided emotional or instrumental support and dissolved relationships that did not provide these functions.

INTRODUCTION

Transitions in medical education are dynamic,¹ emotional and complex² yet, unavoidable. Transitions are imposed by health care systems (eg changing medical teams/firms) and training programmes (eg from pre-clinical to clinical training).^{1,3-5} Few studies explicitly focus on social and developmental aspects to transitions even though medical educators are increasingly fostering competencies, such as collaboration and reflection. In this paper, we contribute to the conversation surrounding social aspects of transitions as we unpack relationships influencing undergraduate medical students transitioning from pre-clinical to clinical training.

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Transitions are dynamic periods¹ requiring the transfer of previous training (eg from pre-clinical classroom-based learning) to the workplace (eg to the clinical environment).⁶ Discourse in transition literature focuses on the associated distress³ and anxiety during transitions which may lead to self-doubt.⁷ Persistent self-doubt can result in limited speaking up behaviour which is linked to increased medical errors.⁸ However, transitions also offer an opportunity for personal and professional development.^{1,3,9} Thus, entering a new environment can also be a 'learning asset'^{10,11}; the 'struggles' experienced when transitioning to being a doctor for the first time can be motivating when supported.¹² Numerous interventions have been developed to address the threats inherent in transitions within medical education. These primarily focus on bridging the educational gap of knowledge and skills that newcomers experience as they move to new environments.³ Although these interventions may increase confidence,¹³ students must develop meaningful relationships and integrate into clinical environments to be able to access opportunities to learn, practice and showcase taught knowledge and skills.^{3,4,14-17}

The social perspective to transitions is important as 'relationships matter',¹⁸ especially in times of transition.⁶ Social integration is notoriously difficult in clinical clerkships, especially those that are rotation-based.^{1,4,5} Social integration buffers stress during intense periods¹⁹ and is one form of social support.^{20,21} Social support is a 'network-based phenomenon'²² described as any social transaction that may be helpful for the receiver in a particular situation.⁶ Therefore, creating and keeping supportive social relationships is crucial during transitions. There is a gap in the transitions literature calling for more research from a social perspective.³ We are yet to know how social relationships influence students' transition as they leave the classroom and go to a clinical training environment.^{3,23,24} Social network research methods could help us fill this gap.

Social network theory tells us that behaviour and performance are the result of the way individuals are tied to their social connections.²⁵ Social network analysis (SNA) has

been invaluable in understanding relationships in undergraduate medical education. We know now that medical students choose friends of similar sex and background during medical training,²⁶ that undergraduate students' relationships predict their performance,²⁷ that institutional allocation influences friendship development²⁶ and even that faculty's social networks influence learning about teaching.²⁸ However, social networks have not yet been explored in relation to transitions in medical training, including how they influence students' transition experiences. In recognising that learning is a collaborative process, we anticipated that exposing the social fabric of relationships between students and others would enable us to consider how social structures and individual preferences interact during the transition to clinical training.

We therefore used SNA to examine the social interactions of undergraduate students, studying their relationships and connections²⁹ during their transition to the clinical environment. Specifically, we sought to answer the following research questions:

RQ1: Who are in the social networks of undergraduate students transitioning to the clinical environment?

RQ2: To what extent do undergraduate students' networks change as they transition to the clinical environment? What are the mechanisms behind these changes?

METHODOLOGY

Context

This study took place in the five-year medical programme of Western Sydney University (WSU), Australia. Every year, approximately 130 students (primarily school-leavers) enter the medical programme at WSU. The programme comprises two pre-clinical years with a PBL curriculum and three clinical years with rotation-based clerkships (also called attachments or placements). We took our sample from an ethnically diverse sampling frame at WSU.

Researchers' stance

We conducted this study within a social constructivist paradigm; we believe that individuals create meaning through their interactions with others.³⁰ In addition to concepts from social network theory mentioned above, we were further sensitised by theoretical constructs from landscapes of practice¹⁰—an iteration of community of practice theory.³¹ This was a useful conceptual tool because, in medical education, new clinical students interface with boundaries surrounding communities of *clinical* practice (CoCPs)³² as they attempt to socially integrate when transitioning in and out of numerous

undergraduate clerkships in the landscape of clinical practice. Likewise, social network research considers the location of the boundary around a network of people who are interacting. Landscapes of practice complements social network analysis given the social perspective to learning and overlapping concepts such as *brokers* and *boundaries*.

Participants

We collected network data from a convenience sample of eight undergraduate medical students. Our eight participants included four males and four females between the ages of 19 and 24. Participants identified their nationality/ethnicity as being: Chinese, Caucasian, Malaysian, Indian, Bangali, Sri Lankan and Middle Eastern. We will refer to the participants as David, Kenneth, Greg, Nicole, Sonita, Elizabeth, Tyrell and Kendi. David and Kendi had some psychological distress during the data collection period due to issues related to training. However, this emotional distress was promptly addressed as both students went to the institution's counsellor and David took two mental health days as allowed.

Procedures

To collect data for the current study and answer our research questions, we used an egocentric approach to SNA by focusing on specific individuals instead of a complete network approach.³³ We therefore focused on the social networks of individuals (*ego*) made up of people called *alters* whose relationship is called a *tie*. We collected data using interviews at two time-points, five months apart, allowing us not only to understand network structure, but also network change and mechanisms functioning within networks. The first interview was within the first two weeks of the first clinical year (T_0), and the second was four months later (T_1).

Our research programme focuses on the transition from pre-clinical to clinical training, and our early literature review stimulated us to explore a number of distinct, yet related, topics. In a previous narrative inquiry, we investigated how students storied their transition and thus the lived reality they experienced. Nine students regularly completed audio-recording diaries for nine months, and they then participated in two interviews yielding over 60 data points (See Figure 1). We report on these findings separately.³⁴ In the current study, we focused on the specific influence of social relationships when students transition to clinical training. The data collected for the current study were different to that for our previous study and answers separate research questions. We collected data for the current study at the interviews conducted for the previous study using a separate interview guide as we describe below. We did this for logistical reasons and to respect participants' time. Eight of the nine students participated in the current study as one did not respond to reminders about the interviews, and thus, this student was not a part of our exploration of social relationships.

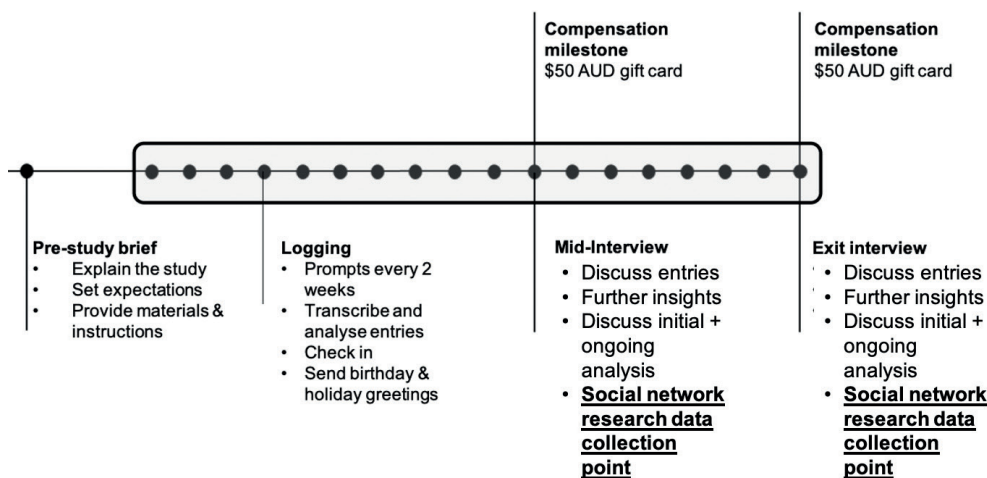


Figure 1: Data collection procedures for two related but distinct studies. Bold and underlined text indicate the data collected for the current study.

During the study period relative to this paper, participants experienced three to four clerkships each five-week duration. To capture each participant's social support networks, we facilitated systematic identification and consideration of alter choices, relationships and level of impact.³⁵ Explicit methodological details and sample images can be found in Figure 2.

We used qualitative data collection through individual interviews at T_0 and T_1 to collect egocentric network data from our eight participants. This allowed us to capture data on mechanisms functioning within the social support networks of participants. AA conducted all interviews following two pilot sessions on persons outside of the sample. No changes in the interview process were made. First, we generated names of alters by having participants complete a list after asking them to: 'think of all the persons who have impacted your transition experiences thus far, positively or negatively. Write each person down'. (Figure 2A). Each alter's name was written on a small Post-it™ (nametag). AA coded each nametag to indicate the gender, role and whether each alter had a positive or negative influence (see Figure 2B). Participants were free to add alters at any time during the interview. We did not limit the number of alters that participants could indicate, so as not to compromise data quality.^{36,37} Participants then arranged each nametag on one of four concentric circles surrounding their name (See Figure 2C). The innermost circle represented alters who had the most impact on the participant, and the outermost circle represented those who had the least impact. We also asked participants to indicate relationships between alters with circles and lines to connect them. The final output is called a target sociogram (See Figure 2C). Using a semi-structured interview guide (Box 1), we discussed network-level and alter-level influences including

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STEP 1

We asked participants to think of all the persons who impacted their transition experiences thus far, positively or negatively
See (A)

STEP 2

A list of alters was created and then each name was placed on an individual sticky paper (nametag).
See (B)

STEP 3

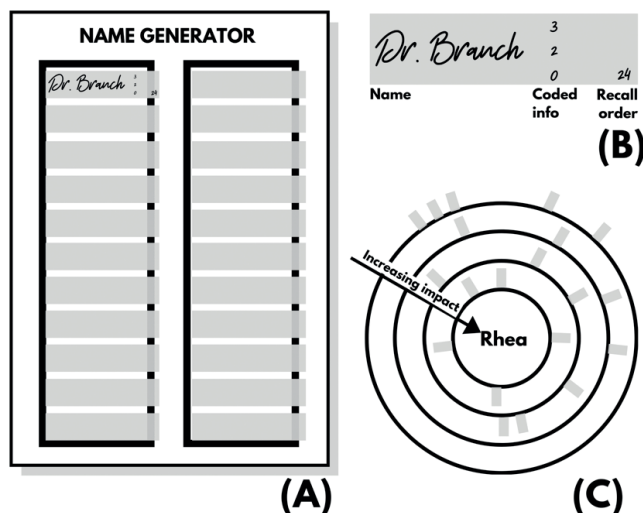
Participants coded each name tag based on gender (male or female), role (peer, near-peer, nurse, doctor, support staff, family, academics or other) and the polarity of their influence (positive or negative).
See (B)

STEP 4

Participants arranged nametags on a sheet with four concentric circles surrounding their name in the middle, nametags placed on the circle closest to their name represented those with the most impact.
See (C)

STEP 5

A semi-structured interview discussed participants' networks and key events that showcased how the alters helped or hindered their transition experiences as they integrated into the clinical environment.



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Figure 2: These images show the procedures used in this study to create target sociograms which represented the support networks of our participants. (a) shows the name generator template where participants listed all those who influenced their transition experiences on name tags (b) shows a coded, labelled name tag. (c) shows how a participant, Rhea arranged her name tags in a way that those who had the greatest impact were on the inner circles and those who had the least impact were on the outermost circles. In this sample 20 nametags represent 20 alters in Rhea's network.

key events that made visible how alters helped or hindered participants' transition experiences. Four months later, these data collection procedures were repeated (T_1). Participants reflected and discussed any changes in their networks at T_1 . We did not show participants their previous networks at the second interview to avoid influencing alter choices at T_1 . This qualitative approach to SNA captured narratives that ultimately expressed how and why relationships were created, kept or dissolved.^{37,38}

Box 1: Semi-structured interview guide: sample questions

When did this relationship develop? Who initiated it?
In what way does this person help or didn't help you to transition to the clinical environment?
What kind of information did they share that impacted your transition experiences?
How are your relationships created/kept/lost?

We used an audio-recorder and video-camera to record the interviews, and the workspace participants used to create their target sociograms (participants not in frame). Video-recording helped us identify which alters participants were referencing as they referred to their sociograms as they spoke. Each interview for our research questions lasted between 45 minutes and 90 minutes depending on participants' network size. In total, participants were interviewed about their social networks for 93 to 194 minutes on average over the two interviews. All audio-recordings were transcribed verbatim. AA wrote reflective notes after each session. All target sociograms were recreated using Microsoft PowerPoint®, and we changed all names to pseudonyms. Participants were able to receive copies of their target sociograms and could make changes if necessary; no changes were made.

Data management & analysis

This is a mixed-methods social network analysis which is defined as 'any study that draws from both qualitative and quantitative data or uses qualitative and quantitative methods of analysis and thoughtfully integrates the different research strands with each other' (p. 20).²⁸ This afforded us richness and interpretative depth through considering the quantitative and qualitative dimensions of the social support networks of participants in our sample. Firstly, AA created a spreadsheet of all alters based on the coded nametags. We also captured strength of the interaction through the concentric circle placement (using a score of 4 for the innermost circle and 1 for the outermost circle). We compared the composition of roles of all alters in all networks at T₀ (n = 128) vs T₁ (n = 134) using Pearson's chi-square statistic.

Ethical considerations

This study received ethical approval through Western Sydney University (WSU). Due to the intimate and personal nature of this research, we have taken care to ensure anonymity through all stages of research and within this paper. We have not indicated the calendar year of data collection, specific participants' ethnicity nor specific position titles to protect the identity of our participants and alters. All names in this paper are pseudonyms.

Researcher positioning

We believe the transition to clinical training is a social process through which learning, and development, occurs. Some of the authors are doctors with clinical experience (AA, PT, IH and WH). LN has experience conducting and supervising qualitative social network analysis. PT, DD, IH, WH and LN are established qualitative researchers and experienced medical educators. This international team spans a wide range of geographical contexts (Australia, Barbados, Canada, Egypt and The Netherlands). The multifaceted perspectives of the research team increase the information power in this study.³⁹ The research relationship between AA and participants, as described earlier, boosted the quality of their interactions.³⁹ AA had no hierarchical relationship with the participants as she was not engaged in any teaching appointments and had no role in their assessment or progression.

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RESULTS

We first describe the network structure in our sample at both T_0 and T_1 to gather network-level (size, diversity) and alter-level insights (gender, roles, strength of ties). This answers RQ1 and tells us, both quantitatively and qualitatively who are in the social networks of students transitioning to the clinical environment. To answer RQ2 (how do networks change and underlying mechanisms for change), we quantitatively and qualitatively compared the alters at T_0 with the alters at T_1 for insight into network change and whether ties were created, kept or dissolved. We also explored whether the composition of networks changed. To answer the sub-question of RQ2, we qualitatively describe the mechanisms functioning to exert network change further integrating the conclusions given by the previous quantitative analysis.

Network structure

During the initial two weeks of their *first* clinical clerkship, eight students interacted with a total of 128 unique alters (approximately 16 alters per student). Network size ranged from 12 to 22 alters at T_0 . Networks were diverse as is evident on sociograms in Figures 3 and 4. These figures are visualisations of two participants' networks, Figure 3 shows T_0 alone for David, and Figure 4 shows T_0 and T_1 for Nicole. The figure shows alters on pinwheels so readers can easily visualise which groups the alters in participants' networks represent (labelled wedge) and also the strength of alters' influence (strongest influence is indicated closest to the centre and receives a score of 4) and polarity of their influence (black means negative interaction). We have three key findings from T_0 network data. Firstly, most networks were diverse and comprised mostly of doctors ($n = 39$; 30.5%), near-peers ($n = 23$; 18%) and peers ($n = 22$ (17.2%); see Table 1, Figures 3 & 4). Secondly, academics, nurses, support staff and peers were often placed on outer

circles as compared to doctors, near-peers, others and family (see Figures 3 & 4). Lastly, a few alters appeared in more than one participant's networks. These alters were primarily in institutional positions and included an academic physician and a student-voted administrative role.

