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Exploring medical student well-being during transition: a realist inquiry

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Abstract

Background

Issues relating to well-being are widely discussed in medical education and the wider profession, however, well-being is poorly conceptualised and theorised, limiting our understanding of the issues. Transitions have been highlighted as a particular area of concern for well-being. The transition literature has tended to focus on learners' struggles, emphasising learner skill and knowledge deficits as the source of their difficulties and poorer well-being. This has resulted in limited understanding of the wider environmental factors and underlying causes of learners' well-being through transition experiences. In this work, transition was conceptualised more broadly as an ongoing developmental process influenced by both environmental and individual factors, with the experiences in one transition affecting the next. This research aimed to improve the knowledge of how well-being is affected during transition by taking a theory-building approach, firstly clarifying the concept of well-being, and then exploring how both student and environmental factors affect well-being through underlying psychological processes during transition, and the links between well-being and learning.

Research approach

This research was conducted within the scientific realism paradigm and adapted realist methodology for problem exploration. The methodology considers how outcomes are caused by underlying mechanisms activated in conducive contexts, representing knowledge of these causal explanations in theories. Three components were designed to address the overarching research question: in what circumstances, for whom, how, and why does the process of transitioning through clinical training affect medical students' well-being?

Component 1: Theoretical integrative review

The theoretical integrative review identified definitions and theories of well-being from the psychology literature. These were analysed for conceptual and theoretical insights, which were synthesised into a concept definition and theory of well-being. Well-being was defined as the subjective experience of life, with two dimensions – feeling and functioning – each with several attributes. The theory explained how well-being changes through three psychological processes, or mechanisms: basic psychological need satisfaction; psychological

flexibility; and resource cycles. The concept definition and theory were the foundation for theory-building in the subsequent components of the research.

Component 2: Realist review

An initial rough theory of how well-being is affected by the transition through clinical training was developed, tested and refined by building on the well-being theory using the clinical training transition literature. Insights about how the transition affects well-being through interactions between contexts and mechanisms were extracted from the included documents and synthesised into context-mechanism-outcome configurations (CMOCs) under four theory areas: higher-system level factors; learning climate; student-teacher interactions; and managing well-being.

Component 3: Realist investigation

Realist interviews were conducted with medical students (n=22) and educators (n=30) and the data analysed to develop, test and refine the CMOCs from the realist review. The findings highlighted the importance of teachers welcoming and involving students, as this facilitates participation, belonging, and role clarity, activating well-being and learning mechanisms, and increasing the student's well-being and readiness for the transition to clinical practice. However, wider contexts can affect the degree of welcome and involvement in the clinical learning environment. In less welcoming learning climates, student participation, belonging and role clarity depends on three student contexts: readiness; self-directed learning; and psychological resources. The findings also highlighted how students' resource pools and experiences affect their well-being and developmental trajectories over time.

Conclusion

The programme of research clarified the conceptual and theoretical foundations of well-being and used these to explore how environmental and student contexts interact with various psychological processes to affect well-being and learning during the clinical training transition. A refined theory was developed on the basis of the findings and used to develop recommendations to improve well-being and learning. Overall, the findings emphasise the importance of medical education adopting a proactive compared to reactive approach, considering the role of environmental as well as individual factors, and acknowledging the complexity of issues like well-being and learning.

Presentations

International

Rosselli, A., Patel, R., Hagan, P., & Doody, G. (2021, February). *Conceptualising outcomes for theory development in realist methodology. Illustrated with the example of well-being.* Poster session presented at the 2021 International Conference for Realist Research, Evaluation and Synthesis, Online.

National

Rosselli, A., Patel, R., Hagan, P., & Doody, G. (2019, January). *Well-being: what actually is it?* Poster presented at the British Psychological Society Division of Occupational Psychology Annual Conference, Chester, UK.

Regional

Melvin, A. (2022, January). *Medical student well-being and the transition through clinical training: What's going on and how can we help?* Invited Educator Masterclass presented at University Hospitals of Derby and Burton, Online.

Rosselli, A. (2021, April). *Understanding and supporting well-being in medical education.* Invited workshop presented at the ASME Midlands Medical Education Conference, Online.

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Local

Rosselli, A. (2021, January). *Well-being during transition in medical school.* Invited oral presentation at the University of Nottingham, School of Medicine – Innovations in Medical Education Conference, Online.

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Abbreviations

B&B	Broaden and build theory
BMA	British Medical Association
CMO	Context-mechanism-outcome
CMOC	Context-mechanism-outcome configuration
CoP	Community of Practice
COR	Conservation of Resources theory
CP1	Clinical Phase 1
CP2	Clinical Phase 2
CP3	Clinical Phase 3
EBM	Evidence-based medicine
EBP	Evidence-based policy
GMC	General Medical Council
GP	General Practice/General Practitioner
HCA	Healthcare assistant
IRT	Initial rough theory
LEP	Local Education Provider
MRT	Middle-range theory
NHS	National Health Service
RCT	Randomised controlled trial (RCT)
SDL	Self-directed learning
SDT	Self-determination theory
SRL	Self-regulated learning
TIR	Theoretical Integrative Review
UK	United Kingdom
ZPoD	Zone of potential development
ZPrD	Zone of proximal development

Glossary

Term	Definition in this work
Clinical learning environment	Clinical settings where students engage in learning, such as hospital wards or general practice.
Clinical training	The second part of medical school where students learn within the clinical environment through clinical placements, also called clerkships in other countries.
Concept	A cognitive representation of real life phenomenon, which is communicated to others through a concept definition (Podsakoff et al., 2016).
Context-mechanism-outcome (CMO)	The CMO is an explanatory heuristic devised by Pawson and Tilley (1997) to capture the principles of causality in scientific realism, as outlined in section 2.4.4. Section 2.5.3 provides details of the specific conceptualisation of context and mechanism in this work.
Engagement	The term engagement is used in a broader sense to refer generally to someone becoming involved with something. For example, teachers engaging in teaching of students, or students engaging with well-being supportive activities, such as exercise.
Flourishing	High well-being with positive experiences in both dimensions (functioning and feeling) and their respective attributes, as outlined in section 3.3.3.1.
Learning	The psychological and social processes involved in developing the knowledge relevant to working as a doctor, making learning a central process of transition. Learning is differentiated from performance, with performance being what is the observable or demonstratable, while learning is the change in knowledge (Bjork and Bjork, 2011).
Middle-range theory	Refers to a level of theory which is abstracted enough to apply across different settings, but specific enough that it can be used to inform specific situations (Wong et al., 2013b). These are contrasted to grand theories, which are highly abstracted theories, such as Marxism, and therefore less applicable to specific situations. Conversely, programme theory is highly specific, explaining an aspect of a programme or intervention.
Participation	Refers specifically to the meaning of participation within situated learning theory, where the student learns by moving over time from legitimate peripheral participation to full participation in the clinical environment (Lave and Wenger, 1991).

Term	Definition in this work
	<p>In this way legitimate peripheral refers to participation in clinical activities in a limited way suitable for a novice, such as observing or simple procedures. While full refers to participation in the work of a practicing doctor. The term participation is sometimes used without specifying whether it is legitimate peripheral or full, because this may depend on the specific student and their level of development.</p>
Substantive/formal theory	<p>Refers to an existing theory, often at the middle-range level, from a specific domain or discipline (Wong et al., 2013b). For example, self-determination theory from psychology (Ryan and Deci, 2017). Formal theory and substantive theory are sometimes differentiated but here they are used interchangeably.</p>
Teacher, educator, and member of the clinical team	<p>The term teacher is used generally in this work to refer to anyone involved directly or indirectly with teaching medical students in the clinical environment, including both educators and members of the clinical team.</p> <p>The term educator is used to refer to someone with a formal educational role, such as clinical teaching fellows, clinical supervisors, and medical school faculty.</p> <p>The term member of the clinical team is used to refer to individuals who students interact with in the clinical environment, but who are not medical professionals and/or do not have a formal educator role, and may therefore be unaware of the medical student role.</p>
Theory	<p>A representation of our knowledge of the world around us and the connections between concepts (Varpio et al., 2020). Theories can be located at different levels of abstraction and come in multiple forms.</p>
Transition	<p>The ongoing psychological and social processes through which medical students become doctors, as outlined in section 1.2.</p>
Well-being	<p>A dynamic, multidimensional concept reflecting an individual's subjective experience of their life with regards to their: feeling, comprised of emotions, engagement, life satisfaction, meaning, and self-perception; and functioning, comprised of connection to others, autonomous regulation, purpose in life, perceived competence, and personal growth, as outlined in section 3.3.3.1.</p>

Chapter 1. Introduction

1.1. The problem

Problems with stress, burnout, mental ill-health and well-being within the medical workforce have been widely recognised and discussed. A British Medical Association (BMA) study reported that 80% of doctors surveyed were at high or very high risk of burnout, especially junior doctors (BMA, 2019). Medical students are more likely to experience burnout than other age-matched students (Dyrbye and Shanafelt, 2016). These problems with poor well-being can have wide-ranging implications for individuals, organisations, and patients. It is important to note that these issues were present before the global coronavirus pandemic, but are likely to have become exacerbated through the additional pressures this has placed upon health services and healthcare professionals.

For individuals, the experience of stress and burnout is detrimental, not only for physical and mental health but also in terms of the individual's perception of their work and the working environment. Such experiences can contribute to doctors leaving clinical practice in the United Kingdom (UK) (GMC, 2021), and may therefore be linked to one in ten doctors considering leaving clinical practice (GMC, 2020), or delaying making career choices through not taking up specialty training straight after foundation training (BMA, 2017). Being competent to practice as a doctor is a necessary but not sufficient outcome of medical school and medical education; individuals also need to enjoy their work and find it satisfying, otherwise they are likely to struggle to sustain their work and may leave to find other employment. This has further implications for organisations, exacerbating issues around staff shortages and training spaces. Furthermore, the quality of patient care may be reduced if there are insufficient staffing resources to meet the demands of health services.

For organisations, there is a need to recruit and retain staff, but recruitment issues are prevalent in postgraduate medical education. Doctors surveyed after leaving clinical practice in the UK indicated a variety of reasons, but a quarter cited burnout as a contributing factor and a third cited dissatisfaction, while just over half left to work abroad (GMC, 2021). In postgraduate education, although many specialties remain highly competitive, others are consistently unable to fill their training posts, and some areas of the country have specific recruitment difficulties (BMA, 2017). A related issue concerns the increasing frequency with which doctors are taking career breaks between foundation training and specialty training,

or the 'F3 phenomenon' (Church and Agius, 2021). In their scoping review, Church and Agius found the reasons for taking a career break are varied, but contributors included burnout and other negative work-related attitudes. In undergraduate recruitment, patterns of recruitment have remained competitive, although some decline was seen (BMA, 2017) before again increasing (MSC, 2021), perhaps related to the global pandemic. The predominance of recruitment issues in postgraduate medical education suggest problems within the experience medical education, rather than a lack of interest in medicine, and well-being issues seem to be contributing to at least some of these problems.

A broader implication of problems with well-being in the medical profession includes the distal impact on patient experience. Burnout is suggested to reduce performance, including increasing the risk of medical errors (Dyrbye and Shanafelt, 2016). Furthermore, poor well-being can detract from an individual's ability to perform to their best abilities, potentially impacting patient care. Although the factors contributing to these trends are multiple and complex, the current negative climate around medicine in terms of stress, burnout and mental ill-health is likely a contributing factor.

Support interventions in medical education tend to be reactive and focused on resolving problems after they arise (e.g. examination failure), often focused on short-term goals, and improvements are not usually sustained (Cleland et al., 2013). As a result, there have been calls for proactive developmental support in medical education, to enable learners to achieve their full potential (Sandars et al., 2014). These calls reflect a need to go beyond fixing problems when they arise (e.g. burnout), to promoting well-being and flourishing in medical education (Slavin et al., 2011).

Furthermore, interventions aimed at tackling issues with well-being have been accused of solutionism, where solutions are designed without first understanding the causes of the problems (Ajjawi and Eva, 2021; Bynum et al., 2021). It is therefore unsurprising that mixed results are often found when the evidence base lacks conceptual and theoretical clarity around these issues. For example, a systematic review of resilience interventions was unable to draw meaningful conclusions due to the lack of clarity around the conceptualisation of resilience (Fox et al., 2018). Establishing conceptual and theoretical clarity around identified problems should be prioritised to enable the design and provision of proactive support for well-being.

This research focuses on the issues around well-being in medical education, taking a theory-building approach to identifying the causes of the observed problems. Whilst

problems with well-being can occur throughout the medical education continuum, transitions are often associated with increased stress and anxiety, however while transitions can be a struggle, they are also opportunities for growth and development (Atherley et al., 2019; Teunissen and Westerman, 2011). Therefore this research focused on issues of well-being and transition.

1.2. Transition

Transitions are a part of life, with individuals experiencing multiple types of transition throughout their lifetime (Jindal-Snape, 2016). Transitions have been conceptualised in different ways, with some considering them as one-off events, and others as an ongoing process (Jindal-Snape, 2016). In medical education, Gordon et al. (2020, p. 1007) defined transitions as “ongoing processes of psychological, social and educational adaptations over time necessitated by changes in context, interpersonal relationships and identities.” Similarly, Teunissen and Westerman (2011, p. 52) state that “transition is not a moment, but rather a dynamic process in which the individual moves from one set of circumstances to another.” In this current work, transition is conceptualised as an ongoing process, aligning with the researchers above. Transition is defined herein as the *ongoing psychological and social processes through which medical students become doctors*. Therefore transition is characterised by both internal (psychological) and external (social) processes of learning, involves a sense of becoming and identity, and is a longitudinal process, rather than situated around specific events or time frames.

Nicholson’s (1990) model of transition cycles, in which transitions occur in ongoing cycles (Figure 1-1), aligns with the conceptualisation of transition in this work. The cycle begins with preparation before the initial encounter, followed by adjustment, and then (sometimes) stabilisation, before preparation for the next transition begins. The cycle is characterised by: recursion, everyone is in at least one cycle at any one time; disjunction, each phase has different qualities and psychological processes; and interdependence, experiences within one phase affect the subsequent phase (Nicholson, 1990). Individuals progress through these different phases, but might not have achieved stabilisation before the next transition begins, which can negatively impact later transitions, if optimal adjustment, stabilisation and preparation have not occurred for the current or previous transition. Adjustment can occur through personal development or role development, which are influenced by organisational factors, such as induction and socialisation processes, role requirements, such as the degree of novelty and decision freedom, and individual characteristics, such as prior socialisation

and motivation (Nicholson, 1984). Therefore, determining how to optimise adjustment is necessary for stabilisation to occur and preparation for the next transition.

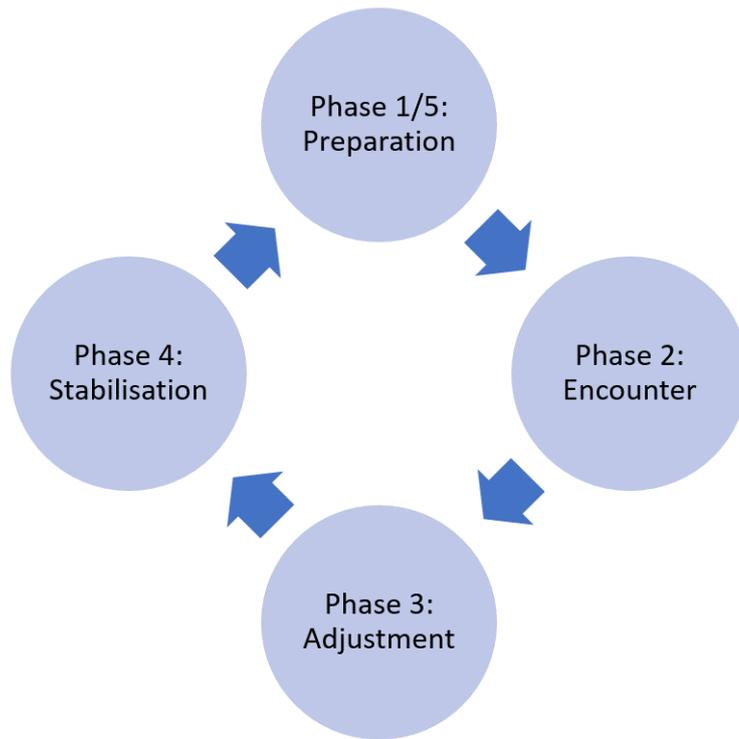


Figure 1-1. The transition cycle (Nicholson, 1990).

1.2.1. Transition in medical education

Medical education is characterised by transition; learners progress through multiple roles aimed at developing them, first into a doctor and then into a specific type of doctor. In the UK, medical school is typically four to six years, involving a pre-clinical curriculum followed by clinical training. After medical school, graduates complete two years of Foundation Training before entering general practice (GP) or specialty training, which can range from three to eight years of additional full-time training. Upon completion of this training, doctors can take on GP or consultant positions. This is a simplification of the process, but illustrates the multiple transitions within the medical education continuum: into medical school; from pre-clinical to clinical training; into foundation training; into GP/specialty training; and then into GP/consultant roles.

Each stage of training requires the learner to complete a transition cycle as they take on a new role, develop a new identity, adjust and stabilise within that role, before moving onto another one (Jarvis-Selinger et al., 2012). In addition to these larger transition cycles, learners are also moving through smaller cycles as they move to new placements and through sub-

stages of each role. Individuals also go through an overarching transition from a lay person to a medical professional. Moreover, learners are often also transitioning from adolescence to adulthood throughout this process, especially in countries like the UK where the majority of medical students enter directly from school around the age of 18. Therefore, alongside professional identity development, these individuals are also forming their own personal identities. Overall, individuals moving through medical education can be considered as moving through multiple transition cycles at any one time, of varying nature, scale and length.

Understanding transitions is important because each transition lays the foundations for those that follow. Problems in early transitions can have ongoing effects for learners, so it is important to understand how to optimise learners' transition experiences. Progression through medical education is characterised by multiple transitions, which usually occur at set points in time, reflecting an induction conceptualisation of transition (Gale and Parker, 2014). Everyone has to transition at that point, providing they have 'passed' the preceding stage, which is usually determined based on demonstration of particular skills or knowledge (GMC, 2018, 2015). This means that if individuals have not fully adjusted to their current role or situation, or developed optimally in areas outside of those assessed (e.g. professional identity), then they might not be ready or best prepared to move into the next role at the required time point, which could have a negative impact on their well-being and subsequent transition experiences (Nicholson, 1984). For example, one study found that strong professional identity was associated with lower burnout in the transition between medical school and junior doctor (Monrouxe et al., 2017a). Therefore, learners need to be supported to adjust and stabilise during the different stages of training, so they are able to prepare for those that follow.

The transition from pre-clinical to clinical training within medical school is the first major transition occurring entirely within medical education, as the school to medical school transition begins outside of medical school. This transition lays the foundations for subsequent transitions, including the move into foundation training and specialty training after that, as shown in Figure 1-2. It also often involves students' first significant experiences working within the clinical environment and their initial steps taking on the role and identity of a doctor. This research is focused on the transition through clinical training in medical school, which is considered a smaller transition within the overarching transition through medical education.

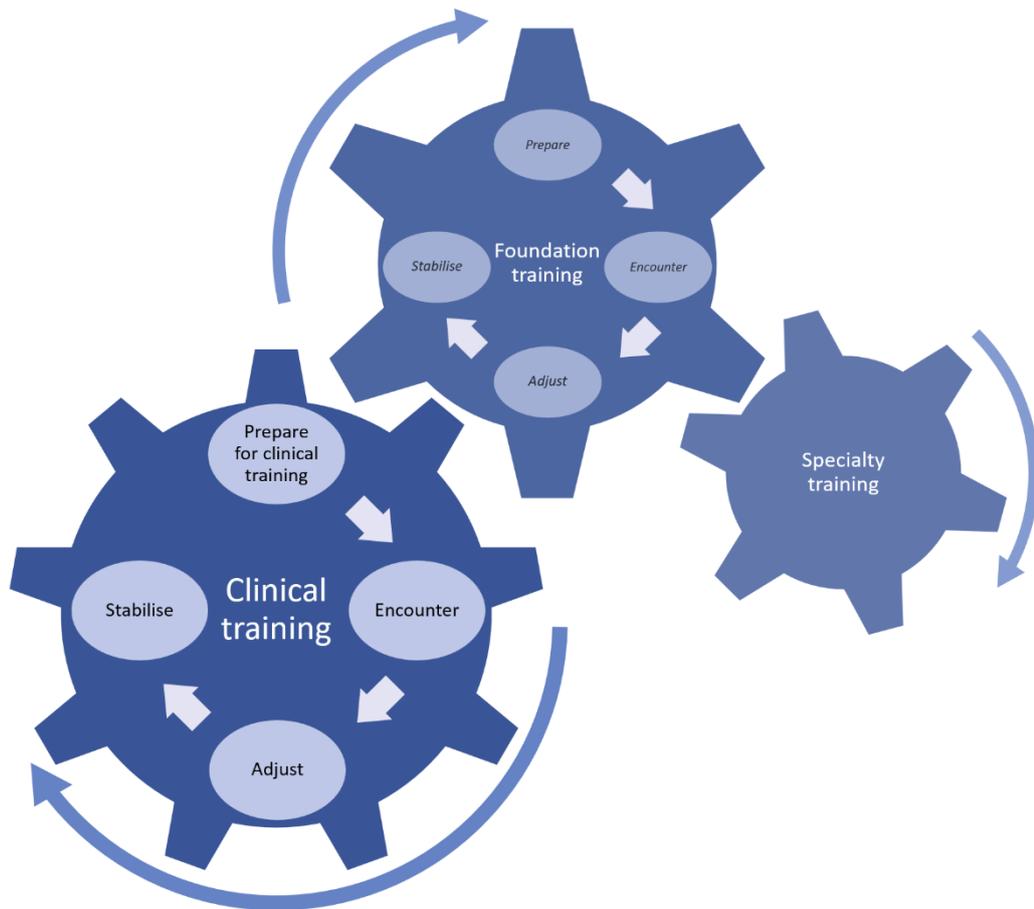


Figure 1-2. The transition cycle (Nicholson, 1990) of clinical training and beyond.

1.2.2. Problems with transition in medical education

In the medical education literature there are indications that some early transitions are not being experienced optimally. In particular, research has suggested that key transition points pose a risk for well-being, as indicated by increased incidences of stress and anxiety at these points (Atherley et al., 2019; Brennan et al., 2010; Dunham et al., 2017; Radcliffe and Lester, 2003; Surmon et al., 2016; Teunissen and Westerman, 2011). These issues have been linked to other problems, such as learners' preparedness for transitions.

Transition research in medical education has commonly focused on the concept of preparedness, which refers to learners' perceptions of being prepared for transitions into new phases of medical education. Learners are often found to feel unprepared for transitions, including those into clinical training (Atherley et al., 2019; Surmon et al., 2016) and foundation training (Monrouxe et al., 2017b). Preparedness conceptualises learners' struggles with transitions as skill and knowledge deficits, which has implications for the types of solutions that are designed to support learners through transitions. Transition courses are

often implemented to help prepare learners for a significant transition and typically focus on increasing skills and knowledge, however few courses evaluated students following the intervention and many lacked clear goals and objectives (O'Brien and Poncelet, 2010; Poncelet and O'Brien, 2008). This lack of clarity around the goals of the courses may reflect issues with the conceptualisation of preparedness, despite the focus upon it within the literature. For example, a wide range of overlapping and contradictory conceptualisations can be found, with preparedness being conceptualised by participants in one study as the process of being prepared, feelings of being prepared, what is needed to be prepared, and outcomes of being prepared (Ottrey et al., 2021). Furthermore, as suggested by Surmon et al. (2016), *feeling* ill-prepared is not necessarily the same as *being* ill-prepared.

The emphasis on preparedness in the medical education transition literature reflects the dominance of the cognitive learning theory school of thought, which centres on learning within the individual (Morris, 2019). A scoping review of the pre-clinical to clinical training transition literature found that most studies took an educational perspective, focusing on the educational deficits of learners, and aligning with the preparedness narrative in which transition is perceived as a struggle (Atherley et al., 2019). Other studies took a social perspective, considering students' struggles integrating with a new environment and social norms, or a developmental perspective, considering transition as a challenge that students had to cope with (Atherley et al., 2019). All three perspectives attribute the struggles or challenges of transition to the student in some way. From the educational perspective, the student lacks specific knowledge or skills; from the social perspective, the student has not yet succeeded in fitting into the new environment, adopting cultural norms and building relationships; and from the developmental perspective, the student had not yet adopted appropriate learning or reflection strategies (Atherley et al., 2019). Overall, even for the social perspective, the emphasis was on the student to adapt to the new environment, rather than considering how the environment affects the student's transition.

This lack of consideration of factors beyond the individual has been challenged by some researchers. Kilminster et al. (2011) critiqued the concept of preparedness and moved beyond it in their research exploring the factors affecting performance during transitions in postgraduate training. They suggested that instead of focusing on preparedness as a concept, transitions should be called 'critically intensive learning periods'. This is because preparedness focuses on the individual and the skills and knowledge that they have acquired in advance of the current transition, however their findings showed that environmental factors also influence performance in the clinical environment. Each work setting in which a

transition occurs has its own culture and social relationships, which affect performance (Kilminster et al., 2011). The extent to which these transition settings acknowledge the role of the wider social processes in performance, will therefore affect the performance of new doctors. Considering the environmental and individual factors affecting transition moves beyond cognitive learning theories to align with socio-cognitive and socio-cultural learning theories (Morris, 2019). These theories consider the social and environmental processes affecting transition, alongside individual processes.

A final point of critique relating to the current focus on preparedness relates to the conceptualisation of transition. Preparedness for specific transitions tends to focus on transition as an event or time period, rather than as an ongoing process. In relation to Nicholson's (1990) transition cycle, this focus only takes into consideration the first two phases, preparation and encounter (Figure 1-1). Transitions are cumulative and there is evidence that not only do some students feel unprepared for the transition into clinical training in medical school, but also at the point of graduation, as outlined above. Therefore, it would be beneficial to extend the exploration of transition through the whole of the transition cycle to consider how students are also adjusting and stabilising, as this could provide insight into the causes of subsequent difficulties in later transitions.

Taking a broader theoretical perspective on transition to incorporate both environmental and student factors affecting the experience, as well as a fuller view of the phases of transition, could facilitate new knowledge of transition and the processes underpinning the problems, and opportunities, they present, including for well-being. However, while often discussed alongside transition, and more broadly, the term well-being lacks conceptual clarity and needs further exploration.

1.3. Well-being

Well-being is a commonly used term in medical education and wider society as there becomes greater recognition and awareness around the importance of mental health. Despite frequent discussion of well-being in various contexts, the meaning of well-being as a concept is unclear; the term is often applied in different ways and is rarely defined, and there is not one generally accepted definition of well-being (Huppert, 2014). The term well-being is often used synonymously with others, such as burnout, stress or resilience. Although conceptually related, these terms signify a state of impaired wellness (Bynum et al., 2021), rather than a state of being well (Huppert, 2014). This research seeks to move beyond a focus on impaired wellness to understand how well-being is affected by transition. Stress, burnout

and resilience are commonly used alongside the term well-being, so are now briefly outlined to clarify the distinction in this research.

1.3.1. Distinguishing well-being from related concepts

Stress can be defined as:

“The unpleasant, and potentially damaging, psychological state that arises when a person perceives that the demands placed upon them exceed the resources available to them to cope with those demands.” (Arnold et al., 2020, p. 467)

Theories of stress can help us to understand the psychological processes by which stress and burnout occur. Transactional stress theories highlight the role of psychological processes in determining an individual’s response to different situations. Individual differences affect an individual’s cognitive appraisal of a situation (e.g. negatively as a threat, or positively as a challenge), their emotional response to it, and their coping style (Lazarus, 1990). If work demands are perceived as mismatched with coping abilities then negative emotions and physical responses result, following this, the outcome of the coping response is evaluated and feeds back into future appraisal and coping (Arnold et al., 2020).

Burnout is a syndrome of work-related stress comprised of exhaustion and disengagement (Demerouti et al., 2001); exhaustion is “a consequence of intensive physical, affective, and cognitive strain” (p. 500) and disengagement refers to “distancing oneself from one’s work and experiencing negative attitudes toward the work object, work content, or one’s work in general” (p. 501). The Job Demands-Resources theory (Bakker and Demerouti, 2017; Demerouti et al., 2001) is used within organisational research to understand burnout. The theory explains how the interaction between job demands and resources can result in either motivation (e.g. engagement) or strain (e.g. burnout), which both influence job performance (Bakker and Demerouti, 2017). This theory of burnout overlaps with the transactional stress theory, with both considering the interplay between demands upon an individual and the resources available to manage those demands.

Resources also play a key part in some definitions of resilience. Windle (2011, p. 12) defines resilience as “the process of effectively negotiating, adapting to, or managing significant sources of stress or trauma.” Windle states that internal and external resources facilitate an individual’s capacity to be resilient, highlighting that an individual’s resilience will vary over time. Resilience reflects responses to adverse experiences rather than flourishing (Windle, 2011).

From the definitions it can be seen that stress, burnout and resilience all relate to the experience of something as difficult, which either results in a particular state, syndrome, or is overcome through drawing on resources. These concepts are related to well-being, in that resilience reduces the likelihood of impaired wellness, such as stress and burnout, in difficult situations. However, to understand what well-being is and how it can be improved we need to look beyond these concepts.

1.3.2. A positive psychological perspective of well-being

Positive psychology recognises that the absence of problems does not mean that people are flourishing; it seeks to identify the causes of human flourishing, so that the human experience of life experience can be improved (Seligman and Csikszentmihalyi, 2000). Positive psychology has influenced the conceptualisation of well-being in this research, which seeks to consider how learners can be supported to have more optimal transition experiences. This does not mean dismissing the difficulties and problems that can occur, but rather adopting a conceptualisation that can consider both problems and opportunities.

1.3.3. Definitions of well-being

Much debate in the well-being literature centres on two philosophical approaches to well-being (hedonia and eudaimonia) and which best represents well-being and how they should be translated to psychological research (Ryan and Deci, 2001). Hedonia generally reflects the perspective that well-being involves the pursuit of pleasure, while eudaimonia is less consistently defined, but is often considered multi-faceted and generally reflects the themes of being true to one's self and developing one's potentials (Huta, 2013). These two focuses are also reflected in the psychological definitions of well-being, which loosely fall into three groups: well-being as 'feeling'; well-being as 'functioning'; and approaches that integrate feeling and functioning (Huppert, 2014).

Well-being as 'feeling' conceptualisations typically reflect happiness. One example and popular conceptualisation is subjective well-being (SWB: Diener, 1984), in which well-being is conceptualised as high positive affect,¹ low negative affect, and satisfaction with life. Although a popular conceptualisation, the main argument against 'feeling' approaches, is that a good life should reflect more than happiness and the content of one's life is also important (Ryan and Deci, 2001; Waterman, 2008). Others have also argued that as positive

¹ Affect refers to experiences of feelings and emotions (APA, n.d.).

affect is in large part determined by individual differences in affectivity, conceptualising well-being as happiness precludes many individuals (e.g. introverts) from having 'good' well-being (Seligman, 2011).

Well-being as 'functioning' conceptualisations typically reflect how individuals live their lives and aspects of optimal functioning. One example is psychological well-being (PWB: Ryff, 1989), in which well-being is conceptualised as having six dimensions: autonomy; environmental mastery; purpose in life; self-acceptance; positive relations with others; and personal growth. Functioning approaches are critiqued by some for including antecedents of well-being within the definition of well-being, e.g. positive relationships, which is argued to be tautological (e.g. Kashdan et al., 2008). These critiques argue that functioning predicts, but does not define, well-being. However, others have found these relationships are bi-directional, e.g. relationships and positive emotions (Lyubomirsky et al., 2005). Furthermore, it seems difficult to conceive of an understanding of well-being that does not include some sense of feeling good.

Other approaches that have conceptualised well-being as both feeling and functioning, include Keyes' and Seligman's conceptualisations of flourishing (Keyes, 2002; Seligman, 2011). Although these approaches overcome some critiques as they incorporate aspects of happiness and the good life, there remain challenges. There are differences in the range of elements included in the different approaches, so clarity is still required about which elements are important for well-being. Furthermore, an explanation for how the different elements relate to one another is often not provided, and these definitions have not been clearly linked to theories of well-being.

Recently, research has begun to accumulate which suggests that, psychometrically, there is one general well-being factor with multiple facets (e.g. Disabato et al., 2016; Longo et al., 2016). Similarly, research has also found that SWB and PERMA² are not psychometrically distinct (Goodman et al., 2018). However, conceptual understanding of a concept is distinct from its operational definition, i.e. quantitative measurement (Goertz, 2006). Furthermore, as Seligman (2018) argues, psychometric evidence for the measurement of well-being is distinct from understanding how well-being can be improved and therefore how it might be supported in different settings. This understanding comes from clear conceptualisation and theorisation of well-being.

² PERMA is the name of Seligman's (2011) conceptualisation, reflecting the five specified attributes of: positive emotion; engagement; relationships; meaning; and accomplishment.

Previous attempts have been made to develop a clear definition of well-being. For example, Dodge et al. (2012, p. 230) reviewed the literature and defined well-being as “the balance point between an individual’s resource pool and the challenges faced”. However, this definition of well-being is not conceptually distinct from resilience (Windle, 2011), nor theories of stress and burnout, in which there is an interplay between demands and resources (Bakker and Demerouti, 2017; Lazarus, 1990). Well-being therefore remains conceptually unclear, given the multitude of definitions of well-being, debates about these definitions, and differences in the attributes specified between even similar definitions. Therefore, further work is needed to identify the elements that are important for a conceptual, rather than operational, understanding of well-being.

1.3.4. Theories relevant to well-being

In addition to a multitude of well-being definitions, there are also multiple theories with relevance to well-being. Some are specific to particular definitions of well-being, such as homeostatically protected mood and SWB (Cummins, 2010). Others are more general and can be applied to both feeling and functioning definitions of well-being, so have greater explanatory power.

Self-determination theory (SDT) is a theory of human motivation, concerned with understanding people as active organisms with tendencies towards growth, development and integration of experiences into the self (Ryan and Deci, 2017). Central to the theory is the idea that social contexts affect the satisfaction of the three basic psychological needs (autonomy, the need to be true to one’s self and self-regulated; competence, the need to feel mastery and control; and relatedness, the need to feel socially connected) and interact with individual differences to facilitate or hinder healthy development and functioning, impacting well-being (Ryan and Deci, 2017, 2000). Satisfaction of these basic psychological needs is proposed to impact both feeling and functioning conceptualisations of well-being, and has been applied into a wide range of contexts (Ryan and Deci, 2017). SDT is deliberately prescriptive about which conditions facilitate need satisfaction to promote wellness and full functioning (Niemić and Ryan, 2013), however, there may be cultural variation in how needs are satisfied (Ryan and Deci, 2000).

Conservation of Resources (COR) theory relates to resources, describing four types of resources (object, condition, personal characteristics, energy), the accumulation of which results in well-being (Hobfoll, 1989). Some resources develop together through favourable conditions, and therefore often co-occur and resource gain spirals can occur (Hobfoll, 2011).

These shorter-term fluctuations in resources can develop into longer-term resource cycles (Hobfoll et al., 2018). This theory highlights how resources can develop and their benefits for individuals. Broaden and Build (B&B) theory concerns the role of positive emotions, proposing that their function is to broaden thought-action repertoires, building resources (Conway et al., 2013; Fredrickson, 2004). Different emotions have different effects, so should be considered individually, rather than under a general label of positive emotions. Therefore, COR theory and B&B theory are complementary, both helping to explain how resources are developed and linked to well-being.

Together these theories can provide initial insights into the psychological processes underlying well-being, including links to the wider environment. However, the general nature of these theories means that specific definitions of well-being are not provided within them, so further work is needed aligning a conceptual and theoretical understanding of well-being, in addition to aligning these to the experience of transition.

1.4. Setting a research agenda

In the 2021 State of the Science issue of Medical Education, Ajjawi and Eva (2021) highlighted the problem of solutionism, whereby pressures to solve problems quickly lead to the adoption of simple solutions, without first understanding the underlying causes. This problem has been identified in medical education, including for the problem of impaired wellness (Bynum et al., 2021), but is also found more widely in the social sciences. Pawson (2018, 2017) has argued the importance of theory-building for social interventions and programmes. He outlines how the narrative of Evidence-Based Medicine (EBM), specifically the predominance of an objectivist approach to research which values the randomised controlled trial (RCT) and meta-analysis above all other methods, is commonly adopted within social programme evaluation. However, Pawson (2018, 2017) argues that this narrative and approach misses the underpinning work of EBM, in which years of research have identified the mechanisms of action through which the designed intervention is intended to work to address the identified problem. Whereas, social programmes and evidence-based policy (EBP) tend to jump straight to the implementation of an intervention, missing out the groundwork identifying the cause of the problem and establishing a theoretical basis for the intervention. It is therefore unsurprising that these programmes often showed mixed effects at best.

Cook et al. (2008) argued that medical education research often lacks the pursuit of scientific inquiry that progresses knowledge because it often missed out the model or theory-

building stage. This aligns with Pawson's (2018, 2017) point around the lack of a theoretical understanding of the cause of the problems we seek to address. Cook et al. (2008) presented a taxonomy of three types of research: descriptive, presenting observations; justification, evaluating interventions; and clarification, drawing on the scientific method to advance knowledge in the field through observation, theory-building, and making and testing predictions. Their review of the literature highlighted a lack of clarification research within medical education (Cook et al., 2008), which remains an issue, as can be seen through the issue of solutionism (Ajjawi and Eva, 2021).

This can be seen in areas relating to well-being; for example, Bynum et al. (2021) highlighted how solutionism had resulted in a proliferation of wellness interventions without a sound understanding of the problems. The same issues can also be seen in the transition literature, where there has been less clarification research explaining the problems around transition, compared to that justifying the use of different interventions (Teunissen and Westerman, 2011). Furthermore, those studies that did seek to clarify often lacked theoretical frameworks, meaning that they did not align their research with relevant theories to support a deeper understanding.

This programme of research sought to fall within the domain of clarification (Cook et al., 2008), theory-building around the problem of transition and well-being, to advance our knowledge of the issues. Through theory-building in this area, it is more likely that we can develop the knowledge of the mechanisms of action around transition and well-being, so that future interventions can be better designed to support learners.

The transition literature, as outlined above, has tended to focus on the issue of preparedness in relation to easing problems experienced by learners, including poor well-being. However, this focus is narrow and takes just one perspective on the issues, an educational perspective (Atherley et al., 2019), and reflects a perception of transition as a threat to learners, rather than an opportunity for growth (Teunissen and Westerman, 2011). Preparedness also focuses primarily on the individual learner, and misses how the interplay between the individual and the environment can affect their experience (Kilminster et al., 2011). Overall, there is a need to consider how both student and environmental factors affect well-being through transitions.

The General Medical Council (GMC) requires medical schools to support student well-being (GMC, 2013), including through transition experiences. It has also specified that students learn to take responsibility for their own well-being into their careers, formalising

this as one of their outcomes for medical graduates (GMC, 2018). However, the current lack of conceptual and theoretical clarity around well-being hinders an understanding of how well-being can be supported alongside transitions and how individuals can manage their own well-being. Theories of well-being suggest that supporting learning and development through transitions will also support well-being because it is aligned to growth and development (Fredrickson, 2004; Ryan and Deci, 2017). However, these well-being theories have not yet been integrated into the transition literature.

This research aimed to improve the knowledge of how well-being is affected by transition by taking a theory-building approach and clarifying the concept of well-being, exploring how both student and environmental factors affect well-being during transition, and the links between well-being and learning during transition.

1.5. Thesis structure

The thesis has eight chapters, including this introduction chapter.

Chapter 2. Methodology

The methodology chapter outlines the philosophical assumptions underlying the paradigm of scientific realism used in this work. It contrasts the paradigm to dominant paradigms in medical education, and to critical realism, a related paradigm. The principles of realist methodology are outlined and the application of the methodology in this work is described, including the research question, research design, and conceptualisation of key concepts.

Chapter 3. Theoretical Integrative Review

The third chapter presents the methods and findings from a theoretical integrative review (TIR) of well-being. The review identified definitions and theories of well-being and synthesised these into a concept definition and theory of well-being. This chapter brings conceptual and theoretical clarity to the central outcome in the work, and forms the basis of initial theorising for the subsequent research components.

Chapters 4 and 5. Realist Review

These chapters outline the methods and findings of the realist review. The realist review examined the existing clinical training transition literature through the lens of the well-being definition and theory from the TIR. The methods provide a detailed description of the steps of the review, providing transparency around the processes followed and decisions made. A

final pool of documents was narrowed down to inform theory-building about well-being and transition, and the findings are presented as explanations of the ways in which contexts and mechanisms interact to change students' well-being.

Chapters 6 and 7. Realist Investigation

These chapters outline the methods and findings of the realist investigation. The methods describe how realist interviews with students and educators were used to obtain data for further theory-building around well-being and transition, building on key theories from the realist review. The findings provide further detail about the contexts and mechanisms that interact to affect students' well-being. They also explore the links between well-being and learning.

Chapter 8. Discussion

Finally, the discussion chapter brings together the findings from the TIR, realist review, and realist investigation. The conceptual and theoretical foundations of well-being are outlined. A refined theory of well-being and learning during the transition through clinical training is presented and discussed in relation to the wider literature. General and specific recommendations based on the refined theory are suggested for supporting well-being and learning through the transition. The chapter concludes with a discussion of the strengths and limitations of the work as a whole, and the final conclusions.

1.6. Chapter summary

The chapter outlined how well-being issues have been commonly cited within medical education and the wider profession, however well-being remains poorly conceptualised. Transition is conceptualised in this work as the ongoing psychological and social processes through which medical students become doctors. Transitions have been identified as particular sources of well-being issues. However, the causes of these remain unclear because research has tended to focus on individual factors alone and has not explained the deeper causes of the problems. Therefore, this research took a theory-building approach to clarify the concept of well-being, explore how both student and environmental factors affect well-being during the transition, and identify the links between well-being and learning.

Chapter 2. Methodology

2.1. Introduction

A scientific paradigm “consists of the concepts, practices, and language that define a particular approach to science” and can be considered in terms of ontology, epistemology, axiology and methodology (Varpio and MacLeod, 2020, p. 687). Medical education is a multidisciplinary field and consequently multiple paradigms are used in the literature, so others do not necessarily share our worldviews (Ellaway, 2016). Therefore, it is important for researchers to be clear about their paradigm so that others with different perspectives can understand their approach (Varpio and MacLeod, 2020).

This chapter starts by outlining three of the dominant paradigms in medical education – positivism, postpositivism, and constructionism – before describing the paradigm of scientific realism used in this programme of research. The four paradigms are then contrasted to understand how scientific realism relates to more commonly used paradigms in medical education. Scientific realism is also contrasted to the closely related paradigm of critical realism, and the key differences are highlighted. The chapter then moves onto a discussion of realist methodology and the principles underpinning this. Finally, the application of realist methodology within this programme of research is described, including the research aim and questions, and overall design.

2.2. Research paradigms in medical education

The dominant paradigms in medical education have tended to be positivism and postpositivism, given the field’s associations with the medical sciences (Woodruff, 2021). There has been a tendency to attempt to apply the medical model and principles of EBM to the problems of medical education (Biesta and van Braak, 2020; Woodruff, 2021). However, this approach can be problematic because it makes specific assumptions about the nature of the social world, such as stability, that are unfounded, leading to problems implementing a positivist paradigm (Woodruff, 2021). Furthermore, as highlighted above in section 1.4, the application of EBM to social problems often misses out the groundwork identifying the mechanisms of action and developing theories of these (Pawson, 2018, 2017). Other paradigms are now being used to gain an alternative perspective on issues within medical education, primarily constructionism.

2.2.1. Assumptions and terminology

It is helpful to consider the ontological and epistemological assumptions underlying different paradigms, as this helps us to understand the basic assumptions underpinning our own and others' work (Varpio and MacLeod, 2020). However, the terminology used within discussions of philosophy of science and paradigms can be difficult to navigate because terms are often undefined and/or applied in different ways, so establishing the nuances of different paradigms can be challenging. To assist in the differentiation, Sayer's (2000) discussion of objectivity and subjectivity was drawn upon. Sayer differentiates between three meanings of objectivity, which are outlined in Table 2-1. These terms will be used to help summarise the assumptions of the positivist, postpositivist and constructionist paradigms. Following the introduction of the scientific realism paradigm used in this work, the assumptions of the four paradigms are contrasted using this terminology in section 2.3 and summarised in Table 2-2.

Table 2-1. Objectivity and subjectivity distinctions. Adapted from Sayer (2000).

Epistemological meanings of objectivity-subjectivity	
Objective₍₁₎: assumption that research should and can be value-free and unbiased.	Subjective₍₁₎: assumption that research is value-laden and bias is inevitable.
Objective₍₂₎: assumption that research should search for truth and objective knowledge, or at least practical adequacy.	Subjective₍₂₎: assumption that ideas are not true or are opinion.
Ontological meaning of objectivity-subjectivity	
Objective₍₃₎: assumption that reality is distinct from knowledge, i.e. mind-independent reality.	Subjective₍₃₎: assumption that reality is not separate from experience, thought, belief or feeling.

2.2.2. Positivism and postpositivism

The positivist paradigm holds the ontological assumption that there is a single observable external reality (Park et al., 2020). A successionist perspective of causation is held, in which causal inferences are made when one variable is regularly observed to occur before another, so they are associated in the absence of possible confounding variables (Park et al., 2020; Pawson, 2008; Sayer, 2000). Epistemologically, a positivist paradigm assumes that it is possible to be objective in research, separating the researcher from the subject matter, so that the findings are not biased (Park et al., 2020). When these conditions are met, the knowledge generated can be said to be true of reality (Park et al., 2020). Consequently,

methodologies which enable control and manipulation of variables are used, typically experiments and quasi-experiments. Methodologies start with theories, which are used to generate hypotheses that are then tested empirically and supported or refined. The goal of research is to generate findings that are representative and generalisable, so that universal laws about reality can be determined (Brown and Dueñas, 2020; Park et al., 2020). Therefore the positivist paradigm takes an objective₍₃₎ perspective of reality (external reality), seeks to generate objective₍₂₎ knowledge (truth), and that this should and can be achieved through being objective₍₁₎ (value-free).

Postpositivism shares many of the assumptions of positivism, however the key difference relates to the epistemological assumptions about knowledge (Young and Ryan, 2020). While positivists assume it is possible to remove bias from research, postpositivists acknowledge human fallibility and while seeking to minimise bias they accept that this is not entirely possible. Postpositivists therefore acknowledge the fallibility of our knowledge about reality and seek to falsify theories through research, rather than assuming, like positivists, that theories accurately reflect reality (Young and Ryan, 2020). Therefore the postpositivist paradigm also takes an objective₍₃₎ perspective of reality (external reality), seeks to generate objective₍₂₎ knowledge (truth), but acknowledges that research is often subjective₍₁₎ (value-laden) although attempts are made to be more objective₍₁₎ (value-free).

2.2.3. Constructionism

A third dominant paradigm in medical education is constructionism. The terms constructionism and constructivism (and sometimes interpretivism) are often used interchangeably or without clear delineation (Rees et al., 2020). However some differentiate them, with constructivism focusing on the individual and the meaning they make of experiences, and constructionism focusing on broader social processes, such as collective meaning making through language (Crotty, 1998; Rees et al., 2020).³ Constructionism is often considered an epistemological position, reflecting the construction of knowledge through social interaction and dialogue (Rees et al., 2020). Ontologically, constructionists often hold a relativist view of reality (subjectivist₍₃₎, i.e. reality is dependent upon our interpretation of it), however constructionism incorporates a wide variety of positions (Rees et al., 2020; Sayer, 2000). Moderate forms of constructionism may accept some aspects of reality as

³ A detailed description of the differences between constructionism and constructivism is beyond the scope and purpose of this work, so the term constructionism is used to refer to both here, unless referring to a specific author in which case their terminology is used.

independent of our knowledge (partial objectivist₍₃₎), while radical forms of constructionism may consider nothing to exist outside of our construction of it (subjective₍₃₎), at other times ontology is not discussed at all (Rees et al., 2020). Constructionism values social processes, such as language and culture, and context, seeking to better understand human experience and nature (Brown and Dueñas, 2020; Rees et al., 2020).

2.2.4. Scientific realism

The programme of research described in this thesis was conducted within the paradigm of scientific realism, specifically the application developed by Pawson and Tilley (Pawson, 2013, 2006a; Pawson and Tilley, 1997).⁴ The paradigm's ontological, epistemological and axiological assumptions are now described. To help clarify these assumptions, the paradigm is then compared to positivism, postpositivism and constructionism, and critical realism in section 2.3. The principles of realist methodology are outlined in section 2.4.

2.2.4.1. Ontology

Ontology considers the nature of reality and what things are real (Varpio and MacLeod, 2020). Ontologically, scientific realism considers reality to be external and independent of our ability to know it, called a mind-independent reality (Sayer, 2000). This means that reality and the things within it (physical, social, psychological etc.) are considered to be real and their existence is not dependent on whether we know about them or not.

In scientific realism, reality is considered stratified into three domains, the real, actual and empirical (Bhaskar, 2008; Jagosh, 2020a; Mukumbang et al., 2020; Sayer, 2000). Various metaphors have been proposed to help understand ontological depth. One metaphor is of an iceberg, with the hidden mechanisms considered the unseen bulk of the iceberg beneath the surface of the water (Jagosh, 2019). Another helpful metaphor is of a plant (Wiltshire and Ronkainen, 2021), which has been adapted in Figure 2-1 to illustrate ontological depth. The domain of the real incorporates all things in the world and all of their causal powers, whether these have been activated or not (it therefore incorporates the other two domains). For

⁴ The name scientific realism was used in Pawson and Tilley's (1997) first work. Pawson (2006, 2013) has since debated the name of the approach, and it does not currently have an accepted name, however the underlying principles of the paradigm remained consistent across Pawson's works. Therefore, for lack of a clear alternative, the name scientific realism is used to refer to the paradigm. Pawson and Tilley's scientific realism has philosophical parallels to the philosophy of science scientific realism (Chakravartty, 2017), however Pawson and Tilley's scientific realism applies these principles within a specific methodology. Unless otherwise stated, the term scientific realism refers to Pawson and Tilley's application of scientific realism, rather than scientific realism as a philosophy of science.

example, there is the potential for plants to grow whether they have done so or not. The domain of the actual refers to events caused by the activation of causal powers in the domain of the real, including their manifested effects (it therefore incorporates the domain of the empirical). For example, the potential for a plant to grow becomes activated in the fertile soil of a sunny garden and the plant grows. The domain of the empirical consists of the tangible things that we can feel, observe and measure through experiences associated with the events occurring in the domain of the actual. For example, we can smell and see the plant that has grown in the garden. The three domains describe the idea of ontological depth in scientific realism; some of the things in the world are unobservable but no less real. This idea contrasts with empirical realism found in other paradigms, in which only observable things are considered real (Bhaskar, 2008). Ontological depth is also an important part of the ideas of causation in scientific realism.

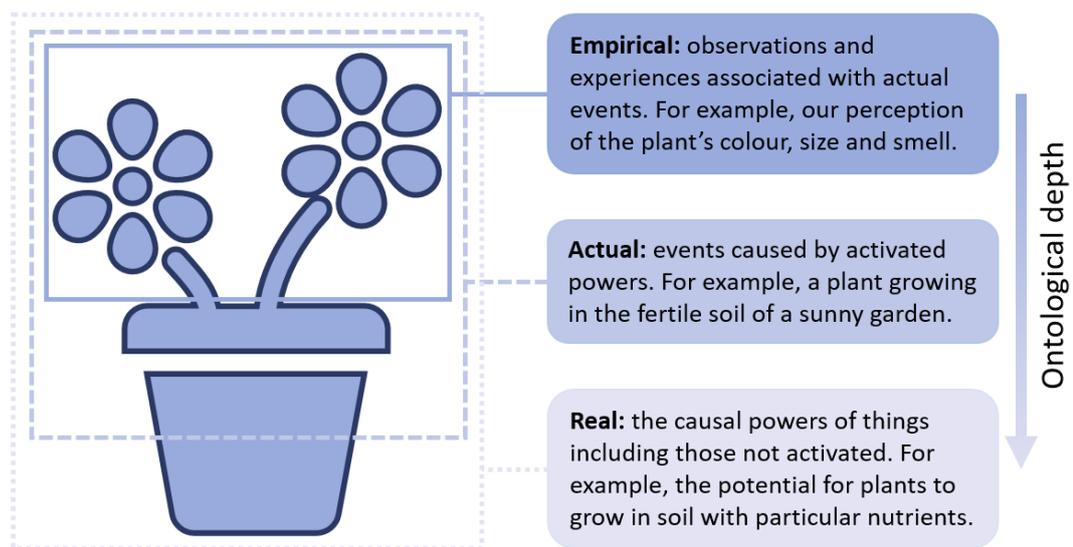


Figure 2-1. Ontological depth. Adapted from Wiltshire and Ronkainen (2021).

Scientific realism subscribes to the idea of generative causation, as opposed to successionist causation (Jagosh, 2019). Successionist causation is the perspective that causality can be inferred from the numerical and temporal co-occurrence and association of variables (Pawson, 2008). Generative causation, on the other hand, is the perspective that events in the world (domain of the actual) and our experiences of these (domain of the empirical) are caused by mechanisms, which are the activated causal powers of things in the world (domain of the real) (Pawson, 2008; Sayer, 2000). These mechanisms are activated in conducive contexts, meaning that the right conditions are available to activate the mechanisms (Figure 2-2). For example, a plant will only grow (activation of the causal mechanism for growth) in

the right soil, light and water conditions (contexts). Different events and experiences are caused because contextual variations change which mechanisms are activated. Furthermore, mechanisms can affect the activation of other mechanisms, called countervailing mechanisms (Astbury and Leeuw, 2010; Pawson, 2013).

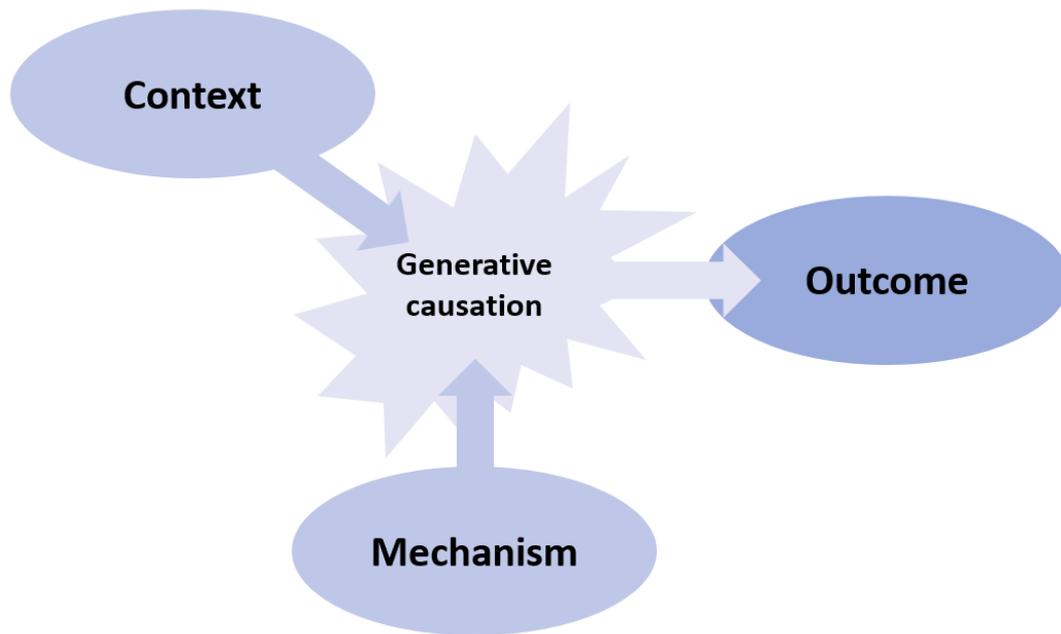


Figure 2-2. Generative causation. Adapted from Jagosh (2019).

The idea of different patterns of mechanisms being activated in different contexts relates to the idea of the social world as open systems, formed of interconnected component parts, each with their own emergent casual powers (Elder-Vass, 2007; Sayer, 2000; Westhorp, 2018). Open systems are constantly changing, which Archer (1998) has called morphogenesis. This is the idea that society continually changes because structures in society affect the choices that people make (agency), but those people in turn make choices that change the structures, and so on. Therefore, realists stress the importance of considering individual actions as embedded within the wider social systems and processes (Pawson and Tilley, 1997). Furthermore, our knowledge of open systems and the things within them must continually evolve to meet these changes. We need to employ methodologies that accommodate this complexity and change, rather than trying to control it, enabling us to develop knowledge about complex systems (Pawson, 2006a).

2.2.4.2. Epistemology

Epistemology considers the nature of knowledge, especially around what we can know and what knowledge is (Varpio and MacLeod, 2020). In scientific realism, theory is the basis through which scientific inquiry is designed (Pawson, 2013). As Bhaskar (2008, p. 182) stated “Theory without experiment is empty. Experiment without theory is blind.” In scientific realism, theories focus on generative causation, seeking to identify the mechanisms causing the outcomes of interest, and the contexts in which these mechanisms are activated (Pawson and Tilley, 1997). Theory-building is required at the start of a research project to identify potential mechanisms and contexts, which are then tested with empirical evidence and refined (this process is described in detail in section 2.4). Research endeavours should be cumulative, so that knowledge develops over time. Scientific realism draws on theories from different levels of abstraction to help develop knowledge. Substantive theories from particular disciplines or domains, such as psychology’s SDT (Ryan and Deci, 2017), and are typically located at an abstracted, or middle-range, level (Merton, 1967; Wong et al., 2013b). This means they can be applied across various settings, such as education and healthcare, enabling cumulative knowledge (Pawson, 2013; Wong et al., 2013b). These substantive theories can be used to develop more specific (and less abstracted) theories, such as programme theories, which detail the ideas about how a particular programme is supposed to work (Shearn et al., 2017; Wong et al., 2013b).

In scientific realism, theories represent our knowledge of the real world. While they aim to accurately represent reality, it is acknowledged that they may often be approximations of truth (Sayer, 2000). Scientific realism acknowledges the fallibility of knowledge for several reasons. Firstly, the open system nature of the social world means that we cannot fully understand what is going on because there are so many mechanisms and contexts interacting at any one time, and change is constant (Pawson, 2013). Secondly, scientific realists recognise that our knowledge is constructed and that this process is affected by our interpretations of the world, which are shaped by our values, beliefs, experiences and characteristics (Sayer, 2000). Therefore, while we strive for that knowledge to reflect reality, it cannot be entirely objective. Thirdly, ontological depth means that many elements of reality are unobservable, so it is not possible to directly experience them, making it more challenging to know them (Jagosh, 2020a). While it is acknowledged that we will not find universal laws because of the changing contexts affecting mechanism activation in open systems, we do however seek to identify demi-regularities, which are semi-predictable patterns of mechanisms and outcomes with variations due to changing contexts (Astbury and Leeuw, 2010; Jagosh et al., 2012;

Pawson, 2006a). Pawson (2013) aimed to capture these demi-regularities in reusable conceptual platforms at the middle-range level of theory, supporting knowledge development through application across different programmes.

Central to the assumption of generative causation is the idea of mechanisms producing effects, rather than merely preceding them (Groff, 2017). As mechanisms are the underlying powers that cause outcomes, they are not the same as variables, nor as programme activities (Astbury and Leeuw, 2010). Mechanisms need conceptualising because they are part of the domain of the real and are not directly observable (Sayer, 2000). Williams (2018) distinguished between ontological and epistemological mechanisms, with the former being the ‘real’ mechanisms we are seeking to identify, and the latter being our theories (i.e. knowledge) of those real mechanisms. Through retrodution – the unearthing of causal mechanisms – we identify causal mechanisms relevant to the subject matter (Jagosh, 2020a), but these are epistemological, not ontological, mechanisms (Williams, 2018). The conceptualisation of mechanism in this work is discussed in detail in section 2.5.3.

2.2.4.3. Axiology

The axiological assumptions of different paradigms have generally been considered less extensively than their ontology and epistemology (Brown and Dueñas, 2020). Axiology links ontology, epistemology and methodology, relating to the values that underpin these and the research (Brown and Dueñas, 2020; Varpio and MacLeod, 2020). In particular, axiology relates to considerations of “why and how specific kinds of research came to be valued and deemed worthwhile” (Varpio and MacLeod, 2020, p. 688). Given scientific realism’s ontological assumptions of mind-independent reality, ontological depth and generative causation, its epistemological assumptions can be seen as valuing knowledge of causality and as reflecting the deeper understanding of reality. Theories represent this knowledge and are the main focus of research conducted within the paradigm of scientific realism, and retrodution is used to try to identify and incorporate mechanisms into those theories. There is an attempt to try to understand the causal powers generating the phenomena in the world around us, although the potential fallibility of that knowledge is acknowledged. The methodology valued by the paradigm is therefore one that seeks to develop, test and refine theory, and this is explored further in section 2.4. The debates between researchers using scientific realism and critical realism often centre around axiological considerations, and these are explored in more detail in section 2.3.3.2.

Table 2-2. Objectivity and subjectivity assumptions of the dominant paradigms.

Paradigms ^a	Sayer's (2000) objectivity-subjectivity distinctions		
	Objective-Subjective ₍₁₎	Objective-Subjective ₍₂₎	Objective-Subjective ₍₃₎
Positivism	Important to be value-free (objective ₍₁₎)	Seeks to find truth (objective ₍₂₎)	External reality (objective ₍₃₎), consisting of observable things; successionist causation
Postpositivism	Recognises bias in research (subjective ₍₁₎), but seeks to minimise this where possible (objective ₍₁₎)	Seeks to find truth but recognises the fallibility of knowledge so it may only be an approximation of the truth (objective ₍₂₎)	External reality (objective ₍₃₎), consisting of observable things; successionist causation
Constructionism (radical)	Research is value-laden (subjective ₍₁₎)	Knowledge is socially constructed and there is no truth to find (subjective ₍₂₎)	No external reality, only social constructions and internal experiences (subjective ₍₃₎)
Constructionism (moderate)			Some objects may be considered real (partial objective ₍₃₎), but others are social constructions (subjective ₍₃₎)
Scientific realism	Recognises role of values and resulting bias in research (subjective ₍₁₎)	Seeks to find truth but recognises the fallibility of knowledge so it may only be an approximation of the truth (objective ₍₂₎)	External reality (objective ₍₃₎), consisting of both observable and unobservable things (ontological depth); generative causation

Notes. ^a The descriptions of the paradigms have been simplified to some extent. Representation of each paradigm is intended to reflect general assumptions for each, it is of course acknowledged that variations are found within each.

2.3. Situating scientific realism alongside other paradigms

Scientific realism is considered in relation to the dominant medical education paradigms of positivism and postpositivism and then constructionism. Drawing on the terminology introduced in Table 2-1, the similarities and differences between the paradigms are summarised in Table 2-2.

2.3.1. Scientific realism, positivism and postpositivism

The positivist and postpositivist paradigms' ontology has similarities to scientific realism in that all three paradigms assume there is a mind-independent reality (objective₍₃₎). However, the key difference with scientific realism is that, for positivists and postpositivists, reality consists only of observable things, reflecting empirical realism (Bhaskar, 2008). For scientific realists, reality consists of both observable and unobservable things. Epistemologically, all three paradigms seek to find the truth about reality (objective₍₂₎). However, both postpositivism and scientific realism assume that knowledge is fallible and recognise that research is value-laden and the potential influence of bias (subjective₍₁₎). Therefore, while both search for the truth they also accept the possibility that knowledge may only be an approximation of true reality (objective₍₂₎). This is in contrast to positivism, which assumes research can be value-free and unbiased (objective₍₁₎), so the search for truth can yield true knowledge of reality (objective₍₂₎).

2.3.2. Scientific realism and constructionism

The variety of ontological positions within constructionism has implications for the compatibility with scientific realism. The radical constructionist perspective that nothing exists outside of our minds is not commonly encountered anymore in research (Chakravartty, 2017), and is not compatible with a realist ontology (Sayer, 2000). However, forms of moderate constructionism that emphasise how our knowledge of things is constructed based on our interpretations, are compatible with a realist ontology (Maxwell, 2012; Sayer, 2000). As Maxwell (2012, p. 5, emphasis in original) states:

“Critical realists thus retain an ontological realism (there is a real world that exists independently of our perceptions, theories, and constructions) while accepting a form of epistemological constructivism and relativism (our

understanding of this world is inevitably a construction from our own perspectives and standpoint).”⁵

Some have argued against a realist ontology and constructionist epistemology. At the International Realist Conference 2021, Westhorp (2021) stated that she did not agree that a constructivist epistemology aligns with realism and a realist ontology. However, the arguments presented seemed to reflect an ‘all-or-nothing’ acceptance of constructivism. Westhorp argued that given the ontological differences between realism and constructivism, and the influence of ontology on epistemology, a constructivist epistemology was incompatible with realist ontology. However, if we consider a paradigm as a specific combination of ontological and epistemological assumptions, then different paradigms can share some assumptions and not others. For example, as outlined above, scientific realism shares commonalities with both positivism and postpositivism, but also key differences. Therefore it is helpful to consider scientific realism and constructionism from a more nuanced perspective, and consider again Sayer’s (2000) three objectivity-subjectivity distinctions (Table 2-1).

Ontologically, scientific realism and constructionism generally hold different assumptions. Constructionists typically consider at least some things to be socially constructed (partially/fully subjective₍₃₎). Conversely, scientific realists assume that reality is external and mind-independent (objective₍₃₎). Epistemologically, the similarities and differences are more complex. Both constructionists and scientific realists consider values to affect research (subjective₍₁₎). Constructionists generally consider knowledge to be socially constructed, so are not searching for truth or objective knowledge (subjective₍₂₎). However, depending on the ontological assumptions of the particular form of constructionism, there might be acceptance of some truth in the world. For scientific realists, there is also an acceptance that knowledge is constructed, but knowledge is an attempt to represent the truth, even if this is an approximate truth (objective₍₂₎). Given the ontological assumptions of an external reality in scientific realism, knowledge is also considered to be real. As Westhorp (2021) argued, for scientific realists, knowledge is a real thing with causal powers. Therefore, knowledge construction is affected by existing knowledge, by the objects being studied, and by our own beliefs, experiences, characteristics and interpretations (Westhorp, 2021). Overall, it is

⁵ In his use of the term ‘critical realism’, Maxwell’s intended meaning is similar to the scientific realism described in this work, rather than referring to Bhaskar’s critical realism specifically.

argued here that scientific realism does have some commonalities with some forms of constructionism, but there are also key differences.

2.3.3. Critical realism and scientific realism

Pawson and Tilley's (1997) and Pawson's (2013, 2006a) realism⁶ is often attributed as sitting within the paradigm of critical realism (e.g. Ellaway et al., 2020; Hinds and Dickson, 2021). However, critical realism is primarily a philosophy of science, concerned with the consideration of questions about the nature of knowledge and how it should be obtained. Conversely, scientific realism was developed to enable the application of the principles of realism to empirical investigation of social issues and, principally, the evaluation of social programmes. While there are similarities between scientific realism and critical realism, there are important distinctions. For example, Porter critiqued Pawson's application of realist principles, and an extensive debate ensued (Pawson, 2016a, 2016b; Porter, 2017, 2015a, 2015b; Porter and O'Halloran, 2012). Whilst the debate is challenging to engage with given the esoteric nature of the discussions, it highlights some areas in which scientific realism and critical realism diverge. Porter's concerns seemed to be centred primarily around Pawson's (and Tilley's) conceptualisation of mechanism and context, and the lack of values-based criticality.

2.3.3.1. Conceptualising mechanism and context

Porter (2015a, 2015b) has critiqued Pawson and Tilley's (1997) conceptualisation of mechanism for conflating structure and agency (Archer, 1998). This perhaps relates to the use of the term mechanism in the context-mechanism-outcome (CMO) heuristic (discussed in detail in section 2.4.4), which could be interpreted as implying a single mechanism. Porter suggested that the CMO could be clarified by changing it to: Contextual Mechanisms + Programme Mechanisms + Agency = Outcomes (Porter, 2015b). Pawson (2016a) dismissed these concerns, arguing that structure was included in the social contexts surrounding an intervention, while the mechanism focuses on agency. Nevertheless, Porter's (2015b) revision to the CMO heuristic, even if not adopted explicitly, is a helpful reminder of the different sources of causal powers within an explanation of generative causation, as these are not explicit in the CMO heuristic. Differences in the specific conceptualisation of mechanism between Pawson and Porter could be related to the different levels of focus of

⁶ In this work, referred to as scientific realism, as outlined above.

scientific realism and critical realism. The focus of scientific realism tends to be at a system level closer to individuals, and consequently the mechanism conceptualisation reflects the importance of individual reasoning. Whereas, critical realism is typically concerned with societal issues, for which explanation and mechanism conceptualisation need to reflect higher-level social structures and agency within these. Nonetheless, scientific realism and critical realism share similar assumptions about mechanisms.

Porter (2015b) also challenged Pawson's conceptualisation of context, stating that at times it aligns with a critical realist understanding of contexts having causal powers, whereas elsewhere it reflected a description of conditions. Pawson (2016b) argued that his approach clearly describes contexts as having causal powers. While this is the case, context has often been conceptualised in realist evaluation and synthesis as a static and fixed aspect of the backdrop of an intervention, rather than as dynamic and active in shaping participants' responses to programmes (Greenhalgh and Manzano, 2021). Therefore researchers have often relegated context to a descriptive, rather than explanatory, role in their causal explanations. This point was also made by Westhorp (2018) who emphasised the need to explain how mechanisms in the context affect programme mechanisms. Therefore, despite Porter's concerns, scientific realism, like critical realism, conceptualises context as having causal powers, although this may have been overlooked in the application of the methodology by some researchers. The conceptualisation of context and mechanism in this work is discussed in detail in section 2.5.3.

2.3.3.2. Axiological differences

As outlined in section 2.2.4.3, axiology links ontology, epistemology and methodology, relating to the values that underpin these and the research (Brown and Dueñas, 2020; Varpio and MacLeod, 2020). While the ontological and epistemological assumptions of scientific realism and critical realism are generally aligned, the key difference seems to be in the axiological assumptions around values and normativity and therefore what is considered the purpose of research.

Pawson (2013) highlighted the contribution of Bhaskar's early work on critical realism to his own ideas, specifically the importance of developing theories about the mechanisms involved in generative causation before implementing or evaluating interventions. However, Pawson (2013) also distanced himself from Bhaskar's later work, which he described as emancipatory and normative. This development of critical realism highlights a key difference with scientific realism, in which the former emphasised normative theory within a critical

social science (Sayer, 2000). This means that the aim of critical realism became about critiquing the current lay theories within society and suggesting ways in which a more idealised society can be reached. Accordingly, Porter's original critique of realistic evaluation seems to be primarily about the lack of 'critical' (Porter and O'Halloran, 2012), which he argues is important because researchers have a duty to help progress human growth and flourishing (Porter, 2015a, 2015b). However, this diverges from the application of realism to evaluation in Pawson's work (Pawson, 2013).

For Pawson, realist methodology should aim to be objective by scrutinising research and seeking to get closer to the truth by cumulating evidence and opening our work up to the scrutiny of others (Pawson, 2016b, 2016a, 2013). Sayer (2011) argued that research should provide information (i.e. evidence) about what is good or bad about society, but that this should not directly inform policy because other factors may be relevant. Pawson (2016b) agreed; research is not and should not be devoid of values, but claims should be based on evidence and data, not values alone. In this way, scientific realism's emphasis is on the process of attempting to conduct objective scientific inquiry that gets closer to the truth through clear rationales behind research and cumulation of evidence. Pawson (2016a, 2016b) seemed to take particular issue with the use of highly abstracted 'grand' theory (Davidoff et al., 2015), such as capitalism or patriarchy, to draw conclusions about programmes or social issues, without locating those claims in evidence. Scientific realism values empirical evidence and locating claims within data, and for Pawson (2013), the 'critical' element of realism is more about being part of a critical science tradition. This reflects scientific realism's other origins in Donald Campbell's postpositivism as well as critical realism (Pawson, 2013).

This aligns with the other important emphasis for Pawson (2013, 2006a), which is the importance of scientific inquiry being pragmatic and producing useful information to inform EBP. His emphasis on the importance of conducting the groundwork to develop theories of generative causation is based on the assumptions of the value of this for understanding how, for whom, in what circumstances and why programmes work (Pawson, 2018, 2017, 2013). In this way evidence is used to make informed policy decisions, rather than incorporating value-judgements into the evaluation process through emancipatory and normative approaches (Pawson, 2016b).

2.3.4. Choosing scientific realism

Paradigm selection depends upon the research problem and the researcher's worldviews. This research sought to understand how well-being is changed by the dynamic and ongoing process of transition, including the influence of student and environmental factors. The goal of this research was clarification (Cook et al., 2008), seeking to understand how and why well-being is affected by transition, and how different factors affect this process. Therefore, a paradigm (and associated methodology) was needed that could embrace complexity and develop causal explanation.

The researcher's own worldviews align with scientific realism's assumption of a mind-independent reality, and epistemological assumptions of the fallibility of knowledge. These also align with postpositivism, however, scientific realism goes beyond postpositivism to consider the deeper causes of phenomena through ontological depth and generative causation, which were considered important for the development of an explanatory account in this research. Constructionism was considered less appropriate as it did not align with the researcher's worldviews around a mind-independent reality, especially for internal experiences such as well-being. The focus of constructionism on understanding individual and social meaning and interpretation was also considered less aligned with this research, which sought to explain phenomena more broadly.

Scientific realism, rather than critical realism, was chosen because the purpose of the research was not primarily to critique current practices around well-being and transition in medical school, as would be the focus of critical realist work. Rather, the purpose was to gather evidence to inform theory development, testing and refinement to provide a better understanding of how well-being is affected by transition, so that this knowledge can be used in policy and practice to improve well-being through the transition. Therefore, this purpose was considered to align more closely with Pawson's scientific realism than Bhasker's critical realism. Furthermore, scientific realism facilitates the application of the ontological and epistemological assumptions of realism within a clear methodology. Therefore, overall, scientific realism was well aligned between the researcher's worldviews and the purpose of the research.

2.4. Principles of realist methodology

Pawson and Tilley (1997) originally developed their methodology for evaluating social programmes.⁷ They sought to integrate the principles of realism into evaluation to overcome issues they identified in the field of EBP. Pawson (2018, 2017) argued that there is a common attempt to replicate EBM methodologies in the social sciences and EBP, for example privileging RCTs. In EBM, before interventions are developed and tested in RCTs, many years of groundwork were conducted determining the mechanisms of action. Even so, findings can still be mixed due to the additional contexts affecting patients in the real world. Pawson (2018, 2017) argues that the social sciences often skip straight to RCTs, without completing the preceding groundwork determining mechanisms of action. Furthermore, social interventions are likely to have a greater array of contexts affecting the mechanisms of action, as they occur within open systems. Therefore, it is perhaps unsurprising that interventions often have mixed or small effects and cannot be replicated (Pawson, 2017). The methodology of scientific realism is focused on overcoming these issues by conducting the groundwork to identify the mechanisms of action in social interventions.

Realist methodology does not prescribe a specific set of steps that all realist research must follow. However, there are general principles that underpin realist methodology and therefore all realist research. The general process of realist inquiry is outlined in Figure 2-3. The theory development process begins with the development of initial theories, which guide literature searching or evaluation design (Wong et al., 2013b). Evidence is accumulated to test the theories, with each piece of evidence brought to the synthesis to examine how they combine or contrast to provide insights into the contexts and mechanisms interacting to produce outcomes (Pawson, 2013, 2006a). The result of this process should be a refined theory, which can then be used to inform future studies and their initial theorising.

2.4.1. Initial theorising

Realist inquiry starts with initial theorising of the programme or problem area. Articulating the theory involves considering the combinations of contexts and mechanisms that interact to produce the outcome. A common approach to this initial theorising is to develop initial programme theories which state how the programme is thought to work (Wong et al., 2013b). An initial rough theory (IRT), as opposed to initial programme theories, can be used

⁷ The terms programme and intervention are used interchangeably in this work.

when the review does not relate to a specific programme to provide an outline of how the object of study is thought to work (Wong et al., 2013b). Initial programme theories and IRTs can be developed in the form of ‘if... then... because...’ statements, CMO statements, or in visual depictions showing the proposed relationships between the different explanatory elements (e.g. logic models). Different sources can be drawn upon to support initial theorising, including consultations with stakeholders, researchers’ own experiences as practitioners, examining programme documentation, literature searching around related programmes, or substantive theories (Wong et al., 2013b). One or several of these strategies may be used.

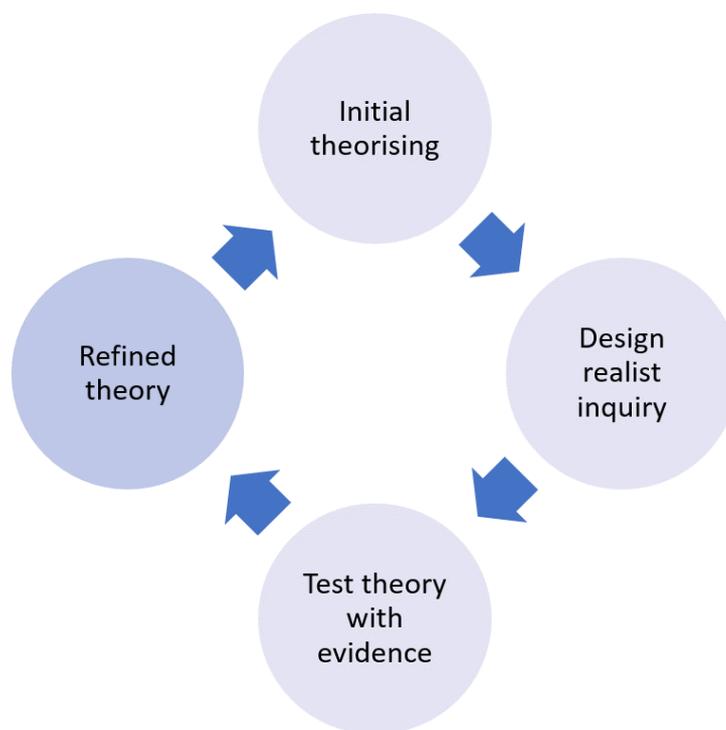


Figure 2-3. Realist inquiry cycle in realist methodology.

Important to initial theorising work in realist methodology are conceptualisation and abstraction. Conceptualisation is “the process of forming concepts, particularly those of an abstract nature, out of experience or learned material” (APA, n.d.). Conceptualisation is necessary and important because social phenomena may not be observable so require interpretation, and they are also changeable so our understanding has to adapt over time (Sayer, 2000). Abstraction is the search for concepts that apply across different settings, meaning they are at an abstracted level, and therefore can help us to make sense of events within those different settings (Pawson, 2013). This relates to Merton’s idea of theories at the middle-range, which aim to capture abstracted concepts so they can be drawn upon in

diverse research endeavours (Merton, 1967; Pawson, 2013). The use of substantive theories in initial theorising relates to abstraction and drawing upon more general theories and applying these to the specific situations being researched (discussed in section 2.2.4.2).

Rycroft-Malone et al. (2012, p. 3) call the work of initial theorising “concept mining and theory formulation”. Key concepts and theories are identified to begin developing an explanation of the subject matter, focusing in particular on the outcomes. Working back from the outcome is beneficial to begin identifying the mechanisms and contexts that might be important (Rycroft-Malone et al., 2012). This approach was developed by Shearn et al. (2017) who proposed an approach to initial theorising for complex programmes that develops an IRT from substantive theories.

2.4.2. Designing realist inquiry

Scientific realism typically draws on two methodologies, realist review or synthesis⁸ and realist evaluation. Both methodologies seek to answer the basic realist question (Pawson, 2013): what works, for whom, in what circumstances, how and why? This extends the typical evaluation question of ‘what works’, to align with realist principles by emphasising the importance of context and mechanisms in understanding how programmes work. Realist review is a form of literature review involving the secondary analysis of existing data sources (Wong et al., 2014, 2013a). Realist evaluation is an empirical investigation involving primary data collection and analysis (Greenhalgh et al., 2017; Wong et al., 2016). Both methodologies apply similar methodological principles, although the specific design varies depending on the nature of the evidence being collected.

Scientific realism is supportive of a range of methods to obtain the evidence or data required to support theory development. In realist evaluation, drawing upon both qualitative and quantitative methods is considered important to provide a range of evidence to test and refine theories (Pawson, 2013). In a realist review, different sources of literature can be used including grey literature, policy documentation, and the more traditional academic literature (Pawson, 2006a). The quality of research, or objectivity, is not determined through the use of specific types of evidence (e.g. RCTs), but rather through considering the reasoning behind the development, testing and refinement of the theories (Pawson, 2013).

⁸ Realist review and realist synthesis are interchangeable names. In this work, the name realist review is used.

2.4.3. Testing theory with evidence

Realist analysis is principle-driven, rather than a procedural approach. It applies a realist logic of analysis to the data, specifically: ontological depth, i.e. understanding of a deeper reality than just that which is empirically observable; mechanisms, often hidden or unobservable, generate outcomes of interest; and mechanisms are activated in conducive contexts (Greenhalgh et al., 2017). Realist analysis uses retroduction and abduction to explore these elements. Retroduction is “the activity of theorizing and testing for hidden causal mechanisms responsible for manifesting the empirical, observable world” (Jagosh, 2020a, p. 1). Given that mechanisms are often hidden, retroduction is supported by abduction, which is “the inventive thinking required to imagine the existence of such mechanisms” (Jagosh, 2020a, p. 2). Realist analysis can involve deductive-retroduction, in which evidence is used to test the causal insights from initial theories, or inductive-retroduction, in which evidence is used to identify new causal insights (Jagosh, 2020b, 2020a).

To gain an ontologically deep understanding of the phenomena under study, realist methodology is more supportive of an evidence-informed approach than an evidence-based approach, which is more aligned with positivist/postpositivist paradigms (Jagosh, 2019). This aligns with the process of retroduction, as the researcher must go beyond what is empirically observable in the data to develop explanations of generative causation (Jagosh, 2020a). This is because causal insights may not be empirically observable or known to participants, so it is necessary to move beyond only that which is stated directly in our data to gain ontological depth in our theories. It is important to acknowledge the role of our interpretations within this analysis process, which are influenced by the researcher and their background and experiences (Maxwell, 2012).

Given the requirements for the use of retroduction and abduction in the analysis process, transparency is important within realist work, so others can follow the logic of analysis through which theories were developed, tested and refined. Transparency enables others to judge the rigour of the work, relates to the trustworthiness of the data being used for theory testing, the interpretations made, and the credibility and plausibility of the resulting theories and conclusions (Maxwell, 2012; Wong, 2018). However, Mukumbang et al. (2021) have highlighted that many realist researchers do not clearly communicate their retroductive processes in their work, and that this is inherently challenging. However, some strategies have been found to support this transparency, such as memoing (Gilmore et al., 2019) and

causal loop diagrams (Mukumbang et al., 2021). However it is achieved, transparency is key for organised scepticism, in which others scrutinise and judge our work (Pawson, 2013).

2.4.4. Refined theory

Theory testing is ultimately used to build refined causal theories of the programme or problem being researched. Pawson and Tilley (1997) developed a heuristic to help researchers capture the key elements of generative causation in their programme theories, which forms the central explanatory framework in scientific realist methodology. This heuristic is the CMO standing for Context + Mechanism = Outcome, and a tool used to develop causal explanations aligning with realist principles. Therefore, they should provide a coherent narrative that explains how the interaction between a mechanism and context produces an outcome, rather than listing contexts, mechanisms and outcomes with no explanation of their relations (Pawson and Manzano-Santaella, 2012). The typical conceptualisation of mechanism in scientific realism is that of 'resources' offered by a social programme, and participants' 'reasoning' in relation to the resource (Pawson and Tilley, 1997). In the original CMO, mechanism captures both the resources and reasoning elements.

Several adaptations to the original CMO have been suggested. As discussed in section 2.3.3.1, Porter (2015b) critiqued the CMO for merging structure and agency within the mechanism. He suggested that the CMO could be clarified by changing it to: Contextual Mechanisms + Programme Mechanisms + Agency = Outcomes. Through this the intention was to emphasise the causal powers within the context, and separate out the programme mechanisms from the individual's agency (Porter, 2015b), although Pawson (2016b) argued that the elements specified by Porter were already contained within the CMO heuristic. In another adaptation, Dalkin et al. (2015) suggested splitting out the mechanism into M-resource and M-reasoning, with the M-resource inserted into the context and changing the M-reasoning to produce the outcome. Their revised heuristic was: Mechanism(Resource) + Context → Mechanism(Reasoning) = Outcome. De Weger et al. (2020) outlined various other alternative configurations that have been used by researchers in an attempt to help implementation of the methodology. For example, strategy-context-mechanism-outcome or intervention-context-actor-mechanism-outcome configurations. Although these adaptations were aimed to help researchers develop their causal explanations, others have argued that these additional elements add unnecessary complications to the causal narrative of the CMO (Wong, 2021).