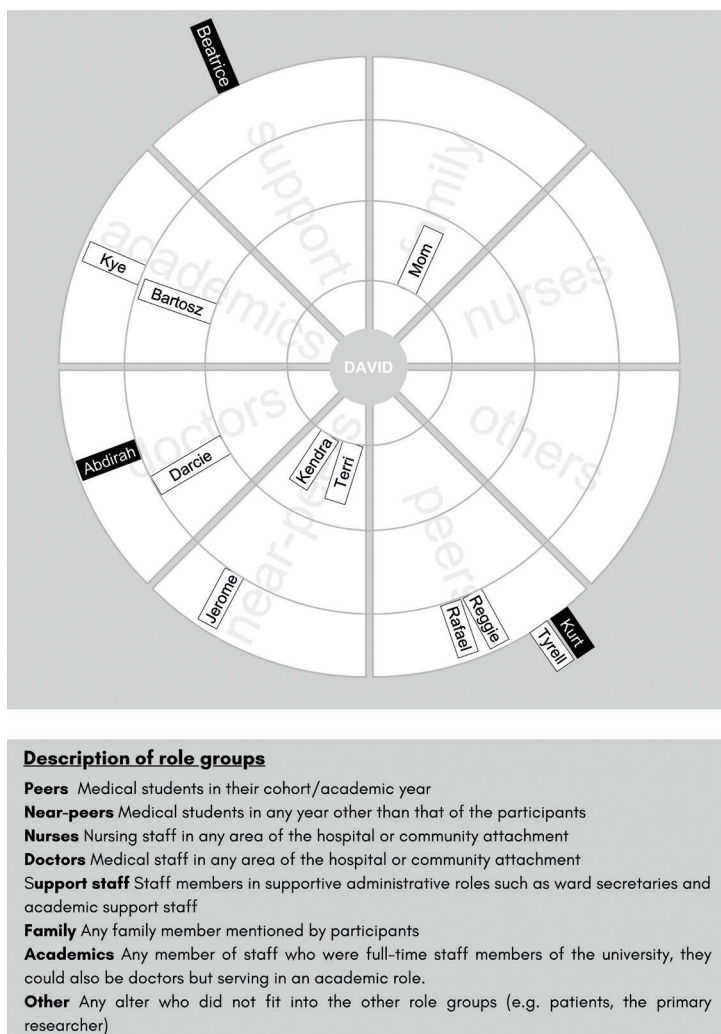
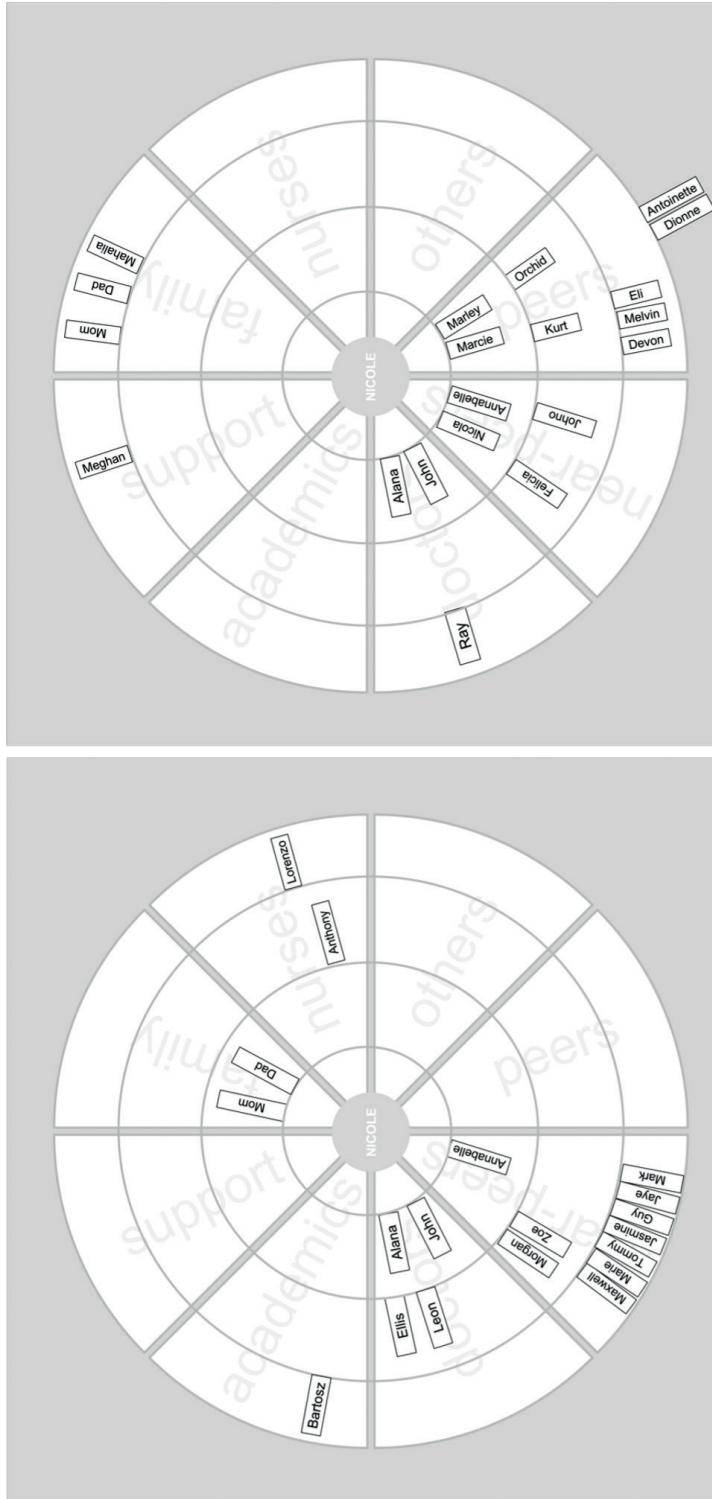


Figure 3: David's network at T₀ had 15 alters from 6 role groups (see below).

This network was made up of a variety of alters including near-peers, peers, doctors, academics, admin staff and family. His most significant ties were with females— His mom (family), Terri (near-peer) and Kendra (near-peer). His least significant ties were with Tyrell (peer) Kurt (peer) and Beatrice (support staff); he had negative, interactions with the latter two.



T1

T0

Figure 4: Nicole's network at T₀ (n=19) and T₁ (n=20).

Nicole's initial network included mainly near-peers and doctors with significant impact from her family. At T₁, Nicole has developed many relationships with her peers and her bonds with near peers have weakened. Her relationships with nurses also diminished though she gained a tie in a support staff member. Relationships with her family members lost significance but remained present.

Networks on the move

Networks were dynamic and alter composition changed over time. At T_1 , there were 85 new ties, 99 dissolved ties, and 28 kept ties in the networks of our eight participants, and this led to the total number of ties at T_1 being 134. Due to the proportions of dissolved ties and kept ties, students' networks did not significantly get bigger over time; average ties per network went from 16 at T_0 to 16.75 at T_1 . The overall network change between T_0 and T_1 varied between -5 and $+15$ alters. In Figure 4, we instantly see more peer ties and less near-peer ties for Nicole; this pattern was seen in most network maps. The role composition of networks was significantly different between time-points ($\chi^2 = 22.6$; $P = 0.002$); see Table 1.

Table 1: Proportion of alters in each of 8 roles at T_0 and T_1 showing increased doctor and peer ties and decreased near-peer and nursing ties.

Role	T0		T1	
	N	(%)	N	(%)
Doctors	39	(30.5)	53	(39.6)
Family	12	(9.4)	15	(11.2)
Near-peers	23	(18.0)	8	(6.0)
Peers	22	(17.2)	38	(28.3)
Nurses	11	(8.6)	2	(1.5)
Support staff	2	(1.6)	2	(1.5)
Academics	9	(7.9)	5	(3.7)
Others (patients, mentees, researcher)	10	(7.8)	11	(8.2)
	Value	df	P	
	χ^2	22.6	7	0.002
	Likelihood ratio	23.8	7	0.001

Mechanisms for network change

The overarching mechanism for network change was through deliberate network management by our participants. Students intentionally created, kept or dissolved ties depending on emotional or instrumental support factors. Some alters provided both types of support.

Emotional support

Emotional support was often provided by peer roommates, family and sometimes patients. Participants made deliberate decisions to create, keep or dissolve a tie based on an assessment of whether they could trust alters or whether they were physically accessible.

It took many participants time to *trust* their peers with their concerns and questions; this eventually led to the creation of peer ties we see above at T_1 . Both female and male participants revealed that at T_0 , they feared that by admitting to experiencing struggles and knowledge deficits, they would be seen as weak by peers. Some participants did not trust that their peers could help, as their experiences were similar. By T_1 , most participants recognised their peers as an important source of support and learning, and they trusted them more over time. For example, Nicole reflected:

"...I think maybe I should have opened up a bit earlier if I had any troubles... to people in my cohort a bit more... I mean I don't feel like I've had a lot of issues, but I would, kind of, feel a bit embarrassed to bring up issues. I didn't want to seem weak in front of other people. But now I just tell people [peers] everything... It really helped me not overthink things and to keep things into perspective so I should have just done it earlier."

Nicole, female, 21 years, T_1

Perceived *accessibility* of ties determined whether they were dissolved. For example, near-peers disappointed some participants who felt that near-peers had their own education to focus on and could not help them. This likely led to a loss of near-peer ties that we see in Table 1 and in Figure 4. Below, David expressed his disappointment when Terri did not live up to the expectations he had for her support and friendship.

"Terri, I was supposed to see her that day after our meeting, she had other commitments... Terri really made me feel bad because I was really desperate for some help and she left me hanging out to dry... that's why there is no senior [student] in this picture right now... no one helps..."

David, male, 22 years, T_1

Trust and perceived accessibility resulted in family ties being stable over time. Family were one group on whom participants always felt they could reliably depend during stressful experiences. Participants welcomed the outside perspective and noted maintaining their family ties was beneficial to their overall well-being. At both T_0 and T_1 , family remained in participants' network, averaging being placed on the second circle from the centre on target sociograms. Below Kendi describes how her dad was reliably supportive resulting in him appearing on her sociogram at both T_0 and T_1 .

"...when I go through, like hardships or obstacles and stuff, um, my Dad's always there to talk to me if I'm feeling upset and he'll – because, like, he's been through – like, he's not a doctor but he's been through, like similar stuff, like [a] transition from uni[university] to being, like go to work and then he'd know sometimes it can be hard and he would tell me to, like encourage me..."

Kendi, female, 20 years, T_0

Contrastingly, David recognised the diminished influence of his mother on his transition, feeling she could not understand as she was from outside the 'medical world'; that tie was dissolved at T_1 . A few alters had similar thoughts.

In practice, emotional support was often provided mainly through facilitating venting or by alters nurturing participants' self-esteem. Venting was an important emotional function that permeated all narratives. It encouraged participants to re-engage once they off-loaded and discussed their stresses and concerns. Venting could help shape many participants' perspective, occurring within relationships that were founded on trust, often with alters on their innermost circles on sociograms (family members, peers and resident doctors). Below, Nicole described how Annabelle facilitated her venting. It is clear that Annabelle was a close, trusted friend by her proximity to the centre at T_0 and that she persisted at T_1 in Nicole's network, as seen in Figure 4.

"...she [Annabelle] was helping me in that way and say if I was having a bad day, I could just, like, vent to her and she could help me see perspective "

Nicole, female, 21 years, T_0

Interestingly, some patients (categorised under the role 'other') increased participants' confidence and validated their presence in the community thereby nurturing their perceived value to the clinical community.

"...she [patient] also said, the cannula was good, it was very gentle. So that was good for me. And it felt good that I tried to reassure her a bit."

Tyrell, male, 19 years, T_1

Contrastingly, some ties functioned as a source of emotional conflict or increased stress. Some students felt ignored or belittled by persons on their networks. Some ties caused tension and did not neatly fit as a positive or negative interaction. This usually instigated strain on participants' time, having to choose between their ties and medicine. Interestingly, there were fewer negative ties described at T_1 . Over time, some students were able to use negative interactions to develop personally and professionally:

"...even though it wasn't a great first-day experience, they made me realise that not everyone will be trying to help me, and I have to make it work by myself. So, I started actively asking questions and trying to, help them as much as I can, and trying to ask questions, trying to help my learning instead of them asking me."

Kendi, female, 20 years, T_1

Instrumental support

Instrumental support was often provided by doctors and near-peers. Participants made deliberate decisions to create, keep or dissolve ties based on an assessment of an alter's expertise or serendipitous interactions with alters who provided academic guidance and shared cultural norms for engaging in a new clerkship environment.

Some participants deliberately sought out the expertise of doctors in particular. Additional doctor ties were created as students experienced more clerkships (see Table 1). Doctor ties were kept if they made participants feel valued, shared their own experiences, recognised participants' knowledge and skills and showed interest in their development. Below, Nicole notes the influence of Alana, a registrar physician in Nicole's network at T_0 and T_1 (see Figure 4). Even though Nicole left Alana's department, five months later, Alana was kept as an alter that Nicole continued to contact for advice.

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"...it was a big thing for her [Alana] to make sure that everyone was really comfortable...and are we doing okay...you know, she had experiences with, you know, maybe people not being as nice to her...when she was a student, so it was important for her for me not to feel that way..."

Nicole, female, 21 years, T_0

Students liked when doctors provided opportunities for students to become part of the clinical environment by giving them tasks and roles that integrate them into everyday patient care and sharing their expertise and knowledge with them. This facilitated social integration by cultivating a sense of belonging to the clinical team. Doctors who facilitated such integration persisted in networks over time.

"...he trusts me with things; "Go examine and tell me what you find," okay? Then he'll type it and that's it, and it makes me feel more responsible..."

David, male, 22 years, T_1

When students were not given this opportunity or the environment did not facilitate integration, this left them feeling like they were not yet transitioning. Below, at T_0 , David struggles with not being invited to participate in clinical tasks.

"...he's my supervisor for GP, I don't think that he understands that I have to act like a clinician at this point. He treats me as a baby student and I don't like that..."

David, male, 22 years, T_0

Guidance was especially important at T₀ and at T₁, was increasingly provided by peers contributing to the creation of numerous peer ties. Guidance mainly included sharing advice about cultural norms and tips for working as a clinical student. In the quote below, Sonita discusses the guidance provided by resident doctors during her first week of clerkship.

“they [residents] just always asked us questions and then, like, they went through the guide as well, which I don’t think a lot of doctors do...so they were like trying to teach us ...at least one topic, over coffee ...even though they were really busy with their work as well.”

Sonita, female, 19 years, T₀

Some participants recognised the reciprocal nature of some ties, especially peer relationships. They recounted how helping others helped them help themselves. This support function of helping others was primarily seen at T1 as compared to T0.

“...I do think I influence my cohort...I go to them for advice, they also come to me for advice. I’ve shared my experiences with them as well, so I think that people — my peers later come to me as well. And they do take in whatever I said, and they take that into consideration as well.”

Nicole, female, 21 years, T₁

DISCUSSION

This study explored structure, change and mechanisms functioning in the social networks of medical students transitioning from pre-clinical to clinical training. We found that the social fabric of relationships as students transition from pre-clinical to clinical training is indeed a complex, dynamic blend. Our study further strengthens the link between social networks and transitions in the literature; two entities previously examined in isolation.⁶ Despite the widespread acceptance of sociocultural theories of learning, including communities or landscapes of practice theory being applied to workplace-based learning, this study appears to be the first social network analysis informed by qualitative methods that explores social networks as they relate to a transition during the medical education continuum. Through data collection at two timepoints, we are confident in our explanatory power regarding *how* and *why* relationships relevant to medical training are created, kept or dissolved. Our qualitative data collection methods showed us that the social support networks of our sample were *diverse, dynamic* and *deliberate*.

Networks were diverse and were not confined to the boundary surrounding clerkship communities or even the landscape of clinical practice.¹⁰ Using an egocentric approach,

we did not assume that networks comprised of people in pre-defined boundaries such as in CoCPs³² and complete network SNA.³³ Additionally, we expected that students would have a larger support network a few months into clinical training. This did not happen, contrary to teacher networks participating in an instructional development programme.⁴⁰ The rotation-based clerkship model is likely responsible for some of the failure we saw for support networks to grow due to a lack of continuity.⁴¹ Lastly, future research could explicitly explore the influence of alters' ethnicity vs students' ethnicity.

Networks were dynamic. During the initial weeks, students missed out on potentially meaningful peer interactions due to feelings of competition and not wanting to appear weak. Promoting speaking up and normalising struggles could help minimise stigma.⁴² These findings are in keeping with the proposed challenges of peer groups in the medical education literature.⁴³ Supportive peer relations may improve perceived psychological safety and improve a focus on learning instead of impression management.⁴⁴ We found that some family ties reduced in strength just five months into clerkship. This could be a part of the professional inclusivity and simultaneous social exclusivity as students become doctors.⁴⁵ With concerns of diminished work-life integration contributing to physician burnout⁴⁶ and retrospective realisation of reliance on family and friends to cope,⁴⁷ maintaining supportive family ties should be encouraged. The loss of nurse ties and lack of meaningful ties with other professionals (eg physiotherapy) could counteract interprofessional collaboration competence⁴⁸; this could be explored in future research. The dynamic nature of networks we found in this study relates to 'tie churn', a concept in SNA theory which describes the stability and change in networks over time using ratios of new and dissolved ties to all and kept ties.⁴⁹

Networks were curated through deliberate network management. This is in line with other social network research which considers 'network intentionality'.⁵⁰ We were able to not only describe tie churn but also underlying mechanisms behind why ties were created, kept and dissolved over time as students transitioned to the clinical environment. While we expected networks to grow, having a deliberate, small network could be more beneficial during the emotionally complex transition period. Additionally, network intentionality could be the result of becoming aware of one's networks and thus actively seeking out or dissolving existing ties. Our qualitative data found this intentionality to be dependent on the provision or not, of emotional and instrumental support. Our sample intentionally dissolved relationships with alters who did not provide either emotional support (eg unable to trust them or they were not accessible) or instrumental support (eg did not have enough expertise or did not provide academic guidance). Notably, we may have made students aware of their networks during our first data collection and future research could explore whether becoming aware of one's network could relate to network intentionality in learners.

Strengths and weaknesses

Our findings are limited in transferability by our single-institution design; however, we aimed for thick description of our processes to make institutional generalisability possible. Our participants experienced a varied combination of clerkships during the study period which allows some transferability outside of any particular clerkship. We acknowledge that transferability is limited but we focused on specific clerkship contexts so as to make data interpretation feasible yet allow comparison within our varied and intense dataset. Using egocentric networks provided insight into understanding both mechanisms functioning in clinical students' social networks over time. Our findings are likely generalisable to the phenomenon of interest and not the sampling frame.⁵¹ For example, the concept of deliberate network management is likely generalisable to all transitioning medical trainees given it being found not only here but relates to network intentionality in general SNA literature. Eight participants may appear low; however, we were interested in the 128-134 ties and properties of those ties.⁵² Given the intense data collection methods, only a small number of participants were necessary to produce this rich, multimodal dataset at two time-points.³⁹ We thus believe this dataset contains sufficient information power³⁹ to answer our research questions.

During a few interviews, AA's influence on some participants was clear as she was mentioned in sociograms and transcripts. As mentioned, AA was known to participants as a researcher exploring their transition to clinical training through their participation in a previous study. We recognised AA's influence on participants might have varied over time. However, following realising the concrete influence AA had on participants in multiple interviews, we discussed the potential negative implications of AA's research relationship. These effects could include that participants felt pressured into further data collection by participating in this study thus increasing their participant burden. However, we discussed the impact of their participation in the interviews and found that the relationship between AA and participants allowed them to be open in the discussions relevant to this paper. From participants, we learned that we unintentionally conducted a reflective intervention by having participants reflect on their relationship and experiences in both this and the other related study we described earlier. For example, one participant had to take time off for psychological reasons and noted he used the opportunities for reflecting in audio-diary recordings to work through his issues and he realised that contemplating his social network allowed him to identify who he could lean on during difficult times. Due to the reflective nature of our data collection, we agree with Froehlich and Gegenfurtner that mapping one's network can potentially be a useful exercise during stressful periods between phases.⁶

Students' social networks are diverse, dynamic and deliberate when transitioning to clinical training

SNA and health professions education in the future

Qualitative and mixed-methods SNA research could benefit health professions education inquiries, as it has general education research.¹⁷ Network development could be a social outcome of medical training⁵³ and could broaden our scope which is dominantly focused on knowledge acquisition and skills training during transitions. SNA could become a marker of social integration through measuring of network size and other measures.⁶ Mapping social networks could help institutions recognise *brokers*¹⁰ and support them. More SNA research in other health professions education fields, like allied health,⁵² could provide holistic data on how networks of health professions interact or not.