Researchers have also experienced challenges conceptualising context within the CMO. Greenhalgh and Manzano (2021) reviewed the application of context in realist research and found two general types of application. In the first, context was conceptualised as something fixed and static within the backdrop of the programme. While in the second, context was conceptualised as something dynamic and changing, which actively interacted with the mechanism affecting the generation of the outcome. In the latter, context is therefore part of the explanation of how outcomes are produced, rather than merely descriptive (Greenhalgh and Manzano, 2021). In his critique of the CMO, Porter (2015b) argued that Pawson and Tilley (1997) inconsistently conceptualised context as both descriptive and explanatory, echoing the findings of Greenhalgh and Manzano's review. Porter emphasised the importance of considering context as having causal powers, highlighting that it does something, rather than simply being something. In his response, Pawson (2016b) denied inconsistency in the conceptualisation of context, emphasising context as having causal powers. However, given the challenges researchers have experienced in implementing the concepts within their work (Greenhalgh and Manzano, 2021), perhaps Porter's critique has some merit. The conceptualisation of context and mechanism in this work is discussed in detail in section 2.5.3.

Each realist inquiry should ideally produce refined theory in the form of context-mechanism-outcome configurations (CMOCs) and an explanation of the patterns across those CMOCs at the middle-range level (Wong et al., 2013b). Therefore, as well as during initial theorising, substantive theories can also be drawn on in the later stages of the realist inquiry to help with the synthesis and refinement of the theories. As scientific realism assumes the fallibility of knowledge, theories should be built upon across multiple research efforts and a single study it is not expected to determine the whole truth of reality (Pawson, 2013). Pawson has advocated for the development of reusable conceptual platforms, which relate to abstraction and take the form of theories at the middle-range that can be used to explain causation across different programmes. In this way, rather than each research attempt or programme design starting from scratch, it should build upon the knowledge that has accumulated previously, supporting a science of inquiry and greater knowledge development (Pawson, 2013).

2.5. Applying scientific realism to problem exploration

Realist methodology (Pawson and Tilley, 1997) was designed for the purpose of evaluating social programmes, however it has useful application beyond evaluation (Westthorp, 2018). The programme of research presented in this thesis used realist methodology to apply the philosophical principles of scientific realism to explore the mechanisms and contexts affecting medical students' experience of well-being during transition through clinical training. Pawson and Tilley (1997) outline how programmes are inserted into existing social systems, in which various mechanisms and contexts interact to produce the 'problem' the programme seeks to address. Pawson and Tilley (1997, p. 74, emphasis in original) state:

“Coming to the matter of explaining the outcomes, the realist evaluator has, of course, to acknowledge the set of mechanisms ... which sustained the initial problem.”

The research in this thesis is focused before programme design and implementation, seeking to identify the context-mechanism interactions in the clinical training environment that are supporting and hindering medical students' well-being. Or in other words, this research seeks to complete the theory-building groundwork that identifies the set of mechanisms sustaining the problem, and which future interventions should target (Pawson, 2018, 2017).

It could be argued that clinical training is a large programme that could in itself be evaluated. However, the decision was made not to take an evaluative approach. This was because well-being is not the primary outcome of clinical training, so the programme design and strategies are not intended to target well-being. This makes it difficult to consider the resources offered by the programme in relation to the outcome of well-being, because these are not aligned. Instead, well-being is part of students' experience as they transition through clinical training, and that transition experience is broader than the formal design of clinical training as a programme. Well-being is affected by the social interactions and personal experiences that students have alongside, and directly in relation to, the formal clinical training programme. Therefore, it was considered more useful to explore how well-being is affected through the experience of transition, rather than evaluating the clinical training programme itself. As outlined above, this was intended to enable theory development that could then be used in the future to design or evaluate specific interventions for well-being.

Given the focus on problem exploration, not evaluation, it was necessary to make some adaptations to realist methodology. Pawson (2016b, pp. 138–9) has stated that:

“Wise researchers begin with a broad attachment to a paradigm, select a subset of protocols most pertinent to the scope of their enquiry and then translate them into a research design to fit the problem under investigation.”

The broad attachment here is to scientific realism and the protocols within realist methodology, but some adaptations were required for this realist inquiry and the problem under investigation, particularly around the conceptualisation of mechanism and context, which is discussed below in section 2.5.3. The adaptation of the methodology is supported in principle by Westhorp’s writing arguing for the wider application of realist methodology (Westhorp, 2018). The specific adaptations were developed iteratively as the research progressed and the researcher’s understanding of the paradigm and methodology developed. They were also discussed during training and mentoring with Justin Jagosh (a realist methodologist), with other researchers in local realist networks, through peer-to-peer support, and during a conference presentation.

2.5.1. Research aim and questions

This research was focused on medical students and their experiences of well-being during transition. Although well-being could also have been studied at the level of educators, members of the clinical team, teams or even higher, it is necessary to focus research in order to achieve a manageable scope (Pawson, 2019; Wong et al., 2013b).

Research aim

This research aimed to improve the knowledge of how well-being is affected by transition by taking a theory-building approach and firstly clarifying the concept of well-being and then exploring how both student and environmental factors affect well-being during transition and the links between well-being and learning during transition.

Research question and sub-questions

The typical realist question was adapted for the problem exploration focus to: *in what circumstances, for whom, how, and why does the process of transitioning through clinical training affect medical students’ well-being?* The question seeks to understand how medical students’ well-being is changed during the process of transitioning through clinical training (how), the mechanisms responsible for changing it both positively and negatively (why), and the environmental (what circumstances) and student (for whom) contexts affecting those mechanisms. Several sub-questions were part of this overarching question:

1. What is well-being (attributes and dimensions)?
2. How does well-being change over time (mechanisms and contexts)?
3. What contexts (environmental and student) affect the activation of different well-being mechanisms during the transition through clinical training?
4. How are students' well-being and learning experiences linked during the process of transitioning through clinical training?

2.5.2. Research design

Within the overall research design, three specific components were designed to answer the research question and sub-questions. The three components of the research design were:

1. Theoretical integrative review of well-being
2. Realist review of the clinical training transition literature
3. Realist investigation with clinical students and educators

The overall research design is depicted in Figure 2-4, which highlights the objective, contribution to the realist inquiry cycle, and the sub-question(s) addressed by each component.

Component 1: Theoretical integrative review

Given the exploratory nature of the work, and the conceptual and theoretical clarity issues around the primary outcome of well-being, the starting point of the work was conceptualisation and abstraction of well-being. The purpose of the TIR was to develop a concept definition and theory of well-being by synthesising existing literature. This clarified the nature of well-being as a concept (sub-question 1), and identified key mechanisms (and some general contexts) responsible for generating well-being (sub-question 2). This component combined Podsakoff et al.'s (2016) recommendations for developing concept definitions and Shearn et al.'s (2017) approach to initial theorising in realist research using substantive theories within a TIR approach (Battistone et al., in press).

Component 2: Realist review

The well-being theory was used as the basis for initial theorising in the realist review, which considered how well-being is affected by the experience of transition. The existing clinical training transition literature was used to identify the contexts that were salient in the specific setting to the activation of different mechanism patterns, affecting well-being during

transition (sub-question 3). Multiple CMOCs were developed through the realist review, some of which formed the basis of further theory development and refinement in the realist investigation.

Component 3: Realist investigation

The clinical training transition literature did not typically have well-being as an explicit outcome. Therefore, the final component built upon the theories from the realist review in a realist investigation, which drew on the principles of realist evaluation, but was adapted for the exploratory focus. Clinical students and educators were interviewed and the data analysed to test and refine the key theories of transition and well-being from the realist review (sub-question 3). The theories were also extended to consider how well-being and learning were related (sub-question 4).

Realist evaluations are generally expected to draw upon mixed methods (Pawson, 2013). However, as this work had an exploratory focus, only interview data was used in the realist investigation. This was deemed most appropriate for the current state of knowledge in the domain and the theory-building focus. The other components did however draw on literature with a range of research designs. The TIR included primarily quantitative research, reflecting the dominant paradigm in psychology. The realist review drew on a range of methodologies, although a larger proportion was also qualitative as this was found to be richer for theory-building. The refined theories were therefore informed by a range of data sources. Future research efforts can use mixed methods to test and refine the theories from this work.

Refined theory

The process of theory-building throughout the review is detailed in Figure 2-5, including how the different theory outputs sit at different levels of abstraction. The initial well-being theory developed in the TIR was the most abstracted, enabling its application to a diverse range of settings. The realist review and investigation developed CMOCs at a less abstracted level, as these detailed specific context-mechanism interactions in the clinical training transition setting. The final output of the programme of research was a refined theory of well-being and learning in the clinical training transition setting, which was presented at a more abstracted level than the CMOCs but less abstracted than the initial well-being theory. This refined theory was used to develop recommendations at an abstracted level, which can be used across different clinical training transition settings to design interventions to support well-being and learning.



Figure 2-4. Research design and three components.

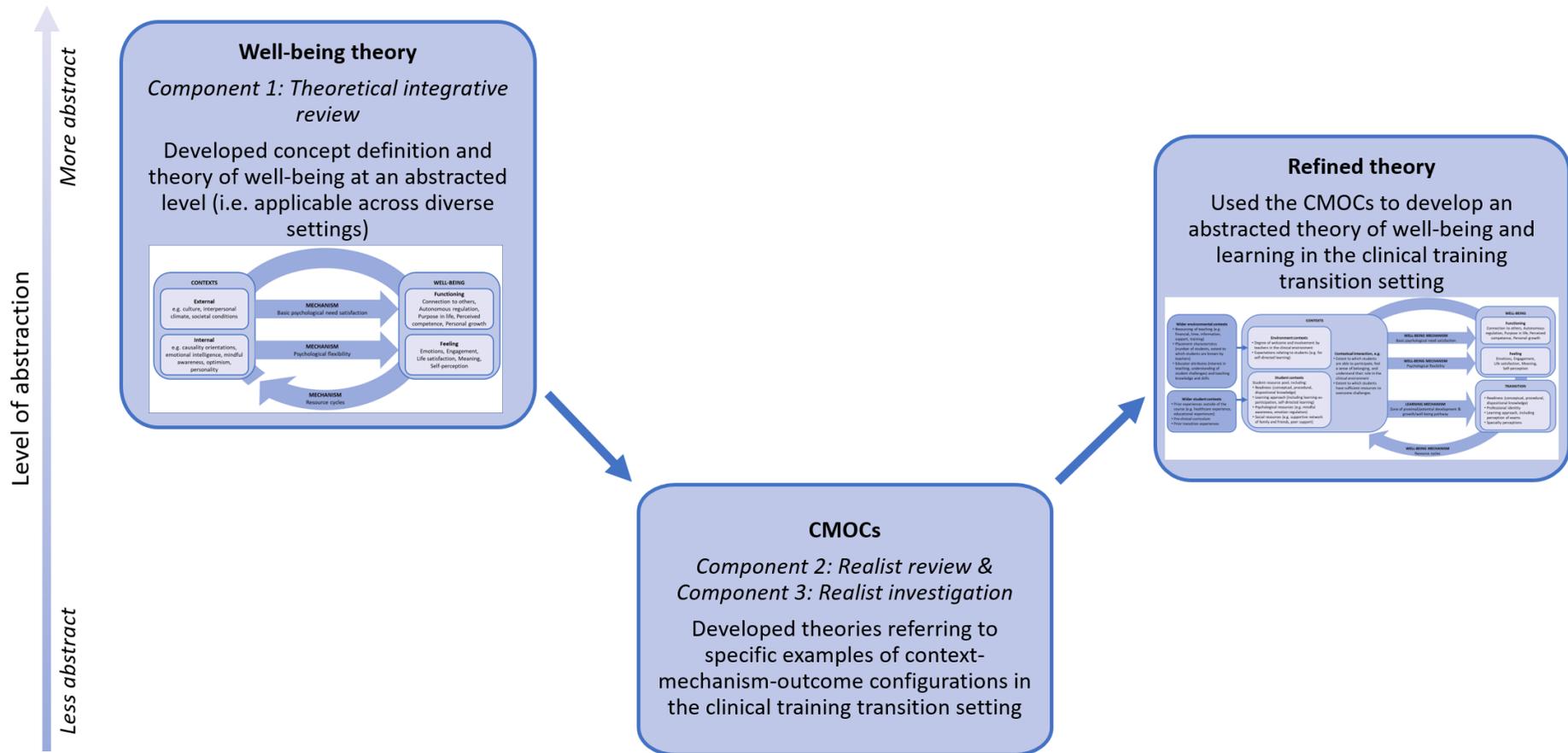


Figure 2-5. Theory-building processes throughout the programme of research.

Research component	Approximate timeline of activities		
Other	Background familiarisation with literature		
Theoretical integrative review	Initial analysis to identify concept dimensions (feeling and functioning) and associated attributes	Theory developed: three mechanisms identified; functioning and feeling separate	Theory finalised: three mechanisms refined; functioning and feeling together
Realist review	Initial rough theory (IRT) developed – informed by early well-being theory	Data searching, extraction and initial synthesis	Synthesis and refining of the theories
Realist investigation	Design of the student study, recruitment of participants, and data collection	Design of the educator study, recruitment of participants, and data collection	Analysis of the data, synthesis and refinement of the theories

Figure 2-6. Sequencing of the research components and associated activities.

Component sequencing

The different components were conducted in sequence but there was overlap between them. Figure 2-6 shows the different components of the research and how the timelines of their different activities overlapped. It shows a general sequential progression through the three components. However, as each component contributed new insight into the problem area, so developments in thinking occurred and bled between the different components. For example, an earlier version of the well-being theory developed in the TIR review informed the IRT in the realist review. Within this the three mechanisms had been roughly identified, but the understanding of these was refined as they were considered within the transition setting. The refinement involved nuanced changes to their characteristics and naming.

2.5.3. Mechanism and context conceptualisation in this work

This research explored how transition experiences affect medical student well-being and learning, rather than evaluating a specific programme. The commonly used conceptualisation of mechanism as ‘resource and reasoning’ was developed for use with programme evaluation (Pawson and Tilley, 1997). In the conceptualisation, programmes offer (or constrain) a resource to the participant who responds in some way, typically changing their reasoning or decision making, if the context is conducive. Westhorp (2018) argues that realist research can be beneficial beyond evaluation, but different mechanism conceptualisations may be required. In the absence of a programme in this work it was therefore necessary to consider whether the ‘resource and reasoning’ conceptualisation remained appropriate.

There were two reasons why the ‘resource and reasoning’ conceptualisation was considered appropriate. Firstly, transition experiences are events or interactions between the student and the clinical training environment, rather than a specific programme designed to support well-being. Nonetheless the student’s interaction with the environment can be thought to offer (or constrain) an opportunity to the student, similar to a programme offering a resource. Secondly, the ‘resource and reasoning’ conceptualisation is focused at the individual-level (as opposed to a higher system level, such as an organisational mechanism), aligning with the focus of this work on the individual student. Therefore, the ‘resource and reasoning’ mechanism conceptualisation was appropriate for this work, however some clarification was needed about the two elements (resource and reasoning), given the absence of a programme.

The definitions for context, mechanism and outcome are provided in Table 2-3, and their relationships are visually depicted in Figure 2-7. The definitions are generalised, as not all the CMOCs related directly to students, but typically the focus was on the student as the individual actor and the following discussions reflect this.

Table 2-3. Definitions of context, mechanism and outcome in this work.

Term	Definition
Context	The conditions and their causal powers that combine to affect the activation of the mechanism(s) changing the outcomes. These conditions pre-exist the events or interactions being studied (e.g. transition experiences), and can be external (environmental contexts) or internal (individual contexts) to the individual actor (e.g. the student). An experience or situation involves the amalgamation of different contexts and their causal powers.
Contextual interaction	An experience or situation involves a combination of contexts and their causal powers coming together. In this work contextual interactions largely concern transition experiences, which are events or interactions between the student and the clinical training environment, i.e. an experience that the student has relating to becoming a doctor. These can relate to educational activities, such as spending time in the clinical environment, or internal experiences relating to the more general process of transitioning through clinical training, such as feeling pressured by the course. These transition experiences involve a specific combination of environmental and student contexts interacting together.
Mechanism	An opportunity arises from the contextual interaction that activates (to a greater or lesser extent) or hinders the individual actor's (e.g. the student) innate psychological capacities (e.g. to be well or to learn).
Outcome	The change produced from the interaction between the context and mechanism. Well-being is the main outcome, which has two domains each with several attributes: functioning (connection to others, autonomous regulation, purpose in life, perceived competence, personal growth) and feeling (emotions, engagement, life satisfaction, meaning, self-perception). Learning related outcomes are also included, such as knowledge and professional identity formation. For CMOCs related to teachers the outcome relates to their behaviour or attitudes towards the student.

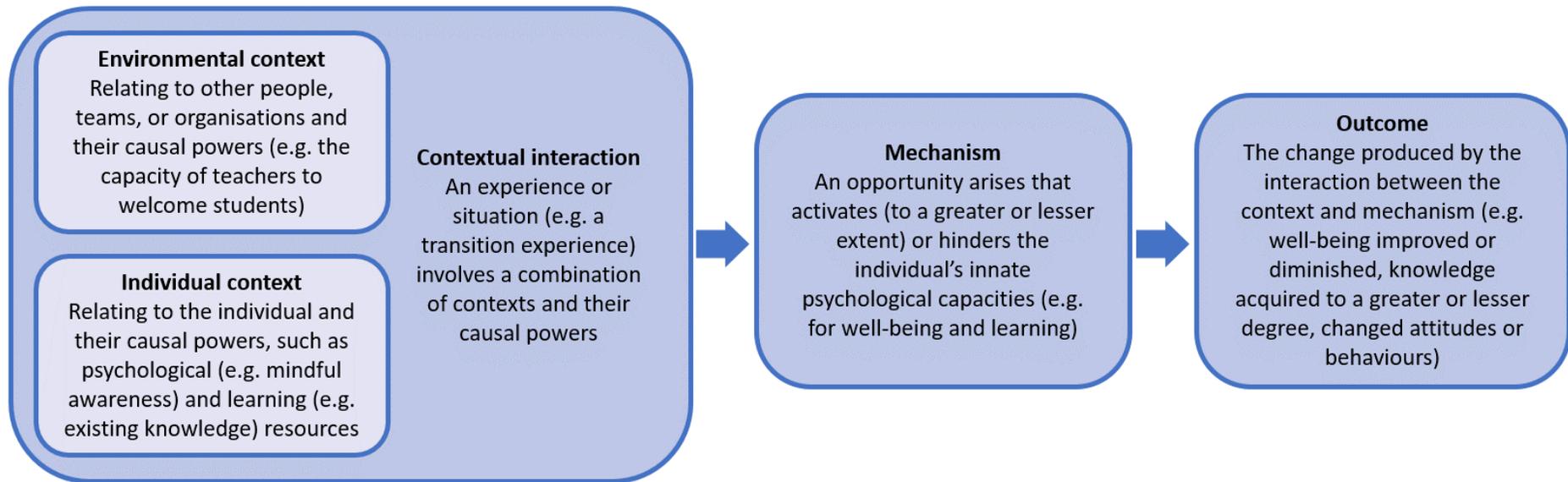


Figure 2-7. Visual depiction of context, mechanism and outcome in this work.

In this work, context refers to the conditions that pre-exist a transition experience. Environmental contexts are the combination of causal powers in the social environment, for example, the capacity of teachers to welcome students. Student contexts are the combination of causal powers that the student has themselves, based on their existing characteristics, for example psychological (e.g. mindful awareness) or learning (e.g. existing knowledge) resources. These conditions have causal powers, which when combined in a specific transition experience, interact to determine the extent to which the student's innate capacities (i.e. mechanisms) for well-being and learning are realised. Therefore, context can be thought of as combinations of social and psychological contextual mechanisms (Porter, 2015b). Mechanisms in either context can countervail (i.e. cancel out or override) mechanisms in the other context. For example, some students may have the psychological skills (student context) that enable them to persevere in their learning role despite detrimental environmental conditions (environmental context). In this way, context is considered to be dynamic, and changeable over time and situations (Greenhalgh and Manzano, 2021), and this work seeks to explain why specific contexts contribute to changes in well-being and learning outcomes during transitions (Westhorp, 2018).

Mechanism within this work refers to innate psychological capacities, such as for well-being and learning, which are underlying psychological processes. All humans have the potential for these capacities, such as to learn and be well, but sometimes these mechanisms are not activated or are hindered by the other mechanisms surrounding an individual, i.e. environmental or individual contexts. When different combinations of contexts come together they interact providing an opportunity for the activation (to a greater or lesser degree) or hinderance of these innate psychological capacities. This opportunity is considered the 'resource' element of the typical 'resource and reasoning' mechanism conceptualisation, but in this case the resource is offered by the context, not a programme. The opportunity leads to a psychological process related to the inherent psychological capacity, which is considered the 'reasoning' element of the 'resource and reasoning' mechanism conceptualisation. Reasoning in this work refers to this psychological response from the individual (usually the student), rather than explicitly referring to a change in reasoning or decision-making, as would be more typical in a programme evaluation. This response is considered to reflect the individual's agency, which is affected by the social structures in the contextual mechanisms (Porter, 2015b).

To complicate matters, in addition to being a part of the mechanism conceptualisation in realist methodology, the term 'resource' is central to COR theory, from which one of the well-

being mechanisms originated (resource cycles), identified in the TIR (see section 3.3.3.2 for details). In COR theory, resources have been defined as “anything perceived by the individual to help attain his or her goals” (Halbesleben et al., 2014, p. 1338). Hobfoll (1989) identified four types of resources: objects (e.g. car, house), conditions (e.g. marriage, tenure), personal characteristics (e.g. self-esteem, optimism), and energies (e.g. time, knowledge). Within realist methodology, Pawson and Tilley (1997, p. 66, emphasis in original) have described social programmes as “reaching ‘down’ to the layers of individual *reasoning* (what is the desirability of the ideas promoted by a program?) and ‘up’ to the collective *resources* on offer (does the program provide the means for subjects to change their minds?).” Although COR theory and realist methodology are different applications of the term resource, the meaning can be considered similar. Pawson and Tilley’s description can be aligned with COR theory by rephrasing Halbesleben et al.’s (2014) definition: programme resources are anything perceived by the programme’s architects as helping the participant attain the programme’s intended goals. The goals of the programme are the intended outcomes, and whether these are generated depends on the resources changing the reasoning of the participant, which is dependent on the interaction with context.

In this work, resources can be part of a mechanism in two ways. Firstly, the environmental and individual contexts (and their associated causal powers) combine to provide an opportunity (a resource) that activates or hinders the student’s innate capacities for well-being and learning. This use of resource is aligned with the ‘resource and reasoning’ conceptualisation. Secondly, resources are also part of the psychological processes involved in the resource cycles well-being mechanism (one of the innate capacities for well-being). In this second use, short-term patterns of resource gain or loss can develop into longer-term resource gain or loss cycles, changing the student’s learning and well-being trajectories either positively or negatively. This use of resource applies to one specific mechanism that can be represented by the general ‘resource and reasoning’ mechanism conceptualisation.

Resources can also be part of the context and outcome. Student resources that pre-exist the current transition experience are considered context, for example psychological skills or existing knowledge. Students can also acquire new resources through transition experiences and these resources are considered an outcome, which then changes the pre-existing conditions available for the next transition experience, so becoming part of the context. So resources can be part of the context, mechanism or outcome, depending on the specific circumstance (Westhorp, 2018).

Differentiating context and mechanism is an ongoing issue that researchers using realist methodology have to contend with. There is always a 'grey area' to some extent between the programme and the resource mechanism, which is why some have adapted the CMO heuristic to other formats (Dalkin et al., 2015; De Weger et al., 2020). However, in this work the 'grey area' is even larger because there is no programme architecture to differentiate the context, programme and resource. Therefore, within this work the resource typically arises from the context and changes the student's psychological response to a transition experience in some way. The psychological response, or 'reasoning', is the truly mechanistic element as it is typically an underlying psychological process situated at a different level of the system.

Mechanisms operate at different levels of the system to the outcome of interest (Westhorp, 2018). In this case, well-being is an internal subjective experience that an individual may have. The psychological processes (mechanisms) responsible for producing well-being are subtly distinguished from the psychological phenomenon of well-being (outcome). Well-being as an outcome is differentiated from the well-being mechanisms because it is a subjective experience; something that someone can directly report experiencing, placing it in Bhaskar's domain of the empirical (Sayer, 2000). Similarly, the proposed contexts relevant to well-being are also typically subjective experiences, such as mindful awareness or social support, which individuals can directly report experiencing. Whereas the well-being mechanisms are not subjective experiences, they are underlying psychological processes, which occur without conscious awareness.

Within this research it was found helpful to try and think about the two elements of the mechanisms, i.e. resource and reasoning, but these were not explicitly differentiated within each mechanism (as in, e.g. Dalkin et al., 2015) because it was not found helpful to aid causal thinking. Additionally, the CMO is a heuristic to support causal thinking and is not the key element of the analysis itself. Rather, the deeper thinking about causal explanation and how the outcome of interest was generated, i.e. retrodiction (Jagosh, 2020a), is the key element. The CMO was therefore used primarily to guide causal thinking and ensure that the relevant elements of the explanation have been developed. However, sometimes thinking explicitly in terms of context, mechanism and outcome was found to be limiting, as the focus then turned to trying to work out where each element of the explanation should be placed, rather than considering the causal narrative. Therefore, it was found helpful in the earlier stages of the analysis to think in terms of causal insights, i.e. what seemed to be going on to affect well-being. This approach retained realist causal explanation principles, but refrained from

being tied to the CMO format. In the later stages of the analysis these insights, once developed, could be formed more explicitly into CMOCs.

2.5.4. Influence of the researcher

As discussed in section 2.4.3, it is important to acknowledge the role of our interpretations within this analysis process. Reflexivity is more typically associated with research from paradigms incorporating greater subjectivity (i.e. subjective₍₁₋₃₎), such as constructionism. Scientific realism recognises that there is some subjectivity in conducting research (subjective₍₁₎), through the influence of the researcher's own perceptions, beliefs and therefore interpretations (Maxwell, 2012). The emphasis on transparency in realist methodology aligns with Olmos-Vega et al.'s (in press) call for greater explanation of how researchers have influenced the research process. Throughout the thesis, the researcher has maintained transparency in the decisions that have influenced the focus of the work, application of the methodology, and processes of analysis. However, it is important to outline some further considerations here to support the reader in understanding the perspective taken in this research.

The researcher influenced this programme of research in several key ways. Firstly, with a background in occupational psychology the researcher was interested in how people function at work. Medical education crosses the boundaries of education and work, especially during the clinical training transition, as students are learning within a workplace setting for a specific occupational role. This work took a psychological perspective considering how educational experiences within workplace settings affect students' well-being and learning, as this will affect their longer-term functioning at work. Similarly, the positive psychological conceptualisation of well-being, including elements of both functioning and feeling, aligned with the researcher's interest in functioning at work and helping develop future doctors. Finally, the researcher's background meant that in some ways they were an outsider 'looking in' at the experience of medical education, although by undertaking a PhD they were experiencing a similar educational transition process. Together, all of these factors influenced the focus of the work, and the interpretations of the topic and data, lending a different perspective on the issues to someone who has gone through it themselves and been socialised into the profession, as well as increasing their empathy for the challenges that students experience.

2.6. Chapter summary

This chapter described the paradigm of scientific realism within which this research was conducted, in terms of its ontology, epistemology, axiology and methodology, and describing how it was applied within this work. Ontologically scientific realism subscribes to the idea of generative causation, which is the assumption that outcomes are caused by underlying mechanisms activated in conducive contexts. Epistemologically, in scientific realism our knowledge of these causes are represented through theories, however the fallibility of this knowledge is recognised. Axiologically, scientific realism therefore values theory-building around causal explanations in a cumulative approach to knowledge, with theories offering evidence-informed information for policy makers and practitioners. Realist methodology is focused on theory development, testing and refinement, with the principles of scientific realism underpinning the approach.

In this work, realist methodology was applied to problem exploration, rather than programme evaluation. The mechanism and context conceptualisations in this work were aligned with the problem exploration application of the methodology. The research design incorporated three components – a TIR, realist review and realist investigation – to answer the research question and develop a theory of how well-being is affected by environmental and student contexts through their interaction with underlying psychological processes (mechanisms) during the transition through clinical training.

Chapter 3. Theoretical Integrative Review

3.1. Introduction

The purpose of this programme of research was theory-building to identify how well-being is affected by transition experiences, establishing new knowledge of the problem to inform future policy, practice and research. Realist methodology is theory-driven, so an early stage of the work is developing an initial theory, as outlined in section 2.4.1. A theory is “an abstract description of the relationships between concepts that help us to understand the world” (Varpio et al., 2020, p. 990). Therefore, clarifying the concepts relevant to our theories is a key part of theory development, and one approach to initial theorising in realist methodology involves integrating substantive theories, with concept definition a key part of the process (Shearn et al., 2017).

Well-being has been poorly defined and theorised within the medical education literature, so it was necessary to look outside of the field to the positive psychology literature (see section 1.3). Within the psychology literature there are many different definitions of well-being, as well as multiple substantive theories. Confronted with a multitude of contrasting definitions, and variation between even similar definitions, it was not possible to confidently select one definition of well-being ‘off-the-shelf’ to use within this work. Therefore, to develop a concept definition and theory of well-being for this programme of research, a TIR approach was used (Battistone et al., in press) in combination with Podsakoff et al.’s (2016) recommendations for developing concept definitions and Shearn et al.’s (2017) approach to initial theorising in realist research using substantive theories.

3.1.1. Concepts

Concepts are cognitive representations of phenomena in the world around us, i.e. our knowledge and understanding of them (Podsakoff et al., 2016). It helps to clearly specify this knowledge for several reasons. Firstly, some phenomena, such as internal subjective experiences like well-being, cannot be directly observed or easily measured. Secondly, in such cases a degree of interpretation is involved in our knowledge of a concept, so we need to clarify how we are interpreting phenomenon. Thirdly, concepts mean different things to different people, disciplines, applications etc., so they can be called travelling concepts (Bal, 2009). Therefore, using the same term does not necessarily imply a shared understanding of the concept underpinning it. We cannot assume that other researchers or consumers of our

research will hold the same concept when using the same term, either because they have a different personal experience of the phenomenon, have interpreted the phenomenon differently, or the concept has travelled and changed between uses. Therefore, it is important to clarify our understanding of a concept both for ourselves and for others, to communicate our intended meaning. This communication can be done through a concept definition.

A concept definition is the clear specification of a researcher's understanding of a concept, and involves considering the concept's structure. One aspect of concept structure is the domain of the concept, i.e. what the concept relates to. This is identified by specifying the combination of attributes that together form the concept (Podsakoff et al., 2016). These attributes align with the domain of the empirical (Sayer, 2000), so conceptual coverage aligns with operational definitions used to measure concepts. In addition to identifying the concept's attributes, Goertz (2006) argued that concepts have a deeper structure beyond that which is observable and measurable, aligning with a realist perspective of ontological depth.

This deeper concept structure refers to the organisation of the attributes within a concept and how the attributes relate to the concept. The two most commonly discussed concept structures are a necessary and sufficient structure, in which a specific set of attributes define the concept, and a family resemblance structure, in which concepts share attributes but are not defined by a particular set of attributes (Goertz, 2006; Podsakoff et al., 2016). For example, burnout is a necessary and sufficient concept with the attributes of exhaustion and disengagement both necessary to be considered burnout (Demerouti et al., 2001). An example of a family resemblance concept is games; board-games, ball-games and card-games share some attributes but each case of a game might have a different set of attributes (Wittgenstein, cited in Podsakoff et al., 2016). Goertz (2006) also argued that concepts in the social sciences have three levels: the basic level refers to the abstract idea of the concept; the secondary level refers to the dimensions of the concept (often multidimensional); and the indicator level refers to the empirically observable aspects of the concept (or attributes).

Developing a concept definition specifying the concept structure is helpful for several reasons. Firstly, it clarifies our own thinking about the concepts we are using in our research, how they might relate to other concepts we are interested in, and how they should be studied. Secondly, it enables us to better communicate our understanding of the concept to others, so that they can be aware of what we mean when we use a term and can then engage with our work and others' in an informed way. Finally, the concept's structure affects how it

interacts with the wider world and relates to our theoretical understanding. It is therefore unsurprising that conceptualising is part of theory development in realist methodology, with Rycroft-Malone et al. (2012) and Shearn et al. (2017) both incorporating concept mining or defining as part of their initial theorising processes.

3.1.2. Well-being as a concept

Well-being is an example of a travelling concept (Bal, 2009). Despite increasingly common use of the term in academic literatures and wider society, the concepts underlying the term can vary substantially. For researchers seeking to apply the concept of well-being in their work, navigating the multiple, and often contrasting, understandings of well-being in the psychology literature is challenging.

In general, as outlined in section 1.3.3, the different definitions of well-being can be described as falling into three groups. Firstly, well-being as ‘feeling’, aligning with a perspective of well-being as happiness, e.g. subjective well-being (Diener, 1984). Secondly, well-being as ‘functioning’, aligning with a perspective of well-being as living a good life, e.g. psychological well-being (Ryff, 1989). Thirdly, well-being as both feeling and functioning, integrating both aspects, e.g. PERMA (Seligman, 2011) and flourishing as mental health (Keyes, 2002). The specific attributes used to define well-being vary considerably even within each of these groups. For example, Seligman (2011) included five attributes in his definition, while Keyes (2002) included many more.

The different definitions of well-being have been debated. Some researchers think only feeling should be used to define well-being because functioning predicts feeling (e.g. Kashdan et al., 2008). However, others have found a bi-directional relationship between the two (Lyubomirsky et al., 2005). Others consider functioning preferable to feeling in defining well-being because it signifies living well as opposed to only feeling good (e.g. Waterman, 2008). Others consider both to be important, for example Seligman changed his approach from mainly feeling (authentic happiness; 2002) to include both feeling and functioning (PERMA; 2011). Seligman felt that feeling, or happiness, was not helpful in deciding well-being policy because emotions are affected by personality, with extraverts experiencing greater positive affectivity and therefore being ‘happier’ than introverts, so taking a perspective of well-being as feeling would lead to policy being based upon extraverts (Seligman, 2011).

This debate between feeling and functioning aligns with philosophical theories of well-being. Engaging fully with these philosophical debates and perspectives of well-being was

beyond the scope of the work, which focused on well-being from a psychological perspective. Discussion of the integration between philosophical and psychological accounts of well-being can be found elsewhere (e.g. Intelisano et al., 2020). In brief, the well-being definitions in the psychology literature can be seen as roughly aligning with either a hedonic philosophical account of well-being when they focus on feeling or a eudaimonic philosophical account of well-being when they focus on functioning (Ryan and Deci, 2001). While psychological accounts of well-being centre on what well-being is, philosophical accounts are also concerned with what should be considered part of well-being. A critique of the hedonic account is that it centres on pleasurable experiences without considering the wider activities and qualities of someone's life. This debate relates to axiology and value-judgements about well-being. Although psychological and philosophical accounts of well-being are linked, this work takes a psychological perspective, considering which attributes are important to a person's experience of well-being, as opposed to which should define well-being. To do this, it was necessary to review the definitions of well-being and synthesise these to develop a concept definition for this work.

3.1.3. Theories of well-being

In addition to a multitude of well-being definitions, there are also multiple theories with relevance to well-being, as outlined in section 1.3.4. Some are specific to particular definitions of well-being, such as homeostatically protected mood and SWB (Cummins, 2010). Others are more general and can be applied to both feeling and functioning definitions of well-being, such as SDT (Ryan and Deci, 2017), B&B theory (Fredrickson, 2004) and COR theory (Hobfoll et al., 2018), so have greater explanatory power. However, the general nature of these theories means that specific definitions of well-being are often not provided within them. Furthermore, the different theories can contribute unique theoretical insights about how well-being changes, but these have not been integrated within one theory of well-being. Therefore, further work is needed to align the theoretical insights from these substantive theories with one another and with a concept definition of well-being.

3.1.4. Review approach

Given the breadth of the literature on well-being and the aim of providing clarity and insight into the different perspectives of well-being, a narrative review was deemed a more appropriate method than a systematic review (Greenhalgh et al., 2018), specifically a TIR. A TIR examines theories in the literature that explain a phenomenon, synthesising the insights

that they offer in order to develop new knowledge of the phenomenon (Battistone et al., in press). TIRs do not have a prescriptive method, as the specific application varies depending on the focus of the review. Instead they follow general steps, including defining the phenomenon (i.e. concept), exploring and analysing the literature, and integrating the theory (Battistone et al., in press). Two other sources were used to supplement the review approach for the purposes of this work. Podsakoff et al.'s (2016) recommendations for developing concept definitions were drawn upon to guide the concept defining element of the work. Shearn et al.'s (2017) approach to initial theorising in realist research follows similar steps to TIRs, and was used to align the approach with realist principles and methodology.

It should be noted that TIRs, within the umbrella of narrative reviews, do not fall within a positivist or postpositivist research paradigm, so do not have the same philosophical foundations. Systematic reviews have a focused review question, prioritise reproducibility and minimising bias, and summate data (Greenhalgh et al., 2018). Conversely, narrative reviews (including TIRs) can deepen our understanding of topics by providing clarification and insight, through the researchers' interpretation (Greenhalgh et al., 2018). Therefore, narrative reviews align with different philosophical assumptions and serve different purposes, meaning that the criteria for rigour are different to systematic reviews.

Rigour of a TIR is judged based on the transparency around the literature search, critical examination of the theories, and theoretical integration (Battistone et al., in press). Therefore, rather than considering objectivity within this review in the sense of a replicable and 'unbiased' account of well-being, as in a positivist paradigm, the review sought to be objective according to Pawson (2016b, 2013), as outlined in section 2.3.3.2. The approach taken was methodical and thoughtful, involving interpretation in conceptualising (Sayer, 2000) and retroduction and abduction in theorising (Jagosh, 2020a), but transparent around these processes to enable "organised scepticism" (Pawson, 2013, p. 107). In this way, the review aimed to provide insight and clarity around well-being, in alignment with the conceptual and theoretical focus, offering a new perspective on well-being that could be of benefit in medical education and other applied settings (Eva, 2008).

The TIR sought to answer two questions:

1. What is well-being (attributes and dimensions)?
2. How might well-being change over time (mechanisms and contexts)?

3.2. Method

The review drew generally on the TIR approach (Battistone et al., in press), in combination with Shearn et al.'s (2017) approach to initial theorising in realist methodology and recommendations for developing concept definitions (Podsakoff et al., 2016). Four steps were followed, adapted from Podsakoff et al. (2016):

1. Identification of relevant definitions and substantive theories
2. Identification of conceptual and theoretical insights
3. Development of a concept definition
4. Development of a theory

The review approach is depicted visually in Figure 3-1.

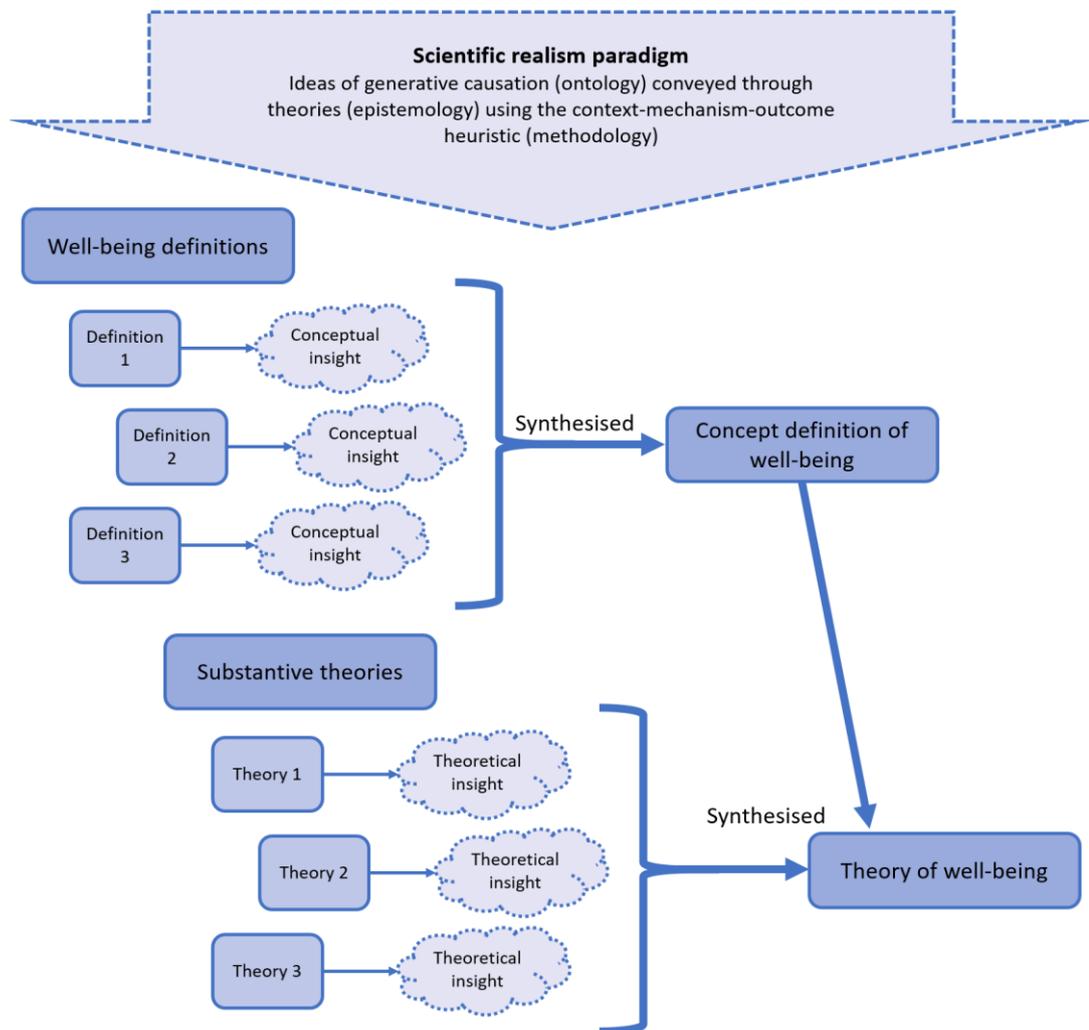


Figure 3-1. Visual representation of the review approach.

3.2.1. Step 1. Identification of definitions and theories

For concepts with existing definitions, where the aim is to clarify the concept, Podsakoff et al. (2016) suggest searching the literature to identify definitions. They advise stopping the search once new definitions become superfluous. A search of the literature was conducted to identify definitions of well-being and relevant substantive psychological theories. Database searching was trialled and found problematic for the nature of the sources required, as they are not indexed by definition and relevant sources were not typically explicit in using the term definition. In addition, the abstracted nature of the review meant there was not a specific setting to focus the search further. Therefore it was not possible to design a search strategy that identified relevant sources within a manageable scope. For example, a search of well-being in the database Ovid SP PsycINFO⁹ resulted in 82,625 results. Including 'definition' in the search strategy¹⁰ reduced the results down to 1,325, but known key papers were absent.

Guidance was sought from a university librarian who recommended using purposive searching starting with a subject handbook, as an alternative strategy to database searching. Subject handbooks are written by leading academics in a field, summarising and critically reviewing relevant literature. Therefore, they are suitable for identifying key perspectives, such as definitions. The *Oxford Handbook of Happiness*¹¹ (David et al., 2013) was chosen as it had a psychological focus and contained a range of contributions covering the different groupings of well-being definitions (feeling, functioning, and integrated). Two sections of the handbook relating to theories and definitions were consulted: *Psychological approaches to well-being* and *Definitions of well-being*. The handbook confirmed seminal works on key definitions and theories previously identified through background literature searching and identified additional definitions. In addition to the background literature searching and handbook searching, further purposive searching activities were undertaken to locate additional definitions and theories of well-being, including those developed since the publication of the handbook. The reference lists of the reviewed chapters in the handbook were searched and relevant sources reviewed. The literature and seminal author websites were also searched for additional sources or measures. Searching finished once no further definitions were found.

⁹ Search: (exp Well being/ OR well-being.mp. OR wellbeing.mp.) on 26.03.2018.

¹⁰ Search: ((exp Well being/ OR well-being.mp. OR wellbeing.mp.) AND definition.mp.) on 26.03.2018.

¹¹ In the text the term 'happiness' was applied broadly and used interchangeably with 'well-being'.

The definitions and theories considered for inclusion in the review are presented in the findings in Table 3-1. Definitions were excluded if they did not relate to a specific well-being definition and instead described: a philosophical theory of well-being (e.g. hedonia or eudaimonia); a measure integrating other definitions; a different concept to well-being; or research findings about well-being. Theories were evaluated for inclusion using Shearn et al.'s (2017) four evaluation criteria:

1. Level of the system, i.e. psychological;
2. Alignment with the aims of the research, i.e. explains how well-being changes, compatible with feeling and functioning definitions of well-being, makes links between the individual and environment;
3. Simplicity, i.e. ease of theory generation; and
4. Compatibility with realist principles, i.e. supports explanation of context-mechanism interactions affecting well-being.

For the purposes of this work this meant that the included theories were those that were focused on well-being at a psychological level, were compatible with a range of well-being definitions, and provided insight into how well-being changes, in different people, environments, and over time through interactions between psychological processes and individual and environmental contexts. Some approaches contained elements of both definition and theory. Where the theory did not make the evaluation criteria for inclusion, for example being too complex (simplicity criteria), then only the definition was incorporated into the analysis.

For each definition or theory included, key references were sourced, alongside more recently cited publications and any associated measures. The definitions and theories were the unit of analysis in this review, with one or more data sources (e.g. journal articles or book chapters) contributing to each approach.

3.2.2. Step 2. Identifying conceptual and theoretical insights

The descriptions of the definitions and theories were examined for insights about well-being, either conceptual or theoretical. Conceptual insights related to ideas about what well-being is, either the potential attributes of well-being or how those attributes are organised in the concept. Theoretical insights related to ideas about how well-being is changed, including underlying psychological processes (mechanisms) and wider influencing factors (contexts).

In the process of reviewing each approach, a record was kept of: identified conceptual or theoretical insights; relevant quotations illustrating the insight; and notes on how the insights were interpreted. Insights were identified through reading the sources for each definition or theory and making annotations about the conceptual or theoretical implications in a Word document. The approaches included in the review, and the insights gleaned from them, are detailed in Table 3-2 in the findings, as well as notes relating to theory evaluation, where applicable.

The conceptual insights were collated and organised into attributes (reflecting the indicator level of the concept) and dimensions (reflecting the secondary level of the concept) of well-being. Each attribute was comprised of one or more insights considered to be describing the same conceptual entity. Related attributes sharing broader conceptual overlap were organised into groups, each reflecting a dimension of well-being. The theoretical insights were also collated and considered in relation to one another and organised into groups sharing theoretical content (i.e. mechanisms or contexts). The identified insights were used to develop the concept definition and theory, the development of which was interlinked and iterative.

3.2.3. Step 3. Developing the concept definition

Descriptions were developed for the attributes and dimensions. Consideration was given to the properties of the attributes and dimensions, informing the development of an overall description of well-being as a concept (reflecting the basic level of the concept) and development of thinking about its organisation and structure. The concept definition was developed through reflection and discussion of the concept and refined iteratively throughout the process.

3.2.4. Step 4. Developing the theory

Insights relating to psychological processes underlying the experience of well-being were incorporated into the theory as mechanisms. Insights relating to individual and environmental factors creating the conditions that affect the activation of those mechanisms were incorporated into the theory as individual and environmental contexts. The theoretical insights were synthesised into an explanatory account of how well-being changes over time, through the interaction between mechanisms and contexts, using the analytical processes of retroduction and abduction (section 2.4.3). Retroduction in this instance involved theorising how the identified psychological processes would cause changes to well-being, and

sometimes this required abduction, which involves imagining the mechanisms required (Jagosh, 2020a). Together, retroduction and abduction were used to consider the links between identified conceptual and theoretical insights and the relationships between contexts, mechanisms and well-being attributes and dimensions. An explanatory account was gradually developed and refined into the theory.

Appendix 1 provides examples to illustrate the analysis processes of the review. Examples 1 to 5 show how analysis notes and diagramming were used to develop thinking over time, as well as transparently retain links between the evidence and the claims being made within the concept definition and theory.

3.3. Findings

Tables are used to transparently show which approaches (i.e. definitions and theories) were included (Step 1, Table 3-1), details of each approach and the specific insights identified from it (Step 2, Table 3-2), and how these insights were grouped into either dimensions of well-being (Step 3, Table 3-3) or mechanisms and contexts relevant to well-being (Step 4, Table 3-3).

3.3.1. Step 1. Identification of definitions and theories

Twenty-seven approaches were identified (Step 1) through the review (two approaches were merged – SDT and an SDT perspective on eudaimonia, as these overlapped considerably). These are shown in Table 3-1 with details of their origin within the searching processes, key references, and the rationale for inclusion or exclusion.

3.3.2. Step 2. Identification of conceptual and theoretical insights

Sixteen of the approaches were included in the analysis, in which conceptual and theoretical insights were identified (Step 2). Table 3-2 summarises the included approaches describing the key features, highlighting conceptual or theoretical notes, and listing the insights associated with the approach and how they contributed to the concept definition and/or theory.

Table 3-1. Identified well-being definitions and theories, origin and associated references, and details of inclusion.

Definition or theory ^a	Origin (associated references) ^b	Inclusion details ^c
Balance point	BLS (Dodge et al., 2012)	Included
Broaden and Build (B&B) theory	Ch-3 OH (Conway et al., 2013); BLS (Fredrickson, 2004)	Included
Conservation of Resources (COR) theory	BLS (Halbesleben et al., 2014; Hobfoll, 1989; Hobfoll et al., 2018)	Included
Emotionally intelligent happiness	Ch-6 OH (Crum and Salovey, 2013)	Included
Endowment-Contrast (EC) model	Ch-4 OH (Griffin and Gonzalez, 2013)	Included
Eudaimonic well-being (EWB)	BLS (Waterman et al., 2010)	Included
Flourishing	BLS (Huppert and So, 2013)	Included
Flow	Ch-5 OH (Delle Fave, 2013); BLS (Nakamura and Csikszentmihalyi, 2002)	Included
Functional well-being	Ch-17 OH (Vittersø, 2013)	Included
Mental health as flourishing	BLS (Keyes, 2002, 1998)	Included
PERMA	BLS (Butler and Kern, 2016; Seligman, 2011)	Included
Personal expressiveness	Cited in Ch-15 OH (Huta, 2013); BLS (Waterman, 1990; Waterman et al., 2008)	Included
Psychological flexibility	BLS (Kashdan et al., 2020; Kashdan and Rottenberg, 2010)	Included
Psychological well-being (PWB)	Cited in Ch-10 OH (Pavot and Diener, 2013) & Ch-15 OH (Huta, 2013); BLS (Ryff, 2014, 1989)	Included
Self-determination theory (SDT) / SDT perspective on eudaimonia	Ch-16 OH (Niemi and Ryan, 2013); BLS (Ryan et al., 2008; Ryan and Deci, 2017, 2000)	Included
Subjective well-being (SWB)	Ch-10 OH (Pavot and Diener, 2013); Ch-13 OH (Miao et al., 2013); Ch-14 OH (Cummins, 2013); BLS (Diener, 1984; Diener et al., 2017)	Included

Definition or theory ^a	Origin (associated references) ^b	Inclusion details ^c
Eudaimonia	Ch-15 OH (Huta, 2013)	Excluded (1)
Flourishing	BLS (Diener et al., 2010)	Excluded (2)
General well-being	BLS (Longo et al., 2017)	Excluded (2)
Hedonic/eudaimonic well-being	BLS (Ryan and Deci, 2001)	Excluded (1)
Mental well-being	BLS (Tennant et al., 2007)	Excluded (2)
Mental well-being	BLS (WHO Regional Office for Europe, 1998)	Excluded (2)
Personal well-being	BLS (ONS, 2018)	Excluded (2)
Quality of Life	Ch-12 OH (Veenhoven, 2013)	Excluded (3)
Religious engagement	Ch-7 OH (Myers, 2013)	Excluded (4)
Rewards of happiness	Ch-9 OH (Jacobs Bao and Lyubomirsky, 2013)	Excluded (4)
Self-regulation in psychopathology	Ch-8 OH (Ferssizidis et al., 2013)	Excluded (4)

Notes: ^a Other terms associated with well-being were identified but not included as they did not represent a specific definition: Feeling good/functioning well, Good life, Happiness, Living well. Additional terms commonly included in discussions of well-being, but considered distinct concepts from well-being were also excluded: Burnout, Hardiness, Health/positive health, Mental health, Mental illness, Mental toughness, Prospering, Psychological distress, Resilience, Salutogenesis, Stress, Thriving, Welfare, Wellness. ^b Chapters 1, 2 and 11 of OH were introductory chapters. ^c Exclusion codes: 1: philosophical theory of well-being; 2: integrated measure; 3: distinct concept to well-being; 4: research findings about well-being. Abbreviations: BLS: Background literature searching; Ch: Chapter; OH: Oxford Handbook of Happiness.

Table 3-2. Details of included well-being definitions and theories and identified insights.

Definition or theory (key reference/s)	Key features	Conceptual/theoretical notes	Insight (contribution to theory)
Balance point (Dodge et al., 2012)	Well-being is “the balance point between an individual’s resource pool and the challenges faced” (p. 230). Driven to maintain balance.	Conceptualisation reflects how well-being is maintained, not the nature of well-being, so contributed theoretical not conceptual insights. Processes necessary for maintaining balance point are not explicit, but aligned with theoretical insights from other theories.	Drive for balance of resources and challenges (M/RC)
Broaden and Build theory (Conway et al., 2013; Fredrickson, 2004)	While negative emotions are associated with specific action tendencies, positive emotions broaden thought-action repertoires, building resources. Different emotions have different effects.	General well-being related theory. Well-being is not clearly defined and its conceptualisation varies. Theory met all four evaluation criteria (level, alignment, simplicity, compatibility).	Emotions support resource acquisition (M/RC)
Conservation of Resource theory (Hobfoll, 1989; Hobfoll et al., 2018)	Accumulation of resources (object, condition, personal characteristics, energy) supports well-being and motivates behaviour. Resource fluctuations (gain or loss) can develop into resource gain or loss cycles.	General well-being related theory. Well-being is not clearly defined. Resources conceptualised as beneficial for goal attainment (Halbesleben et al., 2014). Theory met all four evaluation criteria (level, alignment, simplicity, compatibility).	Resource cycles (M/RC)
Emotionally intelligent happiness (Crum and Salovey, 2013)	Emotionally intelligent happiness is “having the ability to experience emotion in the service of living vitally, meaningfully, socially, and successfully” (p. 103). Positive and negative emotions important for full functioning. Emotional intelligence and awareness support functioning.	Conceptualisation of well-being beyond happiness. Also contained theoretical insights aligning with other theories.	Functionality of positive and negative emotions (FE/EM) Emotions support resource acquisition (M/RC) Emotional intelligence (C/I) Mindful awareness (C/I)

Definition or theory (key reference/s)	Key features	Conceptual/theoretical notes	Insight (contribution to theory)
Endowment-Contrast model (Griffin and Gonzalez, 2013)	Life satisfaction judgements are complex; based on interaction between endowment, contrast, and relevance of current and past events.	Model considering nature of life satisfaction judgements. Only definitional elements included, as theory evaluated as highly complex so impractical for generating ideas about well-being (failed simplicity criteria).	Satisfaction appraisals (FE/LS)
Eudaimonic well-being (EWB) (Waterman et al., 2010)	EWB has subjective (enjoyment of, and intense involvement in, personally expressive activities) and objective (self-discovery, developing best potentials, purpose and meaning in life, effort in pursuit of excellence) elements.	Focus is on operationalising EWB; relationships between elements not explicit. Conceptual overlap between EWB, personal expressiveness (e.g. intense involvement) and flow.	Enjoyment and involvement in personally expressive activities (FE/EN) Self-knowledge (FE/SP) Personal development (FU/PG) Striving for excellence (FU/PG) Purpose in life (FU/PL)
Flourishing (Huppert and So, 2013)	Flourishing is “the experience of life going well. It is a combination of feeling good and functioning effectively.” (p. 838) Flourishing, consists of positive functioning (engagement, meaning, competence, positive relationships), positive characteristics (emotional stability, vitality, resilience, optimism, self-esteem), and positive emotion.	Focus on operationalisation; relationships between elements not specified. Existing questions in a large international survey measured elements; little conceptual detail available. Flourishing synonymous with high well-being and mental health. Optimism conceptually related to personality and psychological characteristics, so considered context. Resilience excluded as it is a separate concept related to the use of resources (Windle, 2011).	Calm (FE/EM) Happiness (FE/EM) Vitality (FE/EM) Engagement (FE/EN) Meaning (FE/Me) Self-esteem (FE/SP) Accomplishment (FU/PC) Positive relationships (FU/CO) Optimism (C/I)

Definition or theory (key reference/s)	Key features	Conceptual/theoretical notes	Insight (contribution to theory)
Flow (Delle Fave, 2013; Nakamura and Csikszentmihalyi, 2002)	Flow state characterised by: intense concentration, merging of awareness and action, loss of self-consciousness, sense of control, altered sense of time, and is intrinsically rewarding. Arises when engaging in activities optimally challenging for skills.	Well-being is not clearly defined, but aligns with good functioning.	Flow (FE/EN)
Functional well-being (FWB) (Vittersø, 2013)	FWB consists of: feelings (hedonicity, quality, duration, intensity); evaluations (life overall, domains, episodes); and optimal functioning (personal growth, social relations, autonomy, meaning). Positive and negative emotions have important roles in functioning.	Meaning reflects both a sense that one's life is meaningful and having purpose in life.	Functionality of positive and negative emotions (FE/EM) Meaning (FE/ME) Positive evaluations of life overall, domains and episodes (FE/LS) Autonomy (FU/AR) Personal growth (FU/PG) Positive social relations (FU/CO) Purpose in life (FU/PL)

Definition or theory (key reference/s)	Key features	Conceptual/theoretical notes	Insight (contribution to theory)
Mental health as flourishing (Keyes, 2002, 1998)	Mental health, or flourishing, is subjective well-being. It consists of: emotional well-being (similar to SWB), psychological well-being (PWB); and social well-being (social coherence, actualisation, integration, acceptance, and contribution).	Focused on operationalising mental health; relationships between the dimensions not specified. Social well-being intended to extend mental health beyond the individual, but not included in other approaches; could reflect contexts.	Frequent positive emotions, infrequent negative emotions (FE/EM) Life satisfaction (FE/LS) Positive attitude towards self (FE/SP) Autonomy (FU/AR) Belonging to a community (FU/CO) Positive relationships (FU/CO) Contribution to society (FU/PL) Purpose in life (FU/PL) Environmental mastery (FU/PC) Personal growth (FU/PG) Societal conditions (social coherence, actualisation and acceptance) (C/E)

Definition or theory (key reference/s)	Key features	Conceptual/theoretical notes	Insight (contribution to theory)
PERMA (Butler and Kern, 2016; Seligman, 2011)	Well-being has five elements: positive emotion; engagement; positive relationships; meaning; and accomplishment.	Relationships between elements not explicit. Extends well-being beyond happiness. Flourishing synonymous with well-being. Engagement synonymous with flow. Meaning reflects both sense that one's life is meaningful and having purpose in life. Accomplishment reflects both daily accomplishments and broader achievement.	Engagement and flow (FE/EN) Meaning (FE/ME) Positive emotions (FE/EM) Accomplishment (FU/PG) Accomplishment of daily responsibilities (FU/PC) Positive relationships (FU/CO) Purpose in life (FU/PL)
Personal expressiveness (Waterman, 1990; Waterman et al., 2008)	Personal expressiveness is a highly positive affective condition arising when an individual engages in activities that truly represent them; considered synonymous with eudaimonia. Distinct from hedonic enjoyment of activities.	Distinction between hedonic enjoyment and personal expressiveness questioned (Kashdan et al., 2008); but differently related to particular activities. Conceptual overlap with flow and engagement.	Enjoyment (FE/EM) Feeling that an activity represents who they are (FE/EN) Autonomy (FU/AR)

Definition or theory (key reference/s)	Key features	Conceptual/theoretical notes	Insight (contribution to theory)
Psychological flexibility (Kashdan et al., 2020; Kashdan and Rottenberg, 2010)	Flexible adaption of psychological response to situational demands. Being psychologically flexible supports well-being through maintenance of goal focused behaviour, especially in presence of distress.	Psychological flexibility is difficult to define; operationalised as the use of avoiding, accepting, or harnessing distress to achieve goals (Kashdan et al., 2020), although other definitions are less specific about distress (Kashdan and Rottenberg, 2010). Capacity to be psychologically flexible depends on several psychological processes, e.g. executive control, mindfulness, and personality (Kashdan and Rottenberg, 2010), considered contexts. Conceptualisation focus, but description of the wider psychological processes incorporated as theoretical insights. Met all four theory evaluation criteria (level, alignment, simplicity, compatibility).	Psychological flexibility (M/PF) Mindful awareness (C/I) Personality (C/I)
Psychological well-being (PWB) (Ryff, 2014, 1989)	PWB is has six dimensions: autonomy; environmental mastery; personal growth; positive relations with others; purpose in life; self-acceptance. Development was theory driven. PWB is predicted by personality (Schmutte and Ryff, 1997).	Focused on operationalisation; relationships between dimensions are not specified. Domain descriptors indicate aspects of feeling, not just functioning. Purpose in life reflects both sense that one's life is meaningful and having purpose in life. Debate around distinction from SWB (Disabato et al., 2016).	Meaning (FE/ME) Positive attitude towards self (FE/SP) Autonomy (FU/AR) Environmental mastery (FU/PC) Personal growth (FU/PG) Positive relationships (FU/CO) Purpose in life (FU/PL) Personality (C/I)

Definition or theory (key reference/s)	Key features	Conceptual/theoretical notes	Insight (contribution to theory)
<p>Self-determination theory (SDT) (Ryan and Deci, 2017, 2000)</p> <p>SDT perspective on eudaimonia (Ryan et al., 2008)</p>	<p>Humans have three basic psychological needs: autonomy (need to self-regulate and act authentically), competence (need to feel effectance and mastery), and relatedness (need to feel socially connected). Satisfaction of basic psychological needs supports well-being, e.g. meaning, self-esteem and vitality. Social contexts (e.g. interpersonal climate) and individual differences (e.g. causality orientations, mindful awareness) support or hinder need satisfaction. Basic psychological needs are considered universal, although satisfaction may vary culturally (Ryan and Deci, 2017).</p>	<p>General well-being related theory. Well-being not clearly defined; generally reflects good functioning. Satisfaction of the basic psychological needs impacts both feeling and functioning. Operationalisation of basic psychological need satisfaction reflects conditions required for need satisfaction. General focus on need satisfaction, but other mini-theories in SDT also indirectly relevant to well-being, e.g. integration of external values into the self is a process through which autonomous regulation of behaviour can be increased. Theory met all four evaluation criteria (level, alignment, simplicity, compatibility).</p>	<p>Meaning (FE/ME)</p> <p>Self-esteem (FE/SP)</p> <p>Vitality (FE/EM)</p> <p>Autonomous regulation (FU/AR)</p> <p>Confidence and effectiveness (FU/PC)</p> <p>Connection to others (FU/CO)</p> <p>Goal content (FU/PL)</p> <p>Purpose in life (FU/PL)</p> <p>Basic psychological need satisfaction (M/BN)</p> <p>Causality orientations (C/I)</p> <p>Mindfulness awareness (C/I)</p> <p>Culture (C/E)</p> <p>Interpersonal climate (C/E)</p>

Definition or theory (key reference/s)	Key features	Conceptual/theoretical notes	Insight (contribution to theory)
Subjective well-being (SWB) (Diener, 1984; Diener et al., 2017)	SWB is an individual's overall evaluation of their life and emotional experiences. Consists of: life satisfaction, high positive affect and low negative affect. Development data-driven; theoretical accounts proposed (e.g. Diener et al., 2006). Personality predicts SWB, especially extraversion and neuroticism (Schimmack et al., 2004; Steel et al., 2008). Cultural variations and universals in SWB have been found (Diener et al., 2017).	Affect reflects emotions. Life and domain satisfaction sometimes distinguished; distinction between these questioned (Cummins, 2013). Cognitive nature of life satisfaction questioned and considered an attitude (Vittersø, 2013). Theories of SWB (e.g. homeostatically protected mood; Cummins, 2013) not included as they aligned to only one definition of well-being and therefore did not meet the evaluation criteria (failed alignment).	Frequent positive emotions, infrequent negative emotions (FE/EM) Life satisfaction (FE/LS) Personality (C/I) Culture (C/E)

Abbreviations: FE: Feeling; EM: Emotion; EN: Engagement; LS: Life satisfaction; ME: Meaning; SP: Self-perception; FU: Functioning; AR: Autonomous regulation; CO: Connection to others; PC: Perceived competence; PG: Personal growth; PL: Purpose in life; M: Mechanism; BN: Basic psychological need satisfaction; PF: Psychological flexibility; RC: Resource cycles; C: Context; E: Environmental; I: Individual.

3.3.3. Steps 3 & 4. Development of the concept definition and theory

The conceptual insights identified from the sixteen well-being approaches included in the analysis were organised into two dimensions of well-being, functioning and feeling (Step 3). The theoretical insights became either mechanisms or contexts (Step 4). The two dimensions, mechanisms and contexts are described in Table 3-3, including the groupings of insights contributing to them.

Table 3-3. Descriptions of the two well-being dimensions, mechanisms and contexts, including contributing insights.

Description	Contributing insights (associated definition/theory)
<i>Well-being dimension – functioning.</i> Reflects how the individual perceives their functioning, particularly in relation to their engagement with others, the environment, and their behavioural motivations. A dimension of well-being, with five attributes.	
<i>Connection to others.</i> The individual perceives that they have positive relationships with other people, which are warm, trusting and satisfying, they feel loved and able to give and receive support, and they have a sense of belonging to a wider community.	Belonging to a community (MHaF) Connection to others (SDT) Positive relationships (Flourishing; MHaF; PERMA; PWB) Positive social relations (FWB)
<i>Autonomous regulation.</i> The individual is living in accordance with their own personal values, standards and beliefs, so their behaviour is generally intrinsically motivated or autonomously regulated, so they feel that they are being true to themselves and who they are.	Autonomous regulation (SDT) Autonomy (FWB; MHaF; PE; PWB)
<i>Purpose in life.</i> The individual has identified what is important to them in life, holds personal goals, aims and objectives, and working towards these gives them purpose and direction in their life.	Contribution to society (MHaF) Goal content (SDT) Purpose in life (EWB; FWB; MHaF; PERMA; PWB; SDT)
<i>Perceived competence.</i> The individual feels able to manage their life environment to support their needs and values, accomplish their daily life activities and responsibilities, and feels they can effectively overcome challenges.	Accomplishment (Flourishing) Accomplishment of daily responsibilities (PERMA) Confidence and effectiveness (SDT) Environmental mastery (MHaF; PWB)
<i>Personal growth.</i> The individual feels they are developing their talents and potentials, achieving they personal goals, and becoming a better person.	Accomplishment (PERMA) Personal development (EWB) Personal growth (FWB; MHaF; PWB) Striving for excellence (EWB)

Description	Contributing insights (associated definition/theory)
<i>Well-being dimension – feeling.</i> Reflects the individual’s cognitive-affective experiences, or feelings, in their life. A dimension of well-being, with five attributes.	
<i>Emotions.</i> The individual generally experiences more positive than negative emotions, however, the importance of a full emotional experience is recognised, as both positive and negative emotions have important roles in a fully functional life.	Calm (Flourishing) Enjoyment (PE) Frequent positive emotions, infrequent negative emotions (MHaF; SWB) Functionality of positive and negative emotions (EI happiness; FWB) Happiness (Flourishing) Positive emotions (PERMA) Vitality (Flourishing; SDT)
<i>Engagement.</i> The individual participates in activities that are optimally challenging for their skills, leading to a positive subjective state characterised by absorption, interest, enjoyment, involvement, and losing sense of time.	Engagement (Flourishing) Engagement and flow (PERMA) Enjoyment and involvement in personally expressive activities (EWB) Flow (Flow) Feeling that an activity represents who they are (PE)
<i>Life satisfaction.</i> The individual holds a positive attitude towards their life and its domains, finding these satisfying.	Life satisfaction (MHaF; SWB) Positive evaluation of life overall, domains and episodes (FWB) Satisfaction appraisals (EC model)
<i>Meaning.</i> The individual feels that their life has meaning, providing a sense of fulfilment.	Meaning (Flourishing; FWB; PERMA; PWB; SDT)
<i>Self-perception.</i> The individual holds a positive attitude towards the self, they know and accept the self, and they feel good about who they are.	Positive attitude towards self (MHaF; PWB) Self-esteem (Flourishing; SDT) Self-knowledge (EWB)
<i>Mechanisms.</i> Reflects several interlinked psychological processes which cause changes in well-being when activated in conducive contexts.	
<i>Basic psychological need satisfaction.</i> All humans have basic psychological needs for autonomy (feeling self-regulated and true to self), competence (feeling control and mastery) and relatedness (feeling connected to others), the satisfaction of which improves feeling and functioning. Need satisfaction is dependent on the social environment being need supportive (environmental context) and internal characteristics (individual context).	Satisfaction of basic psychological needs for autonomy, competence, relatedness (SDT)

Description	Contributing insights (associated definition/theory)
<p><i>Psychological flexibility.</i> The process of remaining flexible in one's psychological response to situational demands, both internal (e.g. uncomfortable emotions or thoughts) and/or external (e.g. setbacks at work), so that strategies can be adapted to maintain goal pursuit in challenging situations. Psychological flexibility is dependent on the individual's psychological skills and characteristics (individual contexts), such as mindful awareness.</p>	<p>Psychological flexibility (PF)</p>
<p><i>Resource cycles.</i> Short-term well-being experiences affect resource gain or loss, causing fluctuations in resources, which over time and repeated experiences can lead the person to enter resource gain or loss cycles, in which well-being is positively or negatively impacted. Resources reflect individual and environmental contexts relevant to goal attainment.</p>	<p>Emotions support resource acquisition (B&B theory; EI happiness) Drive for balance of resources and challenges (Balance point) Resource cycles (COR theory)</p>
<p><i>Contexts.</i> Reflects individual or environmental conditions separate from the concept of well-being, but relevant to its experience.</p>	
<p><i>Individual contexts.</i> These are factors relating to the individual and relevant to their experience of well-being.</p>	<p>Causality orientations (SDT) Emotional intelligence (EI happiness) Mindful awareness (EI happiness; PF; SDT) Optimism (Flourishing) Personality (PF; PWB; SWB)</p>
<p><i>Environmental contexts.</i> These are factors external to the individual that are relevant to their experience of well-being.</p>	<p>Culture (SDT; SWB) Interpersonal climate (SDT) Societal conditions – social coherence, actualisation and acceptance (MHaF)</p>

Abbreviations: B&B: Broaden and build; COR: Conservation of resource; EC: Endowment contrast; EI: Emotionally intelligent; EWB: Eudaimonic well-being; FWB: Functional well-being; MHaF: Mental health as flourishing; PE: Personal expressiveness; PF: Psychological flexibility; PWB: Psychological well-being; SDT: Self-determination theory; SWB: Subjective well-being.

3.3.3.1. Concept definition

Through the synthesis of the conceptual and theoretical insights, the researcher decided that the conceptual insights were best organised into two groups, relating to feeling and functioning. These two broad groupings became the two dimensions of well-being. Within these broader groupings, conceptual insights for different approaches were often found to overlap conceptually and were therefore organised into more specific groupings, which became specific attributes of well-being. The attributes and dimensions were refined by iteratively developing written descriptions. Through the development of the written descriptions the attributes and dimensions were refined and the organisation of the attributes within the dimensions was clarified. Appendix 1 illustrates the iterative nature of this process, starting with the initial broad groupings of attributes (Example 1), refining the insights from each approach (Example 2) and evidencing these (Example 3), and developing the written descriptions (Example 4). The refined concept definition of well-being was finalised as follows (each attribute and dimension is described in Table 3-3):

Well-being is defined as a dynamic, multidimensional concept reflecting an individual's subjective experience of their life with regards to their: feeling, comprised of emotions, engagement, life satisfaction, meaning, and self-perception; and functioning, comprised of connection to others, autonomous regulation, purpose in life, perceived competence, and personal growth.

Well-being as the subjective experience of life reflects the basic level of the concept, the two dimensions of feeling and functioning reflect the secondary level, and the ten attributes reflect the indicator level (Goertz, 2006). In the definition, functioning relates to an individual's perception of their functioning, rather than to the behaviours of functioning themselves.

Conceptually, well-being is considered a continuum from low to high; all individuals experience well-being to a greater or lesser degree, rather than some people 'having' well-being while others do not. The most prototypical example of well-being is high well-being, called flourishing, reflects highly positive experiences in both dimensions (functioning and feeling) and all of their respective attributes of well-being. When only a few of the attributes are experienced positively, well-being is still experienced, but to a lesser degree (i.e. lower well-being). Individuals experience very poor well-being if they have negative experiences in many of the attributes.

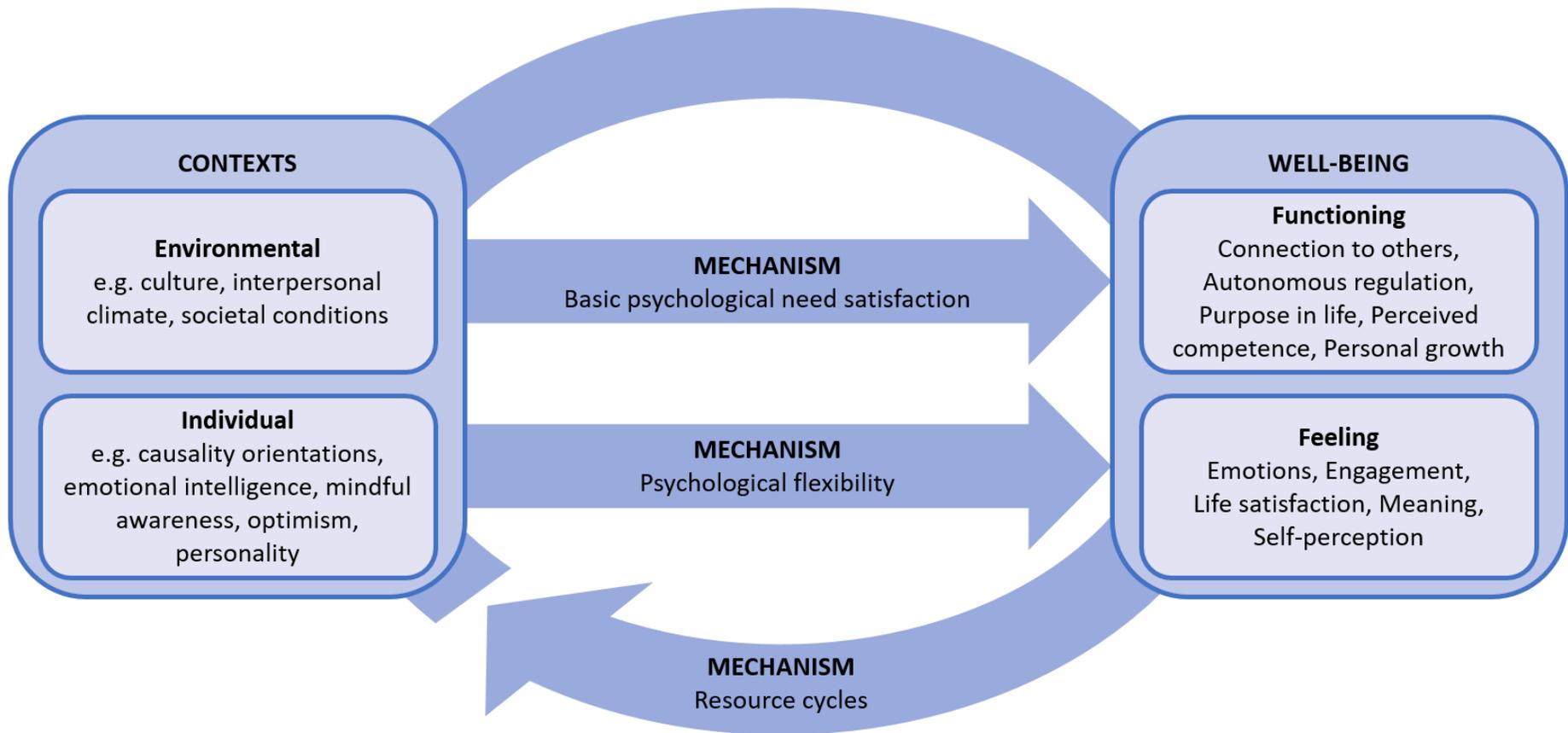


Figure 3-2. Model of the well-being theory.

3.3.3.2. Theory

Similarly to the development of the concept definition, the theory was developed iteratively through the synthesis of the conceptual and theoretical insights. The theoretical insights taken from each approach were considered in relation to one another and the developing concept definition of well-being. Models (visual depictions of theory) were primarily used to support the retroductive processes involved in identifying the relationships between the mechanisms, contexts and well-being and representing these within the developing theory. Appendix 1 shows examples of this process, with initial ideas about groupings depicted visually in Example 1, evidence for these groups recorded similarly to in Example 3 and refined as in Example 4, and the gradual development of models alongside this in Example 5.

The final theory is depicted in Figure 3-2. Three mechanisms were identified from the review: basic psychological need satisfaction; psychological flexibility; and resource cycles. These mechanisms explain how well-being changes over time, through the effects of individual and environmental contextual conditions. Examples of this are provided below. Changes in well-being range from minor daily fluctuations to greater changes following significant life events.

The basic psychological need satisfaction mechanism originated from SDT (Ryan and Deci, 2017). All humans have the potential to grow, develop and be well, providing they receive adequate psychological 'nutrients', which satisfy their basic psychological needs for autonomy, competence and relatedness, causing improved feeling and functioning. However, this is dependent on the environmental contexts (e.g. extent of need support) and the individual contexts (e.g. causality orientations), which interact and affect whether need satisfaction occurs (Ryan and Deci 2017). Basic psychological need satisfaction explains how different situations in an individual's life affect their well-being.

The psychological flexibility mechanism did not originate from an explicit substantive theory. However, the approach (Kashdan et al., 2020; Kashdan and Rottenberg, 2010) described a process that aligned with an earlier theorised mechanism (self-management/self-regulation). Psychological flexibility relates to the process of remaining flexible in one's psychological response to situational demands, both internal (e.g. uncomfortable emotions or thoughts) and external (e.g. work problems), so that strategies can be adapted to maintain goal pursuit in challenging situations (Kashdan and Rottenberg 2010). However, this capacity is dependent on the person having psychological skills or characteristics (individual contexts), such as mindful awareness and emotional intelligence (Crum and Salovey 2013; Ryan and

Deci 2017; Kashdan and Rottenberg 2010), to remain psychologically flexible in difficult situations. Being psychologically flexible means that the person can apply top-down processing to respond to a situation, determining the optimal response for goal attainment, rather than relying on their default or habitual strategies (Kashdan and Rottenberg 2010). Therefore, individuals who are psychologically flexible can maintain well-being, even in challenging situations.

The resource cycles mechanism drew primarily from COR theory (Halbesleben et al., 2014; Hobfoll et al., 2018) and B&B theory (Fredrickson, 2004). Resource cycles are the psychological processes through which shorter-term well-being experiences can develop into longer-term patterns. Positive well-being experiences build and replenish resources, for example through the broaden and build effect of positive emotions (Fredrickson 2004). When individuals have more resources they can invest them to gain further resources, overcome challenges, and work towards goals. Short-term resource gains can develop into a resource gain cycle, which is a positive feedforward process leading to an upward resource and well-being trajectory (Hobfoll et al. 2018). Conversely, actual or threatened resource loss is associated with negative well-being experiences and the individual's capacity to overcome challenges is reduced. Short-term resource losses can develop into a resource loss cycle, which is a negative feedforward process and leads to a downward resource and well-being trajectory (Hobfoll et al. 2018). This reduces their ability to overcome challenges and meet their goals, and may eventually lead to other outcomes, like burnout. These resource cycles explain how longer-term well-being patterns develop from shorter-term experiences. As well as being linked to the individual context and the person's pre-existing resource pool, they are also linked to the environmental context, with some environments supporting resource gain, building resources, or slowing or reversing a resource loss cycle.

The mechanisms and contexts interact dynamically with well-being over time. The environmental contexts, such as interpersonal climate, are more or less supportive of basic psychological needs and interact with the individual contexts, such as causality orientations, to affect the degree of need satisfaction that the individual experiences. Need satisfaction causes improved functioning and feeling (well-being), which results in resource development. This changes the individual context (e.g. psychological skills like mindful awareness) increasing the likelihood that the person will be able to remain psychologically flexible and maintain well-being, even in challenging situations, supporting further resource development. Over time, short-term fluctuations in resources can develop into resource gain cycles, which creates a feedforward process between the person's individual and

environmental contexts (i.e. resources) and their well-being, as greater resources support engagement in activities which promote well-being. These mechanisms are all interacting at the same time with the wider contexts, causing well-being to change dynamically over time and across situations.

3.4. Discussion

The TIR sought to answer two questions: (1) What is well-being (attributes and dimensions)?, and (2) How does well-being change over time (mechanisms and contexts)? Well-being was identified as having two dimensions, feeling and functioning, each with five attributes. Three mechanisms were identified that explain how well-being changes over time. Different environmental conditions are more or less supportive of the basic psychological needs for autonomy, competence and relatedness, affecting well-being. Depending on the individual's psychological resources, they are more or less able to maintain psychological flexibility in difficult situations, affecting their continued engagement in goal-directed behaviour, and their well-being. These shorter-term experiences affect the gain and loss of resources from individuals' resource pools, which can develop into longer-term resource cycles, affecting their well-being trajectories over time. These three mechanisms highlight the dynamic nature of well-being and how it is likely to be affected in a variety of ways as an individual interacts with the wider environment.

Despite the contributions made by the concept definition and theory to initial theorising, some gaps in knowledge remain. These relate primarily to the abstracted level of the theory, which requires further elaboration within specific settings. In relation to the first question and the nature of well-being, the dimensions and attributes were identified for well-being generally. However, it is not known how these would be experienced within a specific setting. For example, whether all of the attributes are equally salient in the experience of well-being during the transition through clinical training, or whether some attributes are more affected by transition experiences. This can be explored within the later stages of the research when exploring how well-being is affected by transition experiences in the realist review and realist investigation.

In relation to the second question and how well-being is changed, mechanisms were identified but further exploration is needed to identify how these are affected by different contexts. Some general contexts could be identified through the TIR, but these do not provide much detail about contextual variations. Contexts will vary between settings, so further exploration is needed to identify the salient contexts for the different mechanisms in

the transition setting, both individual and environmental. This will enable specific configurations of context, mechanism and outcome to be developed, explaining causally how they are linked. These will also be explored within the later stages of the research.

3.4.1. Strengths and limitations of the review

Given the scope of the well-being literature, it is possible that some well-being definitions or theories were not included, so some conceptual aspects of well-being may not have been included in the review. However, the approaches included provided a broad and comprehensive overview of a range of common approaches to well-being, facilitating development of the concept definition and theory.

A common approach for the development of definitions and theory is not established within the literature. The use of a TIR approach (Battistone et al., in press) combined with recommendations for concept definition (Podsakoff et al., 2016) and an approach for initial theorising using substantive theory in realist methodology (Shearn et al., 2017) provided a comprehensive approach that supported rigour and transparency in the development of the concept definition and theory.

There is inevitably a subjective element to this work, given the interpretations required. However, interpretation is part of all research, whether this is made explicit or not (Sayer 2000). By being clear about the process followed and the conclusions drawn, readers can make their own judgements about how well the analysis and resulting concept definition and theory aligns with their own concept of well-being. Ultimately, the intended purpose of the review was not to find the definitive ‘truth’ of well-being, but rather to identify conceptual and theoretical insights about well-being, synthesising them to propose a concept definition and theory, which was achieved. The intention is that these outputs should be viewed as a foundation upon which future research can build, including within the subsequent components of this research.

3.5. Chapter summary

Given the conceptual clarity issues around well-being in the medical education literature, it was necessary to look to the psychology literature for further insight about well-being. However, many varying definitions of well-being can be found within the psychological literature. This review sought to bring conceptual and theoretical clarity to well-being, supporting an improved knowledge of the concept.

The review drew on the TIR approach, integrated with two other approaches, one for developing concept definitions and the other regarding realist initial theorising from substantive theory. Definitions and theories were identified through a search of the literature and analysed for theoretical and conceptual insights. The insights were synthesised into a concept definition and theory of well-being.

The concept definition found well-being to reflect the subjective experience of life, with feeling and functioning as its two dimensions, each with multiple attributes. The theory identified three mechanisms through which well-being is changed, as well as suggesting several individual and environmental contexts. Together, the concept definition and theory provide the foundations for initial theorising within the realist review.

Chapter 4. Realist Review: Methods

4.1. Introduction

Medical education is characterised by transition, with medics experiencing multiple transitions of varying nature, scale and length throughout their educational journeys. Transition is defined in this work as the ongoing psychological and social learning process through which medical students become doctors. Transitions have cumulative effects, with the experiences in one transition affecting those of the next (Nicholson, 1990). Consequently, it is important that students' early transition experiences are supported in the medical education pathway, to optimise their preparation for those that follow. However, this does not seem to always be the case. Research has found that many students feel unprepared for the transition into and through clinical training, and it is associated with increased stress and poorer well-being (Atherley et al., 2019; Dunham et al., 2017; Radcliffe and Lester, 2003; Surmon et al., 2016; Teunissen and Westerman, 2011). Furthermore, many medical graduates feel unprepared for practice (Monrouxe et al., 2017b; Teunissen and Westerman, 2011). In the UK the annual GMC preparedness for foundation training survey highlights variability in perceptions of preparedness depending on a variety of factors, including medical school and demographic groups (GMC, n.d.). These findings indicate contextual variation in the experience of preparedness, both individual and environmental, and highlight that issues with the transition into and through clinical training could be affecting the subsequent transition into medical practice.