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CONCLUSIONS

This is the first social networks analysis paper to explore social networks in transitioning students in medicine. We found that undergraduate medical students' social support networks were diverse, dynamic and deliberate as they transitioned to clerkships. There were more peer and doctor ties and less near-peer and nurse ties over time. Students' deliberate decisions to create, keep or dissolve relationships were based on whether alters provided emotional (eg were trustworthy) or instrumental support (eg provided academic guidance).

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Chapter 4

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Medical students' socialization tactics when entering a new clinical clerkship: a mixed methods study of proactivity

Under Review

ABSTRACT

Purpose

Socialization into clerkships is difficult in part due to associated ambiguity of students' new roles and expected behaviors. Being proactive reduces ambiguity and is essential to socialization. Proactive behavior (PB) can be taught and goes beyond having a proactive personality. Among students entering new clerkships, this study aimed to investigate reported PB and association with social integration (SI), enabling and inhibiting factors for PB.

Method

Using a convergent mixed-methods design, survey data from 200 clinical students across three cohorts, and interview data from 18 of these were collected. Surveys explored five proactive behaviors: *seeking feedback(FB)*, *seeking information(IN)*, *negotiating tasks and roles(NEG)*, *having positive framing around new experiences(POS)* and *building relationships with others(REL)*. Data were integrated using 'following the thread' and *mixed-methods matrix* techniques.

Results

Students exhibited all five PBs. Survey data showed POS and NEG had the highest and lowest scores, respectively. Only POS correlated with SI ($r=0.27$; $p<0.01$) but discordantly with interviews with students describing how other PBs led to SI. Senior clinical students had lower PB scores than juniors. PB was influenced by six factors: *personal interests/motivation*, *personal tendencies*, *energy levels*, *team climate*, *institutional influence*, and *relationships with others*. Data integration revealed three antecedents to PB— *intention*, *capability* and *the environment*.

Conclusion

Students who framed the experience positively were more likely to report increased social integration. Initiating task negotiation was challenging for most. We propose a conceptual model for PB and social integration that could inform future research and interventions to promote socialization and learning during clinical transitions.

INTRODUCTION

Many medical students find socialization into clerkships difficult^{1,2}. This is heightened in rotation-based clerkship models where students are quickly shuttled from one clinical discipline to another³. Socialization is necessary to provide newcomers with access to learning opportunities and contributes to identity formation^{4,5}. Organizational socialization literature suggests that both organizational and individual factors contribute to newcomers' socialization as they transition to new environments^{6,7}. In medical education, these organizational factors would include formal socialization tactics like transition courses⁸. Although transition courses increase students' confidence and reduce anxiety, some students still struggle with socialisation^{1,2}.

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Transitions inherently bring ambiguity to students' new roles and expected behaviors^{9,10}. Being proactive reduces ambiguity by providing information and social support to a newcomer that enables them to learn and thrive¹¹. Further, social integration, which has been associated with proactive behaviors (PBs) such as seeking information when in a new environment¹², is an indicator of adjustment or transitioning^{13,14}. Therefore, PB appears important for successful social integration of newcomers such as undergraduate students entering new clinical clerkships. In previous literature, PB is suggested as fundamental during periods of change—e.g., transitioning from preclinical to clinical training^{9,15,16} or entering a new clerkship. Proactive behavior (PB) is about making things happen⁶ and even in medicine, peers^{17,18}, faculty¹⁹, researchers^{9,15,19} and even national bodies^{20,21} advise undergraduate students to be proactive. Realistically, organizations cannot provide all the information necessary for all newcomers. Individuals also have an active role to play in adjusting to a new environment¹³. Although organizational socialization tactics (e.g. transition courses) can impact how integrated a newcomer feels in their new environment (i.e. social integration (SI), newcomers proactive behavior mediates this relationship)^{11,22}.

Individual's proactive behavior is any action that is 'self-starting, change-oriented and future-focused'^{6,7}—e.g., 1) a novice medical student asking a resident (SS) for feedback on their patient's history to improve history-taking skills as they become a medical professional, or 2) a senior medical student cannulating a patient's vein so the patient can receive medication swiftly without waiting on the junior doctor. In undergraduate medicine, medical students' PB is known to lead to both student-level changes (e.g., proactive feedback-seeking triggers reflection on clerkship activities)¹⁵; and team-level changes (e.g., faculty to describe proactive students as easy to work with and involve them more in clinical activities)¹⁹. In medicine, proactivity has only been investigated in relation to speaking up behaviour²³ and proactive engagement in healthcare tasks²⁴. Among postgraduate business students, Ashford and Black examined four

proactive behaviors exhibited when entering, and fitting into, a new work environment: *information-seeking, feedback-seeking, relationship-building, positive framing and task negotiation*¹¹.

Exploring proactive behavior is important as some authors suggest that PB can be taught²⁵; PB goes beyond having a proactive personality²⁶. Therefore, it is crucial to unpack proactivity in our field as being proactive is influenced by numerous factors, including affect²⁷ and the work environment²³. These influences could vary by the field of work (e.g., medicine, law) given differences in expectations. For example, the hierarchical nature of medicine²⁸, and frequent contextual changes in rotation-based clerkships, could further complicate PB and its influence on the process of socialization when experiencing contextual change.

We therefore aimed to explore proactive behaviors and social integration within a medical education context. Specifically, we were interested in proactivity during periods of change. Consequently, within the context of transitioning to a new undergraduate clerkship/rotation, we investigated the:

- 1) Reported proactive behaviors and their association with social integration
- 2) Enabling and inhibiting factors for proactive behavior.

METHODS

We used the Good Reporting of a Mixed Methods Study (GRAMMS) checklist to ensure adequate description and justification of our methodological choices²⁹. Mixed methods research is suited to rigorous exploration of under-explored constructs³⁰ in context as some proactive behaviors are context-specific^{31,32}. We adopted a convergent mixed methods approach; quantitative and qualitative data were collected and analyzed separately followed by integration of findings³³. Neither phase dominated, but were connected^{34,35}—we used preliminary survey findings to guide interview sampling.

Setting

We set this study in a five-year MBBS (undergraduate medical) programme in Sydney, Australia. Students spend two years in classroom-based education and then transition into full-time rotation-based clerkships for the last three years of training. During these years, they rotate every five to ten weeks through clerkships. This study occurred during the COVID-19 pandemic, and some clerkships were disrupted, which limited students' access to clerkship activities. Additionally, some 5th-year medical students were employed part-time in customized work roles to augment the medical workforce during this pandemic.

Quantitative Study

Sample and procedures

We approached year 4 and 5 students with a paper-based questionnaire during a face-to-face educational session. Year 3 students were approached during a virtual session (due to COVID-19) using a self-administered online questionnaire. This included demographic characteristics and scales measuring five proactive behaviors and social integration (SI). There were no suitable scales in medical education literature; we used proactivity scales validated in postgraduate business students entering the workplace¹¹; we adjusted the phrasing to our context. We used 25 items in five scales measuring: *feedback-seeking and information seeking, task negotiation, positive framing and relationship building*. Responses to all measures were on a five-point Likert scale with two anchors: 1 (To no extent) to 5 (To a very great extent). In our study, the measure of internal reliability (Cronbach's alpha coefficient³⁶) was 0.8 on average, see Table 2. We used a four-item scale used in adults starting a new job in various fields, to measure SI³⁷. Responses were on a seven-point Likert scale from 1-strongly disagree to 7-strongly agree. In our study, Cronbach's alpha coefficient³⁶ was 0.81 for scales measuring PB and 0.83 for the SI scale. The survey ended with an interview invitation.

Data management and analysis

We compiled a database and analyzed data using the Statistical Package for Social Sciences (SPSS) version 26 (SPSS Inc. Chicago, IL). Data were summarized and presented as the mean and standard deviation scores for each survey item. We used t-test and one-way ANOVA to explore associations between demographic variables and scores for PB and SI. Significance was set at the 95% confidence interval. Pearson's correlation coefficient measured the relationship between PB and SI scores.

Qualitative Study

Sample and Procedures

Of 46 who agreed to interview, we selected 18 for a mix of gender, academic cohorts, level of proactive behaviors and level of social integration. During interviews, we elicited qualitative descriptions of how students described their proactivity when entering a new clerkship. We used a semi-structured interview guide (**See Appendix**) drafted during the research proposal phase, and finetuned based on preliminary data. Interviews lasted 40 minutes on average (range 20-51). Using online videoconferencing software, we conducted and audio-recorded interviews. A professional third-party transcribed all recordings verbatim. All transcripts were deidentified before analysis.

Data management and analysis

Thematic analysis began after three interviews were completed and continued iteratively until information power was deemed sufficient³⁸. AA gained familiarity with the data by reading the transcripts and listening to the audio recordings. She coded the transcripts openly line-by-line³⁹. AA then used constructs from the survey to provide theoretical coding³⁹. These initial codes were discussed with IH and WH alongside transcripts, following which AA coded all transcripts. AA and IH had meetings to discuss developing findings and interpretations. Following these meetings, AA applied any adjustments to the dataset analysis. No substantial changes were made to the analysis frame. The research team discussed preliminary themes through synchronous and asynchronous meetings. Data were managed using Atlas.ti.

Integration and mixed methods inferences

After analyzing the quantitative and qualitative data individually, we used the integration techniques of following-the-thread⁴⁰ and mixed-methods matrices^{34,41}; see **Figure 1**. The following-the-thread integration technique facilitated iterative analysis across quantitative and qualitative data. We posed analytical questions to each dataset to explore explanations for results obtained in each of quantitative and qualitative data. Analytical questions led the integrated analysis and arose from promising emergent findings that were related to the overarching research aim⁴¹. We also created a mixed-method matrix for all 18 participants using both quantitative and qualitative data. The matrix was created with columns for each demographic, quantitative variable and also indicated the presence or not of each of qualitative subtheme. The rows then indicate each of 18 participants with an analytic summary of their findings from both quantitative and qualitative data. The 'threads' were used to interrogate the mixed-method matrix allowing us to analyze whether findings from following-the-thread could be confirmed by comparing these findings case by case; see **Figure 1**. We assessed the degree of fit between quantitative and qualitative findings for confirmation (findings reinforced one another), expansion (findings expanded insights of the other) or discordance (findings were contradictory)³⁵. These choices allowed us to create general conclusions greater than the sum of the individual quantitative and qualitative parts of this study⁴².

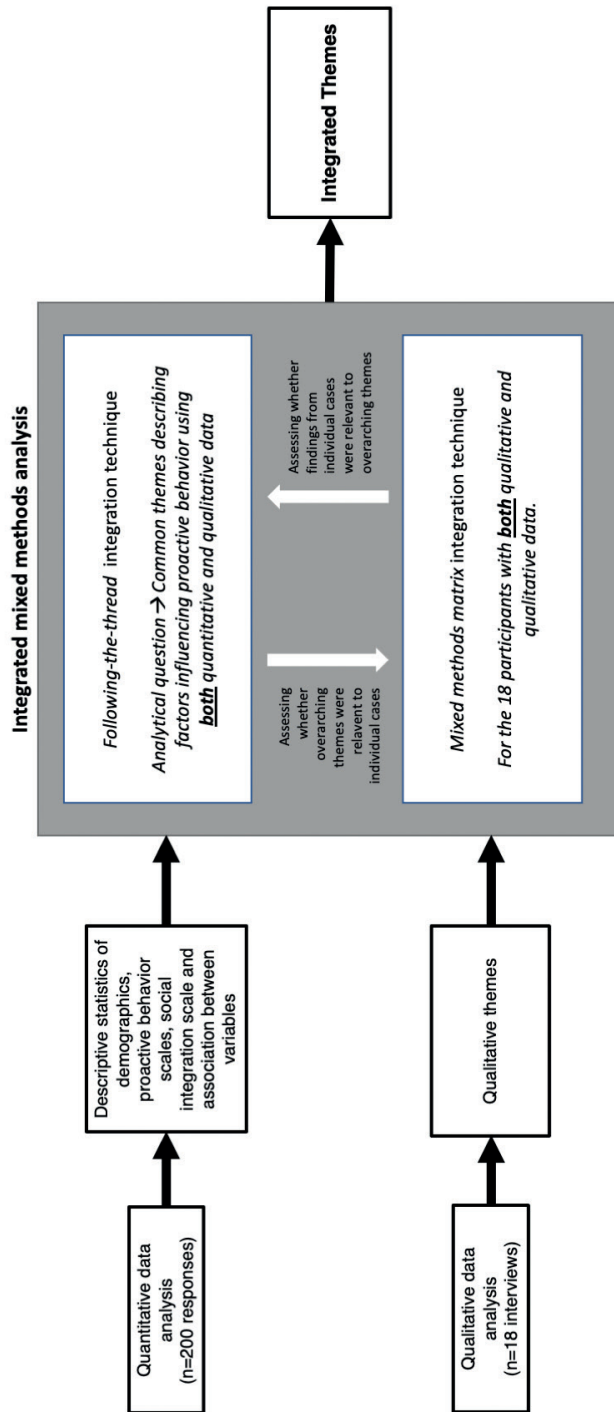


Figure 1: Process of integrated mixed methods analysis for this study

Ethical considerations

We received ethical approval under the identification number H9989. AA had no hierarchical relationship with the students, and WH and IH, academic leaders at the university, were blinded to participants' involvement. Students' participant information sheet reassured them there was no impact on their progression, and withdrawal was voluntary until the point of data anonymization and data aggregation.

RESULTS

Below, we summarize separate quantitative and qualitative findings and then offer the integrated results that answer our research aims. The first research aim was met by quantitative and qualitative findings while the second was met by qualitative findings only.

Two hundred students (53% response rate) completed the 25-item survey, **Table 1**. Most were between 21 and 24 years ($n=159$; 79.5%) and female ($n=119$; 59.5%). The distribution across 3rd, 4th and 5th-year cohorts were $n=84$ (42%), $n=45$ (22.5%), $n=71$ (35.5%) respectively. We interviewed 18 participants. Most were female ($n=13$); 15 were between 21-24 years; and seven, five and six interviewees were from 3rd, 4th and 5th-year cohorts respectively.

Reported proactive behaviors and their association with social integration

Quantitative results

Students' positive framing about entering a new clerkship and task negotiation behavior scored highest [mean(SD)—3.89(0.78)] and lowest [mean(SD)—2.3 (0.99)] respectively. Most students scored highly on the social integration (SI) scale (mean (SD) 5.74(0.83) out of 7; see **Table 1**. Having positive framing about entering a new clerkship correlated with a sense of SI ($r=0.27$; $p<0.01$). There were no other significant correlations between PB and social integration scores.

Qualitative results

The proactive behaviors described by the eighteen interviewees mirrored those measured in the survey except positive framing behavior, which students did not spontaneously describe. No proactive behaviors (except positive framing) were statistically associated with students' sense of SI. This was discordant with qualitative findings as many students felt that seeking feedback and information, feeling able to negotiate tasks on the team and building relationships all led to a feeling of being a '*respected and equal member of the team*'. Further, some students felt that being positive led them to enter a clerkship

Table 1: Average scores for each individual survey item in a sample clinical student population in Australia, 2020

SURVEY ITEMS		MEAN* (SD)	MEAN (SD.) Cronbach alpha
Feedback-Seeking	Sought feedback on your performance after a task	3.3 (0.9)	
	Solicited input from anyone	3.6 (0.8)	3.45 (0.7)
	Sought out feedback on your performance during a task	3.3 (1.0)	0.71
	Asked anyone's opinion of your work in general	3.2 (0.9)	
Information-seeking	Tried to learn the formal structures of the clinical or community service/department	3.4 (0.9)	
	Tried to learn the important policies, procedures and protocols of working in the clinical/community service or department	3.3 (1.0)	3.54 (0.84)
	Tried to learn the politics of working in the clinical/community service or department	3.2 (1.1)	0.85
	Tried to learn the informal norms of working in the clinical/community service or department	3.4 (0.9)	
Task negotiation	Negotiated with anyone about changes to tasks	2.4 (1.1)	
	Negotiated with anyone about your assigned tasks	2.6 (1.2)	2.3 (0.99)
	Negotiated with anyone about the demands placed on you	2.1 (1.1)	0.87
	Negotiated with anyone about their expectations of you	2.2 (1.1)	
Positive framing	Consciously tried to see the attachment experience as an opportunity rather than a threat	3.6 (1.1)	3.89 (0.78)
	Tried to look at the bright side of things regarding your attachment	3.4 (0.8)	0.83
	Tried to see the attachment experience as a challenge rather than a problem	3.6 (0.9)	
	Tried to socialize with attachment team members during lunches and breaks (e.g., going for coffee)	3.1 (1.2)	
Relationship-building	Participated in educational meetings during the attachment (e.g., grand rounds; departmental or service meetings)	3.7 (1.0)	
	Tried to spend as much time as possible with your consultant/supervisor	3.2 (1.1)	
	Tried to form a good relationship with your consultant/supervisor	3.8 (0.9)	
	Worked hard to get to know your consultant/supervisor	3.2 (1.0)	3.36 (0.65)
	Tried to spend as much time as possible with your junior medical officer/s	3.5 (1.4)	0.79
	Tried to form a good relationship with your junior medical officer/s	3.8 (1.0)	
	Worked hard to get to know your junior medical officer/s	3.5 (1.1)	
	Tried to socialize with anyone in the clinical/community environment but not from your attachment team	2.8 (1.1)	
	Tried to get to know anyone from other units and teams on a personal basis	2.3 (1.1)	
	People in the clinical environment respect me	5.9 (0.9)	
Social Integration	People in the clinical environment accept me as one of them	5.6 (1.1)	5.74 (0.83)
	I get along with those in the clinical environment	6.0 (0.8)	0.82
	I feel comfortable around those in the clinical environment	5.7 (0.9)	

*Note: Proactive behavior items are on a scale of 1 to 5; social integration items are on a scale of 1 to 7.

with more enthusiasm resulting in team members, including students in team activities.

"I think feeling positive leading into this clerkship leads me to a bit of a "self-fulfilling prophecy" Doing so meant I had more enthusiasm and energy that I could bring to the team, which was recognized by the doctors. As a result, they helped me to feel more like part of the team..."

Davier, year three male

Integrated results

The mixed methods matrix provided integrated insight that allowed to meet our first research aim, exploring the extent of proactive behaviors and also relationship between PB and SI. We found that while students with lower SI scores (<4 out of 7) did not describe confidence in being proactive at all, those with higher SI scores (>6 out of 7) explained that their confidence to be proactive increased with knowledge acquisition which impacted positively on their P.B. However, interviews revealed that most students' confidence was low regarding negotiating clinical tasks. Survey findings confirmed this; task negotiation scored lowest of all PB scores; See **Table 1**. Qualitative data provided expansion and showed that many students reported limits to what demands they felt they could negotiate. While they could negotiate about doing a clinical task or not, they found it intimidating to negotiate how many hours per day were spent in the workplace. Generally, most students noted their confidence in negotiating tasks and roles became more comfortable over time. However, still, PB scores decreased across academic years.