Most research in this area has focused on preparedness, which considers the problems around transition from an educational perspective (Atherley et al., 2019), aligning with cognitive learning theories (Morris, 2019). Preparedness is primarily focused on individual factors affecting the transition, such as skill and knowledge deficits. Other researchers have emphasised that both environmental and individual factors affect performance through later transitions (Kilminster et al., 2011), aligning with socio-cognitive and socio-cultural theories of learning (Morris, 2019). Therefore, the current understanding of the problems around well-being and transition could be developed by considering factors affecting transition beyond the individual student. Furthermore, research around transition has tended to focus on solutions, such as transition courses, rather than developing a strong theoretical understanding of the causes of the identified problems. This realist review therefore sought to develop the existing literature on the transition through clinical training by considering the

links with well-being from a broader perspective that takes both student and environmental contexts into consideration alongside the underlying causes.

4.1.1. Focus of the review

This work takes an exploratory focus, seeking to develop generative causal explanations of the mechanisms and contexts affecting students' well-being during the transition through clinical training. The research question for the realist review was: *in what circumstances, for whom, how, and why does the process of transitioning through clinical training affect medical students' well-being?* This review therefore aims to contribute to the transition literature by theory-building around how student and environmental contexts interact with one another and the well-being mechanisms identified in the well-being theory to change students' well-being during the transition through clinical training.

The review built upon the initial theorising conducted within the TIR, which developed a concept definition and theory of well-being. Well-being was defined as a dynamic, multidimensional concept reflecting an individual's subjective experience of their life with regards to their: feeling, comprised of emotions, engagement, life satisfaction, meaning, and self-perception; and functioning, comprised of connection to others, autonomous regulation, purpose in life, perceived competence, and personal growth. In the theory, three mechanisms were identified that explain how well-being is improved or diminished (basic psychological need satisfaction), how well-being can be maintained during difficult experiences (psychological flexibility), and how longer-term patterns of well-being develop (resource cycles). Some contexts were also identified, however, these were fairly general as the theory was at an abstracted level. The realist review builds upon the theory from the TIR by applying it to the pre-clinical to clinical training transition literature. In this way, the theory was therefore used as a lens through which to examine the existing clinical training transition literature and as the foundations of a theory of how transition affects well-being in that setting.

4.1.2. Review approach

A realist review methodology was used because it aligned with the paradigm of this work, scientific realism. Other common review methods did not align with the theory-building aim of the review, nor with the philosophical assumptions underpinning the work. Systematic reviews aim to answer narrow questions, for example summarising the effectiveness of an intervention (Munn et al., 2018). This would not have been appropriate, given the

exploratory nature and clarity issues around the outcome, which would not facilitate a clear and specific question. Alternatively, scoping reviews have broader questions, for example summarising the state of knowledge around an issue (Munn et al., 2018). This would have aligned with the exploratory nature, but not the theory development focus, as their purpose is descriptive to direct future research efforts. Furthermore, neither review method aligns with the philosophical assumptions underpinning this work, as outlined in Chapter 2. Systematic reviews are closely aligned with positivist and postpositivist paradigms, seeking to minimise bias and maximise reproducibility (Greenhalgh et al., 2018). Scoping reviews are less clearly aligned with a particular paradigm, as the purposes are more varied, but as a mapping exercise they are less suited to developing causal explanations (Peters et al., 2015; Thomas et al., 2017). Realist reviews, meanwhile, are theory-driven and facilitate an exploration of complexity, aligning with the theory-building focus of this work.

This chapter describes the method followed in the review. The findings are presented and discussed in Chapter 5.

4.2. Method overview

Realist reviews do not have a prescriptive method, but instead follow general steps. Each step contains multiple tasks which occur across the timelines of the review process (Pawson, 2006a). Pawson and colleagues (2005) identified five steps of a realist review: (1) clarify scope; (2) search for evidence; (3) appraise primary studies and extract data; (4) synthesise evidence and draw conclusions; and (5) disseminate, implement and evaluate. Pawson (2006a) subsequently separated Step 3 above into appraisal and extraction, making a six-step process, that is otherwise similar. This method section is presented by the five steps of the realist review outlined by Pawson et al. (2005), as appraisal and extraction were interlinked, so the five-step process seemed clearer. However, both sources (Pawson, 2006a; Pawson et al., 2005) informed the methods. The review was conducted following the Realist Synthesis Quality Standards (Wong et al., 2014) and Publication Standards (Wong et al., 2013a) (Appendix 2 & Appendix 3).

Transparency is important when conducting and presenting a review, to ensure others are clear about what has been done (Pawson, 2006a). However, realist reviews are highly iterative (Booth et al., 2018), so clearly communicating the processes involved can be challenging. To support reading of the method, Figure 4-1 was developed to show the tasks involved in each step of the review in approximate chronological ordering. The steps within the review have been labelled in the textual description and the figure, so the figure can be

referred to while reading the methods to illustrate how the tasks within the steps came together within the overall process of the review. Inevitably there was a degree of task overlap and iteration which could not be captured within the diagram. For specific details of the documents included in the review see section 5.1.

The following sections describe how the theory of well-being was used as the basis for the development of an IRT in combination with searching of the background literature. The literature was then formally searched to identify accounts of the medical student transition experience, from which inferences about well-being were drawn. These accounts were synthesised and this was supplemented by additional searching for relevant studies and substantive theories. Finally, the causal insights from the synthesis were developed into context-mechanism-outcome configurations (CMOCs) to convey the causal explanations in realist terms.

The realist review was registered with PROSPERO International Prospective Register of Systematic Reviews in 2019, project number: CRD42019131786.¹²

¹² Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42019131786

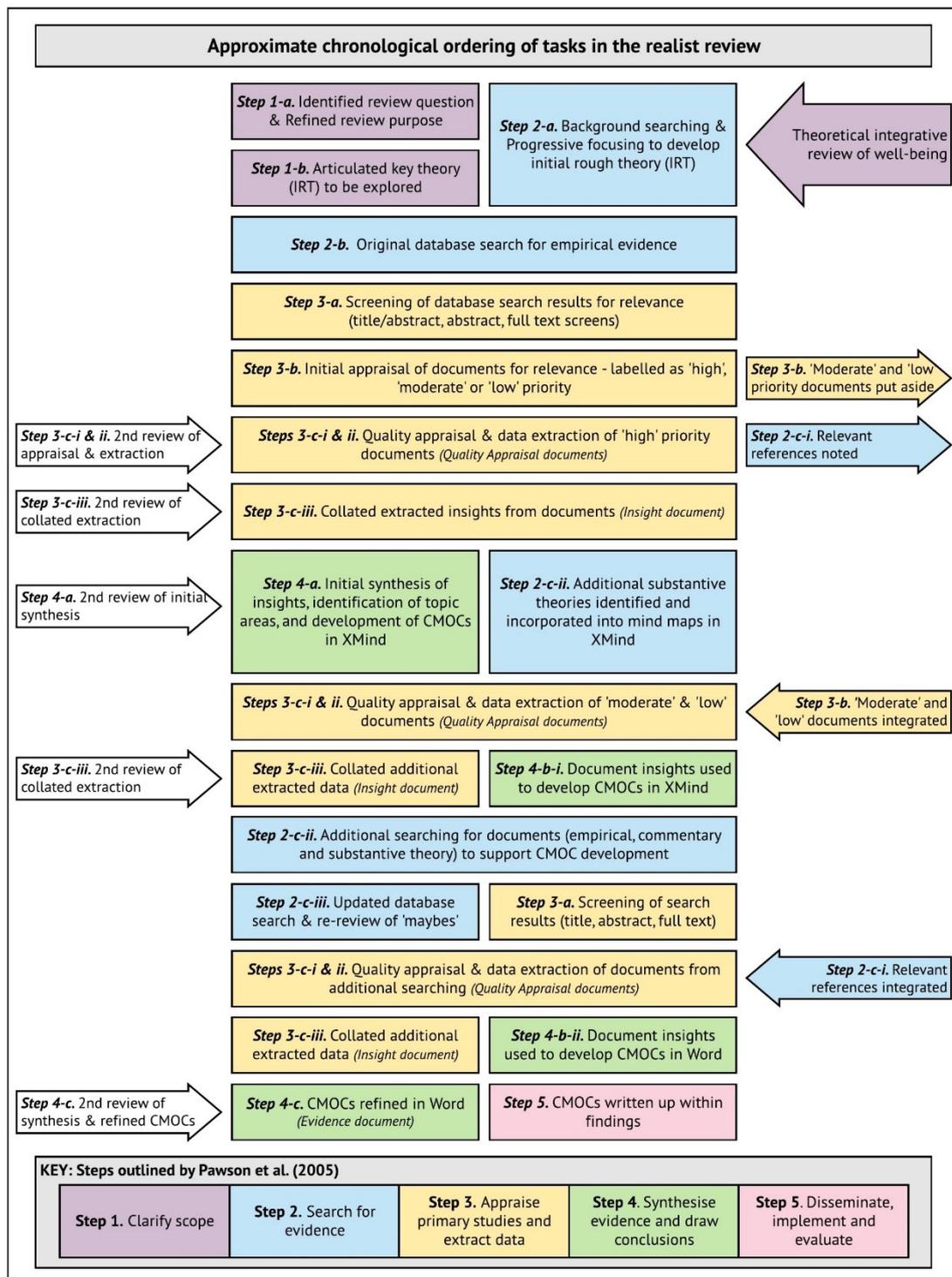


Figure 4-1. Chronological ordering of the tasks involved in each of the realist review steps.

4.3. Step 1. Clarify scope

Clarifying the scope of the review refers to the process of narrowing down the focus of the review, as it is not feasible to explore all potential explanatory avenues around a topic within one review (Pawson et al., 2005). This involved three tasks: identification of the review question; refinement of the purpose of the review; and articulation of the key theory to be explored. The first two tasks overlapped so are described together, followed by the third.

4.3.1. Step 1-a. Identification of the review question & Refinement of the review purpose

This step refers to the researcher developing an understanding of the scope of the chosen topic area (e.g. the intervention or problem) and determining an explanatory focus for the review (Pawson et al., 2005). Pawson et al. emphasise the ongoing nature of this process, which typically continues into the middle stages of the review, as focusing is guided by the researcher's developing understanding of the topic area. Focusing involves specifying the research question for the review, including the elements of the 'realist' question the review will address, and then clarifying the explanatory purpose of the review.

These activities began within the early stages of the PhD research. Background reading identified the wider problem area and narrowed the focus to well-being and transition, as described in Chapter 1. The pre-clinical to clinical transition in medical school was chosen as the focal transition, as this lays the foundations for subsequent transition experiences. The review focused on an individual level outcome, specifically medical student well-being. Other related areas, such as the well-being of educators, teams, and organisations were considered beyond the scope of the review, although potentially important areas for further exploration elsewhere.

The background literature searching highlighted conceptual clarity issues for well-being, so it was important to first clarify well-being as the main outcome of interest. This was done through the TIR, which was described in Chapter 3. The TIR helped focus the realist review and formed the basis of initial theorising, providing initial ideas about the nature of the well-being outcome, mechanisms, and possible contexts that might affect the activation of these. However, the theory from the TIR was developed at an abstracted level and not specific to the medical education transition setting. Therefore, further initial theorising was needed to consider how well-being changes in that specific setting.

Pawson et al. (2005, p. 25) provide examples of potential explanatory themes for realist reviews, and “Reviewing the same theory in comparative settings” seemed applicable. The review focused on applying the well-being theory into the transition setting to understand how different contexts (both relating to the students and the wider environment) change the activation of the identified mechanisms and therefore the well-being outcomes. The question was framed around the key concepts being explored and the relevant elements of the realist question for the explanatory focus of the review.

Much of the transition literature focuses on major transition ‘events’, rather than considering transition as a dynamic and ongoing process (Atherley et al., 2019). As the review progressed it became apparent that focusing solely on the pre-clinical to clinical training transition ‘event’ was overly simplistic and unhelpful, as the same issues were apparent later in clinical training because transition is ongoing. While the literature often focused on the pre-clinical to clinical transition and the short timeframe around this, an effort was made later in the review to include evidence from within clinical training (i.e. not just the first clerkship) to accommodate the conceptualisation of transition as an ongoing process.

4.3.2. Step 1-b. Articulation of the key theory to be explored

Clarifying the scope of the review also involves articulating the theory or theories that underpin the topic area (Pawson et al., 2005), which typically is a programme or intervention. In this research the focus is problem exploration, not programme evaluation. As explained in the Chapters 2 and 3, initial theorising started with the TIR, which was supplemented with Shearn et al.’s (2017) approach to initial theorising using substantive theory, as well as Podsakoff et al.’s (2016) recommendations for developing concept definitions.

In the realist review, the well-being theory from the TIR was developed into an IRT by considering the abstracted theory in relation to the specific transition setting and how the contexts within this might affect the activation of the identified well-being mechanisms. The well-being theory and the relationships described within this were considered alongside background reading of the medical education transition literature. Grey literature was also consulted, including GMC guidance and policies on clinical placements, and local clinical training handbooks for medical students. This was supplemented with the identification of relevant substantive MRTs, such as transition theory (Nicholson, 1990, 1984) and learning theories (e.g. Durning and Artino, 2011), which provided additional insights into potential contexts and additional mechanisms. The IRT was also discussed with supervisors and colleagues in medical education, all stakeholders for the transition, and ongoing reflection

supported further development. Although the well-being theory was developed before the IRT, given the iterative nature of the two reviews within this work, and the progression of the researcher’s thinking, they informed the development of one another to some extent in the early stages of the realist review. The different components were identified as contexts, mechanisms or outcomes, to align with a realist understanding of causation. The IRT development process is represented visually in Figure 4-2.

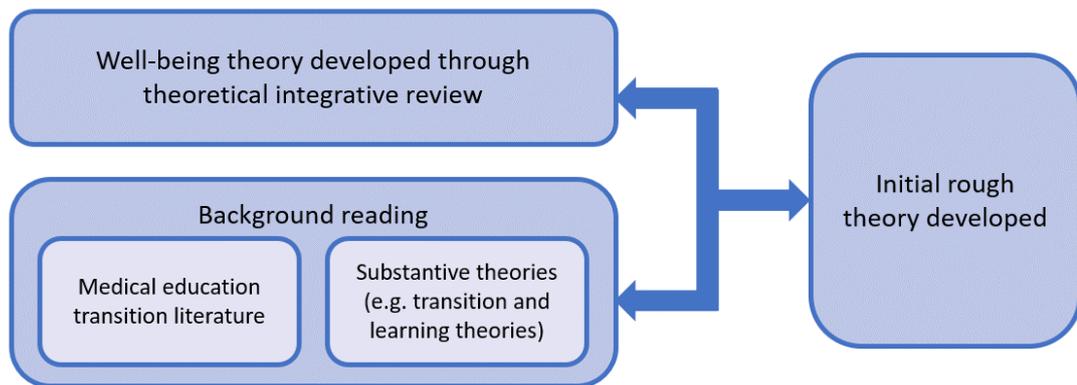


Figure 4-2. Initial rough theory development process.

Pawson (2019) advised that the application of realist methodology to a PhD involves “a partial exploration of a partial set of ideas” about the topic area, and the scope should be managed by focusing the theories being explored. Therefore, while the additional transition and learning substantive theories were consulted to support initial theorising and development of the IRT, for example around relevant contexts, these were not formally incorporated into the IRT at this stage. The final IRT was therefore focused on well-being and the theories identified through the theory, and is shown in Figure 4-3 (see Appendix 4 for earlier examples from the development process). Learning theories were incorporated into the realist investigation (see section 6.6), after an initial causal understanding of transition and well-being had been established within the realist review.

The IRT represented the researcher’s thinking in the earlier stages of the review, which developed over time, especially in relation to two challenges. The first challenge was how the concept of mechanism should be conceptualised in the IRT. Given that the focus of the review was problem exploration, not programme evaluation, it was not initially clear how the typical ‘resource and reasoning’ conceptualisation of mechanism should be applied, as the resource is usually offered by the programme (Pawson and Tilley, 1997). Additionally, the TIR identified well-being mechanisms that did not initially seem to fit with the ‘resource and reasoning’ conceptualisation, as they appeared to be psychological processes (Westhorp,

2018). The development of the understanding of mechanism in this work was outlined in Chapter 2 (see section 2.5.3). However, in the IRT an initial resolution was reached by including two conceptualisations of mechanism. In the top half of the diagram, the ‘resource and reasoning’ conceptualisation was used to represent the resources offered by the transition experience or aspect of clinical training and potential student responses to these. Then a second conceptualisation as psychological processes was used in the bottom half of the diagram to show the effects on some aspects of well-being.

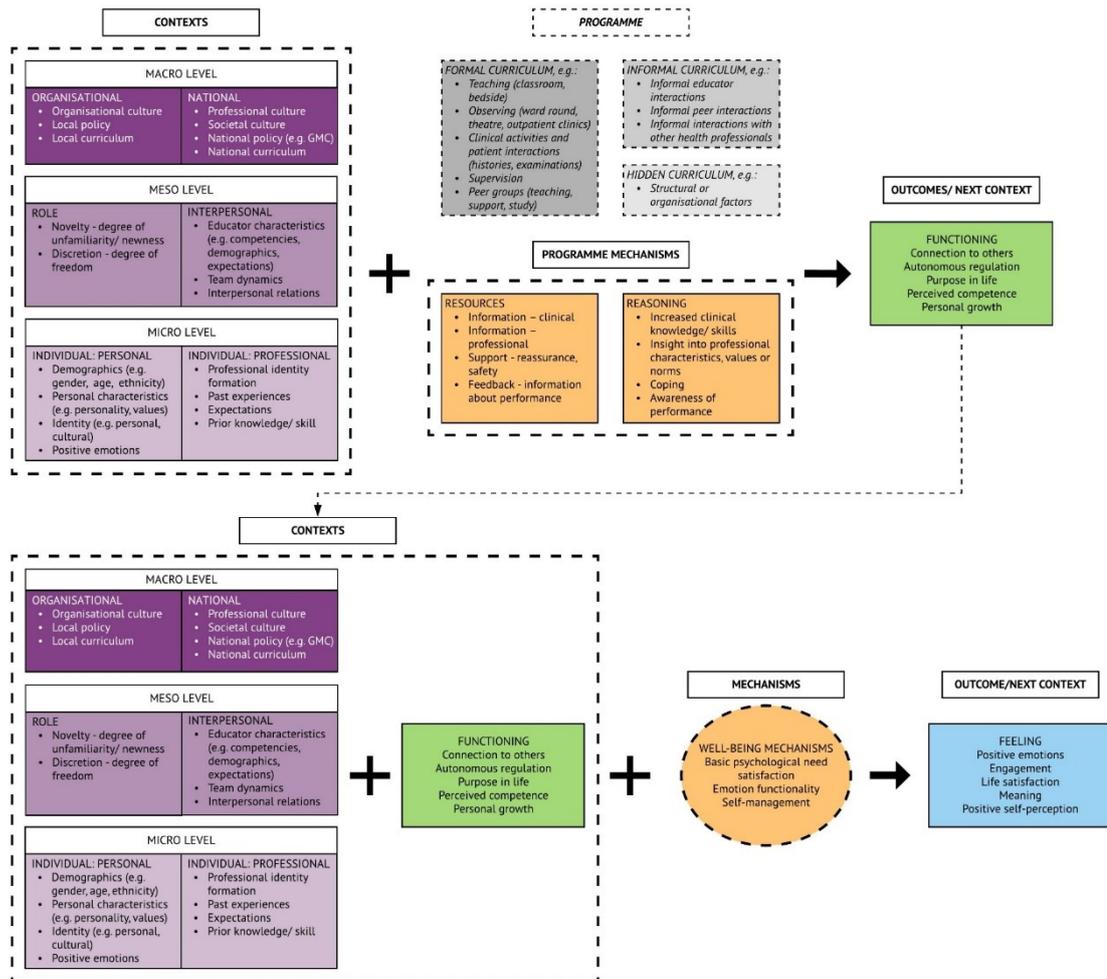


Figure 4-3. Final version of the initial rough theory.

This differentiation reflected the second challenge encountered, which was how to represent the dynamic relationship between the two dimensions of well-being identified in the TIR, which were thought to be related through the well-being mechanisms and affect one another over time. The ‘resource and reasoning’ mechanisms were thought to generate functioning outcomes of well-being (top half of the diagram), which became contexts for the well-being mechanisms (psychological processes) which generated the feeling outcomes of well-being

(bottom half of the diagram). The IRT captured this early thinking about well-being and transition and represented this within the two stages of the figure.

It can also be seen in Figure 4-3 that a programme is referenced in the IRT. This reflected the researcher's early challenges navigating the application of the realist review method to problem exploration rather than programme evaluation. Initially there was confusion about whether the work was an evaluation, however this was later clarified as problem exploration, as confidence in the application of the methodology grew (see section 2.5.3).

The final IRT was a fairly general representation of the proposed relationships between contexts, mechanisms and outcomes within the transition setting. Jagosh et al. (2014) discussed the need to sometimes progress with a review before the key theory has been fully articulated, especially in the case of heterogeneous literature. In this work, the lack of specificity in the IRT reflected the exploratory focus of the review, in which the explanatory purpose was theory development. Furthermore, initial programme theories are often anchored on aspects of the programme or intervention being evaluated, so the absence of such anchors also inhibited greater specificity. Nonetheless, the IRT did specify the general nature of the relationships between contexts, mechanisms and outcomes, as well as identifying potential candidates for these elements, fulfilling the intended purpose of guiding the subsequent steps in the review.

4.4. Step 2. Search for evidence

Realist reviews involve multiple iterative searches and Pawson et al. (2005) identified four components of the realist review search: background searching of the wider literature; progressive focusing to identify key theories; searching for empirical evidence; and final searching for additional evidence for theory refinement. The first two searches were interlinked so are described together, followed by the search for empirical evidence and then the final searching.

4.4.1. Step 2-a. Background searching & Progressive focusing

This step involved searching the background literature to become familiarised with the topic area and focus the review question and purpose (Step 1-a), Progressive focusing of the background literature search supported the articulation of the IRT (Step 1-b). Therefore Step 2-a occurred in parallel to Step 1. As discussed in Step 1, the wider literature was first consulted to identify the general problem area, followed by more focused searching of the

well-being and transition literature. Literature searching for well-being definitions and theories was conducted for the TIR to conceptualise and theorise the outcome. The transition literature and relevant substantive theories were searched and consulted to clarify understanding of the setting and develop the IRT. It also provided familiarity with the scope of the medical education pre-clinical to clinical training transition literature.

4.4.2. Step 2-b. Searching for empirical evidence (original database search)

This section describes the formal main search for empirical studies. The search strategy was kept simple and broad to support the inclusion of relevant documents,¹³ which could be identified through the screening process. Several search terms were trialled before the search strategy was finalised. The term ‘well-being’ was not included in the search strategy because the term is poorly defined in the literature, and the conceptualisation of well-being developed for this research does not consistently align with use of the term in the literature. Instead, documents relevant to well-being were identified through the screening process (Step 3-a). Although a common focus of transition research, the term ‘preparedness’ was not included in the search strategy because it too presented challenges around definition and meaning, and does not fully align with the review focus which is broader than preparedness. Generally, the search strategy was developed using the concepts within the research question. Given the exploratory nature, specific contexts or mechanisms could not be specified within the search strategy because either they were not known or the literature was not expected to use the same terminology. In the end, the final search terms related to transition, medical students, and clinical training.

After trialling the search terms, three search strategies were piloted in four databases: OVID Medline, PsycINFO, ERIC, and Web of Science. The strategies were compared to the number of results returned from a relevant review of transition (Teunissen and Westerman, 2011), which contained 20 pre-clinical to clinical transition papers. Table 4-1 shows the results of the pilot. Search Strategies 2 and 3 returned only one additional paper than Strategy 1, but the number of results was considerably greater. Furthermore, the one additional paper identified by Strategies 2 and 3 related to paramedic students, not medical students, so was not relevant to the review focus. Examination of the four papers not

¹³ The term ‘document’ is used to refer to the sources included in the review, as these extended beyond journal articles, also including books and chapters.

identified through any of the strategies revealed that they were either not focused on transition or did not use the term transition in the paper, so were less relevant to the review. Therefore, Strategy 1 was used, as it reached an appropriate balance of relevant papers identified and a manageable number of results. Furthermore, the review paper used for piloting was included within the results, so reference searching could be used to identify additional relevant documents.

Table 4-1. Results of search strategy piloting.

Strategy	Search terms	Success rate	Results (N)
1	transition* AND (medical student* OR clinical training*)	15/20 papers (75%)	1636
2	transition* AND (medical student* OR clinical training* OR placement* OR clerkship*)	16/20 papers (80%)	8361
3	transition* AND (medical student* OR clinical training OR placement* OR clerkship* OR medical school*OR medical education)	16/20 papers (80%)	9716

The final search strategy was checked by a senior research librarian at the University of Nottingham, who suggested an additional database (Embase), which was included. Five databases were therefore used for the main search for empirical studies: OVID Medline; PsycINFO; ERIC; Embase; and Web of Science. The final search strategy was: transition* AND (medical student* OR clinical training); which was adapted as appropriate to each database (Appendix 5). The search was run on 23/01/2019 and no starting date was specified.¹⁴ The results from each database were imported into separate EndNote X8 libraries. All results were then merged into one EndNote library for the title/abstract screen, enabling the majority of duplicates to be removed through EndNote’s functionality.

Grey literature can be helpful to provide additional details of programmes not typically included in journal articles. However, as the review had an exploratory focus, rather than programme evaluation, empirical journal articles provided sufficiently rich sources of data about student experiences of transition. Therefore, the grey literature was searched in the familiarisation stages (Steps 1-b & 2-a), but not as a source of evidence.

¹⁴ Language was not limited during the search. When importing citations to EndNote the titles were translated by the programme. During the abstract screen non-English documents were identified and rated 4 and excluded.

4.4.3. Step 2-c. Searching for additional evidence

This step relates to the additional searches in the later stages of the review, after the original database search, for targeted evidence to refine the theories. While the additional searches within a realist review can be multiple, the scope of the review was focused on well-being and additional searches were targeted for this, rather than exploring multiple additional avenues. The final searching involved hand searching the reference lists of the included documents, additional searching for empirical and theory documents, and updating the database search. Each is described in turn.

4.4.3.1. Step 2-c-i. Hand searching reference lists

As documents from the database search (Step 2-b) were appraised, their reference lists were examined and relevant references were noted (Step 3-c-i). These were screened following the initial synthesis (Step 4-a), to facilitate the development and focusing of the theory. Relevant references went through an abstract screen and full-text screen (Step 3-a) before being quality appraised (Step 3-c). Retained documents contributed to the synthesis (Step 4-b).

4.4.3.2. Step 2-c-ii. Additional searching

Additional documents were sought to develop specific theory areas during the initial synthesis (Step 4-a) and then during the development of the CMOCs (Step 4-b). Additional empirical studies, commentaries and substantive theories were identified and included, where applicable. These additional documents were used to provide further causal insight when the explanatory power of the existing pool of documents was limited somehow. The new documents were identified during the second review of the initial synthesis (Step 4-a) by one of the supervisory team (RP) through his existing knowledge of learning theories and medical education literature. Others were identified through purposive searching informally in Google Scholar for documents detailing known theories, searching the references cited in relevant theoretical discussions in the subject handbook *Understanding Medical Education* (Swanwick et al., 2019), or through reference searching of another additional document.

Some theories were initially included, but then later excluded through the refinement of the CMOCs. For example, cognitive load theory (Young et al., 2014) was originally found helpful to explain some early CMOCs, but these were later considered less relevant to well-

being, so were removed. Therefore the theories included from the additional searching were those which added explanatory insight to the refined CMOCs.

4.4.3.3. Step 2-c-iii. Updated database search

Additional studies were also identified by updating the database search to check for newly published documents since the original search. The database search was re-run on 28/10/2020, with the years specified as 2019 onwards. Identified documents went through a title/abstract screen, abstract screen, and full-text screen (Step 3-a) before being quality appraised (Step 3-c). While these documents went through a similar screening process to the original database search, only those documents adding novel causal insights were incorporated, as the purpose of this stage of searching was theory refinement.

During the abstract screen for the updated database search, a small number of documents from the original database search that had been marked as 'maybe include' were re-reviewed for relevance. These documents related to transition within, rather than into, clinical training (e.g. between placements or years of clinical training). They had not originally been included because of the initial focus on the transition into clinical training (as a time point). However, as the researcher's thinking developed through the review to reflect transition as a longitudinal and ongoing process, some of these documents became relevant. Those now considered relevant were included in the full-text screen.

4.5. Step 3. Appraise primary studies and extract data

Pawson has presented these two steps in the realist review together (Pawson et al., 2005) and separately (Pawson, 2006a). Although there are distinct elements, the two processes overlapped and interlinked considerably, so are described under one step here in line with Pawson et al. (2005).

Appraisal occurred at multiple points throughout the review as different documents were introduced from the various searches outlined above. Following the original database search (Step 2-b), the results were screened for relevance to narrow the pool, and then an initial appraisal was conducted for relevance and richness to prioritise documents for analysis. Documents were then fully appraised and their data extracted. All documents entering the review at later points through additional searching (Step 2-c) also went through the screening, appraisal, and extraction processes. These three elements are now described in turn.

4.5.1. Step 3-a. Screening of database search results for relevance

The first stage of quality appraisal was the screening process, used to focus on those documents with the most relevance to the review. Three screening processes were used: (1) title/abstract screen; (2) abstract screen; and (3) full-text screen. Each of these screens was an assessment for relevance, with progressive focusing of the included documents to those with relevance to the IRT.

4.5.1.1. Title/Abstract screen

Following the original database search (Step 2-b), the results from each database were merged into one EndNote library, and duplicates were removed. The search results were then screened in EndNote, primarily by title, but where this did not provide adequate information the abstract was also checked through EndNote. The focus of the title/abstract screen was identifying documents of the correct topic area (Appendix 6). The implicit question throughout the title/abstract screen was:

1. Does this citation indicate a document related to the topic area, i.e. the pre-clinical to clinical training transition for medical students in medical school?

Documents relating to both medical students and the pre-clinical to clinical transition in medical school were retained.

4.5.1.2. Abstract screen

The abstracts of the retained documents from the title/abstract screen were then screened for relevance, and decisions were recorded within an Excel spreadsheet. The screening form was adapted from Davies et al. (2017). Although ratings were given based on the criteria developed, the process for determining inclusion and exclusion was flexible to accommodate the developing knowledge of the researcher as the review progressed. This meant that the use of the screening tool was not as a fixed *a priori* set of criteria, but rather a reflection of the process the researcher went through in identifying potentially relevant documents for theory development.

The implicit questions throughout the abstract screen were:

1. Does this citation indicate a document related to the topic area, i.e. the pre-clinical to clinical training transition for medical students in medical school? If yes, then:

2. Does this citation describe a document related to some aspect of the experience of medical students during the transition from pre-clinical to clinical training?

As for the title/abstract screen, the abstract screen was primarily concerned with focusing the results on the topic area, i.e. medical students and the transition from pre-clinical to clinical training. Additionally, this screen was concerned with focusing the results on those documents which related to the experience of transition for medical students. This was to ensure that the retained documents were relevant to the IRT.

Documents were categorised as: (1) Highly relevant; (2) Probably relevant; (3) Possibly relevant; (4) Likely irrelevant; or MRT (Appendix 7). Documents rated 1 to 3 were retained for the full-text screen. Documents labelled 'MRT' were later reviewed for relevance, although none were subsequently considered relevant and included.

For additional searching activities (Step 2-c), similar criteria were applied, but only those documents adding novel causal insights for theory development beyond those obtained from the initial synthesis (Step 4-a) were included. Pragmatically this focused the remaining resources (i.e. time) on those documents most relevant for theory development.

4.5.1.3. Full-text screen

The full texts of the remaining documents were retrieved and screened for relevance, and decisions were recorded within an Excel spreadsheet. The abstract screening tool was adapted for the full-text screen, reflecting the researcher's developing understanding of the topic area. As for the abstract screen, the process was flexible to support a developing understanding of the topic area and how documents might be useful for theory development.

The implicit questions throughout the full-text screen were:

1. Does this citation indicate a document related to the topic area, i.e. the pre-clinical to clinical training transition for medical students in medical school? If yes, then:
2. Does this citation describe a document related to some aspect of the experience of medical students during the transition from pre-clinical to clinical training? If yes, then:
3. Does the full text indicate a depth of information likely to provide useful information relating to the IRT?

In addition to the topic area and focus on experience, the full-text screen was also concerned with identifying documents that had a depth of information that would be beneficial for developing and testing the IRT. In principle, this related to documents that: described interventions aimed at easing the transition into clinical training that were clearly described and evaluated; investigated how an aspect of clinical training affected the student experience of the transition; or commentaries that provided insight into relevant theories or models to support theory development around transition and well-being.

Documents were categorised as: (1) Likely useful; (2) Possibly useful; (3) Probably not useful; or (4) Likely not useful (Appendix 8). Documents rated 1 were retained and entered the initial appraisal. Documents rated 2 were not revisited later in the review for relevance because those rated 1 were numerous enough to inform theory development, within the resources available for the review. Furthermore, some of the documents rated 1 were later excluded during the appraisal for low relevance, as understanding of the review topic developed, so it was considered unlikely than any rated 2 or 3 would be relevant.

As for the abstract screen, for the additional searching activities (Step 2-c), similar criteria were applied, but only those documents adding novel insights for theory development were included.

4.5.2. Step 3-b. Initial appraisal of database documents for relevance

Following the guidance received during realist synthesis training,¹⁵ the documents retained from the full-text screen were read in full without an agenda other than gaining an overall picture of their content. The documents were then read in full again and an initial appraisal was made of their likely contribution to the realist review. Documents were rated as 'high', 'moderate' or 'low' priority for inclusion within the review. Decisions, and brief notes on their potential contribution to theory development, were recorded in an Excel spreadsheet.

'High' priority documents were those which appeared to provide insight into links between contexts, mechanisms and/or outcomes, and were clearly linked to the IRT. Documents in this group appeared able to provide insight into the links between transition experiences and well-being. 'Moderate' priority documents were those which seemed to provide insight into potential contexts and/or mechanisms, but which did not clearly link to the IRT. Documents in this group seemed less likely to provide insight on the links between transition experiences and well-being. 'Low' priority documents were those which indicated

¹⁵ J. Jagosh, CARES Realist Synthesis Masterclass, 16-18 April 2019.

some content relevant to contexts or mechanisms but did not appear linked to the IRT. Documents in this group did not appear to be able to offer any insights into the link between transition experiences and well-being.

This process aligns with the iterative nature of realist reviews (Pawson, 2006a), and reflects the process of focusing the review over time (Wong et al., 2013b), as the researcher's understanding of the topic area increases. The purpose of this initial appraisal was to manage the scope of the review by prioritising those documents that appear to be richest in terms of theory development. By analysing the richest data first the researcher developed their understanding of the topic area and could therefore make better-informed judgements about the relevance of the other documents later on. This enabled a greater focus on the documents with the highest likelihood of yielding causal insights.

Documents categorised as 'high' priority entered the quality appraisal process (Step 3-c). Those documents categorised as 'moderate' and 'low' priority were set aside, before re-entering the review during the development of the CMOCs (Step 4-b), at which point they were quality appraised (Step 3-c).

4.5.3. Step 3-c. Quality appraisal and data extraction of documents

All documents entering the review went through a quality appraisal and extraction process before entering the synthesis. Therefore, this step occurred iteratively throughout the review, as different searching activities identified documents. A quality appraisal template was adapted from one received at realist synthesis training,¹⁶ which recorded the quality appraisal and extraction of each document. The data extracted from the individual documents were then collated in a single Word document.

At various points in this step, a second reviewer was involved to support the appraisal and extraction processes. The collation of the extracted data overlapped to some extent with the initial stages of the data synthesis (Step 4-a). The processes of document appraisal, document extraction, and collated extraction are now described.

¹⁶ J. Jagosh, CARES Realist Synthesis Masterclass, 16-18 April 2019.

4.5.3.1. Step 3-c-i. Quality appraisal

Each document entering the review was read again in full and the quality appraisal template (Appendix 9) was completed, with decisions recorded in an Excel spreadsheet. The form was used to record general information about the document, note relevant references, and list questions for the document's authors.¹⁷ The documents were assessed for relevance, with notes made in the quality appraisal template about the document's relevance to the IRT and possible contributions to theory development (i.e. possible contexts and/or mechanisms and their links to the well-being outcomes).

To assess a document's rigour, a subjective assessment was made about the document's strengths and weaknesses relating to the causal insights relevant to theory development. This assessment was supported by a Critical Appraisal Skills Programme (CASP) checklist, where applicable. The purpose of including the CASP checklists was not to determine the inclusion or exclusion of the document on methodological grounds, as this is not aligned with realist review principles (Pawson et al., 2005). Rather, the checklists were used as prompts to consider methodological factors potentially affecting the rigour of the causal insights drawn from the documents (Pawson, 2006b). Two CASP checklists were employed to inform this assessment: the qualitative research checklist and the cohort study checklist. The majority of studies included in the review were qualitative. While those that were quantitative were not cohort studies, the cohort checklist included factors most relevant to quantitative studies and fulfilled the purpose of supporting thinking about possible strengths and weaknesses. A CASP checklist was not used for documents without empirical data (e.g. commentary or theory documents).

Following assessment of relevance and rigour, an overall appraisal assessment was made, based on pre-defined definitions (Appendix 9), which categorised the documents as 'High', 'Moderate', 'Low', or 'Exclude' as an overall judgement of quality based on relevance and rigour. 'High' documents were those which were considered rigorous and relevant and contributed the richest data to theory development, providing novel and deeper insights. 'Moderate' documents were considered rigorous and relevant, contributing to theory development in some way, but the richness of the data was limited, and these usually supported an insight from a 'high' document. 'Low' documents were considered rigorous and

¹⁷ Any questions were emailed to the first author, as appropriate (e.g. enquiring about additional reports or information about the project). Questions were sent to the authors of two documents. One replied but did not have any further information. The other did not reply.

somewhat relevant for theory development but provided limited causal insight, so these typically supported the insights in other documents or suggested a relevant context.

4.5.3.2. Step 3-c-ii. Data extraction

The quality appraisal document was also used for part of the data extraction process. Within the template, notes were made about the relevance of the document to the IRT and theory development (overlapping with the appraisal of relevance). Further notes were made about the links between potential contexts, mechanisms and outcomes discussed in the document. The ideas were recorded in as much detail as possible, with potential contexts, mechanisms and outcomes identified where applicable. However, the focus was on capturing causal insights from the documents, rather than specifying the CMO elements and linkages explicitly. The protocol uploaded to PROSPERO discussed coding to C, M or O, but this approach was reconsidered to enable focusing on causal insights, as it was not always clear at this stage how the causal explanation fit within the CMO framework. Therefore, adhering rigidly to the CMO framework at this stage was not found helpful. CMO configuring came during the synthesis stage of the review (Step 4-b).

In extracting the causal insights, each document was considered in relation to the well-being definition and theory from the TIR. This supported retroductive theorising, as inferences and causal links could be made about well-being beyond those in each document. Even so, the documents typically gave partial causal insights, and it was rare that a full CMO could be drawn from one document alone. Therefore, to support the development of insights across the different documents, the next step in the data extraction process was to collate the causal insights drawn from the documents to inform the later data synthesis.

4.5.3.2.1. Second review of appraisal and extraction

In methodologies originating from a positivist or postpositivist philosophical paradigm attempts are made to minimise bias, which in a systematic review typically means strategies such as multiple reviewers and inter-rater reliability (Pawson, 2021). Within realist methodology, the focus of the research is different. Rigour is important, but the subjectivity of research is also acknowledged, as retroductive analysis involves interpretation and creative thinking through abduction (Jagosh, 2020a), so review outputs would be expected to vary between researchers (Pawson, 2021). Therefore, the use of second reviewers in realist reviews is not methodologically aligned with their use in systematic reviews. As Pawson (2021) explained, second reviewers can be used to check the interpretations being

made and offer alternative perspectives that might not have been considered. Therefore, in this work second reviewers were incorporated to act as a sense check for the researcher's interpretations as part of the analysis process.

Following the appraisal and extraction of the 'high' priority documents from the initial appraisal of the database search results, a second review was conducted by one of the supervisory team (PH) on a randomly selected subset (n=6) of the documents. PH read the texts in full, making notes about their relevance to the theory. PH then read the quality appraisal notes made by AM for each document and checked her agreement with the overall appraisal rating and the extracted data. The template used to record this process can be seen in Appendix 9. Following her review, PH discussed her findings with AM and any differences in interpretation were discussed and resolved. Five documents had a full agreement for both the appraisal and the data extracted. One document had an agreement on the data extracted but not the final appraisal, this was discussed and agreed upon. Overall, the interpretations identified through the second review were consistent with the first reviewer.

4.5.3.3. Step 3-c-iii. Collation of extracted data

The insights from the different appraisal documents were compiled within one 'Insight document' in Word (Appendix 10). A table was adapted from Gilmore et al. (2019) to record the insights from each document. Some documents supported several causal insights (typically 'high' documents), while others were not rich enough to form a whole insight but supported an insight from another document, for example, a context (typically 'low' documents).

For each document, the data extraction notes within the quality appraisal document were considered and the key causal insights relating to the IRT were extracted into the insight document. This process clarified thinking about the document and how it related to theory development. In the insight document, the table template was completed with information about the document, CMOC ideas (i.e. causal insights), ripple effects or links to other theory elements or documents, the rationale behind the ideas, supporting notes from the appraisal document, and an example quote. The insights were grouped in the document by the different well-being attributes, to support the making of connections between the different insights. Therefore, although primarily data extraction, the collation of the extracted data involved some initial synthesising of the data.

The notes recorded within the quality appraisal and extraction processes represented retroductive theorising, and supported transparency in these processes. Through explaining

the ideas and rationales behind them, the documents captured some of the thought processes involved in retroductive analysis.

4.5.3.3.1. Second review of collated extraction

After the 'high' priority documents from the initial appraisal (Step 3-b) had been quality appraised and their data extracted (Step 3-c-i & ii), a second review was conducted by one of the supervisory team (RP). RP read all the 'high' priority documents, and AM and RP then met to discuss the extracted causal insights. The purpose of this review was to sense check the data extracted from the documents and the interpretation of the literature, and also provide an opportunity to discuss the developing theoretical insights. There was general agreement between the reviewers on the data extracted. Concepts and terminology were discussed to refine the insights, and RP suggested potential substantive theories aligning with the insights that could support further theory refinement (Step 2-c).

This process was repeated after the collation of the extracted data for the 'moderate' and 'low' priority documents and the reference list documents when they entered the review analysis.

4.6. Step 4. Synthesise evidence and draw conclusions

Pawson et al. (2005) highlight that the purpose of synthesising the evidence is to develop, test and refine the IRT. The synthesis should align with the purpose of the review (Pawson et al., 2005). In this case the purpose was theory-building around the environmental and student contexts that affect mechanism activation and consequently well-being outcomes. Contradictory evidence should also be used to generate contextual insights (Pawson et al., 2005). When variable student experiences were discussed in the documents, these were extracted and the reasons why this occurred were considered. Contexts changing the student experience were either noted based on the evidence from the document or theorised (when an explanation was lacking) using the well-being theory and IRT.

The synthesis was comprised of three steps. Firstly an initial synthesis of the data, followed by CMOC development, then CMOC refinement. These three steps resulted in the refined theories at the end of the review, upon which the conclusions were drawn.

4.6.1. Step 4-a. Initial synthesis of the data

This first step was completed with the data extracted from the 'high' priority documents from the initial appraisal (Step 3-b). A mind mapping software (XMind 2020) was used for the initial synthesis of the data, as it allowed for visual connections to be developed between the insights from different documents. The first step taken was to populate one mind map with the extracted data from each of the documents in the insight document (Appendix 11, Example 1), starting with the documents appraised as 'high' quality (Step 3-c-i), then 'moderate' and 'low'.

Topics and sub-topics were created to represent contexts, mechanisms and outcomes, and the 'relationship' function in the software was used to visually connect these. Colour coding and formatting were used to distinguish different theoretical elements (see the key and detail example in Appendix 11, Examples 2 & 3). The notes function on the relationships and topics enabled details of the origin of the insight to be recorded, such as a specific document insight or a theorisation (Appendix 11, Example 4). This enabled the theory elements on the mind map and their associated notes to be tracked back to a specific document and insight in the insight document, maintaining transparency. The mind map visually represented the theorised connections between the collated insights from the extracted data. Therefore, the process of developing the mind map both represented and was part of the process of retroductive theorising in the review.

Once all of the insights had been added to one mind map, consideration was given to the main topic areas around which the insights appeared to be clustered. The specific contexts, mechanisms and outcomes relevant to specific topic areas were copied into new mind maps. This process resulted in nine separate mind maps (Appendix 11, Example 5). Each mind map was examined in turn and the theory elements (topics and relationships) were used to form the basis of initial CMOC configurations for each of the nine topic areas (Appendix 11, Example 6).

4.6.1.1. Second review of initial synthesis

After the initial CMOCs were developed, these were reviewed by RP. AM and RP met to discuss each of the CMOCs to sense check the initial synthesis of the documents and provide an opportunity for alternative interpretations. There was general agreement between the reviewers on the initial synthesis and CMOCs, with some amendments suggested by RP,

including concept and terminology clarification, relevant substantive theories and additional empirical evidence to support theory refinement, where applicable (Step 2-c-ii).

4.6.2. Step 4-b. Development of the CMOCs

Following the initial synthesis, further documents were incorporated into the synthesis to develop the CMOCs at two points, during the development of the CMOCs in XMind (Step 4-b-i) and in Word (Step 4-b-ii).

4.6.2.1. Step 4-b-i. Development of CMOCs in XMind

The ‘moderate’ and ‘low’ priority documents (Step 3-b) re-entered the review during the development of the CMOCs. Following the appraisal and data extraction of these new documents (Step 3-c), their insights were collated and then integrated into the synthesis in XMind during the development of the CMOCs. Where insights supported or added additional information about an existing CMOC, these were integrated into the relevant mind map and CMOC. Where an insight provided new information or contrasted with a CMOC, either a new CMOC was created to incorporate the finding, or an existing CMOC was adapted to incorporate the additional information provided, for example adding a new contextual variation. Throughout this process, the CMOCs were continuously reorganised into different groupings, as thinking developed about the patterns across them.

4.6.2.2. Step 4-b-ii. Development of CMOCs in Word

The CMOCs were transferred to Word, along with the supporting ‘evidence’ for each of these (i.e. the insights from documents that contributed to the theory). The process of collating the evidence for each CMOC as they were refined served several purposes: (1) to maintain transparency by showing the evidence that contributed to each CMOC; (2) as a checking process to ensure that the refined CMOCs continued to reflect the insights and evidence from the literature following several developmental iterations; and (3) to enable the original evidence to be briefly re-examined in light of the researcher’s developed thinking to check the original interpretations made still aligned with this. The CMOCs continued to be developed throughout this process.

The reference list documents (Step 2-c-i) were incorporated into the synthesis during this process, followed later by the additional documents from Steps 2-c-ii and 2-c-iii. Throughout this process, the CMOCs were again re-organised into various groupings, as thinking about the patterns across them developed.

4.6.3. Step 4-c. Refinement of the CMOCs

Refinement of the CMOCs took place during the drafting of the review findings. Through the process of conveying the CMOCs in writing, thinking about them was further clarified and refinement took place in the form of, for example, specifying mechanism details, differentiating between context and mechanism, clarifying ripple effects, consolidating overlapping theory areas, and removing CMOCs with weak explanatory power.

4.6.3.1. Second review of refined CMOCs

Following the refinement of the CMOCs, a second review was conducted by RP. AM and RP met to discuss the refined CMOCs to ensure agreement, which was reached.

4.7. Step 5. Disseminate, implement and evaluate

The final step outlined by Pawson et al. (2005) largely extends beyond the scope of work for this thesis. It involves developing recommendations, implementing recommendations, and evaluating them. Recommendations were proposed following the completion of the entire PhD project and are presented within Chapter 8.

4.7.1. Maintaining transparency through the analysis

Using NVivo has been suggested as a way to increase the transparency of realist analysis (Dalkin et al., 2021; Gilmore et al., 2019). However, the exploratory nature of this review made it challenging to code within NVivo, without clear programme theories to use as parent nodes. Therefore, transparency was maintained in an alternative way by assigning each document a label and using the various documents discussed (Quality Appraisal document, Insight document, XMind mind maps, Evidence document) to keep a record of the development from the data extracted from individual documents to the refined CMOCs. During the final refinements of the CMOCs NVivo was used as a data management tool to store relevant quotes for each CMOC, with key quotes from the documents retrospectively coded to each CMOC.

A worked example of the analysis process involved in developing two CMOCs is included in Appendix 12. This shows how the appraisal, extraction and synthesis came together in the analysis.

4.8. Chapter summary

The realist review adhered to the RAMESES guidance for realist reviews, adapting the process for the problem exploration focus. The realist review built on the well-being theory from the TIR, developing this into an IRT through background searching of the medical education literature and considering how the theory applied to the transition setting. Evidence was located through database searching and additional searches. The identified documents were narrowed down to an appropriate pool through the appraisal process, and causal insights relating to context and mechanism interactions affecting well-being were extracted. Finally, these insights were synthesised and developed into CMOCs using a combination of mind mapping and writing. The findings are outlined in Chapter 5.

Chapter 5. Realist Review: Findings

5.1. Documents included in the review

Figure 5-1 shows the flow of documents in the review, and the origins of the final pool of documents. The review synthesis drew on 50 documents, which are detailed in Table 5-1. Each document was assigned a number label, which is used to refer to the document within the findings. Twenty-seven of the documents were considered 'high' quality in the quality appraisal, indicating high relevance, rigour and richness for theory-building. Nine were considered 'moderate' quality, and 14 'low' quality (Step 3-c). The majority of documents were empirical studies (n=39), including analysis of empirical data. Most of these were qualitative (n=30), compared to quantitative (n=7) or mixed methods (n=2), due to the richer information relevant to theory development. Eleven documents were non-empirical, consisting of a mix of perspective or commentary pieces about transition, or articles or chapters outlining relevant theories or concepts.

Nineteen documents with empirical data were from Europe, specifically the UK (n=10), the Netherlands (n=7), Finland (n=1), and Sweden (n=1). Fourteen documents were from North America, specifically the USA (n=9), Canada (n=4), and both the USA and Canada (n=1). Four documents were from Australia, one from Indonesia, and one from South Africa.

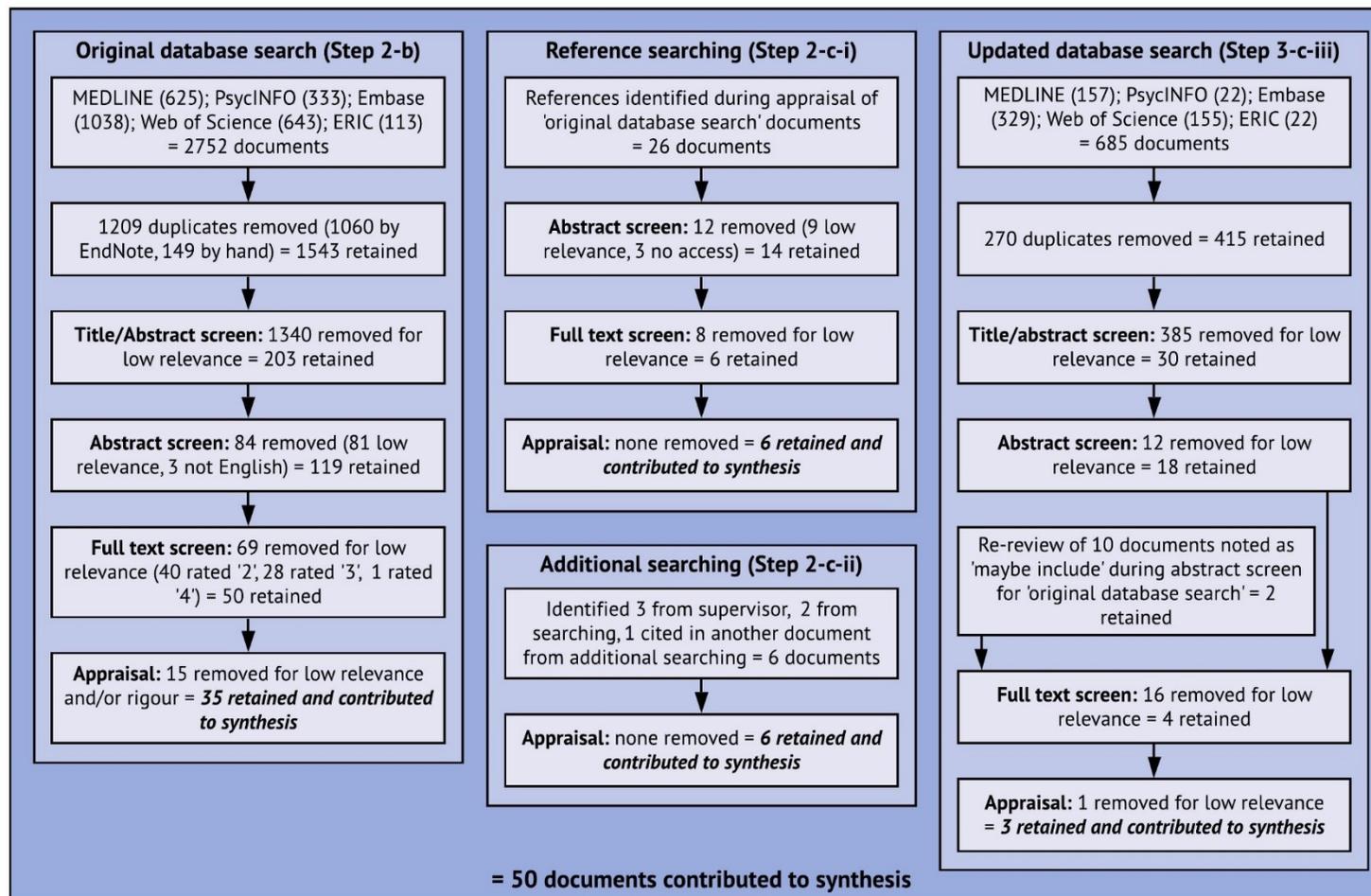


Figure 5-1. Document flow diagram.

Table 5-1. Details of documents included in the synthesis.

Document number, ^a author, year and title	Document details (e.g. design, participants, focus)	Country ^b	Type ^c	Origin ^d	Appraisal ^e
01-Babaria et al. (2009) The Effect of Gender on the Clinical Clerkship Experiences of Female Medical Students: Results From a Qualitative Study	In-depth interview study with female students (n=12) exploring gender-related experiences of the first month of clinical training.	USA	Emp-qual	OS-HIA	High
02-Balmer et al. (2015) How students experience and navigate transitions in undergraduate medical education: an application of Bourdieu's theoretical model	Longitudinal case study using interviews to investigate students' (n=22, 101 interviews) experiences of transitioning through medical school (pre-clinical, clinical and prior to residency). (Linked to 03-Balmer-2017).	USA	Emp-qual	OS-HIA	High
03-Balmer et al. (2017) Understanding the relation between medical students' collective and individual trajectories: an application of habitus	Secondary analysis of longitudinal case study data (n=19, 5 narratives each), exploring collective and individual student trajectories through medical school, using I-poems. (Linked to 02-Balmer-2015).	USA	Emp-qual	OS-HIA	High
05-Berkhout et al. (2017) How clinical medical students perceive others to influence their self-regulated learning	Constructivist grounded theory study using semi-structured interviews and visual Pictor technique to explore the factors influencing self-regulated learning in novice and experienced clerkship students (n=14).	The Netherlands	Emp-qual	OS-HIA	High
08-Brown (2010) Transferring Clinical Communication Skills From the Classroom to the Clinical Environment: Perceptions of a Group of Medical Students in the United Kingdom	Focus group and semi-structured interviews using framework analysis to explore clinical students' (n=17) perceptions of clinical communication skills teaching, learning and transfer to the workplace.	UK	Emp-qual	OS-HIA	High
11-Chou et al. (2011) A "Safe Space" for Learning and Reflection: One School's Design for Continuity With a Peer Group Across Clinical Clerkships	Exploration of students' (n=42) perceptions of a peer group designed to offer a supportive learning environment, using surveys and focus groups.	USA	Emp-mix	OS-MIA	Low

Document number, ^a author, year and title	Document details (e.g. design, participants, focus)	Country ^b	Type ^c	Origin ^d	Appraisal ^e
12-Colbert-Getz et al. (2016) What's in a Transition? An Integrative Perspective on Transitions in Medical Education	Journal article presenting an integrated theoretical model of transition navigation, including influencing factors and mechanisms relating to cognitive load theory.	N/A	Other	OS-HIA	High
15-Dubé et al. (2015) Transition processes through a longitudinal integrated clerkship: a qualitative study of medical students' experiences	Longitudinal design using conversational interviews to explore students' (n=12) transition experiences within a longitudinal clerkship.	Canada	Emp-qual	OS-HIA	High
16-Dunham et al. (2017) Medical Student Perceptions of the Learning Environment in Medical School Change as Students Transition to Clinical Training in Undergraduate Medical School	Longitudinal survey study examining students' (n=4,262) perceptions of the learning environment across multiple years in 23 American and Canadian medical schools.	USA & Canada	Emp-quant	OS-MIA	Low
18-Godefrooij et al. (2010) Students' perceptions about the transition to the clinical phase of a medical curriculum with preclinical patient contacts; a focus group study	Focus group study examining students' (n=21) perceptions of the transition to clinical training and the value of pre-clinical patient contacts.	The Netherlands	Emp-qual	OS-HIA	Moderate
20-Holmboe et al. (2011) The rotational approach to medical education: time to confront our assumptions?	Journal article discussing rotational transitions from the perspectives of sociology, learning theory, and improvement of quality and safety.	N/A	Other	OS-MIA	Low
21-Holmes et al. (2015) Harnessing the hidden curriculum: a four-step approach to developing and reinforcing reflective competencies in medical clinical clerkship	Journal article proposing reflective competencies to help students manage the hidden curriculum during the transition to clinical training. (Linked to 22-Holmes-2017).	N/A	Other	OS-HIA	High
22-Holmes et al. (2017) (Almost) forgetting to care: an unanticipated source of empathy loss in clerkship	Phenomenological study of the lived experienced of students (n=12) participating in a course implementing reflective competencies to manage the hidden curriculum in their first clinical training year. (Linked to 21-Holmes-2015).	Canada	Emp-qual	OS-HIA	High

Document number, ^a author, year and title	Document details (e.g. design, participants, focus)	Country ^b	Type ^c	Origin ^d	Appraisal ^e
24-Kalén et al. (2012) The core of mentorship: medical students' experiences of one-to-one mentoring in a clinical environment	Interview study using inductive content analysis to explore students' (n=12) perspectives on the meaning of mentorship during early clinical training.	Sweden	Emp-qual	OS-MIA	High
25-Kligler et al. (2013) Becoming a Doctor: A Qualitative Evaluation of Challenges and Opportunities in Medical Student Wellness During the Third Year	Interpretive description approach to analysing reflective student essays (n=173) about how the transition to clinical training had affected their health and wellness.	USA	Emp-qual	OS-HIA	High
26-Ledger and Kilminster (2015) Developing understandings of clinical placement learning in three professions: Work that is critical to care	Narrative interview study with students (n=40) and educators (n=19) in medicine, nursing and audiology to explore their understanding of learning and work in early clinical placements.	UK	Emp-qual	OS-HIA	Low
27-Levitt and Cooke (2011) Tips for teaching in longitudinal clerkships	Journal article outlining strategies for delivering teaching on longitudinal clerkships, informed by feedback from students and teachers.	N/A	Other	OS-MIA	Low
29-McKee and Markless (2017) Using action learning sets to support students managing transition into the clinical learning environment in a UK medical school	Action research project describing a pilot of two action learning sets designed to develop students' (n=20) knowledge of learning in the clinical environment and provide support.	UK	Emp-qual	OS-HIA	High
30-McLean et al. (2015) More than just teaching procedural skills: How RN clinical tutors perceive they contribute to medical students' professional identity development	Interview study using template analysis with registered nurses (n=8) involved in teaching medical students, to explore student professional identity development.	Australia	Emp-qual	OS-LIA	Low
31-Noureddine and Medina (2018) Learning to Break the Shell: Introverted Medical Students Transitioning Into Clinical Rotations	Letter to the editor from medical students describing the challenges that introverted students have transitioning to clinical training.	N/A	Other	OS-MIA	Low

Document number, ^a author, year and title	Document details (e.g. design, participants, focus)	Country ^b	Type ^c	Origin ^d	Appraisal ^e
32-O'Brien et al. (2007) Perceptions and Attributions of Third-Year Student Struggles in Clerkships: Do Students and Clerkship Directors Agree?	Focus groups and interviews with medical students (n=83) and clerkship directors (n=65) in 10 American medical schools, exploring differences in the perceptions of difficulties during the transition to clinical training.	USA	Emp-qual	OS-HIA	Low
34-Perrella et al. (2019) Navigating Tensions of Efficiency and Caring in Clerkship: A Qualitative Study	Focus group and interview study using thematic analysis to explore medical students' (n=14) understanding of their roles as learners and developing professionals.	Canada	Emp-qual	OS-HIA	High
36-Prince et al. (2000) A Qualitative Analysis of the Transition from Theory to Practice in Undergraduate Training in a PBL-Medical School	Focus group study to explore medical students' (n=20) experience of the transition to clinical training. (Linked to 37-Prince-2005).	The Netherlands	Emp-qual	OS-HIA	Moderate
37-Prince et al. (2005) Students' opinions about their preparation for clinical practice	Cross-sectional survey study examining students' (n=71) perceptions about the experience of transitioning to clinical training. (Linked to 36-Prince-2000).	The Netherlands	Emp-quant	OS-MIA	Low
38-Radcliffe and Lester (2003) Perceived stress during undergraduate medical training: a qualitative study	Semi-structured interview study using framework analysis to explore final year medical students' (n=21) perceptions of sources of stress during medical school.	UK	Emp-qual	OS-HIA	High
39-Radomski and Russell (2010) Integrated Case Learning: teaching clinical reasoning	Qualitative case study exploring the experiences of students (n=8) participating in an integrated case learning environment during clinical training.	Australia	Emp-qual	OS-HIA	Moderate
40-Ratanawongsa et al. (2005) Third-Year Medical Students' Experiences with Dying Patients during the Internal Medicine Clerkship: A Qualitative Study of the Informal Curriculum	Interview study using a grounded theory approach to explore students' (n=32) experiences of death and dying patients in their first year of clinical training.	USA	Emp-qual	OS-HIA	High

Document number, ^a author, year and title	Document details (e.g. design, participants, focus)	Country ^b	Type ^c	Origin ^d	Appraisal ^e
41-Seabrook (2004) Clinical students' initial reports of the educational climate in a single medical school	Longitudinal ethnographic study using a grounded theory approach to explore the educational climate in one medical school. Paper reports on students' perceptions of the clinical educational environment from interviews (n=19) and other research activities. (Linked to 54-Seabrook-2003 and 55-Seabrook-2004).	UK	Emp-quant	OS-HIA	Moderate
42-Shacklady et al. (2009) Maturity and medical students' ease of transition into the clinical environment	Cross-sectional survey study comparing mature (n=29) and non-mature (n=58) medical students' experience of the transition to clinical training.	UK	Emp-quant	OS-MIA	Low
45-van Dijk et al. (2017) A cross-sectional examination of psychological distress, positive mental health and their predictors in medical students in their clinical clerkships	Cross-sectional survey study examining the prevalence and predictors of psychological distress and positive mental health in clinical students (n=406).	The Netherlands	Emp-quant	OS-MIA	Low
46-van Hell et al. (2008) Transition to clinical training: influence of pre-clinical knowledge and skills, and consequences for clinical performance	Cross-sectional survey study examining the associations between students' (n=83) perceived transition difficulty, pre-clinical skills and knowledge, and performance in their first clerkship. (Linked to 47-vanHell-2011).	The Netherlands	Emp-quant	OS-HIA	Moderate
47-van Hell et al. (2011) Alternating skills training and clerkships to ease the transition from preclinical to clinical training	Cross-sectional study comparing students' perceptions of stress, workload and skills level during a dual learning year intervention for skills training for the clinical transition (n=476) with a baseline before implementation (n=83). (Linked to 46-vanHell-2008).	The Netherlands	Emp-quant	OS-HIA	High
48-Wenrich et al. (2010) Ready or not? Expectations of faculty and medical students for clinical skills preparation for clerkships	Cross-sectional survey study comparing expectations of clinical skills preparedness between pre-clinical faculty (n=30), clinical faculty (n=56), and students (n=115).	USA	Emp-quant	OS-HIA	Low

Document number, ^a author, year and title	Document details (e.g. design, participants, focus)	Country ^b	Type ^c	Origin ^d	Appraisal ^e
49-White (2007) Smoothing Out Transitions: How Pedagogy Influences Medical Students' Achievement of Self-regulated Learning Goals	Interview study using thematic analysis to compare the transition experiences of students in problem-based learning (n=18) and traditional (n=18) medical school environments.	USA	Emp-qual	OS-HIA	High
50-Widyandana et al. (2012) Preclinical students' experiences in early clerkships after skills training partly offered in primary health care centers: a qualitative study from Indonesia	Focus group study using inductive content analysis to compare the experience of transitioning to clinical training between students who had skills-based pre-clinical training (n=30) or early clinical experiences (n=30).	Indonesia	Emp-qual	OS-MIA	Low
51-Barrett et al. (2017) Novice students navigating the clinical environment in an early medical clerkship	Ethnographic study including interviews with students (n=17) and using content analysis to explore individual and environmental factors affecting students' self-directed learning with patients.	Australia	Emp-qual	Ref	High
52-Dornan et al. (2007) Experience-based learning: a model linking the processes and outcomes of medical students' workplace learning	Grounded theory based analysis of group discussions with junior (n=24) and senior (n=12) clinical medical students, exploring their experiences of workplace learning.	UK	Emp-qual	Ref	High
53-Pitkala and Mantyranta (2003) Professional socialization revised: medical students' own conceptions related to adoption of the future physician's role - a qualitative study	Content analysis of students' (n=22) personal writings from a portfolio course, exploring their experiences of professional development in their first clinical year.	Finland	Emp-qual	Ref	Moderate

Document number, ^a author, year and title	Document details (e.g. design, participants, focus)	Country ^b	Type ^c	Origin ^d	Appraisal ^e
54-Seabrook (2003) Medical teachers' concerns about the clinical teaching context	Longitudinal ethnographic study using a grounded theory approach to explore the educational climate in one medical school. Paper reports on teachers' teaching experiences from interviews (n=22) and other research activities. (Linked to 41-Seabrook-2004 and 55-Seabrook-2004).	UK	Emp-qual	Ref	Low
55-Seabrook (2004) Intimidation in medical education: students' and teachers' perspectives	Longitudinal ethnographic study using a grounded theory approach to explore the educational climate in one medical school. Paper reports on perceptions of intimidation in teaching from interviews with students (n=19) and doctors (n=22) and other research activities. (Linked to 41-Seabrook-2004 and 54-Seabrook-2003).	UK	Emp-qual	Ref	High
56-Treadway and Chatterjee (2011) Into the Water - The Clinical Clerkships	Perspective piece describing the experiences of a former medical student and an educator in navigating, or supporting others to navigate, the transition to clinical training.	N/A	Other	Ref	Moderate
57-Woolf et al. (2008) Ethnic stereotypes and the underachievement of UK medical students from ethnic minorities: qualitative study	Interview and focus group study with students (n=27) and clinical teachers (n=25), exploring ethnic stereotypes and underachievement of medical students.	UK	Emp-qual	AS	High
58-Konkin and Suddards (2017) Students' experiences of role, relationships and learning in two clerkship models	Hermeneutic phenomenological study using one-to-one reflective conversations with students (n=33) to explore their experience of transitioning from a longitudinally integrated clerkship to a rotational clerkship.	Canada	Emp-qual	US	High

Document number, ^a author, year and title	Document details (e.g. design, participants, focus)	Country ^b	Type ^c	Origin ^d	Appraisal ^e
59-Atherley et al. (2021) Students' social networks are diverse, dynamic and deliberate when transitioning to clinical training	Mixed-methods social network analysis identifying the structure of, and changes to, students' (n=8) social networks as they transition into the clinical environment.	Australia	Emp-mix	US	High
60-Blitz et al. (2019) Designing faculty development: lessons learnt from a qualitative interpretivist study exploring students' expectations and experiences of clinical teaching	Focus group study using thematic analysis from an interpretivist stance to explore students' (n=23) experiences of clinical teaching to inform faculty development.	South Africa	Emp-qual	US	High
61-Bjork and Bjork (2011) Making Things Hard on Yourself, But in a Good Way: Creating Desirable Difficulties to Enhance Learning	Book chapter outlining the importance of desirable difficulties in learning, and distinguishing learning and performance.	N/A	Other	AS	Moderate
65-Steele (1997) A threat in the air: How stereotypes shape intellectual identity and performance	Journal article providing details of stereotype threat theory.	N/A	Other	AS	High
66-White et al. (2014) Self-regulated learning in medical education	Book chapter outlining a model of self-regulated learning.	N/A	Other	AS	High
67-Sandars and Cleary (2011) Self-regulation theory: Applications to medical education: AMEE Guide No. 58	Journal article providing details of self-regulation theory.	N/A	Other	AS	Moderate
68-Cruess et al. (2018) Medicine as a Community of Practice: Implications for Medical Education	Perspective piece providing details of the theory of Communities of Practice.	N/A	Other	AS	High

Notes. ^a Numbering is discontinuous due to the exclusion of some documents after number assignment. ^b Country is specified for documents with empirical data. ^c Empirical: document including analysis of empirical data (Emp-qual: qualitative; Emp-quant: quantitative; Emp-mixed: mixed methods); Other: non-empirical document. ^d AS: Additional searching; HIA: High initial appraisal; LIA: Low initial appraisal; MIA: Moderate initial appraisal; OS: Original database search; Ref: Reference document; US: Updated database search. ^e Definitions outlined in 4.5.3.1.

5.2. Findings structure

The findings were grouped into four theory areas, which are summarised in Figure 5-2:

1. Theory Area 1: Higher-level system factors
2. Theory Area 2: Learning climate
3. Theory Area 3: Student-teacher interactions
4. Theory Area 4: Managing well-being

Each theory area has several associated CMOCs, which detail specific ways that well-being is affected. Theory Areas 2 to 4 relate more directly to the individual student and their experience. While Theory Area 1 relates to the higher-level system factors that create the contexts more directly relevant to the student's experience, so those CMOCs have a different focus to the other findings. Although grouped into distinct theory areas for clarity of communication, the different theories overlap and interlink.

All 50 documents were included in the synthesis and contributed to the thinking and retroductive analysis that led to the final CMOCs. Through the process of the synthesis and refinement of the CMOCs some elements were removed to clarify the explanation, so although a document might have contributed an insight to the earlier synthesis activities, not all of these were retained in the refined theories. Therefore, not all 50 documents are explicitly cited within the final CMOCs. However, all of the 50 documents were included in the synthesis at some point, so are included in the final pool of documents.

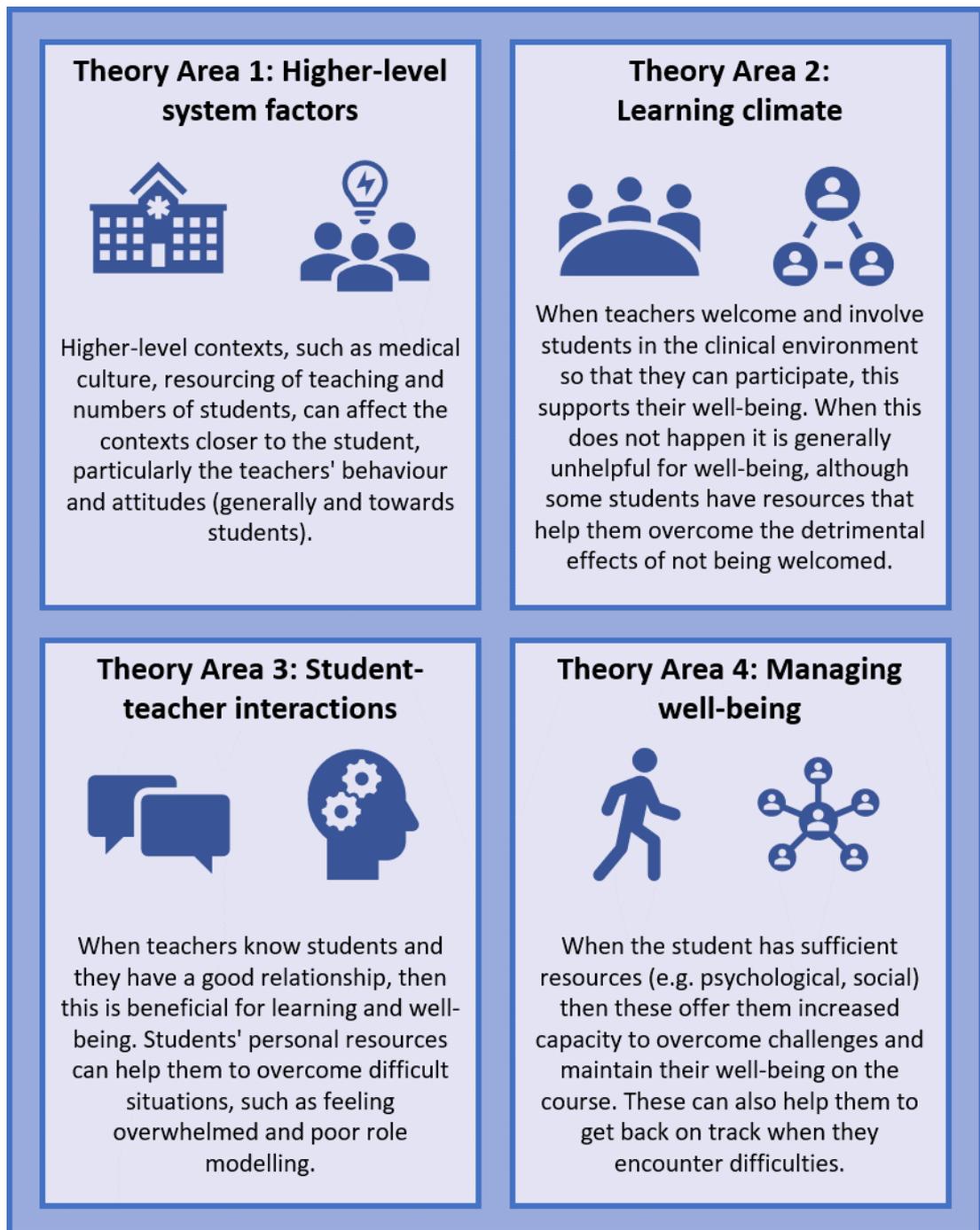


Figure 5-2. Realist review findings overview.

A worked example of the development of CMOCs 5 and 6 from Theory Area 2 is included in Appendix 12. This illustrates how the documents were synthesised to develop and refine the CMOCs. The abbreviations used within CMOCs 1 to 24 within Theory Areas 2 to 4 in the findings are listed in Table 5-2. The specific documents contributing to each CMOC are included in the CMOC tables. Each document is referred to by the document number specified within Table 5-1.

Table 5-2. Abbreviations used within the findings.

Abbreviation	
AR	Autonomous regulation
CO	Connection to others
TIR	Theoretical Integrative Review ^a
EM	Emotions
ME	Meaning
PC	Perceived competence
PG	Personal growth
SP	Self-perception
+	Positive effect
-	Negative effect

Notes. ^a Relates to theorising informed directly by the TIR.

5.3. Theory Area 1. Higher-level system factors

This theory area explains how causal powers at higher levels of the system can change the conditions within lower levels of the system. These causal insights, although not the main focus of the review, were identified within several documents and had relevance for the explanation of well-being changes during transition, so were included.

Several documents identified higher-level system factors that appear to indirectly affect students' well-being. Initially these were included within the student-focused CMOCs as distal contexts, but as thinking developed they were incorporated into their own CMOCs. Several potential contexts were originally identified, but some seemed more relevant to the explanation of transition experiences so these were refined and included under this theory area. These relate to the ways in which the culture of the medical profession (CMOC 1), resourcing of clinical teaching (CMOC 2), and placement characteristics (CMOCs 3 and 4), affect teachers' behaviours and attitudes, and subsequently their interactions with medical students.

5.3.1. Medical culture

Several documents discussed the culture of medicine in more or less detail, typically focusing on the negative aspects, and it was therefore identified as a relevant contributing factor. The

culture of the medical profession refers to the behaviours, beliefs and values considered part of being a doctor, and relates to doctors' professional identity. Teachers have been socialised into this culture and have therefore integrated these behaviours, beliefs and values into their own identities (TIR – SDT). Therefore, students' interactions with teachers and the role modelling they observe are partially determined by the medical culture, influencing their own socialisation experiences as they learn to become doctors (68).

CMOC 1: Medical culture
Medical culture reflects particular behaviours, beliefs and values which are considered important to the profession, including a perception of needing to be strong and tough and the importance of hierarchy (Context). Teachers were socialised into this culture during the development of their professional identity so their behaviour, beliefs and values reflect the medical culture (Mechanism). Therefore, teachers' expectations of students, treatment of students, and the role modelling that students observe are all influenced by their professional identities and the medical culture (Outcome).
<i>Documents:</i> TIR, 21, 25, 26, 32, 34, 41, 54, 55, 68

Medical culture will continue to change over time, and there will be variation in the ways that teachers are socialised into it and affected by it. However, it remains part of the wider context of all of the CMOCs presented in these findings and has particular salience for four. Firstly, teachers' perceptions of students needing to be tough can lead to them engaging in intimidatory teaching strategies (Theory Area 2 CMOC 9). Secondly, the hierarchical nature of medicine can lead to students feeling pressured to comply with educators' expectations, even when they do not agree with them (Theory Area 3 CMOC 14). Thirdly, the perception of being tough and strong may have been interpreted by some teachers as not openly discussing or showing emotions, which can lead to closed emotional role modelling (Theory Area 3 CMOC 16). Finally, the perceived need to not appear weak is linked with a stigma around help-seeking, which can make medical students reluctant to open up to their peers, affecting peer support (Theory Area 4 CMOC 22).

5.3.2. Resourcing of clinical teaching

The resourcing available for clinical teaching affects teachers' behaviour and attitudes towards teaching and their interactions with students. Resourcing here refers to things like the time available for teaching, financial reimbursement for teaching activities and teaching

aids, and information about curricular content. Document 54 explored this context in detail, supported by less detailed mentions in other documents.

CMOC 2: Resourcing of clinical teaching
When teachers are provided with the resources (financial, time, information) to engage in clinical teaching and these are transparently allocated to departments or individuals with teaching responsibilities (Context). Then teachers perceive that the organisation values their teaching role, so they feel more positive about teaching and more able to engage in teaching (Mechanism). Therefore, teachers are more likely to welcome and involve students in the clinical environment (Outcome).
<i>Documents: 8, 51, 54, 60</i>

The resourcing of clinical teaching can influence teachers' attitudes about teaching and therefore how they interact with students. In positive cases, where teachers feel adequately resourced and supported, they may be more inclined to positively interact with students, making a need-supportive learning climate more likely (Theory Area 2 CMOC 5). Whereas, in cases where teachers feel less adequately resourced and supported, they may feel less able or willing to engage with students, making a need-unsupportive learning climate more likely (Theory Area 2 CMOC 6). The resourcing of clinical teaching is linked to placement characteristics below, but the two were considered separate enough to warrant distinction into two CMOCs.

5.3.3. Placement characteristics

Some documents talked about students having different experiences at different placement locations, such as teaching versus district hospitals. Through further consideration and retrodution, the different experiences seemed to relate to the varying opportunity to be known within a placement, rather than the placement location *per se*. Typically students were better-known within district hospitals and GP placements than large teaching hospitals, due to the smaller numbers of medical students attending, but this may not be exclusive to these locations.

CMOC 3: Smaller student numbers on placements
When placement locations receive fewer medical students at a time, e.g. GP and district hospitals (Context). Then teachers have the opportunity to get to know students and be known by them, so they find their engagement with students more satisfying and enjoyable (Mechanism). Therefore, teachers are more likely to welcome and involve students in the clinical environment (Outcome).
CMOC 4: Larger student numbers on placements
When placement locations receive large numbers of medical students at a time, e.g. teaching hospitals (Context). Then teachers have little opportunity to get to know students and be known by them, so they find their engagement with students less satisfying and more pressured (Mechanism). Therefore, teachers are less likely to welcome and involve students in the clinical environment (Outcome).
<i>Documents: 15, 41, 52, 55</i>

The key characteristics of the placement seemed to be the number of students attending at any one time, and the length of time that students have for a placement. Longitudinal placements in rural locations have few medical students attending for an extended period of time, providing ample opportunity to be known by teachers and teaching is also less pressurised. In this setting, the student is more likely to experience a need-supportive learning climate (Theory Area 2 CMOC 5) and be able to form positive student-teacher relationships (Theory Area 3 CMOC 10). Whereas, in busy teaching hospitals where there are large numbers of students frequently rotating through, teachers are likely to find it more challenging to engage with students as they have less opportunity to do so, and teaching is also experienced as more pressured. In those settings, students are more likely to experience need-unsupportive learning climates (Theory Area 2 CMOC 6).

5.4. Theory Area 2. Learning climate

The CMOCs under this section relate to experiences resulting from the interactions between students and teachers in the clinical environment. Learning in clinical training occurs through participation within a Community of Practice (CoP), in which students engage in legitimate

peripheral participation to learn to be a doctor (68). Alongside this process, students are socialised into the profession through the internalisation and integration of professional behaviours, attitudes and values (68, TIR – SDT). However, engaging in the clinical environment can be challenging for students (51). Participation requires either the student to be welcomed and guided by teachers, or that the student has sufficient skills and knowledge to participate independently. Without one or both of these conditions, problems with well-being can arise, as the student cannot participate and fulfil their learning role.

Learning climate refers to the intangible atmosphere within a clinical environment, which is created by the actions of teachers, including individuals with formal educational roles and members of the clinical team, and it affects how students feel in that environment. The term learning climate was derived from others describing interpersonal climates in SDT (TIR) and educational climates (41). The learning climate affects well-being through the extent to which it is need-supportive, or even need-thwarting (TIR – SDT). Need-supportive learning climates provide the nutrients necessary for the satisfaction of the student's basic psychological needs for autonomy, competence and relatedness, leading to improved well-being. When learning climates are less need-supportive these nutrients are lacking, resulting in less or little basic psychological need satisfaction, and poorer well-being. Learning climates can also be need-thwarting when the conditions actively frustrate the basic psychological needs, leading to negative effects for well-being.

CMOCs 5-9 explore the environmental and student contexts that change the extent to which learning climates are need-supportive, and the implications of this for well-being. CMOC 5 and 6 explore the implications for well-being of more and less need-supportive learning climates. CMOC 7 explores how the student learning context can support basic psychological need satisfaction, even in less need-supportive learning climates. CMOC 8 and 9 examine how teachers might create need-thwarting learning climates either due to stereotyping or the use of intimidation as a teaching strategy.

5.4.1. Degree of welcome and involvement in the clinical environment

As discussed above, participation is central to learning in the clinical environment. Within a CoP, students need to be welcomed and involved by teachers to be able to meaningfully participate in clinical activities. However, the extent to which teachers feel able and willing to take responsibility for students and welcome them varies, depending on wider system factors (e.g. Theory Area 1 CMOCs 2-4). Teachers have the potential to legitimise and clarify participation for the student creating a need-supportive learning climate that activates the

well-being mechanism of basic psychological need satisfaction, and improves well-being. The longer-term implications for the student's resources were also explored within the CMOCs. The development of these CMOCs is explained in detail in Appendix 12, as a worked example.

CMOC 5: Need-supportive learning climates

When teachers enjoy and value teaching medical students and feel supported to do so they feel willing and able to take responsibility for the student (**Context**), so they welcome the student and involve them in clinical activities. This creates a need-supportive learning climate by legitimising and clarifying the student's participation and satisfying the student's basic psychological needs for autonomy, competence, and relatedness (**Mechanism**). The student experiences improved well-being (**Outcome**), both *functioning*: connection to teachers and belonging in the clinical environment (*CO+*), learning and participation are intrinsically motivated (*AR+*), accomplishment in their learning role (*PC+*), and development into a doctor (*PG+*); and *feeling*: working in the clinical environment is enjoyable (*EM+*), and feeling valuable and more confident (*SP+*).

Improved well-being (**Context**) facilitates resource acquisition (e.g. skills and knowledge, social support, and confidence), so the student's resource pool is increased (**Mechanism**). Therefore, the student has increased capacity to overcome future challenges (**Outcome**). Over time these short-term resource gains can develop into longer-term resource gain cycles (**Mechanism**), supporting continuing patterns of improved well-being and learning during transition experiences (**Outcome**).

CMOC 6: Need-unsupportive learning climates

If teachers are unwilling or feel unable to take responsibility for the student (**Context**), the student is not welcomed or involved in clinical activities. This creates a need-frustrating learning climate in which participation is not supported, and the student's basic psychological needs for autonomy, competence, and relatedness are frustrated (**Mechanism**). The student experiences diminished well-being (**Outcome**), both *functioning*: feeling anonymous, unwelcome and an outsider (*CO-*), uncertainty in their role and how to participate (*PC-*), perceived poor development as a doctor (*PG-*); and *feeling*: discomfort, intimidation, embarrassment and frustration (*EM-*), and feeling useless, lost and less confident (*SP-*).