Enabling and inhibiting factors for proactive behavior

Quantitative findings

Academic advancement (being in 3rd, 4th, or 5th year) negatively correlated with proactive behavior. Year three students had higher information-seeking or positive framing scores than students in year four or year five and had higher feedback-seeking scores than those in year four, see **Table 2**. We found no relationship between gender or age and PB scores.

Qualitative findings

Qualitative findings contributed data that enabled us to meet our second research aim titled above. We categorized factors that enabled or hindered students' PB fit into two themes of individual or social factors, see **Table 3**. There were three individual-related subthemes— *personal interests/motivation*, *personal tendencies* and *energy levels*. For example, many students' interest in a clerkship made them more likely to ask questions and negotiate specific tasks. See **Table 3** for a description of each of these themes and a representative quote or analytical memo.

Table 2: Average scores regarding proactive behaviors and social integration showing differences between academic year groups in a sample clinical student population in Australia, 2020

	Mean (SD.)			F value	p-value
	3rd-year cohort	4th-year cohort	5th-year cohort		
Feedback seeking	3.6 (0.7)	3.3 (0.7)	3.4 (0.6)	3.3	0.038*
Information seeking	3.9 (0.8)	3.5 (0.8)	3.2 (0.8)	11.2	0.000
Task negotiation	2.4 (1.0)	2.3 (1.0)	2.2 (0.9)	1.0	0.36
Positive framing	4.2 (0.7)	3.8 (0.7)	3.5 (0.8)	15.5	0.000
Relationships	3.6 (0.6)	3.5 (0.6)	3.2 (0.6)	8.9	0.000
Relationships (Consultants)	3.6 (1.0)	3.6 (0.8)	3.2 (0.8)	4.7	0.01
Relationships (Junior Doctor)	4.2 (0.8)	3.9 (0.7)	3.4 (1.0)	13.5	0.000
Social integration	5.7 (1.0)	5.8 (0.7)	5.8 (0.7)	0.9	0.43

Note: p-values in bold represent statistically significant values.

* Tukey post-hoc testing showed students in year 3 were likely to exhibit: more feedback-seeking behavior than those in year 4 (3.58 vs 3.26; p=0.036), more information-seeking than those in year 4 (3.85 vs 3.47; p=0.033) or year 5 (3.85 vs 3.24; p=0.000), and more positive framing than year 4 (4.2 vs 3.85; p=0.000) or year 5 (4.2 vs 3.54; p=0.000).

Integrated results

We collapsed the six subthemes from the qualitative findings into three antecedents which both enabled and inhibited proactive behavior among students in our sample.

Capability

Students' tendency to be proactive or not was influenced by how capable they felt of being proactive. Students felt most capable of PB at the beginning of both the day or a new clerkship based on their mental energy. Team members could reduce the mental effort for PB by being welcoming; this, in turn, increased students' confidence and their perceived capability to be proactive. Therefore, this antecedent was the result of both individual and social influences as described below.

One crucial quantitative finding suggested that PB decreased with academic progression. Qualitative data revealed that participants described having a 'proactive battery'. Many felt that this 'battery' drained each time they asked a question or 'put themselves out there' leaving them with little energy to 'go above and beyond'. Patricia noted:

"I need a lot of recovery time because being assertive is so draining to me specifically. So, I always find that I just get so, so drained throughout the day because the placements take up so much time and then I have to go home and study...".

Patricia, Year four

Table 3: Overview of six themes describing factors that influenced medical students' proactive behavior when entering a new clerkship

Theme	Sub-Theme	Description	Exemplar Quotes
Individual factors	Personal interests and motivations	Students' personal interest in a clerkship made them more likely to ask questions and negotiate specific tasks. Some students described that their future career-motivated them to get feedback on their progress and develop a network within the clinical community.	"I really would like to do this canula because I've never. And I kind of expressed to them I'd like to do more Cannulas, or I'd like to learn about this when you have the time. If we could sit down and go through it, so. I think like negotiating in that way" Kimberly year 4 student
	Personal tendencies	Some students had natural tendency to be positive about a new experience, and some were more outspoken. This translated into being more engaged in team activities. Some students reported that they were innately shy and found it difficult to speak up about their learning goals or to initiate relationships	"...I kind of see every attachment as an opportunity. So, I want to experience everything that I can in the limited time that I have. And I'm someone who really doesn't like the idea of wasting time." Juliëtte, Year 3 female
	Energy levels	Most participants described that being proactive was draining. Having low energy limited how proactive they felt able to be. Team climate, time of the day or week and competing workloads drained participants' mental energy.	"I have a big energy meter, and throughout the day it reduces slowly, every time I would be assertive or ask a question, it drains that meter...it drains and drains and drains and by a certain point it's just empty...I need to go home. I need a lot of recovery time because being assertive is so draining to me specifically" Patricia, year 4 female
Social factors	Team climate	Being assigned to a team that was not inviting meant some students used more mental effort in being proactive leading to faster energy drain early in the clerkship. Having a previous experience with team members who had negative reactions to students being proactive also made students tentative about being proactive when entering another clerkship.	Lisa felt like a part of her clinical team as noted her team members "made themselves feel very open... simple small things like my registrar advocating a lunch time for the both of us", this environment made her feel safe to negotiate her tasks if she felt overburdened. Lisa, year 5 female
	Institutional influence	Some students recognized that they only sought feedback as required by their medical school in formative assessment exercises or for their portfolios. They also felt that the formative assessments were the only reasons some consultants were willing to give feedback at all.	Most of Akili's motivation to being proactive was external coming from institution logbooks and so she could impress others. Akili, year 4 female
	Relationships with team members and others	Many students described difficulties building relationships especially with team members that were higher in the medical hierarchy. Most students were aware of this hierarchy with one student placing medical students below the rubbish bins on the ward. Building a bond with team members created an environment that students felt safe to put themselves out there. Further, a few students' motivation was to help out team members and contribute to patient care.	One enabler for James "taking charge" of his own learning was feeling ignored by the medical team and instead this prompted him to develop relationships with nurses and negotiated with them to involve him in patient care tasks so that he could meet his clerkship goals. James, year 3 male

Most students noted this 'energy drain' usually happened toward the end of a day, the end of a clerkship or, as found in survey responses, over time as students advanced through academic years. Interview findings were discordant about the latter as students thought they became more proactive over time. Further, interview data revealed that the level of effort needed for PB determined how quickly students' proactive batteries were drained; more effort was required if a team was not welcoming. When members of the clinical team trusted students to do tasks like cannulation, this gave them confidence, and they felt capable of PB.

"...I feel like it's just a lot easier to be proactive when the team also is proactive about including you. So, it's sort of like a two-way street..."

Stephanie, Year three

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Intention

Students' tendency to be proactive or not started was influenced by their individual intention to be proactive; this was induced by numerous factors. We found that students' career interests and motivation influenced PB. Qualitatively, extroverted students described being innately proactive, whereas shy students felt PB took increased effort. Additionally, some students planned in advance to be proactive once they were entering clerkship of career interest. Students' interest in a clerkship therefore increased their intention for PB in that clerkship; this was mainly seen in individuals with high total SI scores (>6). For example, Akili expressed being proactive about interacting with patients:

"I always want to find out more about oncology. So, therefore, because I like knowing more about it, I am more interested, and I now prefer going in and speaking to patients."

Akili, Year four female

While motivation increased students' tendency to be proactive, motivation sources varied. Peers also influenced motivation and could trigger negative perceptions of a clerkship. This was confirmed in the survey, showing students who lived with peers in medicine had lower positive framing of their last clerkship as compared to those who lived with non-medical others (mean 3.64 vs 4.25; $p=0.049$). Similarly, students who had previous contacts in healthcare had lower positive framing than those who did not (mean 3.97 vs 3.68; $p=0.02$). Some students were motivated about their future in medicine and others about helping the team and improving the patient experience. In this way, the future-oriented motivation for some individuals being proactive was for the benefit of the team and patients.

Environment

Students' tendency to be proactive or not was influenced by their immediate environment and system-level factors. People, protocols and a pandemic (COVID-19) created an environment that supported or hindered students being proactive when entering a clerkship. Junior doctors and consultants created a supportive environment for PB All interview participants found it easier to build relationships with junior doctors than consultants. Quantitative data confirmed this; students had higher relationship-building scores for junior doctors as compared to consultants, see **Table 1** and **2**. Qualitative data expanded this finding; students spent more time with junior doctors who were less busy or intimidating than consultants. As a result, students sought feedback and information from junior doctors more than consultants. Similarly, students rarely negotiated tasks with consultant doctors as speaking up to senior team members was intimidating.

"Normally, when the consultant tells you to do something, you don't second guess. You just say I'm going to do it. If he says to jump up and spin around three times, you've got to do that..."

James, year three

Given this difference in relationship-building between junior doctors and consultants, we looked at the quantitative students' relationship-building scores with others outside their clinical team; these were comparatively low; see **Table 1**. However, in the qualitative findings, findings were discordant for some cases; a few participants, 3rd and 5th year, developed relationships with the nursing staff, especially during the first weeks of a new clerkship. These students would inform nurses of patient care changes following medical ward rounds.

Some students received feedback from doctors without asking or only via mandatory formative assessments; this limited their feedback-seeking behavior. Further, COVID-19 protocols to protect and inform all healthcare workers meant that much logistical induction information was shared; students felt there was less necessity to seek information when entering in new clerkships. Simultaneously, COVID-19 reduced learning opportunities due to social distancing protocols which led some students to be proactive about creating new learning opportunities.

"... because I can't go into theatre [due to COVID-19], I find that I am really proactive in doing histories, doing CEXs [formative assessment] and doing all these little tasks just because there isn't much else to do..."

Stephanie, female

DISCUSSION

Socialization into clinical environments is notoriously reported as difficult for undergraduate students^{1,2}. Both individuals and the organization can embrace socialization tactics to make socialization more accessible to students. Being proactive is one socialization tactic that can be harnessed by medical students. We aimed to enhance the understanding of proactive behavior (PB) in medical students entering a new clerkship. We found that positive framing and task negotiation had the highest and lowest scores of the PBs we measured. **Figure 2** summarizes our understanding following this project. We found three antecedents for PB: *intention, capability and the environment* that came from six subthemes of influential factors found in qualitative data. Quantitatively, students having positive framing to entering their new clerkship was associated with a positive sense of social integration (SI) although there was qualitative evidence that seeking feedback and information, feeling able to negotiate tasks on the team and building relationships all led to a feeling of being integrated (see dotted lines in **Figure 2**).

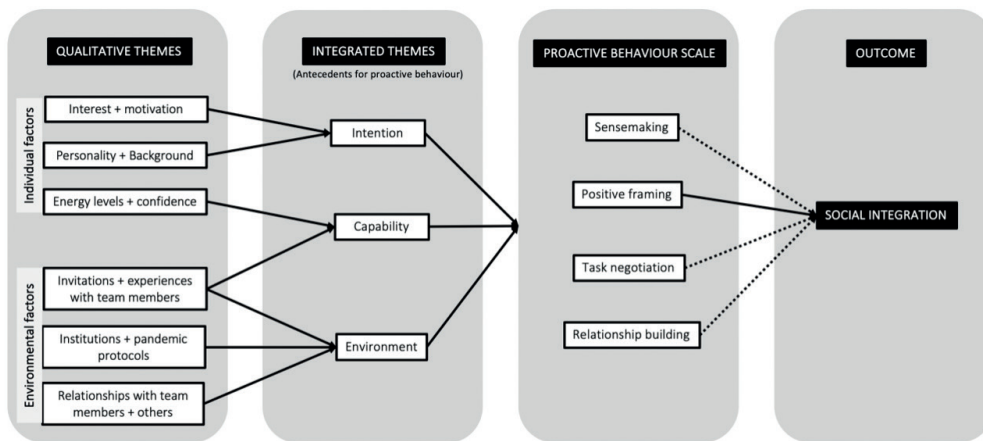


Figure 2: Integrated themes generated from mixed methods study conducted in Australia in 2020 indicating three antecedents for proactive behaviour. While mixed-methods data showed that positive framing leads to social integration, only qualitative data suggested the relationships indicated by dotted lines.

Intention

Being motivated and setting intention for PB stemmed from being positive about the challenges of a new clerkship; one contributing mechanism to generating an intention for PB was positive framing. Positive framing is a cognitive mechanism that newcomers can use to *'alter their understanding of a situation by explicitly controlling the cognitive frame they place on it'*¹¹. Studies in the business field confirm that positive framing is associated with a sense of social integration¹³. Further, positive framing is shown to be

related to positive mood and emotions⁴³. Like us, authors report that when newcomers engage in positive framing, they are more confident and ultimately experience job satisfaction¹³ and sense of SI¹³. Further, we agree that being positive also promotes relationship-building by giving newcomers confidence to interact with others¹³. Some educators have found success in teaching positive framing, highlighting that this proactive behavior is not merely a trait and can be enhanced²⁵.

Capability

Novice clinical students statistically had the highest PB scores when compared to senior medical students; this contrasts to other higher education students who became more proactive over time⁴⁴. Further, all students also described feeling more physically capable of proactivity at the beginning of a new clerkship and the beginning of a new day. This concept of a newcomer assessing how capable they feel to be proactive is compatible with organizational research³². However, we found that PB drained students' mental energy. PB could be mentally taxing, but we also found that team members could minimize the effort needed for PB by being welcoming and giving students confidence. Researchers found that students make a cognitive appraisal of the costs (of effort and face) associated with feedback-seeking⁴⁵. Literature in other fields suggest that sustained physical or psychological effort can exhaust one's mental and physical resources through energy depletion^{46,47}. The medical hierarchy could further heighten the influence of others on energy drain. This energy drain bears similarities to the emotional exhaustion inherent in burnout⁴⁸ and the coping reservoir of wellness in medicine described by Dunn et al. ⁴⁹. Additionally, service jobs (e.g., providing health services²⁴) require displaying organizationally-desirable emotions—this is emotional labour⁵⁰. Emotional labor has been associated with burnout⁵¹. Specifically, PB could contribute to the drain on students' psychological resources that first result in exhaustion and then burnout⁴⁹. This highlights the importance to promote adequate rest for psychological recovery⁵². On the other hand however, as students become more senior, it is likely that their sense of ambiguity is reduced; given that high ambiguity is a factor that promotes proactivity⁵³, this could also be at play.

Environment

Social context had a significant role to play in newcomers' PB¹³. Developing relationships reduces social isolation, the mental effort associated with PB in a hierarchical environment, and increases SI^{11,37}. Strong relationships at work promotes psychological safety which facilitates proactive learning⁵⁴. Further, Voogt et al. found that low psychological safety limited residents' tendency to speak up about medical errors and workplace issues (another proactive behavior)²³. Often consultants and residents prefer teaching students who are proactive¹⁹, and we add that these doctors can also influence desired PB by considering the psychological safety of clinical learning spaces.

Implications for practice and research

Some educators have had success with teaching specific PBs²⁵. The creation of workshops and other innovations to promote PB may benefit the health professions field; for example, feedback-seeking behavior has increased after workshops⁵⁵. However, creating an environment that supports students' PB and learning²³ is paramount, as even naturally proactive individuals can be hindered when placed in an environment that stifles PB⁵⁶. One mechanism for the social limits of PB is the 'initiative paradox'⁵⁷. Proactive newcomers are not always well accepted by seniors or peers who perceive others' PB as bothersome or unable to follow the rules. Future research could explore the perceptions and expectations of clerkship team members, related to students' PB, specifically, the extent to which the 'initiative paradox'⁵⁷ occurs in the hierarchical medical environment. Future research could use observational methods and longitudinal research to investigate exhibition and PB dynamics over time in an authentic clinical setting. Lastly, future research could explore other proactive behaviors (e.g. speaking up²³) and outcomes (e.g. performance).

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Strengths and limitations

Using mixed methods for an underexplored construct allowed us to offer more significant insights into the health professions education community about proactivity. The variety of contexts and backgrounds from this international team enhanced our interpretations and reduced any individual biases. Our findings are in line with those found using similar instruments in other populations, increasing the likelihood of transferability of our conclusions. Further, we provided a conceptual model that future research in our field can build on. We acknowledge that the single-institution nature of this study may limit its generalizability. Secondly, we were limited in instrument choices given that this construct is not well explored in health professions education. Lastly, we used a cross-sectional survey exploring students' perceptions, which may limit our conclusions about longitudinal development of proactivity and may just reflect differences between cohorts.

Conclusion

This study provides evidence on the proactive behaviors of medical students' entering new clerkship environments. Students who framed the experience positively were more likely to report increased social integration. Initiating task negotiation was challenging for most. By condensing our findings into three antecedents to PB— *intention*, *capability* and *the environment* we proposed a conceptual model for proactivity and social integration to support learning during clinical transitions for future research and interventional design. Addressing both individual and environmental socialization tactics and especially how this relates to students' proactivity will be necessary if the growing medical workforce is to be proactive.

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Chapter 5

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6

Appraising the use of smartphones and apps when conducting qualitative medical education research

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ABSTRACT

Smartphone use is rampant in everyday life and is increasing in: patient management, teaching and learning of medicine and health research. There is untapped potential to use smartphones as research tools in MER for a range of research approaches. Qualitative research is increasingly common in medical education research (MER). Smartphone use as a research tool has not been well explored in MER and this Guide will be useful to researchers considering integrating smartphones specifically in qualitative MER. First, we discuss the potential for smartphones in qualitative MER. Then, we discuss the opportunities and drawbacks for using smartphones in qualitative MER. We then provide three principles to consider when conducting smartphone MER: communication, ethics and reflection. Next we share ten lessons that emerged from the literature and our experiences. We end by looking to the future of smartphones in qualitative MER and hope this Guide provides evidence-based information to optimise smartphone use in qualitative MER. This Guide is important as there is an urgent need to redefine ethical boundaries to account for blurred lines between personal and professional use of smartphones.