Worsened well-being (**Context**) requires the student to draw on their existing resource pool to maintain their well-being, so they experience resource loss (or at least lack of resource gain) and the student's resource pool is diminished (**Mechanism**). Therefore, the student has reduced capacity to overcome future challenges (**Outcome**). Over time these short-term resource losses can develop into longer-term resource loss cycles (**Mechanism**), leading to patterns of worsened well-being and learning during transition experiences (**Outcome**).

Documents: TIR, 1, 2, 5, 8, 12, 15, 18, 29, 30, 38, 40, 41, 47, 51, 52, 53, 54, 55, 58, 59, 60, 61, 68

In environments where teachers welcome and involve the student their basic psychological needs are satisfied, so their well-being is improved. This has ripple effects on the student's resource pool, which is increased, supporting them to maintain their well-being through future challenges. These shorter-term patterns in resources and well-being can accumulate over time into longer-term patterns; a resource gain cycle develops and the student enters an optimal learning and well-being trajectory.

Conversely, when the student is not welcomed and involved in the clinical environment, their basic psychological needs are not satisfied, so well-being is diminished. The student is then required to draw on their existing resources to restore and maintain their well-being, reducing their resource pool. If multiple similar experiences occur, then the student's resource pool continues to diminish, reducing their capacity to overcome challenges and maintain their well-being, as they do not receive resources from the wider environment. Over time, a resource loss cycle is likely to develop so the student enters a negative learning and well-being trajectory, leading to them struggling with the course.

5.4.2. Student contexts facilitating participation

Several documents in the literature reported that some students were less affected by need-unsupportive learning climates, such as those with better developed self-regulated learning (SRL) skills (5). It appeared that these students were proactive in less welcoming environments and were able to participate despite the lack of teacher support. This idea was explored within the documents to determine why some students could be proactive.

Several interrelated factors were identified, including SRL (including goals, motivation, proactivity), skills and knowledge (including the ability to help clinically), understanding of

the clinical environment (e.g. due to prior experience), maturity, and confidence. Students were more likely to be able to participate independently as they progressed through training and acquired greater confidence, skills and knowledge. The student had to be able to recognise the need to implement a new strategy and know how to participate independently, therefore this requires them to have existing learning resources to draw upon. In addition, the student needs to have sufficient psychological skills to remain psychologically flexible and to maintain goal-directed behaviour despite the discomfort of feeling unwelcome and ignored by teachers (TIR – PF). The specific context(s) remains unclear from the information available in the documents, so the context was identified broadly as psychological and learning resources.

CMOC 7: Student contexts facilitating participation

When teachers do not welcome or involve the student in clinical activities (**Context**), but the student has relevant psychological (e.g. mindful awareness) and learning (e.g. SRL skills) resources (**Context**). Then the student maintains psychological flexibility, despite their discomfort, drawing on their resources to implement an alternative strategy to participate (e.g. with clinical team members and patients), so satisfies their basic psychological needs for autonomy, competence, and relatedness (**Mechanism**). The student experiences improved well-being (**Outcome**), both *functioning*: connection to clinical team members and belonging to the team (*CO+*), learning and participation are intrinsically motivated (*AR+*), accomplishment in their learning role and helping others (*PC+*), and development into and becoming a doctor (*PG+*); and *feeling*: working in the clinical environment and with clinical team members and patients is enjoyable (*EM+*), feeling meaning in helping patients (*ME+*), and feeling useful, valuable and more confident (*SP+*).

Improved well-being supports resource gain and a potential positive trajectory through resource gain cycles (detailed in CMOC 5).

Documents: TIR, 2, 3, 5, 8, 12, 15, 18, 29, 34, 38, 42, 46, 49, 50, 52, 53, 60, 66, 67

By being able to participate independently, the student can help teachers and patients, which frees up the teachers to later be able to help the student in return, supporting further resource acquisition and positive learning and well-being trajectories.

5.4.3. Stereotyping by teachers

A few documents described how some students felt they were treated differently to their peers, such as females, ethnic minorities, and quiet or introverted students. Stereotyping was one possible explanation for the differences and was explored further by searching for additional documents (57, 66). Stereotyping of students from certain groups may be one context that explains why a teacher might treat students differently, meaning that the learning climate is need-thwarting for some students.

CMOC 8: Teacher stereotyping
<p>If the teacher holds a negative stereotype about the student, either due to the group(s) to which the student belongs (e.g. female) or their characteristics (e.g. quiet) (Context), they are less willing to welcome and involve the student clinically compared to other students. This creates a need-thwarting learning climate by signalling to the student that they are not valued and accepted by the teacher, so the student's basic psychological needs for autonomy, competence and relatedness are frustrated (Mechanism). The student experiences worsened well-being (Outcome), both <i>functioning</i>: feeling disconnected from the teacher and profession (<i>CO-</i>), less able to accomplish their learning role (<i>PC-</i>), and less progress developing as a doctor (<i>PG-</i>); and <i>feeling</i>: stress and frustration (<i>EM-</i>).</p> <p>Worsened well-being supports resource loss and a potential negative trajectory through resource loss cycles (detailed in CMOC 6).</p>
<p><i>Documents:</i> TIR, 1, 41, 45, 47, 53, 55, 57, 65</p>

When the teacher engages differently with the student due to their held stereotype, then this changes the student's experience of the learning climate. The student is less likely to engage positively in return, which may reinforce the teacher's stereotype. If the student perceives that they have been treated differently before or that others similar to them have been, then they may also experience diminished well-being due to the perceived threat of a stereotype being applied to them and their situation (66). Other contexts are likely to contribute to a need-thwarting learning climate, but further exploration of these was beyond the scope of the review.

5.4.4. Intimidation as a teaching strategy

A few documents mentioned intimidation in the clinical environment, and this was explored in detail in Document 55. Teachers may use intimidatory teaching strategies for a variety of reasons, such as believing that it will prepare students for the demands of being a doctor or experiencing similar teaching strategies themselves. This CMOC relates to the use of intimidation specifically as a teaching strategy, but students may also feel intimidated in environments in which they are ignored (Theory Area 2 CMOC 6). The use of intimidatory teaching strategies creates a need-thwarting learning climate, as students fear punishment and become externally motivated for learning, as well as the detrimental impact on their well-being (TIR – SDT). This fear of punishment is theorised to also be detrimental for learning as it makes it more likely that students will focus on performance, not learning (61).

CMOC 9: Intimidation as a teaching strategy
<p>The teacher believes that intimidation is an effective teaching strategy (Context) and uses such strategies with students. This creates a need-thwarting learning climate by inducing a sense of intimidation in the student, so the student’s basic psychological needs for autonomy, competence and relatedness are frustrated (Mechanism). The student experiences diminished well-being (Outcome), both <i>functioning</i>: feeling rejected and unsupported by the teacher (<i>CO-</i>), learning is externally motivated by a fear of punishment (<i>AR-</i>), focusing on performance and less able to accomplish their learning role (<i>PC-</i>), and less developed as a doctor (<i>PG-</i>); and <i>feeling</i>: intimidation, fear and stress (<i>EM-</i>).</p> <p>Worsened well-being supports resource loss and a potential negative trajectory through resource loss cycles (detailed in CMOC 6).</p>
<p><i>Documents:</i> TIR, 8, 38, 53, 55, 61</p>

The use of intimidation as a teaching strategy, even when intended to support learning, appears generally detrimental to learning and well-being. There were a couple of examples of some students responding differently to intimidation. Mature students with previous careers were less accepting of intimidation or other poor treatment (41, 55). Although they often wanted to challenge intimidation, they experienced peer pressure to conform or recognised the problems that this could cause (55). These students may still experience diminished well-being, but their emotional experience is more likely to centre around frustration (55).

Other students may not be intimidated. One student reported experiencing no intimidation and stated that he had decided early in the clinical course not to be intimidated (55). The reason for this was unclear, although the student was described as a high-achieving white male, so it is possible that this gave him resources to resist intimidation, such as increased confidence, or perhaps put him in a position of power to speak out against intimidation. Alternatively, perhaps educators may have been less likely to use intimidatory teaching strategies with this student, given his intersectionality (converse to Theory Area 2 CMOC 8). The mechanism is currently unclear for both of these examples, and further exploration was beyond the scope of the review. However, it highlights that the student context can change the experience of the same situation, differently impacting well-being.

5.5. Theory Area 3. Student-teacher interactions

Alongside participation in the clinical environment, students learn what it means to be a doctor through doctors' role modelling. This involves the social process of socialisation, which is underpinned by the psychological process of the identification and integration of observed behaviours, beliefs and values into the student's existing identity (TIR – SDT). SDT (TIR) highlights how the quality of the interpersonal relationships with those being observed are important for determining the extent to which role modelled behaviours, beliefs and values are identified and integrated (Ryan and Deci, 2017). When relationships are more need-supportive, then the student is more likely to integrate observed entities into their own identity, so their professional identity will be more autonomous and less controlled. Whereas in poor relationships the student is less likely to seek to emulate the doctor, so less socialisation occurs as behaviours, beliefs and values are less integrated into the self, so remain more controlled in their regulation and less a part of the student's identity (Ryan and Deci, 2017).

Although participation, socialisation, and identification and integration are interlinked processes, the literature tended to discuss participation separately to role modelling and socialisation, so the CMOCs were developed as distinct theory areas. The CMOCs in this theory area relate more to the one-to-one interactions between a student and teacher, compared to the environmental focus of Theory Area 2, however, the two theory areas overlap considerably. CMOCs 10 and 11 relate to the quality of the student-teacher relationship and implications for well-being and professional identity formation. CMOCs 12 and 13 explore students' feelings of being overwhelmed by the extent of learning to become a doctor early in clinical training when they observe doctors working in practice, and the role

of resources in reducing those feelings. CMOCs 14 and 15 relate to the experiences associated with perceived poor role modelling and the resources that support an understanding of this. Finally, CMOCs 16 and 17 explore the implications of doctors' open and closed emotional role modelling.

5.5.1. Student-teacher relationship

The quality of the student-teacher relationship is determined by many different factors, but a key context is the extent to which there is the opportunity to develop a good relationship by being known by one another. When students have the opportunity to be known by a teacher, then they are able to be more open with them and consequently address challenges they experience. This relates back to Theory Area 1 and CMOCs 3 and 4, relating to placement size and number of students affecting the extent to which students are known.

CMOC 10: Student-teacher relationship
<p>When the student is known by a teacher in a non-judging capacity (Context), the teacher can explore the student's learning needs, support their learning, and guide them in making sense of their experiences. The student feels safe to openly discuss their challenges creating a need-supportive relationship, and satisfying the student's basic psychological needs for autonomy, competence, and relatedness (Mechanism). The student experiences improved well-being (Outcome), both <i>functioning</i>: supported by the teacher (<i>CO+</i>), intrinsically motivated to learn (<i>AR+</i>), able to overcome challenges (<i>PC+</i>), and developing into and becoming a doctor (<i>PG+</i>); and <i>feeling</i>: enjoy working with the teacher (<i>EM+</i>), and feel good about self (<i>SP+</i>).</p> <p>Improved well-being supports resource gain and a potential positive trajectory through resource gain cycles (detailed in CMOC 5).</p>
<p><i>Documents</i>: TIR; 20, 24, 27, 56, 59, 68</p>

Supportive student-teacher relationships provide students with the opportunity to share their experiences and challenges and make sense of these, which satisfies their basic psychological needs, and improves well-being. The student's resources are increased, which has wider benefits for their well-being and learning. Supportive relationships also provide an opportunity for students to share their experiences of poor role modelling and gain a better understanding of those situations (Theory Area CMOC 14).

5.5.2. Professional identity formation

In need-supportive relationships, students are more likely to identify and integrate the behaviours, attitudes and values role modelled by doctors (TIR – SDT), which is part of a positive socialisation process and leads to the development of their professional identity as a doctor (68).

CMOC 11: Professional identify formation

When there is a good student-teacher relationship (**Context**), the student seeks to emulate the doctor and become like them. The student identifies with the behaviour, attitudes and values displayed by the teacher and these are integrated into their identity, leading to these elements of their professional identity being more autonomous (**Mechanism**). The student develops their professional identity as a doctor and is more likely to enact the expected behaviours, attitudes and values (**Outcome**).

Documents: TIR; 8, 15, 40, 56, 68

Socialisation into the profession is more complete and effective when the student feels supported by the teacher. Whereas, when the student does not feel supported by the teacher they will be less likely to integrate the behaviours, attitudes and values observed into their identity, leading to less development of their professional identity as a doctor.

5.5.3. Feeling overwhelmed about learning to be a doctor

This CMOC relates to early transition experiences when students can feel overwhelmed by the amount of learning they need to do to become a doctor. Socialisation is also stressful as students feel like outsiders to the profession and the CoP that they want to join. However, some students were able to counteract these feelings by recognising their role as a learner and rationalising their perceived lack of progress.

CMOC 12: Feeling overwhelmed about learning to be a doctor

When students are early in the transition and aspire to emulate the doctors that they admire and respect but perceive their skills and knowledge to be low (**Context**). Then observing doctors provides the student with information and awareness that they are far from becoming a doctor, so their basic psychological needs for autonomy, competence

and relatedness are frustrated (**Mechanism**). The student experiences diminished well-being (**Outcome**), both *functioning*: lack a sense of belonging to the medical profession (*CO-*), learning becomes motivated by feelings of inadequacy (*AR-*), and a sense of not progressing to becoming a doctor (*PG-*); and *feeling*: negative emotional experiences of stress and being overwhelmed (*EM-*).

CMOC 13: Psychological and learning resources reduce feelings of being overwhelmed

However, in the same context, when the student also has relevant psychological (e.g. mindful awareness) and learning (e.g. understanding of the process of becoming a doctor) resources (**Context**). Then they can maintain psychological flexibility by reflecting on their role as a learner, gaining perspective on the situation, and remaining focused on their learning, so their basic psychological needs for autonomy, competence and relatedness are satisfied (**Mechanism**). The student maintains their well-being (**Outcome**).

Documents: TIR, 18, 41, 52, 53, 68

If students have good psychological and learning resources (similar to Theory Area 2 CMOC 7), then they can better understand their experiences, manage their learning, and maintain their well-being.

5.5.4. Perceptions of poor role modelling

Students talked about their experiences of observing poor role modelling in several documents, which can either reflect genuine bad practice or sometimes a misunderstanding of the situation (21). When role modelling conflicts with the student's own perceptions of being a doctor or their values and beliefs, then students can feel pressured to go against their values and beliefs in order to emulate the doctor and obtain good grades. This reflects the hierarchical nature of the medical culture (Theory Area 1 CMOC 1), in which students are often expected to comply with senior doctors' expectations. However, some students were able to resist the pressure to conform to perceived poor role modelling.

CMOC 14: Perceptions of poor role modelling

When there is a less supportive student-teacher relationship (**Context**). If the doctor demonstrates behaviour, attitude or values that appear to conflict with the student's perceptions of being a doctor, or their own values and beliefs (**Context**). The student

perceives a pressure to conform to the doctor's behaviours, attitudes or values, disregarding their own, in order to impress the doctor. So, their basic psychological needs for autonomy, competence and relatedness are frustrated (**Mechanism**) and the behaviour, attitude or value is less integrated into their identity (**Mechanism**). The student experiences diminished well-being (**Outcome**), both *functioning*: disconnection from the teacher and medical profession (*CO-*), and their behaviour is controlled and misaligned with their sense of self (*AR-*); and *feeling*: conflicted and distressed (*EM-*). The student also develops their professional identity as a doctor, but the behaviours, attitudes and values are less autonomous and more controlled (**Outcome**).

CMOC 15: Learning resources supports rejection of poor role modelling

However, in the same contexts, if the student also has learning resources that support an understanding of the realities of learning in the clinical environment (e.g. the possibility for poor role modelling) (**Context**) and/or the student is confident in themselves (**Context**). Then the student feels able to reject the role modelled behaviour and the pressure to conform. So, their basic psychological needs for autonomy and competence are satisfied, but their need for relatedness is frustrated (**Mechanism**). The student experiences mixed changes to well-being (**Outcome**), as their *functioning* is improved in some ways and not others: they feel disconnected from the teacher (*CO-*), but confident that they are developing into the type of doctor they want to be (*PG+*), and their behaviour remains autonomous and aligned with their values (*AR+*).

Documents: TIR, 8, 15, 21, 22, 34, 41, 53, 66, 68

When students do not have need-supportive relationships with their teachers, then they may feel unable to explore their perceptions of poor role modelling, or to resist the pressure to conform to teachers' expectations. However, when students understand this is part of the learning experience in clinical settings, then they can feel more able to reject the poor role modelling and maintain better well-being.

5.5.5. Emotional role modelling

Students acquire information about how to manage the emotional challenges of the profession through observing doctors, for example around emotion management. However, what students learn depends on what they are role modelled, and the degree of openness that the doctor has in showing their emotions.

CMOC 16: Closed emotional role modelling

When the student experiences a distressing event (**Context**) and the doctor does not openly show or acknowledge their emotional experience (**Context**). The student perceives that the doctor is unaffected by the distressing event so therefore their own distress and emotional response is misaligned with being 'professional'. So the student's basic psychological needs for autonomy, competence and relatedness are frustrated (**Mechanism**). The student experiences diminished well-being (**Outcome**), both *functioning*: feel unsupported and disconnected from the doctor (*CO-*), and less able to manage the challenges of their role (*PC-*); and *feeling*: continue to feel distressed and frustrated (*EM-*).

In the same contexts, the student infers that doctors do not show their emotions and may attempt to suppress their own emotional experience, adopting maladaptive emotion regulation strategies (**Mechanism**). This may lead to future problems with emotion regulation during difficult experiences (**Outcome**).

Worsened well-being supports resource loss and a potential negative trajectory through resource loss cycles (detailed in CMOC 6).

CMOC 17: Open emotional role modelling

When the student experiences a distressing event (**Context**) and the doctor openly shows and/or explicitly acknowledges their emotional experience to the student (**Context**). Then the student feels reassured and supported in their emotional reaction, so their basic psychological needs for autonomy, competence and relatedness are satisfied (**Mechanism**). The student experiences improved well-being (**Outcome**), both *functioning*: supported by the doctor and connected to them (*CO+*), more autonomous in their emotional reaction (*AR+*), able to overcome challenges in their role (*PC+*), and developing the skills needed to become a doctor (*PG+*); and *feeling*: relieved and reduced distress (*EM+*).

In the same contexts, the student learns how to appropriately manage their emotions in a professional capacity, acquiring adaptive emotion regulation strategies (**Mechanism**). This increases the likelihood of the student using adaptive emotion regulation during future difficult experiences (**Outcome**).

Improved well-being supports resource gain and a potential positive trajectory through resource gain cycles (detailed in CMOC 5).

Documents: TIR; 40, 56, 68

In the medical culture there is a perception of needing to be strong (Theory Area 1 CMOC 1). Therefore, some doctors may have learnt to hide or suppress their emotional reactions to distressing events, leading to students feeling confused about their own emotional responses. Other doctors who feel more comfortable being open about their emotions can better support students to develop healthy emotion regulation strategies.

5.6. Theory Area 4. Managing well-being

This theory area relates to experiences that students have alongside their transition through clinical training, which relate to activities that support the management of well-being. Students reported experiencing improved well-being when they engaged in well-being supportive activities (e.g. eating well, sleeping enough, exercising) (CMOCs 18-20), received emotional support from family, friends and peers (CMOCs 21-23), and had the option to attend learning/support groups on their course (CMOC 24).

5.6.1. Engagement with well-being supportive activities

Well-being supportive activities were those that helped students to feel and function better and were also good for their overall health, such as exercising, eating healthily, and sleeping enough. Despite being aware of the short- and long-term benefits of these activities for health from their medical studies, some students struggled to engage with them alongside the demands and pressures of their course. When students did not engage with them, then they could end up experiencing poor well-being and associated problems, such as exhaustion. However, some students were able to reflect on these experiences and learn from them, re-engaging with well-being supportive activities to improve their well-being. The mechanisms relevant to engagement with these activities were not fully clear from the literature available, but have been theorised.

CMOC 18: Engaging with well-being supportive activities

Clinical training is associated with a high workload (**Context**), but when the student recognises the importance of well-being supportive activities (e.g. from prior experience)

and the student has adequate resources to support those activities (e.g. financial, partner support) **(Context)**. Then even when the student feels pressured by the demands of the course, they feel confident and able to prioritise well-being supportive activities, which supports satisfaction of their basic psychological needs **(Mechanism)**. The student experiences improved well-being **(Outcome)**, both *functioning*: feels able to manage their life activities and overcome challenges (*PC+*); and *feeling*: positive emotional experience (*EM+*), and feeling confident and good about self (*SP+*).

Improved well-being supports resource gain and a potential positive trajectory through resource gain cycles (detailed in CMOC 5).

CMOC 19: Not engaging with well-being supportive activities

When the student does not recognise the importance of well-being supportive activities (e.g. from prior experience) and/or the student has insufficient resources to support those activities (e.g. poor finances, little partner support) **(Context)**. Then the student feels unable to prioritise well-being supportive activities when they experience time pressures on the course and a requirement to balance competing demands, which frustrates their basic psychological needs **(Mechanism)**. The student experiences diminished well-being **(Outcome)**, both *functioning*: feeling less able to manage the challenges of the course (*PC-*); and *feeling*: guilt (*EM-*), and less good about self (*SP-*).

Worsened well-being supports resource loss and a potential negative trajectory through resource loss cycles (detailed in CMOC 6). The student is more likely to experience associated problems like stress and burnout **(Outcome)**.

CMOC 20: Learning from poor well-being experiences

If the student experiences cumulative negative emotional experiences (e.g. exhaustion and stress) but they have relevant psychological resources (e.g. awareness and reflection skills) **(Context)**. Then the student becomes aware of the negative effect of not engaging in well-being supportive activities on their health and maintains psychological flexibility despite their distress, enabling them to recognise the need to implement an alternative strategy, i.e. prioritising those activities. So their basic psychological needs are satisfied **(Mechanism)**. The student experiences improved well-being **(Outcome)**, both *functioning*: feels more in control of their life and better able to manage challenges (*PC+*); and *feeling*:

emotional experience is improved (*EM+*), and confidence and feelings about self are improved (*SP+*).

Improved well-being supports resource gain and a potential positive trajectory through resource gain cycles (detailed in CMOC 5).

Documents: TIR; 15, 25, 36, 37, 38, 40, 45, 47, 53, 54

To feel able to prioritise well-being supportive activities, it was thought that students need to both recognise the value of those activities and have the resources to engage with them. In those cases, the student is able to resist the pressures to forego well-being activities and prioritise them, which has beneficial impact on well-being. Alternatively, students who had experienced adverse outcomes from a lack of engagement with well-being supportive activities, but had relevant psychological resources, were able to reflect on their experiences and change their engagement with well-being supportive activities, re-prioritising these to improve their well-being.

5.6.2. Emotional support

Students could draw on their support networks for emotional support to help them to manage the challenges of the course, including their family and friends, and peers. However, the peer group could be problematic and unsupportive if students felt unable to trust their peers and ask for help.

CMOC 21: Emotional support from family and friends

When the student has good relationships with others, e.g. family, friends and peers (**Context**), they can emotionally offload, help make sense of problems, and diffuse their emotional tension. The student is able to access emotional support from others and gain new perspectives on their problems, so their basic psychological needs for autonomy, competence and relatedness are satisfied (**Mechanism**). The student experiences improved well-being (**Outcome**), both *functioning*: feel loved and supported (*CO+*), and better able to manage challenges of their life (*PC+*); and *feeling*: increased positive emotion and reduced negative emotion (*EM+*), and feel better about self and self-esteem is boosted (*SP+*).

Improved well-being supports resource gain and a potential positive trajectory through resource gain cycles (detailed in CMOC 5). The student actively cultivates emotionally supportive relationships (**Outcome**).

CMOC 22: Challenges to engaging with peer support

When students perceive that there is a need to be strong as a doctor and a stigma around help-seeking, and there is perceived competition between students, e.g. for grades (**Context**). Then there is a lack of trust between students so a supportive peer climate is absent and the student fears being seen as weak and feels pressure to perform well, so their basic psychological needs for autonomy, competence and relatedness are frustrated (**Mechanism**). The student experiences diminished well-being (**Outcome**), both *functioning*: lack supportive peer relationships and feels isolated (*CO-*), less autonomously motivated for learning (*AR-*), and they feel they are not developing optimally as a doctor (*PG-*); and *feeling*: negative emotional experience (*EM-*).

CMOC 23: Overcoming reservations about engaging with peer support

Over time, if the student recognises the value of their shared experience with their peers (**Context**). Then the perceived value of peer support outweighs their worries about being perceived as weak, so they engage with peers for support, satisfying their basic psychological needs for autonomy, competence and relatedness (**Mechanism**). The student experiences improved well-being (**Outcome**), both *functioning*: feeling connected and supported (*CO+*), better able to manage challenges (*PC+*), and improved learning and development (*PG+*); and *feeling*: positive emotional experience (*EM+*).

Documents: TIR, 2, 11, 38, 40, 49, 51, 59

These three CMOCs highlight the importance of students having adequate support networks to draw on for emotional support. Those who do not have support from family or friends are lacking an important resource to support their experiences in medical school, and may then struggle to maintain their well-being. Additionally, students can also experience challenges gaining support from their peers, depending on the culture within the peer group. However, if students come to recognise the value of peer support and their shared experiences, then this can help them to overcome their reservations about seeking support from peers. Peer support is not only beneficial for emotional support, but also instrumentally, with peer learning benefits.

5.6.3. Groups

The final CMOC reflects documents that talked about specific groups designed to support students through their transition experiences. These groups came in different formats, but could provide emotional and/or learning support for students.

CMOC 24: Groups supporting learning and well-being
<p>When support and/or learning groups are available to the student (and the student recognises the value of these if they are voluntary) (Context). The student has the opportunity to share their experiences and receive support and information to help them navigate their clinical experiences, so they feel emotionally and developmentally supported and their basic psychological needs for autonomy, relatedness and competence are satisfied (Mechanism). Therefore the student experiences improved well-being (Outcome), both <i>functioning</i>: feeling connected to peers and belonging to the group (<i>CO+</i>), and better able to manage challenges (<i>PC+</i>); and <i>feeling</i>: positive emotional experience (<i>EM+</i>). The student also acquires knowledge of the clinical environment beneficial for clinical learning (Outcome).</p> <p>Improved well-being supports resource gain and a potential positive trajectory through resource gain cycles (detailed in CMOC 5).</p>
<p><i>Documents</i>: TIR, 11, 21, 29, 39, 56, 68</p>

These groups can therefore provide resources which may be absent in the clinical environment, for example if students experience need-unsupportive learning climates (Theory Area 2 CMOC 6). Through the groups, students may be able to develop their psychological and/or learning resources, improving their capacity to engage effectively with the clinical environment (Theory Area 2 CMOC 7). This may help them to manage challenges on the course, such as understanding poor role modelling (Theory Area 3 CMOC 15) or putting their learning role into perspective (Theory Area 3 CMOC 13). However, the groups described were often voluntary, so students self-selected to attend them. There would likely be further challenges engaging other students who may benefit from the group but do not see the value in attending. For example, in Document 56 a student described attending a mandatory group that he initially did not see the value of, but he later reflected on how beneficial it was. Therefore, the nature of engagement with the group is likely to be a key context determining student perceptions of, and engagement with, similar groups.

5.7. Discussion

The review sought to answer the question: in what circumstances, for whom, how, and why does the process of transitioning through clinical training affect medical students' well-being? The findings are discussed in relation to the four theory areas. Theory Area 1 explained how higher-level contexts, in particular medical culture, resourcing of teaching, and numbers of students, can affect the contexts closer to the student, particularly teachers' behaviour and attitudes (generally and towards students). These then impact upon students' well-being through the degree to which teachers feel willing and able to welcome and involve students in the clinical environment, the opportunity for teachers to get to know students and develop a good relationship, and through the behaviours, values and attitudes role modelled to students. Each of these is related to another of the theory areas, so the higher-level contexts indirectly influence well-being through the actions of teachers.

Theory Area 2 explained how teachers' actions in the clinical environment can support or hinder students' well-being through the learning climate they create. When teachers welcome and involve students in the clinical environment so that they can participate, this supports their well-being, because it creates the conditions through which the basic psychological need mechanism can be activated. Conversely, when students are not welcomed or involved then this can frustrate the basic psychological need mechanism, hindering well-being. However, this was not the case for all students. The exact context needs further exploration, but it seemed that some students have sufficient learning and psychological resources to overcome the detrimental effects of not being welcomed.

Theory Area 3 explained how the quality of the student-teacher relationship can support well-being. In good quality relationships, students can be open with teachers and also seek to emulate them, supporting the development of their professional identity. Students are also differently affected by less beneficial interactions with teachers, depending on the psychological and/or learning resources available to them. When students have relevant resources these enable them to maintain psychological flexibility to overcome difficult situations, such as feeling overwhelmed and poor role modelling.

Finally, Theory Area 4 explained how students' resources (e.g. psychological, social) can provide them with increased capacity to overcome challenges and maintain their well-being on the course. Students can use their resources to help them to get back on track when they encounter difficulties, and students can also influence their well-being and resources, through engagement with well-being supportive activities. However, different students

seemed more or less able to engage in such activities, although the specific context and mechanism interaction was less clear from the review, so needs further exploration.

5.7.1. Strengths and limitations

The use of realist methodology for the review supported the development of theories explaining how and why well-being is affected by transition experiences, including the influence of both environmental and student contexts. The review process was implemented in alignment with the RAMESES Quality Standards (Wong et al., 2014) – with appropriate adaptations for the problem exploration focus – strengthening the application of the methodology.

Rigour in realist research relates to the trustworthiness of the data used to develop theories and the plausibility of those theories (Wong, 2018). Drawing on the work conducted within the TIR supported initial theorising and retroduction. The well-being theory and concept definition enabled interpretation of the existing literature to draw insights about well-being mechanisms and outcomes. The quality of the literature was good enough to enable the identification of contexts that support and hinder the well-being mechanisms. Each CMOC was developed from multiple sources of data, including theoretical insights from the TIR and substantive theories, enabling triangulation between sources of varying types and trustworthiness (Wong, 2018). Although the review was largely conducted by AM, others were involved at various points, providing the opportunity for alternative interpretations to be identified, and to check the plausibility of the theories being developed. Furthermore, the data collection and analysis processes have been reported transparently to enable others to judge the processes of combining evidence with theorising to develop a causal narrative of the problem.

Despite these strengths, the evidence was limited in some ways, particularly in relation to the lack of explicit conceptualising of well-being. The conceptualisation of well-being for this work did not typically align with the existing literature, requiring inferences to be drawn. Therefore, while insights were drawn about the contexts that affect the well-being mechanisms and therefore well-being, gaps remain in some of the theory details. In particular, information was often limited about the specific student contexts that change the experience of transition, so these need further investigation to clarify the context details and the interactions with the mechanisms. Another area that had limited detail was around how students manage their own well-being through well-being supportive activities. Further research is needed to clarify the relevant student contexts and to directly explore the well-

being experiences during transition. Finally, limited information was available linking well-being experiences to learning processes, so this also needs further investigation to enable the relationships between well-being and transition to be more fully elaborated.

Overall, the realist review contributed new theoretical insights to the area of transition and well-being in clinical training. The work lays a foundation upon which future research can build, by testing and refining the theories, as is part of the scientific realism paradigm.

5.8. Chapter summary

The realist review sought to answer the question: in what circumstances, for whom, how, and why does the process of transitioning through clinical training affect medical students' well-being? Using the well-being theory as a foundation, the realist review developed theories about how transition affects well-being in four areas: higher-system level factors; learning climate; student-teacher interactions; and managing well-being.

The key findings were that well-being is improved within welcoming and involving learning environments and when students have good relationships with their teachers, which satisfy students' basic psychological needs. In the absence of such environments, students with sufficient psychological and learning resources are able to facilitate their own learning, supporting their well-being. The findings also showed how students with certain resources, such as awareness, can use these to maintain psychological flexibility in difficult situations, supporting their well-being. Finally, students' resources in different areas such as supporting engagement with well-being supportive activities and emotional support from family and friends, enabled them to manage their well-being on the course.

Our knowledge of these processes could be improved by establishing greater detail about how different environments affect well-being, how different student contexts change those experiences, and how well-being and learning are linked. These gaps were explored in the realist investigation.

Chapter 6. Realist Investigation: Methods

6.1. Introduction

This programme of research seeks to understand how well-being is affected by the process of transition through clinical training. It draws on the principles of scientific realism to develop explanations of generative causation, identifying how different contexts affect medical students' innate capacities (mechanisms) for well-being. This piece of research applied these principles using realist methodology. It aligned broadly with the processes of a realist evaluation; however, as the purpose was not evaluation it has been called a realist investigation. This reflects the exploratory, theory-building focus of the work.

The realist investigation aimed to develop, test and refine key theories from the realist review. The realist review findings highlighted several different ways in which students' well-being can be affected by their experiences of transitioning through clinical training. However, gaps remained around the links between well-being and learning, and the student contexts that affect participation in the clinical environment and patterns of well-being.

The research question for the realist investigation was: *in what circumstances, for whom, how, and why does the process of transitioning through clinical training affect medical students' well-being and learning?* The realist investigation sought to build upon the theories from the realist review through three main objectives:

1. Clarify how more or less welcoming and involving clinical environments affect students, including the links between well-being and learning, and the environmental contexts affecting the degree of welcome and involvement.
2. Clarify the student contexts that change students' experiences within less welcoming learning environments.
3. Explore how different patterns of student well-being and learning develop over time.

These three areas built on two of the theory areas from the realist review. Objective 1 built upon Theory Area 2 relating to the learning climate, extending the theory to include learning as well as well-being outcomes. Objective 2 built on the same theory area, but focused on clarifying the student contexts that affect engagement with less welcoming learning climates. Objective 3 built upon Theory Area 4 relating to managing well-being and the student contexts affecting this. Theory Area 3, relating to student-teacher interactions,

was a separate theory area in the realist review because the literature tended to discuss the clinical environment and role modelling separately, although they were interlinked. Theory Area 3 seemed less causally important for well-being experiences, and in the realist investigation role modelling was included within Objective 1 as a learning process in the clinical environment. Theory Area 1 from the realist review focused on higher-level factors, which were explored primarily as part of the wider environmental contexts changing the learning climate in Objective 1.

The realist investigation was designed in alignment with the RAMESES II Quality Standards (Greenhalgh et al., 2017) and reported in alignment with the Reporting Standards for Realist Evaluation (Wong et al., 2016) (see Appendix 13 and Appendix 14). This chapter presents the method of the realist investigation, while the findings are presented in Chapter 7.

6.2. Study design

The realist investigation was designed for problem exploration in two ways. Firstly, data was collected through interviews. This reflected the theory-building nature of the work, as it would have been unclear in advance of this work what variables to measure with quantitative approaches. The outcome of well-being also has issues around clarification, so measurement would have presented a challenge. The TIR developed a concept definition of well-being, but this did not align completely with any existing measures of well-being and determining a suitable measure was beyond the scope of this work. Secondly, mechanism has been adapted within this work to reflect the absence of an explicit programme, so the 'resource' is conceptualised as being offered by the context, rather than the programme itself. This was explained in detail in section 2.5.3.

Data was sought from interviews with two key stakeholder groups to obtain information to develop the theories around well-being and transition, clinical students and educators. Students were those currently experiencing the clinical training transition, in either the penultimate or final year of medical school, called locally Clinical Phase 2 (CP2) and Clinical Phase 3 (CP3). Educators were those involved in formal teaching roles, and in some cases also held leadership positions relating to the clinical course in either the University or a local education provider (LEP).

The purpose of including students in the investigation was to explore their experiences of the clinical training transition in order to: develop knowledge about the well-being experiences during this process; explore the student contexts that can affect these

experiences; and gain knowledge of the environmental contexts that affect students. Through interviewing students about their experiences, in-depth accounts of those experiences could be obtained. The purpose of including educators within the investigation was to explore the experiences of those who have supported many students through the clinical training transition, and could therefore provide a perspective across many students. This provided the opportunity to: explore the student and environmental contexts that can affect students' experiences; and to explore the educator context in greater detail through exploring the experiences of educators.

Data was collected at two points. The student interviews were conducted in November and December 2019, and the educator interviews were conducted in June and July 2020. The alignment between these activities and other aspects of the research are described in section 2.5.2 and Figure 2-6. Ethical approval for the study was granted by the University of Nottingham Faculty of Medicine and Health Sciences Research Ethics Committee (Reference No. 340-1906).¹⁸

6.3. Choosing cases

Choosing cases is described by Emmel (2013) as more appropriate terminology for sampling in realist research, as the term sampling is associated with positivist assumptions. Emmel outlines how, in realist research, choosing cases is purposive and guided by internal and external powers. Internal powers are our pre-existing theories about the phenomenon, which guide our thinking about where and who to choose as cases, while external powers are dependent on the wider social systems within which we conduct our research, such as the institutions we work for or the gatekeepers we encounter (Emmel, 2013). Therefore, Emmel argues that it is important to consider the generative mechanisms that affect our choice of cases, although he recognises the limits in the extent to which we can be truly reflexive. Cases should be sought that are information rich and offer insight into the phenomenon being studied (Emmel, 2013).

A number of factors guided the choice of cases in this research. The internal powers were the pre-existing theories being brought to the study from the TIR and realist review (although this had not been finalised at the point of data collection). These theories centred around the student and environmental contexts affecting the experience of well-being through clinical

¹⁸ Details of specific materials (e.g. recruitment materials, information sheets, and consent forms) are available on request.

training, suggesting to the researcher the need to focus on student cases as the source of those experiences. Transition was conceptualised as an ongoing process in this research, extending the typical medical education focus on the initial transition into clinical training, to consider the student's journey through transition. In Nicholson's (1990) cycle this meant considering not only the preparation and encounter phases, but also adjustment and stabilisation. Therefore, in order to capture student experiences throughout this process, student cases were sought within the mid to later points within the clinical course. Educators involved in supporting students through these experiences were also likely to have rich information from their experiences working with students, so were also chosen for cases.

The external powers influencing the choice of cases are also important to consider. Being a PhD student at the University of Nottingham made it pragmatic to choose cases from within Nottingham's medical school, as access was available through gatekeepers within the supervisory team, while access would have been more difficult elsewhere. Nottingham has two main courses, the undergraduate and graduate-entry courses, which provided two different student cohorts to choose cases from, enabling exploration of student contexts. These external powers relating to access to cases supported the case choices driven by the internal powers relating to the pre-existing theory ideas.

Sample size, or the number of cases, Emmel (2013) argues is often based on external powers relating to the acceptability of the sample size to the consumers of research and the researcher attempting to provide reassurance to these external sources about the trustworthiness of their data. He argues that sample size cannot be pre-determined in any meaningful way within realist research, and instead the cases should be chosen based on how they can be used to test and refine theories (Emmel, 2013). To support consideration of the use of cases within the study, the concept of information power was found beneficial (Malterud et al., 2016).

Malterud et al. (2016) propose various factors that can be taken into consideration to guide the choosing of cases. In this study, students were considered to have fairly homogenous experiences, as they were all going through the same clinical course, however the theory around their well-being experiences was less established. Therefore, the opportunity to speak to a variety of students was needed to gain appreciation of the variation in their experiences and understand the student contexts better, but this also needed to be balanced against longer interviews to explore their experiences in-depth. Regarding the educator cases, there was more heterogeneity in their experiences due to the range of different roles, backgrounds, and involvement in student education, however this was

balanced out by more established theory (as their data was collected at a later point) and less requirement for depth of experience in the interviews, compared to the student cases.

6.3.1. University of Nottingham Medical School context

The realist investigation took place within the medical school at the University of Nottingham in the United Kingdom. The following description related to the course at the time of the study, although curricular change has since taken place. The medical school has two courses, an undergraduate (UG) and a graduate-entry (GEM) course. The two courses experience different pre-clinical curriculum before merging for the clinical course, as shown in Figure 6-1. The UG course is five years long. It has two years of pre-clinical teaching following a more traditional curriculum. In their third year, students complete a BMedSci research programme, before commencing the clinical course approximately halfway through the third year. There are approximately 350 students in each year of the UG course. The GEM course has 18 months of pre-clinical teaching following a problem-based learning curriculum, before the students commence the same clinical course. Students entering the GEM course have completed a previous degree and obtained relevant work experience, usually within healthcare. There are approximately 90 students in each year of the GEM course.

The clinical course is 2.5 years long, broken into three clinical phases. Clinical Phase 1 (CP1) is four months long, running from March to June in students' third (UG) or second (GEM) year of medical school. Students complete placements in medicine and surgery, and these can vary in length depending on the location of the placement. CP2 is the longest phase, running throughout the duration of the fourth (UG) or third (GEM) year of medical school. Students complete placements within the specialties. CP3 is the final year of medical school. Students complete placements in medicine and surgery before sitting their final exams in February, after which they complete a Transition to Practice course, electives, and shadowing.

Year of course	1	2	3	4	5	
Undergraduate course	2 years pre-clinical		BMed- Sci	CP1	CP2	CP3
Graduate-entry course	n/a	18 months pre-clinical				

Figure 6-1. Representation of the Nottingham course timelines.

6.3.2. Choosing student cases

Having the two medical school courses meant that it was possible to gain information from students with quite different backgrounds, although the benefits of this were not fully appreciated by the researcher until during the data analysis. GEM students had prior higher education experiences and other life and work experiences, meaning that their context was different to UG students who had entered medical education directly from school.

As all students within CP2 and CP3 were considered potentially information rich cases relevant to the theories being tested and refined, recruitment did not specifically target any group of student. A balance between UG and GEM students was sought because it was thought that the two groups might have some different contexts that could affect their experiences. However, no direct action was taken to limit participation of any student groups or deliberately seek additional participants from other sub-groups of students, because it was not clear enough in the initial theories from the realist review which students might have relevant characteristics. Therefore cases were chosen opportunistically depending which students were interested in participating, however the overall strategy was purposive sampling (Emmel, 2013), in that all students from the two courses were considered relevant for theory-building.

Recruitment emails were sent by course administrators on behalf of the researcher to all medical students in the CP2 and CP3 cohorts on the 19th November 2019, and re-sent approximately three weeks later (to CP2 students on the 6th December 2019 and to CP3 students on the 10th December 2019). Recruitment posters were also put up in the corridors of the medical school, with detachable study details attached to the bottoms. In addition to these methods, some students reported being told about the study by friends who had already participated. Students were offered a £10 Amazon voucher as an inconvenience fee for their participation. Students interested in participating in the study emailed the researcher and were sent an information sheet with further details and a list of available dates and times for an interview. If the student was still interested in participating, a mutually convenient time and date were arranged for an interview.