INTRODUCTION

Smartphones have been used in patient management, teaching and learning of medicine and health research; less consideration has been given to smartphones in medical education research (MER). Smartphones are influential in many ways – our relationships with others, daily habits such as health care (Dorsey et al. 2017) and in education (Masters et al. 2016; Valle et al. 2017; Maudsley et al. 2019). As smartphones increase connectivity, there will be the urgent need to redefine ethical boundaries to account for the blurred lines between personal and professional use. Increases in smartphone use offer new opportunities in all aforementioned areas, including MER, but simultaneously bring challenges. This Guide will provide critical reflections on the opportunities and drawbacks for using smartphones in the medical education research arena. In this Guide we focus on smartphones, however the findings and suggestions that follow may apply to other mobile devices with overlapping capabilities (e.g. tablets, smart watches). Additionally, even though we discuss medical education research, the evidence and suggestions are likely relevant to other health professions education research.

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Smartphones and their software applications (commonly called “apps”) have successfully penetrated the medical education environment; the vast majority of medical students and doctors own a smartphone (Ramesh et al. 2008; Koehler et al. 2012; Browne et al. 2015; Patel et al. 2015; Raiman et al. 2017). Smartphones are used every day in patient care to assist decision-making (Mosa et al. 2012; Patel et al. 2015; Valle et al. 2017), in medical education by facilitating how medical students and residents learn (Mosa et al. 2012; Browne et al. 2015; Maudsley et al. 2019), and in healthcare research by facilitating global participation in studies of asthma, breast cancer and Parkinson’s disease (Dorsey et al. 2017). Simultaneously, smartphones have advanced general research processes (Garcia et al. 2016). Smartphones in quantitative studies can reduce data collection costs, improve data management and maintain participant interest (Garcia et al. 2016). Recently, authors have also recognised the use of smartphones in qualitative research – in ethnography (Beddall-Hill et al. 2011), interview research (Beddall-Hill et al. 2011; Redlich-Amirav and Higginbottom 2014) and longitudinal data collection (Garcia et al. 2016). In medical education research (MER), smartphone use is often implicit rather than explicit, even though there are important considerations for using them in our field.

The first author is a PhD student and this Guide was inspired by her experience in developing research protocols for her first empirical study, a longitudinal narrative inquiry using smartphones as a research tool. She and her co-authors realised that the topic had not been well explored in the medical education research space. Thus far, smartphones and apps have been used as interventions to supplement learning

in medical education, but there is untapped potential to use smartphones as research tools in MER for a range of research approaches.

Smartphone use in research should be critically considered and we hope this Guide will provide direction to researchers choosing to use smartphones in qualitative MER. Smartphones can indeed be used in quantitative research (Dorsey et al. 2017). Smartphones facilitate in-the-moment data collection and capturing experiences as they happen, but overt exploration of their use in qualitative MER is rarely apparent. We therefore chose to focus on qualitative MER due to our ongoing experiences and the explosive potential of using smartphones in qualitative inquiries.

In this Guide, we aim to:

- Provide readers with a critical appraisal of using smartphones as a research tool within qualitative MER through highlighting the opportunities and drawbacks that using smartphones may provide in qualitative MER.
- Consider the way forward in using smartphones in qualitative MER and share ten lessons grounded in the literature and our experiences.

Qualitative research, smartphones and medical education research (MER)

Qualitative research is a humanistic, person-centred way of uncovering reality (Holloway and Biley 2011). It is important to consider how any research tool fits into the assumptions inherent in a study's methods and theoretical background; this should be no different when using smartphones (Hein et al. 2011). Lingard reminds us that the importance of the tools in qualitative research lies in their critical purpose rather than the tools themselves (Lingard 2007). The just-in-time capabilities of smartphones in qualitative research may reduce recall bias as participants have access to their smartphones most times in the day. This constant access facilitates instant reaction to an experience that which may otherwise fail to make it in a written diary entry (Garcia et al. 2016)

Smartphones can help ethnographers collect multiple forms of data in order to recreate events (Hein et al. 2011) facilitating interpretation and analysis. When using ethnography – an approach that uses observations, interviews and documents to explore social phenomena from multiple perspectives (Reeves et al. 2013) – we depend on the thick description of methods and events, reflexivity and triangulation of data obtained in different ways (Reeves et al. 2013). Hein notes that smartphones contribute to the epistemological assumptions in ethnography by supporting social constructionism (Burr 1998) through insight to multiple social realities (Hein et al. 2011). Ethnography as a methodology is increasing in MER (Atkinson and Pugsley 2005) having been used to explore bedside teaching (Atkinson 2018) and the implicit versus explicit curriculum in general paediatrics (Balmer et al. 2009). Smartphones complement this method of

inquiry as medical education researchers continue to explore the practices and beliefs of medical trainees and professionals.

Smartphones, likewise, can help facilitate narrative inquiry research – an approach to inquiring into participants' experiences through their stories which considers the larger world in which the experiences are lived (Clandinin et al. 2017). Narrative inquiry is also increasing in MER (Clandinin et al. 2017) having been used to explore professional identities (Monrouxe 2009). Clandinin and colleagues note the need to create and use methods that are congruent with narrative inquiry principles. Smartphones are likely one piece of the puzzle allowing participants to story their experiences (story-telling) in real-time through audio recordings (Andrews et al. 2013; Garcia et al. 2016). Smartphones also create a remote space where participants may feel safe to tell their stories; this safety is critical to narrative inquiry (Clandinin et al. 2017).

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Opportunity | Smartphones can collect different types of data

Smartphones can unlock multiple data sources to researchers, which can help them answer research questions within qualitative research (Hein et al. 2011). Smartphones are capable of replacing the functions of a digital camera, video camera, voice recorder, note pad, drawing pad, and geo-tracking; they are like 'electronic Swiss Army knives' (Barkhuus and Polichar 2011). Outside of MER, in an ethnographic exploration of young males' consumer experiences, smartphones were used to record field notes and interviews and also to take photographs (Hein et al. 2011). Within MER, smartphones can facilitate data collection within the nine observational dimensions for an ethnographic study described by Reeves and colleagues. Balmer and colleagues used observations and interviews during their ethnography (Balmer et al. 2009). Smartphones can facilitate such observations through digital drawings of the location of participants and objects and how they interact in space, to record informal interviews about participants' feelings and general field notes. Diaries are a common data collection tool within narrative inquiry studies; diaries can be written or audio-recorded. Monrouxe used dictaphones for participant audiodiaries during narrative inquiry (Monrouxe 2009) while Gordon and colleagues (2017) used smartphones for audiodiaries.

Opportunity | Smartphones can make data collection more efficient

Using smartphones in research could save time through the real-time digitisation, management and backup of data (Redlich-Amirav and Higginbottom 2014; Garcia et al. 2016). Garcia et al. described being able to remotely monitor data collected via an app, which facilitated automatic notifications as reminders for participants (Garcia et al. 2016). Smartphones are portable, multifunctional devices and allow efficient data collection by minimising the need for participants to juggle multiple devices in order to participate (Beddall-Hill et al. 2011). In narrative inquiries, it has been recognised

that audio diaries benefit some participants, as less time is taken to complete them, and reduce cognitive processing versus a written diary (Fisher and Noble 2004). Lastly, smartphones can maintain participants' interest due to the everyday integration of the smartphone in everyday life (Garcia et al. 2016). This however does not guarantee fewer dropouts during longitudinal research (Garcia et al. 2016). Oppenheim quite accurately describes many researchers' early experiences in setting up at the beginning of an interview, trying to hide frantic attempts to welcome the participant, gain consent while setting up the recording equipment and making sure it is optimally placed (Oppenheim 2000). Smartphones are used by most persons daily and this familiarity could facilitate a smoother entry into research interviews. Additionally, the smartphone can be used to digitally take notes; these can then be analysed alongside the interview transcript (Beddall-Hill et al. 2011). While we did not find examples of improved efficiency using smartphones within MER, Gordon and colleagues found lower attrition rates when using smartphones for a longitudinal audio diary study exploring the trainee to trained doctor transition (Gordon et al. 2017).

Drawback | Smartphones can negatively impact data quantity and quality

Using smartphones could, however, negatively impact the quantity and quality of data collected. Reduced data quantity from dead smartphone batteries could lead to participants not being able to complete their research tasks on time. Smartphone apps installed for the purpose of research could introduce software viruses and contribute to dead batteries by using excess battery power. Additionally, having participants answer questions remotely using their smartphones is risky as the notifications may fall victim to the barrage of information continually popping up on their phones that is often ignored. Some authors found that response times when answering questions using a smartphones are longer compared with using a computer due to many reasons including increased distractions (Lynn and Kaminska 2013). Regarding data quality, some academics were mystified at the use of a smartphone to record an interview as it may not be seen as a 'serious' research tool due to its primarily social usage, raising queries about data security (Beddall-Hill et al. 2011). This could potentially influence the quality of data obtained as participants may not take the process seriously. All the aforementioned ways in which smartphones can affect data quantity and quality are relevant in medical education research (MER). Smartphones are used every day in healthcare and medical education and research prompts may be lost among competing reasons for smartphone use.

Drawback | Smartphones threaten privacy

Qualitative MER is often done in clinical healthcare settings when exploring trajectories of medical students, residents and even the influence of patients on medical education. The importance of protecting privacy is increasing.

General Data Protection Regulation (Official Journal of the European Union 2016) laws are being enforced in the European Union and worldwide. This has resulted in changes to many institutional policies. Within many health care institutions, strict policies on the use of smartphones in the clinical context are being implemented (John 2018). These policies stipulate security requirements for smartphones (The University of Alabama at Birmingham 2016), and the requirement of consent for taking photographs or identifiable information of anyone (Health Facilities Scotland 2008). These policies are equally, if not more, relevant to medical education researchers as we conduct research in these multifunctional environments.

Some participants may lose awareness that they are being observed and recorded (Beddall-Hill et al. 2011; Hein et al. 2011). Due to smartphones' ubiquitous nature, using them in qualitative research could lead to the researcher becoming invisible in the environment leading to 'covert surveillance' (Beddall-Hill et al. 2011) – smartphones may not always be recognised to be a research tool. Even though this might be considered an advantage by reducing observer effect, it could mean that data are collected that participants would otherwise prefer to be private (Beddall-Hill et al. 2011). Additionally, apps could present a security risk to participants as not all apps may have standardised data security procedures and therefore may not reach standards required for healthcare mobile device policies for security.

Within MER, when collecting data in the clinical environment, participants may provide consent that allows us to observe and interview them informally. However, bystanders in the complex clinical environment may be unintentionally recorded; their individual consent may be logistically difficult to gain. As smartphones are so integral to everyday life, bystanders may not recognise that recording is occurring, which augments the risks. How can the voices in the background of researchers' field audio-notes and persons in the background of photographs be protected? Anonymising photographs is more complicated than simply cropping and blurring images as digital photographs on smartphones often carry information such as date and exact location, which may make it possible to triangulate information, thus eroding anonymity (John 2018).

Drawback | Smartphones introduce distractions

Smartphones introduce another source of interruption, multitasking and distraction into the hospital environment (Katz-Sidlow et al. 2012). Smartphones enhanced observations in an ethnographic study within marketing (Hein et al. 2011), however, this benefit could be overshadowed when brought to the healthcare context due to the risks involved. Distraction of clinicians by smartphones occurs when one's primary task is interrupted by any use of their smartphone (McBride 2015). The term 'distracted doctoring' has been coined by Papadakos highlighting the dangers of seductive mobile

devices (Papadakos and Bertman 2017). These interruptions can have significant consequences on both patient care (Halamka 2011; Wu et al. 2013), and learning (Fox et al. 2009) as there is the potential for missing important information (Katz-Sidlow et al. 2012). When using smartphones for MER, prompts may be used to stimulate participant responses. A review found that distraction by social connectivity could affect the impact mobile devices have when used in the clinical setting for learning (Maudsley et al. 2019). Using smartphones to conduct MER intensifies distraction in the clinical setting.

Principles of smartphone use in qualitative medical education research (MER)

Based on the aforementioned opportunities and drawbacks to using smartphones, we offer three principles that a medical education researcher using smartphones as a research tool should consider during protocol development, ethics application, data collection and storage.

Communication

Communication between researchers and participants should take place through previously agreed upon channels, which should include secure apps or institution emails. This facilitates fast resolutions of technical issues and an outlet for participants to voice concerns. Communication is key to reassure participants of their protection. One such opportunity for this is during consent where researchers can discuss the flow of data. In a case of academics who were fearful of using a smartphone to record interviews due to concerns about threatened data security (Beddall-Hill et al. 2011), reassurance and information could dispel these perceptions. It should be made clear when the device is recording and that it is not transmitting data during interviews. Sharing data with participants could function as member checking but also shows participants what data has been collected and facilitates dealing with any research use of data that participants are not comfortable with (Beddall-Hill et al. 2011). While in principle, participants should be free to withdraw part or all of their data at any time during the research process, it should be communicated that this can only be done if possible. For example, if their data has already been integrated through preliminary analysis, you can assure them of deletion of their raw data but it will not be possible to remove their existing input from aggregated growing analyses, although their privacy would be maintained. In the era of co-creation, including participants during protocol development could be potentially helpful to ensure procedures are acceptable for participants using their smartphones. Lastly, at an institutional level, similar to the proposed training for medical students and junior doctors on smartphone use (Maudsley et al. 2019), similar training for MER researchers would be beneficial.

Table 1: Sample data management plan summary

	Description	Origin	Format	Size	Data utility
Audio files	Audio files from interviews and audiodiaries	Audiodiaries and interviews	.mp3	216 MB	Will be deleted after analysis
Video files	Video files from participatory interviews	Participatory interviews	.mp4	40Gb	Will be deleted after analysis
Interview & Audio diary transcripts	Interview transcripts from interviews and audiodiaries	Audiodiaries and interviews	.docx	6Gb	Will be kept on an encrypted hard drive and at the end of the study uploaded to approved institutional database or research direct for duration as determined by ethical board
Participant-produced diagrams	Participant-produced diagrams from participatory interviews	Participatory interviews	.jpeg	480MB	Will be stored on approved institutional database once anonymised for duration as determined by ethical board

Ethics

Institutional review boards (IRBs) have a role to play in policing protocols using smartphones to collect MER data. As smartphone use in research increases, it will be imperative that IRBs actively consider the implications for using smartphones to do MER. The consent process should be informed by a deep understanding of the implications of smartphone use and participants should be fully informed of the unique risks. Health care organisations and researchers should also consider whether participants should have institution-provided smartphones or if it is sufficient to use individual personal devices within institution policy. Research using mobile technology in education could consider moving from 'permission-seeking' modes of ethical approval toward iterative, incremental models of ethical approval when using technology like smartphones (Lally et al. 2012). Such a model would provide the flexibility necessary when conducting qualitative MER. Iterative ethical approval would allow researchers to efficiently gain further access as necessary as their research unfolds.

Since the launch of data protection protocols such as the European Data Protection Regulation, complete data management plans (European Research Council 2017) (see Table 1 and Box 1 for examples) should be critically considered, documented and submitted alongside ethical applications. This is especially important when designing a study using smartphones as a research tool. Storing data on internal smartphone storage or using native apps threatens participant privacy. As such, all data should be uploaded promptly and stored on secure app servers and those regulated by institutions. Regarding protecting 'unintentional participants', researchers and participants should avoid the voices, faces or identifiable attributes in video, audio and photos of persons and places that have not provided permission to be included in a study. Where their

inclusion is inevitable, as much as is possible, their informed consent should be obtained at that point.

Box 1: Sample data management data flow system

1. Sanne will record audio diaries securely from September 2018 until March 2019 via her smartphone.
2. Sanne will take part in two participatory interviews with AA which will be audio recorded and will produce a concentric circles network map. The work area will be videotaped as well.
3. Sanne's audio recordings will be obtained by AA who upon downloading will assign Sanne a code- 001.
4. Sanne's audio recordings and interviews will be saved using her code e.g. 001-diaries.mp3; 001-interview1.mp3; 001-interview2.mp3; 001-interviewvideo.mp4; 001-ccmap.jpg.
5. Sanne's audio recordings and interviews will be sent to a professional transcription service (as 001-diaries or 001-interview1). The transcription service will sign a confidentiality form. The transcript names will follow the naming system for the recordings (e.g. 001-diaries.docx)
6. AA will de-identify the transcript and delete the identifiable version. This will be saved as 001-diaries_anon.docx.
7. AA will analyse Sanne's data alongside all participants.
8. AA will delete the audio recordings, video recordings (of the workspace) and interview recordings following analysis of all participants.

Burning questions regarding the ethics of using smartphones in qualitative MER remain. (1) When should raw data be deleted when collected with smartphones? Whatever the decision, this should be disclosed in the ethics protocol and communicated to participants. (2) Is there a risk introducing a third party (e.g. apps) whereby we depend on them to delete the data from their servers? Just as many transcription companies sign confidentiality agreements with institutions, app developers should be required to do the same. (3) Do IRB blanket statements such as 'locking data in a locked cabinet or password protected computer' need to be reconsidered in the era of using smartphones as research tools? (4) Are there any legal concerns with data that were taken for research purposes but may be necessary for legal proceedings as evidence (e.g. tracking and location data)? Lastly, amidst global participation in health research through smartphone use (Dorsey et al. 2017), (5) is a global IRB system possible, as this could ultimately extend to MER using smartphones?

Reflection

Reflection is important in medical education practice (Mann et al. 2009) and research (Ng et al. 2015) and has the ability to change practice and understanding (Mann et al. 2009). Qualitative research often includes maintaining audit trails and research diaries. Through reflection, medical education researchers should also be flexible in their

decisions for data collection to minimise risks and challenges. It may be beneficial to discuss with peers and potential participants from your sampling frame to help inform your research design choices. Published reflective papers report on the process choices researchers make when using smartphones in research, with explicit examples critical decisions made by researchers and questions still to consider (Beddall-Hill et al. 2011; Garcia et al. 2016). These papers are examples of how reflection could impact future research practices and protocols when using smartphones (Beddall-Hill et al. 2011; Garcia et al. 2016). Lastly, asking participants to discuss their experiences with the research process (Crozier and Cassell 2016) could be another way to improve future MER using smartphone research. Ultimately, when conducting MER, such flexible, intentional data collection could increase participant adherence while protecting both participants and patients. In addition to these principles, Box 2 describes ten lessons when using smartphones in qualitative MER grounded in the literature and our experiences.

Box 2: Ten lessons for using smartphones in qualitative medical education research

1. Beyond innovation, smartphones fit the principles of qualitative MER.
2. Smartphones can collect different types of data (audio, video, notes, photos, location)
3. Smartphones can make data collection more efficient
4. Smartphones can negatively impact data quantity and quality
5. Smartphones threaten privacy
6. Smartphones can perpetuate distractions in the clinical environment
7. Constant communication of risks and benefits to participants via an open agreed upon communication channel is important.
8. Institutional review boards have a responsibility to consider risks when using smartphones as they provide approval
9. A data management plan is critical
10. Reflection, peer discussion and participant feedback will launch the way forward in using smartphones in MER.

The future of smartphones in MER

In these days of internationalisation of medical education, MER could follow suit. Barring challenges and ethical considerations, could technology provide automatic translation that minimises the need for participants and researchers to speak the same language? Can medical students in the United States, the Caribbean, the UK, Europe, Australia, and Asia potentially take part in the same study, regardless of language, providing they meet the inclusion criteria? Just as apps have erased the geographical boundaries placed on health research and allowed global participation, especially for diseases with lower prevalence, could smartphones and apps be the start of true multi-institutional globalised MER?

While researchers can use existing smartphone apps for their research, often the cost attached to existing apps is quite high and could reduce use in those with limited research budgets. Many apps that can facilitate research data collection are created for market research; commercial companies have high budgets. There is therefore an opportunity for the creation of low-cost research apps tailored for efficient and secure collection of audio, images, video, survey data while allowing for geo-tracking data in educational contexts.

It is rare to find meta-research on the impact of using smartphones or technology in research in medical education. McLeod and colleagues adopted socio-materiality – how the human and non-human relate to organise, allow and constrain social interactions – to explain that materials (e.g. mannequins, stethoscopes and technology) are not a neutral elements to human interaction in learning but impact agency and meaning making (MacLeod et al.; MacLeod et al. 2015). Future research could further explore socio-materiality theories to examine how smartphones and other mobile devices influence process and outcomes in MER.

CONCLUSION

The aim of this Guide was to provide guidance to design, conduct and reflect on the use of smartphones in medical education research. It is critical for researchers to share experiences in the academic literature to facilitate global progression of research processes. Smartphones can enhance the research purpose and fits the principles of qualitative MER. Researchers must however be mindful of using smartphones in MER as they can affect the research data, threaten privacy and perpetuate distractions. We suggest constant communication with participants, being reflective as a researcher and challenge institutional review boards to recognise their responsibility in monitoring the use of smartphones in MER. We look forward to seeing intentional, reflective use of smartphones in medical education research in the future.

Practice points

1. Identify a secure, fast communication channel with participants to facilitate remote discussion of issues and concerns during data collection.
2. Communicate risks to participants particularly if they are in the clinical setting regarding privacy risks to patients and others in the clinical environment.
3. Complete a data management plan to submit alongside ethics applications.
4. Consistently reflect and discuss the research process and concerns with peers

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General Discussion

What did you learn from the last major transition you had at work or in your personal life? What challenges did you encounter? In what way were those challenges detrimental? What made you more or less likely to have meaningful growth as a result of navigating that change?

Transitions are critically intensive learning periods (CILPs)¹ that are both a threat and an opportunity for medical trainees to learn and develop². Many medical educators consider the transition to clinical training as a ‘problem’ to be minimised and solved—this is the transition-as-problematic perspective³. However, medical educators cannot eliminate the gap between the two training phases. Transitions are inevitable, and there is a need to reframe transition discourse⁴ and identify new transition outcomes beyond student satisfaction⁵. Medical education researchers are increasingly highlighting the opportunities inherent in periods of change and adaptation that can lead to learning and development^{2,4-7}. Such reframing is necessary to advance transition research and practice, and optimise transition interventions to better support trainees adapting to change. This thesis results from a research agenda developed with the primary aim: ***to enhance our understanding of how undergraduate medical students navigate the transition from pre-clinical to clinical training using sociocultural lenses.*** To meet this aim, we answered the following research questions: 1) *In what ways does the transition from pre-clinical to clinical training contribute to medical students’ professional and personal identity development? (Chapters Three and Five)* 2) *What role do social relationships play in students’ transition from pre-clinical to clinical training? (Chapters Four and Five).* This chapter will highlight how we contribute to a better understanding of how students navigate the transition from pre-clinical to clinical training. We will first discuss what we learned in this body of work and relate this to existing literature. Then, we discuss the implications of our findings for practice and research and lastly, we consider the strengths and weaknesses of our research approaches

Contribution to the health professions education literature

We explored the phenomenon of students transitioning from pre-clinical to clinical training from multiple conceptual lenses. These lenses relate to sociocultural learning theory from thinkers who considered that knowledge is based on social interaction⁸. Using this lens to view participative medical education was illuminating^{9,10}. We used sensitising concepts from landscapes of practice, social networks and organisational socialisation to understand the transition to clinical training in unique, yet complementary ways. We now focus on two main conclusions from our data within two new perspectives to the familiar ‘problem’ of students navigating this transition period.

A developmental perspective on the transition to clinical training

We add to the literature an explicit consideration of student identity formation *as* it occurred when students went from being pre-clinical students to becoming clinical

students working and learning around patients. Student identity formation is underrepresented in the literature and importantly, is distinct from professional identity formation¹¹. Research embracing the developmental side of transitions acknowledges the challenges inherent in transitions and used reflection and empowerment strategies to help students adapt to change⁶. Through a sociocultural lens of work by Wenger et al., our qualitative longitudinal study (**Chapter Three**) shed light on the presence of students' positive and negative emotions during the transition from pre-clinical to clinical training. Using research poetry **in Chapter Three** to analyse and present data allowed us to authentically share the emotional charge inherent when students transition to clinical training and the identity work that exists. In **Chapter Three**, we answer Hodson's call for empirical work on medical education in landscapes of practice, and identity formation through membership of multiple communities⁹. Like authors in the Netherlands¹², we found evidence of Wenger's three *modes of identification* that describe how newcomers develop an identity as they participate in a new learning environment—engagement, imagination and alignment¹⁰. Within this frame¹⁰, we found evidence of professional and personal development as students learned to be proactive about their learning (see also **Chapter Five**), finding role models and developing a journey mindset, all. At the same time, they frequently transitioned to new learning environments (e.g. clerkships). We echo Wenger that the transition, cross that boundary into a new clerkship space, is where clinical students learned new skills and knowledge; they developed^{9,10}. Therefore, rather than assuming that learning occurs only when students enter a new clerkship and aim to be a fully participating member, we recognise that transition periods, boundaries, are a 'place where novel learning and growth arises'⁹. We inadvertently conducted a transition intervention by having students reflect throughout their transition journey; they became active participants in their identity formation^{13,14}. Other authors found that reflective exercises toward the end of pre-clinical training helped students recognise critical experiences¹⁵⁻¹⁷, promoted professional development¹⁵, and reframed their experiences towards becoming the type of doctor they wanted to be¹⁶.

Wenger-Trayner has posited that 'the 21st century will be the century of identity'¹⁸. We found evidence of student identity development as students transitioned to clinical learning, and work, spaces. In this way, crossing borders and becoming transient members of multiple communities contributed to students' identity formation in a meaningful, transformational way⁹. Hodson suggests that future doctors will need to possess skills to navigate the changing landscape of knowledge and respond to unpredictable challenges⁹. We contribute to this thinking by highlighting that while proactive behaviour is one necessary skill for entering a new environment, institutions must ensure this environment is psychologically safe to support proactivity.

In **Chapter Five**, we describe how students felt concerning their tendency to be proactive about seeking feedback and information, negotiating day to day tasks and building relationships with those in the clinical environment. Proactive behaviour was affected by individual and team- and system-level factors. Authors in other fields suggest training can develop transition skills such as proactive behaviour. However, focusing on optimising the environment, so students feel safe to be proactive is crucial. Proactivity is desirable behaviour, and faculty often reward proactive students with attention and teaching¹⁹. Organisational socialisation authors gave us a framework to examine proactivity in **Chapter Five**. In return, we have expanded their conceptualisation of the predictors for and antecedents for proactive behaviour in a medical context. Previously, the main proactive behaviours implicitly explored in medical education are speaking up²⁰ and feedback-seeking²¹. We now add that negotiating tasks is difficult for most clinical students especially when in a new environment but even more importantly, that proactivity is not an individual construct but is heavily influenced by social factors.

A social perspective on the transition to clinical training

We also add the literature an embrace of the social side of transitions. By tapping into Wenger-Trayner's landscape of practice model¹⁰, in **Chapter Four**, we explained how students' social networks change over time in part due to their journey across the borders separating clerkship communities^{9,10,22}. We are the first to highlight transitioning medical students' social network structures and how these structures change over time. Embracing a qualitative approach to social network analysis in **Chapter Four** allowed us to find that students deliberately created, kept and dissolved relationships based on whether they thought the relationship served them with emotional or instrumental support. Social network theory provided us with both a methodology and a lens to examine transitioning students' networking choices and implications as they enter the clinical side of medicine. Social network theory provided some explanatory power for our findings. Social network theory offered us a concept of network intentionally²³ to add weight to this finding. We found that networks changed significantly, even just over five months of being in clerkships. Networks were not static. By considering *tie churn*—stability and change in networks over time²⁴— we offer that during the transition to clinical training, relationships are created, kept or dropped but this does not automatically mean that learning is lost or even gained²⁵ given the evidence of individual development in **Chapters Three and Five**.

In **Chapter Five**, we found that although students ultimately become socially integrated, this process can be more difficult if they have a negative mindset and feel intimidated by those above them in the medical hierarchy. Students' tendency to exhibit proactive behaviour was indeed a result of their social network and a particular clerkship's learning environment. The hierarchy in medicine, especially limited their propensity to

negotiate their clinical tasks and initiate relationship-building with consultant doctors. Importantly, we also gained insight into how members of students' networks can become role models that affect their identity development²² (**Chapter Three**). Social network theory argues that individual behaviour is a result of social connections²⁶. Therefore, we believe that proactive behaviour is a social construct; students' social networks in the clinical environment impact how proactive they might be. Network members can cultivate a safe learning environment where students feel motivated and capable of being proactive about their learning and build meaningful relationships (**Chapter Five**).

Strengths and limitations

Using the aforementioned conceptual frameworks to explore the student experience navigating the transition to clinical training is innovative. Still, our research choices also allowed us to contribute to the medical education field conceptually and methodologically. A scoping review allowed us to take a bird's eye view of the literature on the transition to clinical training and zoomed in on the existing conceptualisations of this transition in the field. This review allowed us to highlight gaps in the field to answer in this programme of research. Following students from pre-clinical training through their transition to clinical training, *as they were experiencing*, it adds authentic insight into how they navigate change. This methodology allowed us to see students' well-documented struggles, eureka moments and shift to a journey mindset that was part of identity development; students progressed through five months of clinical clerkships (**Chapter Two**). Using smartphones facilitated this research choice perfectly allowing us access to participants in a non-intrusive way. Our decision to use smartphones as a research tool led us to create a concrete artefact (**Chapter Six**) that offers the field a critical appraisal of using technology to collect rich qualitative data. Further, using research poems— poems created from transcripts— to analyse, interpret and present data from the longitudinal study (**Chapter Three**) allows us to be the first to contribute a vibrant, yet accurate representation of students' experience of *becoming* a 'student doctor' according to our participant David. Lastly, using mixed methods to unpack the construct of proactivity will hopefully offer the field insight into the social aspect of proactivity.

We recognise some limitations of our research decisions and processes. The sample sizes in chapters three and four were relatively small due to our intense research methods, limiting the transferability of our results²⁷. Secondly, **Chapter 4** could have benefited from more extended data collection period. However, we considered constraints regarding the PhD timeline. Thirdly, all of our studies only used medical students as participants. It would be essential to investigate the perspectives of clerkship directors and the groups mentioned in participants' networks regarding their influence on students' development and network development.

Implications for practice and research

The transition to clinical training is both a threat and an opportunity for learning and development. Students' lived reality of this dichotomy is depended on educators' perspective shifts and creating a supportive environment for the transitioning student. These changes can take the field toward meaningful transition strategies and research.

Implications for practice

Completing regular audio-diaries about their lived experiences over nine months helped our participants in **Chapter Three** recognise critical experiences and growth. They realised that changing their mindset was key to becoming more positive and having a meaningful transition experience through reflection. Therefore, medical students could find it beneficial to reflect on their lived experiences during any transition phase. Specifically, using smartphones to reflect is an efficient way to reflect.

We found countless examples of students' family members being outlets for conscious reflection and venting about their day-to-day experiences. Venting provided the necessary emotional support for students. Family members should be aware of the role they play on the development of their loved ones. Healthcare and educational institutions also have a role to play. Some students in our studies used the transcripts from their audio-diaries, and the research poems we sent them, as an entry in their institutional portfolios. Institutions could consider being flexible in how students submit portfolios and giving reflective space for medical students. Two students in the longitudinal study had psychological distress requiring time off, although the institution facilitated this needed break from them. It could be illuminating to look at the social factors that could have contributed to this distress (e.g. the environment's psychological safety).

Students' explicit reflection of their social networks was illuminating for them. Medical institutions could consider this an activity where students can draw their social networks and reflect on them; this could alert students to the meaningful relationships they can rely on for emotional and instrumental support during the challenging transition phase. Having students complete social network diagrams could alert institutions to the practical brokers in their institutions— the individuals who help newcomers adapt to the clinical space. Sometimes these brokers included near-peer medical students. Transitioning medical students often leaned on near-peer students, especially at the beginning of the transition period; both near-peer students and institutions should consider this trend. Near-peers have their development and learning to manage, which led to limited time to offer support to transitioning medical students. Brokers themselves could require support and the institution could consider offering brokers protected time to administer support to those who naturally come to them.

Implications for future research

When students described their social networks in **Chapter Four**, we found limited relationships between transitioning students and other health professionals like nurses and physiotherapists. Interestingly, some students felt more capable of being proactive around nurses, for example, as compared to junior or senior doctors. Future research could explore interprofessional relationships' influence on students' behaviour, especially when adapting to a new clinical environment. We acknowledge the social impact on this transition period and future research could involve 'others' in the clinical community to gain insight into how groups in students' social networks perceive they influence students' transition experiences.

Students deliberately curated their social support networks, and we found that these networks created an environment that either stimulated or hindered individual behaviour like proactivity. Therefore, exploring the association between network development, as a social outcome of transitioning, and a sense of social integration and students' performance in clinical experiences could be a practical next step.

Future research could continue introducing technology to collect data in transition research, given the just-in-time capabilities that allow insight *as the* transition is occurring. Students in our studies sometimes alluded to how having coffee breaks, and lunches with clinical team members made them feel included as a part of the team. Ethnographers found that corridors in hospitals created a space where the hierarchy and the 'rules' of patient procedures disappeared and where open conversations could occur between inter-professionals²⁸ Similarly, transition research could benefit from observations in the field.

Additionally, observing clinical team members' creation of a psychologically safe or unsafe learning space could be illuminating as we explore social influences on developmental skills such as proactive behaviour. These suggestions could take researchers beyond students' perspectives⁵ and give concrete insight into the lived reality of transitions related to how new clinical students interact with clinical spaces and the impact this has on them and the impact they have on the clinical environment.

Reflexivity

I was the primary researcher in all studies in this programme of research. However, working with supervisors and researchers from different backgrounds—clinicians, educational researchers, designers and leaders— helped me challenge my current thinking about transitions. Together with participants' data, these backgrounds led to the interpretations the reader meets in this thesis. The methodological choices of conducting a longitudinal qualitative study over nine months and having face-to-face

interviews with participants reflecting on their social support network privileged me to develop an intense researcher-participant relationship with most participants. I am not oblivious that this could be a negative, yet unintentional outcome of this research but I, and my supervisors, believe this was an asset. I became a third party in whom many participants confided and used as a 'sounding board' for their day-to-day experiences, positive or negative, as they transitioned to clinical training. For this reason, I believe this relationship allowed me insight into students' transition that would not have been accessed had I used other data collection methods and study durations.

I am the product of many transitions—professional, geographical and psychological. As I experienced my transitions, and wrote in my research diary, some of my opinions changed. My transition experience moving to new cities that were 7,149 km (Maastricht) and 16,156 km (Sydney) away from my home in Barbados, threatened my psychological health. However, these experiences were equally an opportunity for my personal and professional development. I gained experience in problem-based-learning and resolved significant interpersonal conflict in my PBL group with confidence and grace. I battled substantial bouts of anxiety stimulated by a high cost of living in Sydney and being away from home. In talking through and reflecting my everyday life, I began to appreciate the challenge. Still, as my research progressed, I realised that I was only able to do this because of the extensive social support network I have deliberately selected over the past thirty-four years. My research and mindset blossomed almost simultaneously as I realised a transition is *both* an opportunity and a threat, depending on the level of support received by a medical student. I hope that readers acknowledge that this book results from my own complex identity, created across a complicated landscape of medical and research practice, and has multi-membership in innumerable communities. I am the result of all my experiences, emotions, papers, discussions, coffee talks, dinners, workshops, conferences that I encountered in my career thus far as a health professions educator and researcher.

Final thoughts

In this thesis, we now have an enhanced understanding of the scope of medical education research regarding the transition to clinical training. Specifically, we found that most medical education researchers have a negative, problematic perspective on the transition to clinical training. Researchers approach the transition to clinical training from an educational perspective leading them to create strategies to prepare students for clinical training by teaching them knowledge and skills ahead of their first clerkship experience. Fewer researchers and educators consider the social and development perspectives to the transition to clinical training which would acknowledge and address the social influences on students' transition experiences and the personal developmental growth that is inevitable. The transition to clinical training is an opportunity for identity

and lifelong skills development and social network development and utilisation. The transition to clinical training is a time of deliberate curation of students' social support networks which provide emotional and instrumental support. These networks contribute to nurturing learning environments where students can experience psychological safety that allows them to be vulnerable while being proactive about their learning and development. Using technology helped us to meet our research agenda by providing an avenue to facilitate data collection *while* students were transitioning. We are confident we met our research agenda but acknowledge that there is much more work to do in unpacking the opportunities inherent in all transitions in medical training while cultivating meaningful strategies to help trainees adapt to change.

Transitions can be stressful and will always present a threat to medical students' learning and development. Shifting transitions towards being an opportunity for empowerment and growth could be achieved by allowing students to live through their transitions by offering them space to reflect, making their support networks visible, and creating awareness for clinical team members of their influence.

Based on the information presented in this entire thesis, we believe that Instead of focusing on the 'struggles' inherent in transition phases, we recommend that researchers and educators accept that transitions are a challenge *and* an opportunity for significant development. Additionally, we agree that boundaries, including between pre-clinical and clinical training, are a learning asset¹⁰; 'boundaries are the places where novel learning and growth arise'⁹. We found that the boundary surrounding the clinical environment, and other specific clerkship communities, was where learners developed networking skills and exhibited proactive behaviour and gradually developed mindset shifts. While the transition to clinical training and other medical education transitions are known as critically intensive learning period (CILPs)¹, we found that this transition is also crucial for networking. Rather than focusing on transitions as time-bound 'problem', using terms like 'period' and 'struggle', we consider it important to focus on the inherent developmental opportunities that transitions incur. We suggest the transition to clinical training could, in fact, a **developing and networking asset** once systems demand supportive learning environments. A place where, personal and professional development occurs, heavily dependent on students' social networks. By looking **beyond the 'struggles'** of the transition to clinical training, we can create interventions that privilege space for students to live, reflect on, and be supported by educational and healthcare institutions.

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Summary

Chapter One

This PhD thesis began by considering whether the transition to clinical training is an opportunity or a threat to medical students' personal and professional development. The literature is littered with evidence mainly portraying the threats to personal and professional development that the transition to clinical education can bring. We first described the origin of transitions in medical training, then we shared a brief literary debate regarding whether a transition is an opportunity or a threat to personal and professional development and existing transition interventions. Recently, authors have called for new perspectives on transitions in medical training. Therefore, we sought to enhance our understanding of how undergraduate medical students navigate the transition from pre-clinical to clinical training using sociocultural lenses (e.g., landscapes of practice, social network theory and organisational socialisation). To meet this aim, we first conducted a scoping review (Chapter Two) exploring how researchers have approached the transition from pre-clinical to clinical training and identified the gaps in these approaches. From this review, we determined what empirical studies were necessary and created a research agenda to advance evidence and contribute to the development of meaningful strategies to help students navigate change. Our subsequent research questions were: 1) In what ways does the transition from pre-clinical to clinical training contribute to the professional and personal identity development of medical students? [Answered by Chapters 3 and 5] 2) What role do social relationships play in students' transition from pre-clinical to clinical training? [Answered by Chapters 4 and 5]

Chapter Two

Chapter Two reflects the aforementioned scoping review conducted to 1) explore the existing conceptual perspectives regarding the undergraduate transition from pre-clinical training to clinical training and 2) suggest a research agenda with practical implications. We included 46 articles from five electronic databases. We found that the transition to clinical training was often described negatively —“difficult”, “a problem”, and “a struggle”. Further, we found that researchers in medical education conducted studies on the transition to clinical training from three conceptual perspectives: *educational*, *social* and *developmental*. Most research approached the transition to clinical training as a problem to be addressed from an educational perspective through transition to clerkship courses and curriculum innovations. Some research was conducted from a social perspective focusing on building relationships. Regarding development, we found a few articles highlighting opportunities for personal and professional development by nurturing transferrable learning strategies and reflection. Our findings provided an empirical base for future research to better understand and support students' ability to navigate change. Using social and developmental perspectives to explain and support the transition to clinical training is likely promising as this could help researchers to look **beyond** preparing students for **the struggles** of transitions in medical training.

Chapter Three

The scoping review in Chapter Two identified that developmental perspectives to the transition to clinical training could be useful to focus on student empowerment and transferrable learning behaviours. In Chapter Three, we made visible *student identity formation* (as opposed to professional identity formation) and explored research question 1 (RQ1) above. In this chapter, we aimed to explore how nine 2nd year medical students narrated their navigation of the transition from pre-clinical to clinical training and their student identity development. Students generated 61 reflective entries comprising of audio-diary (or typed) submissions over nine months (starting three months before clinical clerkships began) and two interviews. *Research poems* (transcripts reframed as poetry) helped us construct a meaningful, emotive elicitation of our longitudinal data and analysed data using sensitising concepts from Wenger's modes of identification: *engagement*, *imagination* and *alignment*. We found that students described their transition as a journey filled with positive and negative emotions and uncertainty about their current and future career. Students in our sample contributed to their developing student identity using three mechanisms: 1) becoming more engaged by taking charge, 2) shaping their image of self through engagement and finding role models; and 3) learning to flexibly adapt to clerkship norms by managing expectations and adopting a journey mindset. Students accepted the ups and downs that they experienced and stated that the act of reflecting in this study was beneficial to their experiences. These results suggest that instead of seeking smooth transitions, transitions should be lived, reflected on and supported. To answer our RQ1, we found that, during the transition to clinical training, students' professional identity development occurs through students being proactive, shaping their self-image and developing a journey mindset.

Chapter Four

The scoping review in Chapter Two identified that social perspectives to the transition to clinical training could be useful to focus on the influence that relationships have on student' transition experiences and learning. In Chapter Four, we used qualitative, social network research methods to explore social relationships and support as medical students transitioned from pre-clinical to clinical training and explored research question 2 (RQ2) above. Eight medical students completed a social network map during a semi-structured interview within two weeks of beginning their clinical clerkships (T_0) and then again four months later (T_1). Students then indicated meaningful interactions that influenced their transition from pre-clinical to clinical training and discussed how these relationships (ties) impacted their transition. We conducted mixed-methods analysis on this data. At T_0 , eight participants described the influence of 128 people in their social support networks; this marginally increased to 134 at T_1 . People from within and beyond the clinical space made up participants' social networks. As new relationships were created (e.g., with peers and doctors), old relationships were kept

(e.g., with doctors and family) or dissolved over time (e.g., with near-peers and nurses). Participants deliberately created, kept or dissolved relationships over time dependent on whether they provided emotional support (e.g., they could trust them) and/or instrumental support (e.g., they provided academic guidance). These findings provide insight into how social relationships are created, maintained and dissolved during the transition to clinical training. We found that this transition is also a. To answer our RQ2, we found that the transition to clinical training is a critically intensive networking period as students developed and refined their social networks over the transition period. Students deliberately curated social networks are diverse and dynamic over time.

Chapter Five

The transitions literature and the study in Chapter Three identified the construct 'proactivity' as a skill which augments students' learning and development during clinical training. We therefore explored 1) to what extent do clinical students exhibit proactive behaviours when entering a new clerkship and 2) the influential factors and the relationship between being proactive and feeling integrated socially into a new clerkship. Though this study intended to answer RQ 1 above, it also provided answers to RQ 2. This mixed-methods study included data from 200 participants and 18 individual interviews from 3rd, 4th and 5th-year clinical students. Surveys explored five proactive socialisation behaviours: seeking feedback, seeking information, negotiating tasks and roles, having positive framing around new experiences and building relationships with others. While students generally were positive when entering a new clerkship, they found it challenging to negotiate tasks. More senior (4th & 5th year) clinical students were less proactive than novice (3rd year) students. We found three antecedents to being proactive as a clinical student in a new clerkship: *intention to be proactive*, *feeling capable of being proactive* and *being in an environment supporting proactivity*. Individual factors influenced the intention to be proactive, social factors curated an environment that supported proactivity, and both individual and social factors affected students' capability of being proactive. Lastly, having positive framing about new experiences when entering a new clerkship was associated with social integration. These findings suggest that supporting and encouraging proactive socialisation behaviours, especially in senior clinical students, could potentially enhance social integration into the clinical environment. To answer our overarching research questions, this Chapter revealed that proactive behaviour is a developmental skill that contributes to both personal and professional development. Further, proactive behaviour is a social construct influenced heavily by team members and healthcare and educational systems.

Chapter Six

In Chapter Six, we share an evidenced-based reflection on using smartphones to collect qualitative data in medical education. This chapter was borne out of our realisation that

most prior transition literature used cross-sectional study designs. These prior research approaches yielded the potential for recall bias given that they collected data before or after students had 'transitioned' to a new environment. Smartphone use is ubiquitous in many aspects of health— patient management, education and health research. We aimed to provide guidance to design, conduct and reflect on the use of smartphones in medical education research (MER). It is critical for researchers to share experiences in the academic literature to facilitate global progression of research processes. We found that smartphones can enhance the research purpose and fits the principles of qualitative MER. Researchers must however be mindful of using smartphones in medical education research as they can affect the research data, threaten privacy and perpetuate distractions. We conclude that the intentional, use of smartphones in future MER is depended on researchers openly communicating with participants, being reflective and challenging institutional review boards to recognise their responsibility in monitoring the use of smartphones in MER.

Chapter Seven

In Chapter Seven, we answer our research questions as we synthesised and discussed our findings of all studies. In this body of work, we aimed to enhance our understanding of how undergraduate medical students navigate the transition from pre-clinical to clinical training using sociocultural lenses. Specifically, regarding our first research question (*in what ways does the transition from pre-clinical to clinical training contribute to the professional and personal identity development of medical students?*), we made visible the student identity formation and learned that this occurs through students being proactive, shaping their self-image and developing a journey mindset. In relation to our second research question (*what role do social relationships play in students' transition from pre-clinical to clinical training?*), we found that the transition to clinical training is an opportunity for the students' social network development and utilisation through deliberate curation of a dynamic network made of a diverse group of people. Our findings suggest that allowing students to live through their experiences by offering them space to reflect, making their support networks visible, and creating awareness for clinical team members of their influence could shift transitions to being an opportunity for students to move beyond the struggles of change toward empowerment and growth as they move on to another phase in their career.

Samenvatting

Hoofdstuk Één

Dit proefschrift begon met de vraag of de overgang naar klinisch onderwijs een kans biedt of juist een bedreiging vormt voor de persoonlijke en professionele ontwikkeling van Geneeskundestudenten. De literatuur staat bol van bewijs dat voornamelijk de bedreigingen voor de persoonlijke en professionele ontwikkeling schetst die de overgang naar klinisch onderwijs met zich mee kan brengen. Eerst beschreven we de intrede van transitie in de medische opleiding; vervolgens deelden we een kort literair debat over de vraag of een overgang een kans biedt of juist een bedreiging vormt voor de persoonlijke en professionele ontwikkeling en bespraken we bestaande transitie-interventies. Auteurs hebben onlangs opgeroepen tot nieuwe visies op transitie in het medisch onderwijs. Daarom hebben we vanuit sociaal-culturele invalshoeken (zoals praktijklandschappen, sociaalnetwerktheorie en organisatiesocialisatie) getracht om meer inzicht te verkrijgen in hoe bachelorstudenten Geneeskunde bij de overgang van preklinisch naar klinisch onderwijs hun weg vinden. Om dit doel te bereiken, hebben we eerst een verkennende literatuurstudie (*scoping review*) uitgevoerd (Hoofdstuk 2) waarin we onderzochten hoe onderzoekers de overgang van preklinisch naar klinisch onderwijs hebben benaderd om vervolgens de discrepanties tussen deze benaderingen in kaart te brengen. Op basis van deze review bepaalden we welke empirische onderzoeken er nodig waren en stelden we een onderzoeksagenda op met het doel bewijs te presenteren en bij te dragen aan de ontwikkeling van zinvolle strategieën om studenten te helpen om te gaan met verandering. Onze volgende onderzoeksvragen waren: 1) Op welke wijze draagt de overgang van preklinisch naar klinisch onderwijs bij aan de ontwikkeling van een professionele en persoonlijke identiteit van Geneeskundestudenten? [Beantwoord door Hoofdstuk 3 en 5]; en 2) Welke rol spelen sociale relaties bij de overgang van preklinisch naar klinisch onderwijs door studenten? [Beantwoord door Hoofdstuk 4 en 5].

Hoofdstuk Twee

Hoofdstuk 2 geeft de voornoemde scoping review weer waarmee we poogden 1) de bestaande wetenschappelijke zienswijzen ten aanzien van de overgang van preklinisch onderwijs in de bacheloropleiding naar klinisch onderwijs te onderzoeken en 2) een onderzoeksagenda met gevolgen voor de praktijk voor te stellen. We includeerden 46 artikelen uit vijf elektronische databases. We constateerden dat de overgang naar klinisch onderwijs vaak werd beschreven als negatief, met woorden als “moeilijk”, “een probleem” en “een strijd”. Voorts vonden we dat onderzoekers in het medisch onderwijs de studies op het gebied van de overgang naar klinisch onderwijs hadden verricht vanuit drie wetenschappelijke zienswijzen, namelijk een *onderwijskundige*, *maatschappelijke* en *ontwikkelingsgerichte* zienswijze. In de meeste studies werd de overgang naar klinisch onderwijs beschouwd als een probleem dat vanuit een onderwijskundig perspectief moest worden aangepakt door over te stappen op coöperatieve trainingen en door middel van curriculumvernieuwingen. Enkele studies waren vanuit een maatschappelijke

zienswijze verricht en richtten zich zodoende op het opbouwen van relaties. Met betrekking tot ontwikkeling vonden we een paar artikelen die de nadruk legden op de kansen voor persoonlijke en professionele ontwikkeling door het bevorderen van overdraagbare leerstrategieën en reflectie. Onze bevindingen boden een empirisch uitgangspunt voor toekomstig onderzoek dat beoogt beter te begrijpen in welke mate studenten in staat zijn om te gaan met verandering en hen daarbij te ondersteunen. We verwachten dat het hanteren van een maatschappelijke en ontwikkelingszienswijze voor het verklaren en ondersteunen van de overgang naar klinisch onderwijs veelbelovend is, omdat dit onderzoekers zou kunnen helpen om **verder** te kijken dan het voorbereiden van studenten op **de moeilijkheden** die transities in het medisch onderwijs met zich meebrengen.

Hoofdstuk Drie

De scoping review uit Hoofdstuk 2 wees uit dat het aannemen van een ontwikkelingszienswijze ten aanzien van de overgang naar klinisch onderwijs nuttig zou kunnen zijn omdat dit een focus op studentempowerment en overdraagbaar leergedrag mogelijk maakt. In Hoofdstuk 3 maakten we de *vorming van een studentidentiteit* (als tegenhanger van een professionele identiteit) zichtbaar en beantwoordden we onderzoeksvraag 1 (RQ1) hierboven. In dit hoofdstuk wilden we onderzoeken hoe negen tweedejaars Geneeskundestudenten hun beleving van de overgang van preklinisch naar klinisch onderwijs en de vorming van hun studentidentiteit beschreven. De studenten genereerden 61 reflecties bestaande uit audio- of getypte dagnotities gedurende een periode van negen maanden (met aanvang drie maanden vóór de start van de coschappen) en twee interviews. Met behulp van *onderzoeksgedichten* (tot poëzie herschreven transcripten) waren we in staat om op zinvolle en emotionele wijze onze longitudinale data te activeren. De data werden geanalyseerd aan de hand van richtinggevende begrippen (*sensitising concepts*) afkomstig van Wengers identificatiemethoden: *betrokkenheid*, *verbeelding* en *aanpassing*. Onze bevinding was dat de studenten hun overgang beschreven als een reis vol positieve en negatieve emoties en onzekerheid rondom hun huidige en toekomstige loopbaan. De studenten uit onze steekproef droegen middels drie mechanismen bij aan de ontwikkeling van hun studentidentiteit: 1) meer betrokken raken door het heft in eigen handen te nemen; 2) hun zelfbeeld vormen door betrokken te zijn en rolmodellen te zoeken; en 3) leren om zich flexibel aan te passen aan de coschapsregels door aan verwachtingen te voldoen en een reismindset aan te nemen. De studenten accepteerden de ups en downs die ze meemaakten en gaven aan dat het reflecteren in deze studie aan hun beleving ten goede kwam. Deze resultaten maken aannemelijk dat, in plaats van te streven naar vlotte transities, deze transities doorgemaakt moeten worden, erop gereflecteerd moet worden en deze ondersteund moeten worden. Als antwoord op RQ1 concludeerden we dat studenten gedurende de overgang naar klinisch onderwijs hun professionele

identiteit vormen door proactief te zijn, hun zelfbeeld te vormen en een reismindset aan te nemen.

Hoofdstuk Vier

De scoping review uit Hoofdstuk 2 wees tevens uit dat het nuttig zou kunnen zijn met een maatschappelijke bril te kijken naar de overgang naar klinisch onderwijs, omdat dit een focus op de invloed van relaties op de beleving van deze overgang en het leren tijdens de overgang door studenten mogelijk maakt. In Hoofdstuk 4 gebruikten we kwalitatieve methoden voor sociaal-netwerkonderzoek om sociale relaties en ondersteuning te onderzoeken gedurende de overgang van preklinisch naar klinisch onderwijs door Geneeskundestudenten en beantwoordden we onderzoeksvraag 2 (RQ2) hierboven. Acht Geneeskundestudenten vulden binnen twee weken na de start van hun coschappen (T0) en vier maanden later nogmaals (T1) tijdens een semigestructureerd interview een sociaal-netwerkschema in. Vervolgens gaven de studenten aan welke contacten zinvol waren doordat deze hun overgang van preklinisch naar klinisch onderwijs beïnvloed hadden en bespraken zij hoe deze contacten (banden) van invloed waren geweest. We pasten een multimethodische analyse toe op de data. Bij T0 beschreven de participanten de invloed van 128 mensen uit hun sociaal ondersteuningsnetwerk; dit aantal was bij T1 licht gestegen naar 134. Het sociale netwerk van de participanten bestond uit mensen van binnen en buiten de klinische omgeving. Terwijl nieuwe contacten werden opgedaan (bijv. met coassistenten en artsen), werden gaandeweg oude contacten gehandhaafd (bijv. met artsen en familie) of verbroken (bijv. met meer ervaren coassistenten en verplegers). In de loop der tijd gingen de deelnemers doelbewust nieuwe contacten aan, behielden zij deze of verbraken zij deze al naargelang deze contacten emotionele ondersteuning (bijv. zij konden hen vertrouwen) en/of functionele (bijv. academische) ondersteuning boden. Deze bevindingen geven inzicht in hoe sociale contacten tijdens de overgang naar klinisch onderwijs worden aangegaan, behouden en verbroken. Als antwoord op RQ2 concludeerden we dat de overgang naar klinisch onderwijs een cruciale periode is van intensief netwerken, aangezien studenten tijdens deze overgangperiode hun sociale netwerk opbouwden en verder vormgaven. De sociale netwerken die studenten doelbewust hebben opgebouwd zijn variabel en dynamisch in de tijd.

Hoofdstuk Vijf

In de literatuur over transities en de studie uit Hoofdstuk 3 werd het construct "proactiviteit" aangemerkt als een vaardigheid die het leren en de ontwikkeling van studenten tijdens klinisch onderwijs bevordert. Daarom onderzochten we: 1) in hoeverre klinische studenten bij de overgang naar een nieuw coschap proactief gedrag vertonen; en 2) de factoren die een rol spelen en het verband tussen proactief zijn en het zich sociaal geïntegreerd voelen in een nieuw coschap. Hoewel deze studie bedoeld

was om RQ1 hierboven te beantwoorden, werden er ook antwoorden op RQ2 gegeven. Dit multimethodisch onderzoek omvatte data van 200 participanten en 18 individuele interviews van klinische studenten uit het 3^e, 4^e en 5^e jaar. Met behulp van vragenlijsten werden vijf vormen van socialisatiegedrag onderzocht, te weten: vragen om feedback, op zoek gaan naar informatie, onderhandelen over taken en rollen, het geven van een positieve invulling aan nieuwe ervaringen en relaties opbouwen met anderen. Hoewel studenten over het algemeen positief waren tijdens de start van een nieuw coschap, vonden ze het lastig om te onderhandelen over taken. De meer ervaren klinische studenten (vierde- en vijfdejaars) waren minder proactief dan junior (derdejaars) studenten. We constateerden dat proactief gedrag door klinische studenten tijdens een nieuw coschap voorafgegaan werd door: *de intentie om proactief te zijn, het gevoel proactief te kunnen zijn en het zich in een omgeving bevinden waarin proactiviteit wordt gestimuleerd*. Persoonsgebonden factoren beïnvloedden de intentie om proactief te zijn; sociale factoren maakten dat de omgeving proactiviteit stimuleerde; en een combinatie van persoonsgebonden en sociale factoren beïnvloedde het vermogen van studenten om proactief te zijn. Ten slotte werd het geven van een positieve invulling aan nieuwe ervaringen bij het starten van een nieuw coschap in verband gebracht met sociale integratie. Deze bevindingen maken aannemelijk dat het ondersteunen en stimuleren van proactief socialisatiegedrag, met name bij klinische studenten uit latere jaren, de sociale integratie in de klinische omgeving kan bevorderen. Als antwoord op onze overkoepelende onderzoeksvragen gaf dit hoofdstuk aan dat proactief gedrag een ontwikkelingsvaardigheid is die bijdraagt aan zowel de persoonlijke als de professionele ontwikkeling. Verder is proactief gedrag een sociaal construct dat sterk beïnvloed wordt door teamleden, het zorgstelsel en het onderwijssysteem.

Hoofdstuk Zes

In Hoofdstuk 6 delen wij een empirisch onderbouwde reflectie op het gebruik van smartphones voor het verzamelen van kwalitatieve data in het medisch onderwijs. Dit hoofdstuk kwam voort uit ons besef dat het overgrote deel van de literatuur over transitie tot nu toe gebruik heeft gemaakt van transversale onderzoeksopzetten. Bij deze onderzoeksbenaderingen bestond het risico op *recall bias* (vertekening van het geheugen), aangezien de data verzameld werden voor of nadat de studenten naar een nieuwe omgeving waren "overgegaan". Het gebruik van smartphones is tegenwoordig niet meer weg te denken uit vele gezondheidsgerelateerde terreinen, zoals de behandeling van patiënten, het onderwijs en gezondheidswetenschappelijk onderzoek. Wij wilden handvatten aanreiken voor het ontwerpen van smartphonetoepassingen, het gebruik ervan en voor het reflecteren op het gebruik van smartphones in onderzoek van medisch onderwijs. Om de vooruitgang van onderzoekstrajecten wereldwijd te bevorderen, is het van cruciaal belang dat onderzoekers hun ervaringen delen in de wetenschappelijke literatuur. We constateerden dat smartphones het onderzoeksdoel

kunnen verruimen en binnen de uitgangspunten van kwalitatief onderzoek van medisch onderwijs passen. Onderzoekers moeten er bij het gebruik van smartphones in onderzoek van medisch onderwijs echter rekening mee houden dat deze de onderzoeksdata kunnen beïnvloeden, de privacy in gevaar kunnen brengen en voor voortdurende afleiding kunnen zorgen. Onze conclusie is dat wanneer onderzoekers smartphones willen gebruiken in toekomstig onderzoek van medisch onderwijs, zij openlijk moeten communiceren met participanten, moeten reflecteren en ethische toetsingscommissies moeten wijzen op hun verantwoordelijkheid om op het gebruik van smartphones in onderzoek van medisch onderwijs toe te zien.

Hoofdstuk Zeven

In Hoofdstuk 7 vatten we onze bevindingen uit alle studies samen, bespraken we deze en gaven we al doende antwoord op onze onderzoeksvragen. Met dit uitvoerige werk hebben we middels sociaal-culturele invalshoeken getracht inzicht te bieden in hoe bachelorstudenten Geneeskunde bij de overgang van preklinisch naar klinisch onderwijs hun weg vinden. Specifiek met betrekking tot onze eerste onderzoeksvraag (*Op welke wijze draagt de overgang van preklinisch naar klinisch onderwijs bij aan de ontwikkeling van een professionele en persoonlijke identiteit van Geneeskundestudenten?*) hebben we de vorming van een studentidentiteit zichtbaar gemaakt en zijn we erachter gekomen dat deze tot stand komt doordat studenten proactief zijn, hun zelfbeeld vormen en een reismindset aannemen. Met betrekking tot onze tweede onderzoeksvraag (*Welke rol spelen sociale relaties bij de overgang van preklinisch naar klinisch onderwijs door studenten?*) was onze bevinding dat de overgang naar klinisch onderwijs studenten een kans biedt om een sociaal netwerk op te bouwen en te benutten door doelbewust een dynamisch netwerk bestaande uit een diverse groep mensen op te bouwen. Onze bevindingen maken aannemelijk dat als we studenten hun ervaringen laten doormaken door hun ruimte te bieden voor reflectie, hun ondersteuningsnetwerken zichtbaar maken en de klinische teamleden bewust maken van hun invloed, transities omgevormd kunnen worden tot een kans voor studenten om over de uitdagingen die verandering met zich meebrengt heen te stappen richting empowerment en ontplooiing terwijl zij verder gaan naar een andere fase in hun loopbaan.



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In this short chapter, we will highlight the concrete conclusions from this body of work. We also explore the relevance and impact on stakeholders and wider society relevant to this work. We then explore the potential for access to the knowledge we shared in this thesis.

Research summary

This dissertation aimed to enhance the understanding of students' navigating the transition from classroom-based training to learning from patients in the clinical setting. We used concepts from multiple theories that relate to how social contexts influence learning in some way. We conducted four empirical studies using scoping review methodology, qualitative and mixed-methods designs all involving undergraduate medical students. We offer the medical education community insight into the transition of one transition period, from pre-clinical to clinical training. We first found that most authors in medical education research use negative discourse when describing transition to clinical training. Additionally, researchers primarily approach this transition as a problem to be solved cognitively with knowledge and skill sessions to prepare students for their new roles. We found researchers were less likely to consider the social and developmental aspects inherent in students' navigating change to learning and working with patients. We then found evidence that the transition to clinical training is an emotional period with negative and positive emotions that contributes to students' identity formation, being proactive about their learning and development and creation of students' social support networks. Transition to clinical training was both a threat and an opportunity for learning and development of undergraduate medical students, and the social context significantly contributes to whether threat or opportunity is more prominent.

Relevance

Medical trainees will undergo many transitions throughout their career development. Transitions are inevitable. The medical hierarchy leads to many medical students seeing themselves 'below the rubbish bins' in the clinical environment; they feel they have little value. Feeling lesser likely contributes to the challenges inherent in entering a new environment, seeing patients for the first time regularly, and trying to integrate into an environment which often ignores them. Importantly, some research suggests that transition periods are the source of numerous medical errors and psychological distress. Thus, both patients and trainees can be affected, and this thesis is relevant for both the medical community and patients. We also highlight that both healthcare institutions and health professionals at the workplace have a role to play in being open to newcomers, offering support and guidance, teaching lifelong learning skills and providing an outlet for active reflection.

Stakeholders that can benefit from these findings

The results in this thesis are relevant to multiple stakeholders, some more surprising than others. This thesis with the dynamic, honest experiences presented in Chapter Two and other quotes presents **medical students** with an insight into the benefits of active reflection during stressful experiences. Additionally, *Peers* influence how positive a medical student tends to be when entering a clerkship and likely do not recognise how much emotional support they provide to one another during a transition. Similarly, many transitioning students lean on *near-peer* students in other cohorts for support. If a near-peer is exceptional at providing emotional and academic support, that near-peer may become overburdened in helping others in the academic years below them. This awareness is essential for the near-peer, the transitioning student and the institution. Explicit consideration of the 'who' in medical students' social networks was illuminating and showed students in our sample on whom they could depend during difficult times. Our results may be relevant to the **medical and non-medical staff** in clinical settings. These persons are responsible for the climate of the learning environment and creating a space where students feel comfortable to speak up, negotiate their learning goals and ask questions. Additionally, many junior and senior doctors, and **nurses** were present on students' support networks. Awareness of the importance students place on doctors and nurses for support is necessary. These results have relevance for **academic educators and administrative staff**; they too were meaningful members of students' networks as they transitioned to clinical training. Specifically, it could benefit **institutions** to have medical students map their social networks to expose the critical persons that transitioning students go to for information and guidance. Highlighting these persons could alert institutions of the need to support these persons for their often-unintended role of helping students adapt to a new environment. Institutions could therefore facilitate social network mapping sessions allowing students to map their networks and reflect on their options for support during stressful times. Additionally, institutions could utilise technology like smartphones to facilitate students' reflections and portfolio contributions; the mere act of reflection through audio-diaries was powerful for students in our sample. The **family and roommates** of medical students also have an essential role to play. These were often stable relationships and family, and roommates, should remain available where possible to be an outlet for medical students to vent about stressful days and a place where students can gain advice from outside the medical field.

Access to findings

The target groups mentioned above can access three papers from this thesis that are available as published manuscripts (Chapters Two, Four and Six); all are open access. Chapters Three and Five are undergoing peer review. Between 2017 until the present, some of these target groups have already seen the content in this thesis at national

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and international conferences — the annual conference of the Association for Medical Education in Europe (AMEE), the Rogano Conference, the annual meeting of the Australian New Zealand Association of Health Professions Educators, online virtual sessions for the Association of scientific medical education (ASME) organisation and local departmental meetings in the Netherlands and Australia. As publications occurred, most members of this research team shared short conclusions on personal Twitter social media pages. Social media interactions were reminiscent of in-person coffee break/water-cooler talks. Further, we also shared our findings on formal online videoconferencing sessions with worldwide participation. Over the next one to two years, outputs from this thesis will continue. This thesis will be printed as a book and placed online in both The Netherlands and Australia. Some participants used their data transcripts and social network maps as part of their mandatory portfolio at their institution.

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Appendices

ABOUT ANIQUE



Dr. Anique Atherley is a **black, female** medical doctor from the south of the gem of the Caribbean Sea—**Barbados**. Anique completed medical training at the University of the West Indies (The UWI) and medical internship at the Queen Elizabeth Hospital in Barbados. During her internship, she met **Dr. Charles G. Taylor Jr** who opened her eyes to the field of medical education. She then went on to complete, with merit, a master's degree in **public health (epidemiology)** from the University of Liverpool in the United Kingdom. With Dr. Taylor's guidance, she took on a role as a Junior Research

Fellow in Medical Education at The UWI where she led medical education research projects and contributed to teaching undergraduate medical students research methods and other public health concepts. Her love for education starting during medical school teaching her peers and preparing presentations; and blossomed when she had the teaching opportunities at The UWI. She also completed numerous online courses in health professions education and graduated in 2018 with a Postgraduate Diploma in University Teaching and Learning from The UWI, Cave Hill in Barbados. During her time at The UWI, she was the coordinator of the Medical Education Learning Community (MELC) and contributed to the creation of a career-advising symposium highly rated by medical students.

Then, Anique received the opportunity she had been searching for. After the passing of her beloved mentor Dr Taylor, she knew she wanted to complete a **doctorate** in Medical Education and continue her academic journey as an early career medical educator. She was chosen as the inaugural recipient of a PhD scholarship for a dual doctoral degree in medical education from the School of Medicine at Western Sydney University and School of Health Professions Education (SHE) at Maastricht University. She began her PhD trajectory in September 2017 where she began the work seen in this thesis. Along this journey to becoming a medical education researcher, Anique received a Travel Grant from Medical Education' Association of Scientific Medical Education in 2019, she gained experience facilitating problem-based learning sessions at WSU, she wrote her first invited commentary in Medical Education (journal), co-organised national and international conferences (e.g., SHE academy) and even published an AMEE (Association of Medical Educators in Europe) Guide (No. 130). To this day, she has published over 15 peer-reviewed articles and has conducted workshops and made presentations in the Netherlands and Australia. As her stars align, Anique proudly is now at the end of her doctoral journey in medical education.

Having completed her PhD, Anique keenly remains involved with **SHE** through contributing to the master's in health professions education programme (MHPE). Currently, she is an **Assistant Professor** in the Academy of Teaching and Learning at Ross University School of Medicine (RUSM) in Barbados. Here she has joint responsibility for student **academic coaching** and **faculty development**. She is excited to contribute to this vibrant department at RUSM and hopes to bring educational research to the forefront and mentor faculty in providing evidence-based teaching. Lastly, she is also the **managing director** of a small research coaching company where she also helps postgraduates through their research process.

Personally, Anique also contributes to the community and she is the co-founder of 'Drops of Love'— an organisation that offers public education regarding blood donation to increase voluntary donations in Barbados. Additionally, during this trajectory, Anique co-founded a small company in Barbados that provides outdoor movie experiences at private events and became the adopted mom of two fur babies— Chai & Spyce. Anique loves marine life and enjoys spending time with loved ones who roll their eyes when she 'gets all academic on them' but who always know how to make her laugh.

LIST OF PUBLICATIONS

Related to thesis content

Atherley, A, Teunissen, PW, Hegazi, I, Hu, Wendy, Dolmans, D.. (2020), 'Exploring the lived reality of transitioning from pre-clinical to clinical training' (research paper) [Under Review] **[Thesis paper]**

Atherley, A, Teunissen, PW, Dolmans, D., Hu, Wendy, Hegazi, I. (2020), 'Medical students' socialization tactics when entering a new clinical clerkship: a mixed methods study of proactivity' (research paper) [Under Review] **[Thesis paper]**

Atherley, A, Nimmon, L., Teunissen, PW, Dolmans, D., Hegazi, I, Hu, Wendy. (2020), 'Students' social networks are diverse, dynamic and deliberate when transitioning to clinical training' *Medical Education* Early Online View **[Thesis paper]**

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Appendices

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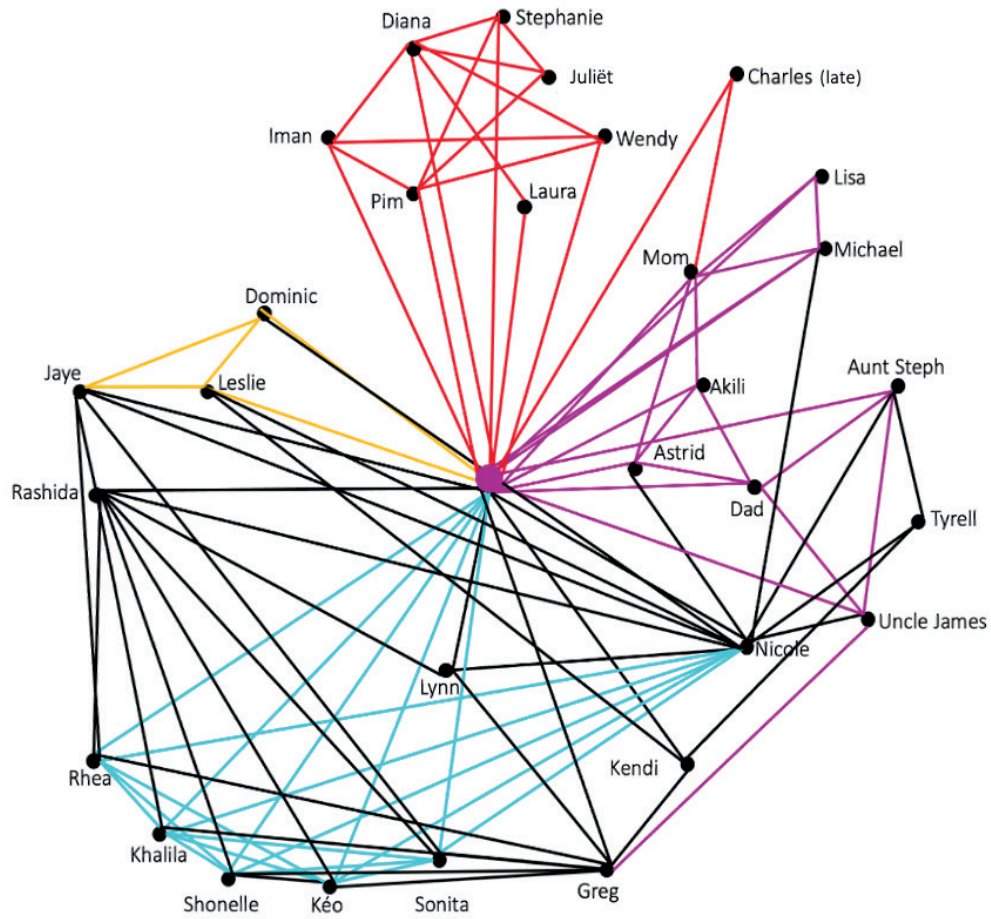
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My social support network for this PhD Trajectory

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The SHE Dissertation Series publishes dissertations of PhD candidates from the School of Health Professions Education (SHE) who defended their PhD theses at Maastricht University. The most recent ones are listed below. For more information go to: <https://she.mumc.maastrichtuniversity.nl>

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Beyond the struggles

by Anique Atherley

Change, Fear
Inevitable, Problematic
Transitions;
An opportunity or a threat?

Through review,
Through reflection
Through rhyme,
Through relations
Through rationales and theory

We find

Emotions
Nervous, excited
Seeing patients for the first
They exclaimed

Being proactive
Finding role models
Changing mindsets
They develop

Building relationships. Deliberate,
Diverse
Dynamic
They feel supported

Transitions
A threat; if unsupported
An opportunity; with support and mindsets
Developing
Networking
An Asset
They grow

I grow

Toward the growth
and
Beyond the struggles
We both become something more

Note: This is a research poem grounded in data, field notes, conclusions and reflections from this entire thesis.