The interviews were conducted face-to-face within the medical school. In the interview, students were talked through the details of the study and had the opportunity to ask questions. They then completed the consent form. Demographic information was collected verbally at the start of the interview. The topic guide was then used to inform the content of the interviews. The interviews were audio recorded using a Dictaphone. Besides from the

consent form, data collected in the interviews was associated with a participant code rather than names, to facilitate anonymity of the data. Notes were recorded throughout the interview where applicable, and reflections were made after the interviews.

The data was stored securely and participant names and email addresses were kept separate from the study data, which was stored using participant codes. The audio recordings were clipped to remove the demographic information, before being sent to an external University approved transcription service. On return, the transcripts were read while listening to the audio recordings as part of the familiarisation process and to check their accuracy. During this process any potential identifying details (e.g. home town, specific hobbies) were removed to anonymise the transcripts before analysis.

6.3.3. Choosing educator cases

A wide range of educators are involved in organisation and delivery of teaching for medical students.¹⁹ As with choosing the student cases, a purposive sampling strategy was used to find cases with information relevant to theory development (Emmel, 2013). However, different strategies were needed to find educator cases compared to student cases, and five strategies were used. Firstly, the organisational chart for the medical school was used to identify educators with specific leadership roles. Secondly, the knowledge and connections of two of the supervisory team (GD and PH) were used to identify educators with other leadership roles within the medical school and LEPs not included on the organisational chart, as well as others with teaching roles. This was done through a meeting in which the medical school faculty organisational chart was used as a starting point and then systematic consideration was given to educators within different LEPs. A list of educators was compiled during the meeting and sent recruitment emails. Thirdly, administrators within different LEPs were asked themselves to participate, but also to forward the recruitment email on to teaching fellows within their LEPs. After a period of recruitment, effort was made to identify additional cases with teaching roles, rather than leadership roles. So, fourthly, current Masters students in Medical Education at Nottingham were emailed to enquire about interest in the study from teaching fellows specifically. Finally, some study participants identified colleagues who might be interested in participating and forwarded the emails to them, in particular roles that had not been identified through the initial processes. The

¹⁹ The term educator includes individuals with administrative or managerial roles in medical education.

overall sampling strategy was therefore purposive, but opportunistic strategies were used within this.

Recruitment occurred from 22nd May 2020 to the later stages of the interviews at the end of June 2020. Recruitment emails were sent out through the different channels identified above. When educators expressed interest in the study, they were sent the participant information sheet and then asked to complete the online consent form through Microsoft Forms if they still wished to participate. Following completion of this, they were sent a link to a separate Microsoft Form to collect their demographic information, and given a participate code to enter rather than their name to facilitate anonymity.

Interviews were conducted via Microsoft Teams and recorded through the software's functionality. In the interview, educators were given the opportunity to ask questions. The topic guide was used to inform the content of the interviews. Besides from the consent form, data collected in the interviews was associated with a participant code rather than names, to facilitate anonymity of the data. Notes were recorded throughout the interview where applicable, and reflections were made after the interviews. The data was stored securely and participant names and email addresses were kept separate from the study data, which was stored using a participant code. The audio recordings were sent for external transcription by a University approved transcription service.

6.4. Realist interviewing

The interviews in the study drew upon the principles of realist interviewing (Manzano, 2016; Pawson, 1996; Pawson and Tilley, 1997). In realist interviews, rather than assuming research naivety to the subject matter, the researcher brings their own understanding to the interview in the form of their initial theories and then works with the participant to develop, test and refine that understanding (Mukumbang et al., 2020). Pawson (1996) calls this process the teacher-learner cycle. Manzano (2016) outlined three phases of realist interviewing (theory gleaning, refinement and consolidation), which might occur within the same interview or across the interviews within a realist evaluation. Theory gleaning involves the researcher seeking to establish their early ideas (or theories) about how the programme works and the contexts affecting this. Theory refinement involves the researcher asking more nuanced questions, as their understanding of the theories develops through the interviewing process, for example exploration of more subtle differences in contexts and the effects of these. Finally, in theory consolidation the researcher has established a set of key theories and seeks to refine these theories with the participants. Manzano (2016) highlights how the three

phases are not necessarily distinct, they more reflect the process that the researcher goes through as their understanding develops across the interviews and how this changes their engagement with their theories and participants.

6.4.1. Student interviews

Given the exploratory nature of this work, rather than programme evaluation, some adaptation was required to apply the realist interview method. Following the realist review, it was apparent that there was a gap in the literature around the student well-being experience during transition. Therefore the focus of the student interviews was on exploring their well-being experiences and linking these to the contexts affecting those experiences. The topic guide (Appendix 15) remained fairly general because there were not clear theories relating to well-being at this stage of the research. The topic guide does not seem overtly 'realist', however, the researcher approached the interviews with a 'realist' mindset and started with the general questions in the topic guide, then used probing questions to try to gather information to draw out the contexts and mechanisms, in relation to the theories being developed. The student interviews were therefore generally aligned with Manzano's (2016) theory gleaning phase.

The topic guide was designed to be used flexibly, depending on each specific interview. The student interviews started with a general question about what interested them in taking part in the study. This was meant to ease the participant into the interview, but also served the purpose of highlighting if there were any particular experiences that the student wanted to share. This provided valuable initial insight into their experiences and initial direction to the interview. The next section of questions focused on the things the student did to support their well-being and the things that affected how they felt. The final section explored the student's perceptions of transition more directly in order to unearth experiences and contexts relevant to the theory that might not have been already identified.

Some students were less forthcoming than others in sharing their experiences, so in those instances, the topic guide questions were followed more explicitly. Whereas if the student had a strong initial response for coming to the interview and/or was more comfortable sharing their experiences then the interview would progress flexibly in response to this. Although explicit questions about the initial theories were not used, as is typical in realist interviews, the interviews were still theory-driven with the researcher always focused on unearthing the deeper causes of the students' experiences. So the interviews were 'realist' but adapted to the exploratory nature of the work.

6.4.2. Educator interviews

The educator interviews took place after the student interviews and closer to the end of the realist review analysis. Therefore, the existing theories were more developed at this point in the work, so the topic guide (Appendix 15) and interviews were more typically 'realist' than the student interviews. Additionally, the educators were not inputting on their own experiences of well-being, but rather their experiences working with students through clinical training, so more directed questions seemed better aligned for the purposes and focus of these interviews.

Different educators had different perspectives on the student experience, depending on their role. Those with leadership roles tended to focus more on the policy level and how the course was designed or managed to support students. These individuals were also able to provide information about higher-level system factors that affected the more direct contexts around the students. Although most educators were involved in teaching, some educators' primary roles were teaching, so these individuals were more likely to provide information at the student level. A final group of educators were not directly involved in teaching, but were administrators who managed the placements in different LEPs. These individuals had a lot of interaction with students but their perspective was sometimes different, as they were not healthcare practitioners. They could provide information about wider contexts as well as those more directly relevant to the students. Although the majority of participants were doctors, it was useful to include teachers from other healthcare professions and administrators in the sample because they offered different perspectives on the medical student experience through comparison to their own healthcare training or from an outsider perspective. This enabled a wider range of perspectives that could be contrasted to develop better explanations (Emmel, 2013).

The interviews with educators moved more clearly through the three realist interview phases (Manzano, 2016). Some gleaning occurred in earlier interviews, however, this was less predominant given the later stage of the project. Therefore, there was more theory refinement, as ideas from the realist review and student interviews were explored further, and theory consolidation, as the key theories began to become clearer and could be more explicitly explored with educators later in the interviewing process. Therefore, especially in the later interviews, there was more typical engagement with the realist interview techniques of describing theory ideas and asking the participant to comment on these.

6.5. Realist analysis

A specific method for realist analysis is not specified, as different methods can be used. For the analysis of interview data, as was collected in this research, some have reported using thematic analysis (Braun and Clarke, 2006) or framework analysis (Ritchie and Spencer, 1994). However, neither of these methods is intended to apply a realist logic of analysis. The researcher attended training with Justin Jagosh on 'Coding, Configuring and Conveying in Realist Analysis' (29/10/20 to 03/11/20).²⁰ The training proposed an approach to applying a realist logic of analysis to interview data, which was followed within this work. The proposed approach has similar steps to those within thematic and framework analysis, however it is specifically designed to support retrodution, enabling generative causal explanations to be developed.

Realist analysis uses two approaches to develop an ontologically deep understanding of causality: deductive-retrodution and inductive-retrodution (Jagosh, 2020a, 2020b). Deductive-retrodution involved searching the data for theoretical insights to test and refine existing theories from the realist review. Inductive-retrodution involved searching the data for new theoretical insights to develop new theories.

Realist analysis can use three types of coding (Jagosh, 2020, personal communication). Direct coding is 'cut and paste' coding, with small sections of transcript extracted into the analysis. This is used when a causal insight is clearly articulated within a transcript. Indirect coding is where parts of a document are highlighted and annotated, but not extracted directly. This is used when a section contains a causal insight, but across a large section, i.e. the causal insight not clearly articulated in the transcript or when something interesting is conveyed in a vague way, so it is noted. Holistic coding is used when reading the whole transcript brings out a theoretical insight, but no specific section sums it up or provides an illustrative quote.

It is necessary to include indirect and holistic coding, as well as direct coding, because exclusive use of direct coding supports a perception of being 'rigorous' and evidence-based, but on its own misses the opportunity for developing evidence-informed causal insights through retrodution and abduction (Jagosh, 2020, personal communication). By using direct coding alone there is a risk of missing key causal insights by using only what is empirically observable, but this is only one layer of reality and we need to access deeper unobservable

²⁰ All references to personal communication with Justin Jagosh in this section refer to this training.

layers to obtain a deeper explanatory account for generative causation (as discussed in section 2.2.4.1). Transparency in how causal insights are developed supports this process, as does a cumulative approach to knowledge development, as our theories will be tested and refined by others.

Jagosh (2020, personal communication) proposed realist analysis should involve: familiarisation with the data; coding the data for causal insights including direct, indirect and holistic coding; configuring the causal insights into a causal picture by first clustering them in groups of similar insights and then configuring those into CMOCs; and finally conveying the insights through the write-up. These components were developed into three steps within this work:

1. Step 1: Familiarisation
2. Step 2: Coding and collating
3. Step 3: Configuring and conveying

These steps have parallels with the phases of thematic analysis (Braun and Clarke, 2006): (1) Familiarising yourself with your data (Step 1); (2) Generating initial codes (Step 2); (3) Searching for themes (Step 2); (4) Reviewing themes (Step 3); (5) Defining and naming themes (Step 3); and (6) Producing the report (Step 3). However, the process is concerned with causal insights drawing on a realist understanding of causality, rather than themes.

6.5.1. Step 1. Familiarisation

Familiarisation with the dataset involved reading the transcripts while listening to the audio recordings. This served the dual purposes of checking the accuracy of the transcripts and familiarisation. Notes were recorded about the causal insights offered by each transcript (Appendix 16, Example 1).

6.5.2. Step 2. Coding and collating

All data sources were then coded. This involved moving back and forth between close (direct) and distant (indirect and holistic) coding, with a combination of holistic coding with each transcript and across the dataset, and direct and indirect coding of causal insights within each transcript. Throughout the coding process at various points the codes and analysis notes were collated into groups of causal insights to support theorising throughout the analysis process. Coding took place within NVivo, which was used to manage the volume of data. The educator data was coded first because it was thought this would contain insights about

patterns across students, which would help interpret the student data, which would provide more in-depth examples and counter-examples of those patterns.

Before starting coding, an initial coding framework was developed for NVivo, using three strategies. Firstly, the realist review findings were used to develop an initial coding framework. Some adaptations were made, such as 'learning climate' and 'student-teacher interactions' being merged together under 'learning to be a doctor'. To supplement this, the second strategy involved reading the familiarisation notes and supplementing the initial coding framework with additional causal insights. Finally, the research question was considered to guide thinking about any further potential codes.

The initial coding framework was designed within NVivo and supported deductive-retroduction. New insights from inductive-retroduction were added as new nodes at later stages in the analysis. However, the nodes were designed to act as 'containers' within which causal insights could be grouped, rather than specifying contexts, mechanisms and outcomes separately, as this would lose the connections between them. Therefore, each node or container was fairly broad, as developing numerous specific nodes was found unhelpful. Alongside the coding within NVivo, analysis notes were made in a Word document, to record the specific insights coded from each transcript and as part of the retroductive process, as the act of writing the note helped develop the researcher's thinking. In this way, the analysis notes formed the main part of the analysis and retroductive theorising, while the NVivo coding acted as a data repository to store the key parts of transcripts from which insights had originated.

A period of initial coding was conducted to trial the initial coding framework and refine the analysis process. Nine educator transcripts were coded and analysis notes made for each. The analysis notes were reviewed and re-organised by codes rather than transcript to streamline the analysis process. The insights generated from these nine transcripts were initially collated in a mind map in XMind, to help think through additional theoretical insights not already captured within the coding framework. The coding framework (Appendix 16, Example 2) was updated in NVivo with the new nodes, which mainly related to specific student contexts.

The remainder of the educator transcripts were then coded and analysis notes were made. After all the educator transcripts had been coded, the analysis notes for each code were collated and a summary of the causal insights in the notes was written. Alongside this, the collated causal insights were developed into another mind map to aid retroductive

theorising by thinking through the key elements and developing visual connections between them. The same coding and collating process was then followed for the student data. Each transcript was coded and analysis notes made. The analysis notes were collated in the Word document (Appendix 16, Example 3).

Following this, the student and educator collation notes were reviewed and merged (Appendix 16, Example 4). Each analysis note was re-read to check they had been represented within the summary. Those that had not been were highlighted and either incorporated or left out because they lacked relevance.

6.5.3. Step 3. Configuring and conveying

The final step of the analysis involved configuring the causal insights into explanations of generative causation in the form of CMOCs, and conveying these in writing. The collation summaries from Step 2 were read and the key points were transferred to a new mind map. The mind map was used to support initial configuring by grouping insights and developing connections between them. The insights were captured in a way that roughly identified the context, mechanism and outcome, where possible, but the focus was on developing causal explanations through chains of causal insights (rather than labelling specific elements as context, mechanism and outcome). The causal insights from the data were supplemented with the existing insights from the realist review CMOCs and TIR well-being theory. Multiple versions of the configuring mind map were developed as the causal insights were refined (Appendix 16, Examples 5 & 6). The configuring was reviewed by the supervisory team at various points to provide an opportunity to sense check the configuring and provide an opportunity for alternative interpretations.

Alongside this process, as gaps in the causal explanations became apparent, additional literature was sought to further develop these explanations alongside the theories already identified through the realist review and TIR. Literature was drawn upon to clarify insights about student contexts using existing concepts, and to clarify the learning mechanisms using substantive learning theories. This additional literature was either suggested by RP during a review of the configuration process, or identified through existing knowledge of the literature and re-examining this to check for relevant concepts and theories to refine the causal explanations. Details of the concepts and substantive theories incorporated into the analysis are provided in the next section.

Gradually the causal insights in the mind maps were honed and organised into an overall findings structure. The ideas were then transferred to Word where they were developed and refined into the CMOC format. Furthermore, the patterns across the CMOCs were identified and developed through the writing of the wider findings narrative, including incorporating quotes to convey the development of the CMOCs.

6.6. Theoretical underpinnings linking learning and well-being

The process of retroduction involved considering the data through the lens of the existing theoretical understanding developed through the TIR and realist review. However, during this process the theoretical underpinnings developed within the work to-date were found to be insufficient to fully explain the links between well-being and learning and the patterns being found within the data. Therefore, alongside the data analysis, additional theories and concepts were identified to help make sense of the data and more deeply theorise the links between transition, well-being and learning. This section provides an outline of the additional concepts and theories drawn upon within this work, to support reading of the findings. Although presented prior to the findings, the actual process of identification of the following concepts and theories occurred iteratively alongside the data analysis.

Readiness

Within the context of clinical training, students should be acquiring and refining knowledge on their placements, increasing their readiness to work as junior doctors in clinical practice. Readiness was identified as a concept that reflected the researcher's interpretations of the student factors (contexts) that appeared to support students' engagement in the clinical environment. Billett (2015) described readiness as knowledge that the student possesses that enables them to learn. He identified three dimensions of knowledge that determine readiness. Conceptual knowledge is what the student knows from basic facts to complex concepts, procedural knowledge is what the student can do from basic tasks to complex strategies, and dispositional knowledge is what the student values including knowledge of social and professional norms, values and practices (Billett, 2018, 2015). Readiness was used as a concept rather than 'preparedness' (as discussed in Chapter 1) because it encompasses more than the individual's specific skills and knowledge, also incorporating the dispositional knowledge aspect, which helps to explain the student's interaction with the working environment, rather than focusing on the student alone.

Participation

Readiness is best developed through participation in authentic activities, which supports the development of all three domains of knowledge (Billett, 2018, 2015). Therefore, the concept of readiness aligns with situated learning theory (Lave and Wenger, 1991), which was drawn on in the realist review (Cruess et al., 2018). The theory proposes that newcomers learn through participation within a CoP, moving from legitimate peripheral participation to full participation over time (Lave and Wenger, 1991). For this to occur, the existing members of the CoP need to welcome the learner, accepting them into the CoP and supporting them to participate peripherally and then more fully.

Within medicine this means that students learn by working with existing doctors in the clinical environment during clinical training (Cruess et al., 2018). They should be supported to participate in the clinical activities within that clinical environment appropriate to their level of development, initially in a basic way and then moving to more complex and full participation over time. When students are novices, their participation needs to be facilitated by more experienced members of the CoP, i.e. doctors, nurses, and other healthcare professionals. Through participation students learn from others through role modelling as well as engaging directly in clinical activities, so they develop their readiness to work and learn as a doctor in the future.

Self-directed learning

Realist review CMOC 7 identified that different student contexts affect their experience of less supportive learning climates, these student contexts were explored in more detail in the realist investigation. The student's learning approach within clinical training was found to be relevant. The main aspect of the student learning approach was self-directed learning (SDL). SDL has been conceptualised in a variety of ways, but this work draws upon the conceptualisation from Stockdale and Brockett (2011). In their conceptualisation, SDL has a personal component reflecting the individual's preference for taking responsibility for their learning and a behavioural component reflecting the individual's action of taking responsibility of their learning.

SDL has often been used interchangeably with SRL, and the two are interlinked (Loyens et al., 2008; Saks and Leijen, 2014). Stockdale and Brockett (2011) include SRL as part of the behavioural component of SDL. SDL, as opposed to SRL, was drawn upon in this analysis, because the relevant student context seemed to be broader than their regulation of learning on specific tasks (Sandars and Cleary, 2011), instead reflecting the extent to which the

student was comfortable being self-directed (personal component) and the extent to which they could be self-directed in their learning (behavioural component). The behavioural component of SDL was interconnected with readiness, as students might want to be self-directed, but have insufficient readiness to actually be self-directed in their participation. Therefore, students' appreciation of the need to learn through participation in clinical training, and the extent to which they could do this, is interlinked with their readiness and SDL.

Socialisation

Socialisation occurs alongside participation, and was explored within the realist review CMOCs 9 and 10. As students observe doctors working they identify the values, beliefs, and behaviours important to being a doctor, and over time they integrate these into their own identity, forming a professional identity as a doctor (Jarvis-Selinger et al., 2012). The psychological process underlying socialisation is *identification and integration* (Ryan and Deci, 2017). Individuals *identify* with the values, beliefs, and behaviours displayed by those within the social group they seek to join and *integrate* them into their existing identity. Identification and integration occurs to a greater extent in environments that are supportive of basic psychological needs, meaning those values, beliefs, and behaviours become more autonomously regulated (Ryan and Deci, 2017).

In terms of professional identity, this means that students who have integrated the values, beliefs, and behaviours of being a doctor into their own identity more fully will enact 'being a doctor' more autonomously as a part of their identity, rather than through more external pressures to act that way. So more complete socialisation, i.e. identification and integration, supports better professional identity formation (Crues et al., 2018; Jarvis-Selinger et al., 2012). This also depends on the appropriate values, beliefs, and behaviours being role modelled by doctors, which is a separate issue beyond the scope of this work and not discussed further here, but was explored to some extent within the realist review CMOCs 12 and 13.

Growth and well-being pathways

The realist review CMOC 4 explained that when educators welcome and involve students in the clinical environment, this creates a need-supportive learning climate, which satisfies the student's basic psychological needs and improves their well-being. This study sought to clarify the links between well-being and learning. Boekaerts's (2011) Dual Processing Self-Regulation model was used to develop the link between learning and well-being. The model

proposes two learning pathways, the *growth pathway* when the student experiences a learning task as beneficial, and the *well-being pathway* when the student perceives the learning task as detrimental to their well-being so they disengage from the learning activity. Students can self-regulate their learning and change from the well-being to the growth pathway by using strategies such as emotion regulation. This theory was thought to align with the psychological flexibility mechanism. Under distressing circumstances the individual draws upon their psychological resources (e.g. mindful awareness, emotional intelligence) to implement alternate strategies to maintain goal-directed behaviour, for example using emotion regulation strategies to maintain engagement within a challenging learning activity.

Zones of development

Billett (2018) identified how readiness affects learning, linking the concept to Vygotsky's work on the zone of proximal development (ZPrD). Considering this alongside Boekaerts's (2011) model further clarified how the availability of guidance in the clinical environment affects learning and well-being. The student's readiness alongside their effort determines the student's *zone of potential development* (ZPoD), i.e. what the student can do and/or learn on their own (Billett, 2018). When the student receives guidance from others this moves them into the ZPrD, which is what the student can do and/or learn with guidance, i.e. more than the student can do and learn alone (Billett, 2018). With guidance students are able to learn and do more, so are more likely to remain on the growth pathway, optimising their learning and future readiness. When guidance is absent, the student's capacity to engage independently in the learning task depends on their existing readiness and whether the learning task is within their ZPoD or not. When the task is beyond their ZPoD then they cannot learn and their readiness for future activities is not improved, and the well-being pathway is more likely to be activated.

6.7. Influence of the researcher

This section considers some of the ways in which the researcher influenced the data. As outlined in section 2.5.4, scientific realism acknowledges that the researcher influences the research through their beliefs, assumptions and interpretations (Maxwell, 2012). Throughout the realist investigation, the researcher kept a reflective diary through which to consider and reflect upon their influence on the research. Appendix 17 shows example extracts from this.

One important area to consider was how the perspectives of the researcher influenced the research (Olmos-Vega et al., in press). This was considered broadly in section 2.5.4, but

in relation to the realist investigation this required thinking about the researcher's own perspective and the potential influence this might have on the way that they interacted with participants and data. An example included recognising that not all students were as aware of their psychological experiences as the researcher (Extract 1, second paragraph). Such reflections were incorporated into the analysis by considering what they meant for student contexts and how these influenced their experiences, for instance, the example above is illustrative of differences in individuals' mindful awareness.

Another area of reflection related to the relationships and power dynamics between the researcher and participants (Olmos-Vega et al., in press). With regards to the student participants, the power dynamics seemed fairly balanced, as the researcher was not involved in their education and could in some ways be seen as being in a similar role to them (i.e. a student navigating a PhD and the academic CoP). As reflected in Extract 1, it seemed helpful to have an outsider position as the researcher, as this made students more comfortable sharing their experiences. With regards to the educator participants, the power was more on the educator side than the researcher's as some were senior academics or clinicians. Sometimes it was difficult to develop an interactive style of questioning and answering, as some participants would speak for long periods about their role, and it was challenging to know whether or how to interrupt them to ask more directed questions in the realist style of interviewing (Extract 2). Other educators were more engaged with the interview process, and in these cases it was easier to engage with the realist style of interviewing (Extract 3).

Through reflecting on these possible influences throughout the course of the research, the researcher aimed to be open to recognising how they influenced the work and other possible interpretations.

6.8. Chapter summary

The realist investigation built upon theories from the realist review, in particular the impact of learning climate on well-being and learning, student contexts affecting the experience of less welcoming learning climates, and patterns of student well-being over time. The realist evaluation method was adapted for the problem exploration focus of this programme of research. Realist interviews were held with students going through the clinical training transition, and with educators involved in organising and delivering teaching. The samples were selected purposively to identify those individuals who would have insights relevant for theory-building. Realist analysis was conducted to analyse the data, consisting of deductive-retroduction and inductive-retroduction to identify theoretical insights to develop, test and

refine existing theories or new ones. Throughout the analysis, various learning concepts and substantive theories were identified and incorporated to support interpretation of the data and develop the links between well-being and learning. The findings are presented and discussed in the following chapter.

Chapter 7. Realist Investigation: Findings

7.1. Samples

Face-to-face interviews were conducted with 22 medical students in November and December 2019. The average interview length was 92 minutes (range 61-141). Thirteen students were GEMs and 9 were undergraduates. Twelve were in their CP2 year (penultimate year of medical school) and 10 were in their CP3 year (final year of medical school). Eleven students were male, 11 female. The average age was 25 years (range 21-31); the average age for GEM students was 27 years (range 24-31) and for undergraduates it was 22 years (range 21-24 years). Sixteen students described their ethnicity as White, 3 Black and 3 Other (not specified to maintain anonymity). Nine GEM students had a previous science degree and 8 had worked in a healthcare delivery role previously.

Online interviews were conducted with 30 educators in June and July 2020. The average interview length was 62 minutes (range 46-100). Seventeen educators were female, 13 male. Twenty one educators described their ethnicity as White, 7 Asian, and 2 Other (not specified to maintain anonymity). The average years of experience teaching or supporting students in clinical training was 16 years (range 2 to 34 years). Of the educators, 22 were medical clinical educators, 4 were non-medical clinical educators, and 4 were non-clinical staff responsible for managing students' placements within a LEP. Seven educators had a leadership role in the University and were responsible for overseeing an aspect of the medical school course, 4 had a leadership role that involved overseeing an aspect of the course within a LEP, 2 had a leadership role in both the University and LEP, and 17 did not have a leadership role.

7.2. Findings structure

The findings are grouped into three theory areas, which are summarised in Figure 7-1:

1. Theory Area 1: Differences in learning climates
2. Theory Area 2: Differences in student participation
3. Theory Area 3: Well-being patterns

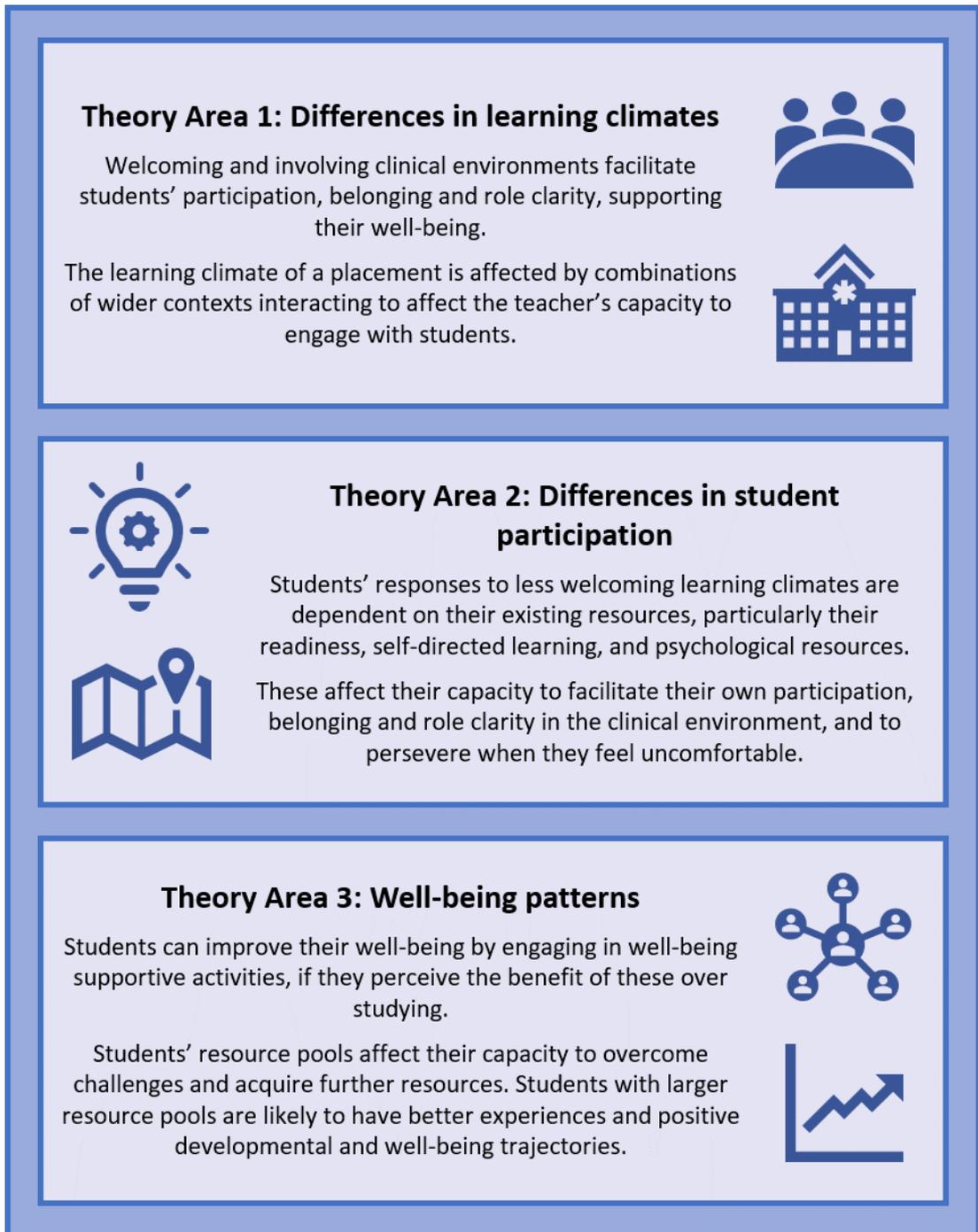


Figure 7-1. Realist investigation findings overview.

Quotes have been included within the findings to illustrate how the CMOCs were reached through retroductive processes. It should be noted that while these aim to illustrate the key insights taken from the data, the need for quote brevity means that often the full insight could not be illustrated. This reflects the use of indirect coding (as discussed in section 6.5 describing the analysis), in which insights were often obtained from large sections of the transcripts. The abbreviations used within the findings are listed in Table 7-1.

Table 7-1. Key for finding notations and abbreviations.

Abbreviation	
CMOC boxes	
AR	Autonomous regulation
CO	Connection to others
EM	Emotions
EN	Engagement
LS	Life satisfaction
ME	Meaning
PC	Perceived competence
PG	Personal growth
PL	Purpose in life
SP	Self-perception
+	Positive effect
-	Negative effect
Student quotes	
CP2	Clinical Phase 2 (penultimate year of medical school)
CP3	Clinical Phase 3 (final year of medical school)
GEM	Graduate-entry medical student
UG	Undergraduate medical student
Educator quotes	
AD	Administration role
CT-M	Clinical teacher – medical
CT-NM	Clinical teacher – non-medical
L-U	Leadership role – University
L-L	Leadership role – LEP
L-U&L	Leadership role – University and LEP

7.3. Theory Area 1. Differences in learning climates

This theory area explains how the degree to which students are welcomed and involved in the clinical environment affects their well-being and learning, and the wider factors influencing these learning climates. The investigation focused on testing and refining the theories from the realist review by exploring how different learning environments affect student learning in addition to well-being. The perception of the learning climate varied between students with some reporting never experiencing any issues and others reporting common problems with teacher engagement. This suggested that student contexts contribute to the perception of the learning climate, in addition to environmental contexts. These student contexts are explored in Theory Area 2 (see 7.4).

Theory Area 1 describes the benefits of welcoming and involving learning climates and the problems that can arise when there is an absence of welcome and involvement, building on CMOCs 5 and 6 from the realist review. Several wider contexts were identified in the data collection and analysis that affected the learning climate through teachers' attitudes and behaviour towards students. These contexts are explored in relation to numbers of students and being known, teaching cultures, and teaching attitudes and skills, building on CMOCs 2-4 from the realist review.

7.3.1. Welcoming and involving learning climates

All students talked about the benefits of being known by teachers, being welcomed and guided to engage in clinical activities. Students talked about this being beneficial for their well-being because it made the experience more enjoyable and engaging. For example, one student explained the difference in his experience when he felt part of the team.

You feel more at ease and I feel more comfortable in that environment, you know that they're happy to have you there and they're more likely to take some responsibility for you as well and say, come and see this, or, give me a hand with this ... it's just that sense of being part of a team and a sense of belonging almost... (CS22, GEM, CP2)

This suggests that welcoming environments and teachers result in positive changes to both feeling, such as ease and comfort (EM) and functioning, such as being part of a team and being supported (CO). This quote also highlighted some aspects of the resource that the welcoming context provides, specifically around the student feeling that they have been accepted into the team which provides them with a sense of belonging in the clinical

environment, and someone taking responsibility for the student, which provides them with greater access to learning opportunities. It also highlights the importance of the relationship between the student and teacher and having the opportunity for this to develop so that the student can be known.

Other students' data highlighted aspects of the link between the context and mechanism. One student talked about how a teacher guiding their participation provides them with legitimacy, which reduces the student's sense of imposing on healthcare staff.

I feel like sort of being told to do a specific thing gives me more legitimacy in doing it; whereas if it's just a vague go have at it, I sort of, I always feel like I have less right to be there. ... I like feeling that I have a purpose. ... I feel more confident in being there and not quite bothering people but taking their time and attention when I've been told to. ... I think it's just healthcare professionals are always so busy. So I feel bad about causing them any interruption. (CS14, UG, CP2)

This supports the findings of the realist review, that welcoming teachers provide legitimacy to the student's participation. Other students more directly illustrated the link between the environmental context and learning mechanisms and outcomes. Students talked about being more comfortable on welcoming wards, so they spend more time on them, gaining access to informal learning opportunities. Furthermore, students can be guided by teachers to acquire new knowledge that they would not have had access to on their own. Students also reported benefits for well-being and learning when they were able to participate legitimately in clinical activities, as this helped them to feel like they were learning and becoming a doctor.

That's why I really enjoyed GP placement as a medical student, because all day you're in your own room, and you see patients. ... But you do feel at that point you actually are a junior doctor... You do feel like you're a part of the team at that point... (CS02, UG, CP3)

The combination of legitimate participation and doctor feedback was perceived as most beneficial for learning. Students also discussed how teachers who were engaged, enthusiastic and welcoming inspired them in thinking about the type of doctor that they want to become.

So I think the doctors that I find really inspiring are definitely the ones that have the better bedside manner and that the patients seem to love. And then they usually end to be those that are more engaging with me as a student, or just the team in general, and it just makes a really nice like much more calmer

environment. So then if I find myself trying to replicate, because I think just you just subconsciously try and replicate what people are doing around you... (CS09, GEM, CP2)

The quote highlights how positive interactions with teachers support the process of identification and integration, contributing to the student's professional identity formation. Furthermore, students' experiences in different specialties affected their perceptions of those specialties and the career paths they were considering.

... if I enjoy the placement I think oh I could do that as a career, but then if I didn't enjoy the placement because the clinicians weren't as nice, then it just doesn't motivate me to take an active interest. (CS18, UG, CP3)

Welcoming learning environments positively influenced perceptions of specialties, even when the student had little previous interest in it as a career option, emphasising the influence that each placement can have.

These insights were integrated alongside the theoretical underpinnings outlined in section 6.6 to test and refine realist review CMOC 5. The CMOC was fairly well developed within the realist review, but the data and substantive theories provided further insight into the resource offered by the environmental context and how this affected the student's innate capacities for learning and well-being.

CMOC 1: Welcoming teachers who involve students support well-being and learning

When the teacher welcomes the student into the clinical environment and team and involves them in clinical activities (**Context**), the student feels known, accepted and as though they belong in the clinical environment. Their role is clarified and they feel able to fulfil it because their participation is legitimised by their sense of belonging in the clinical environment. So their basic psychological needs for autonomy, competence and relatedness are satisfied (**Mechanism**). The student experiences improved well-being (**Outcome**), both *functioning*: supported by the teacher and part of the team (*CO+*), learning and participation are intrinsically motivated (*AR+*), sense of accomplishment in their learning role and feeling useful (*PC+*), and a sense of progress in becoming a doctor (*PG+*); and *feeling*: enjoyment, ease and comfort (*EM+*), and feeling valuable and more confident (*SP+*).

In the same context, the student's learning is supported by the teacher so the student enters the ZPrD and can learn more extensive skills and knowledge, acquiring new and/or refining existing knowledge and remaining on the growth pathway **(Mechanism)**. The student's readiness is improved in all three knowledge domains (conceptual, procedural, dispositional) **(Outcome)**, and they have additional resources to overcome future challenges **(Outcome)**.

In the same context, the student feels inspired by the teacher and seeks to emulate them, so there is greater identification with their role modelled behaviours, beliefs and values, and integration of these into their own identity **(Mechanism)**. Their professional identity develops **(Outcome)** and they are more likely to view the specialty favourably **(Outcome)**.

However, not all clinical environments were found to be welcoming, so the next section explores the implications of an absence of welcome and involvement.

7.3.2. Absence of welcome and involvement

While all students talked about experiences with engaging and welcoming teachers being the most enjoyable and beneficial for learning, student perceptions of less welcoming learning environments and teachers were more varied. Generally, not being welcomed and involved was problematic for well-being and learning, although this was not the case for all students and the reasons for this are explored in Theory Area 2. This section explores the implications for learning and well-being when students perceive that they are not welcome in the clinical environment.

Students talked about how they were not welcomed by teachers or involved in some environments, perhaps due to being unnoticed rather than ignored.

I wouldn't quite saying being ignored because people aren't actively trying to ignore you but just being unnoticed. (CS14, UG, CP2)

Students can find it challenging when they are not welcomed or acknowledged by teachers because they are then unsure of the legitimacy of their presence and how to engage in their learning role, and they feel unwelcome in the environment.

...sometimes you just turn up for a ward round, and they look at you, so they must know you're there, but they don't say anything. And then it makes it harder to approach them then because you don't know whether they really want you

there or not. And you're there to learn, but at the same time you don't want to get in the way. (CS15, UG, CP2)

Many students found the feeling of being unwelcome especially challenging because they felt like they did not have much to 'offer' as a medical student because they cannot often do very much. Therefore it seemed that they need the acceptance of the teacher to legitimise their presence and participation in the clinical environment. Without this, they feel they are intruding or being an inconvenience, which is uncomfortable and inhibits their participation and learning. This is especially the case earlier in clinical training when many students have limited knowledge, and then they can feel vulnerable having to attempt to apply that knowledge and potentially make a mistake, which is further exacerbated when they feel unwelcome. Without teachers' acceptance and reassurance that fear is more difficult to overcome.

You might make a mistake, you might do something and if your self-esteem isn't good enough that you can deal with it I think it's really hard to then put yourself back in that position. (CS04, GEM, CP2)

Students often compared themselves to students from other healthcare professions, who they thought had better experiences on the wards because they have a specific role and someone to take responsibility for them. Whereas medical students do not have a role in the team so they are often dependent on someone welcoming them in and teaching them.

...sometimes it feels like you're not really anybody's responsibility when you're on a ward ... I don't know why med students it's different but you're just kind of dropped and expected to just kind of, I don't know, get on with it a lot better. (CS09, GEM, CP2)

There was a perception that medical students are just expected to get on with learning on their own in the clinical environment. Other students talked about trying to remain engaged, but when they do not perceive any engagement in return from the teacher it is demotivating and being in the clinical environment is perceived as a waste of time.

I try to engage initially, asking questions. ... But if it's met with nothing I tend to then just give nothing or expect nothing. ... I sort of feel like it's a wasted opportunity for us to learn and then that's quite demotivating. (CS10, GEM, CP2)

Educators reflected on students' lack of a clear role in the clinical environment, and thought that if it were made clearer to students about what is expected of them, then this would help them to feel more comfortable and get more out of their experiences.

So I think if that could change, where they had an environment where they knew what was expected of them, and they know what to expect from the environment, I think they'd get loads more out of it. (E07, CT-NM, NL)

This highlighted the importance of a teacher welcoming the student and involving them, because they do not have an automatic role within the healthcare environment. So many students, without that sense of legitimacy to their participation and clarification of their role, struggle to understand how to engage and get involved, which negatively affects their well-being and learning. These insights were integrated with realist review CMOC 6 to develop the CMOC, which clarified the detrimental impact that not being welcomed can have, as the environmental context hinders their innate capacities for well-being and learning.

CMOC 2: In the absence of welcome from teachers

When the teacher does not welcome the student so the student is not included in the team or involved actively in clinical activities (**Context**), the student feels unwelcome, unwanted and as though they do not belong in the clinical environment. They may also feel unclear of their role and/or unable to accomplish it. So their basic psychological needs for autonomy, competence and relatedness are frustrated (**Mechanism**). The student experiences worsened well-being (**Outcome**), both *functioning*: rejected by the teacher and team and unsupported (*CO-*), sense of being useless and lack of accomplishment in their learning role (*PC-*), and a sense of not making progress in becoming a doctor (*PG-*); and *feeling*: discomfort, intimidation and frustration (*EM-*), and feeling less confident (*SP-*).

In the same context, without teacher guidance the student remains in the ZPoD so their learning is less optimal and they find it harder to acquire new knowledge. So they are more likely to revert to the well-being pathway (**Mechanism**). The student's readiness is less optimally improved (**Outcome**). They are more likely to withdraw from the clinical environment and engage in alternative learning approaches, such as book learning (**Outcome**). The student is also more likely to perceive the specialty negatively (**Outcome**).

This experience was not the same for all students, some were able to facilitate their own participation, which is explored further in Theory Area 2. The implications of students' withdrawal from the clinical environment are also explored there.

7.3.3. Environmental contexts influencing learning climates

Several wider environmental factors affecting variations in the learning climates were identified in the data. These related to the numbers of students and implications for how well the student was known, the teaching cultures in different placements, and teachers' attitudes and skills.

7.3.3.1. Numbers of students and being known

The number of students affects the organisation of placements. When there are large numbers of students in comparison to the size of the clinical service, timetables are more structured to manage the numbers of students in the clinical environment. This means that students will typically have more formal teaching activities, and less opportunity to spend longer periods of time in the clinical environment in those placements. Generally, district hospitals, compared to large teaching hospitals, receive fewer medical students on placement so are less structured.

...it [district hospital] was very humanising, I knew all the staff, they knew me, they knew exactly what I wanted to get out of it, and what I had done and what I hadn't done, the teaching was very personal. (CS13, GEM, CP2)

Because it's [teaching hospital] highly timetable, it's regimented, it's registered, ... Yeah there's a lot of classroom teaching, a lot of the syllabus material is covered in classes, a lot of the ward time is supervised. So for some people that's great, for some people it's not. (CS08, GEM, CP3)

This affects the extent to which students are able to get to know teachers in the clinical environment and participate. Accordingly, most students reported good experiences in district hospitals and GP settings, where there are smaller numbers of students.

...so GP was feeling nice as part of a team, because you turned up every day to the same place and you saw the same GPs each day and even the reception staff knew you and the nurses knew you, whereas otherwise you don't really get that continuity. (CS22, GEM, CP2)

Doctors have to take responsibility for students, so if they do not know a student then they do not know what they can safely do. Whereas, when the teacher knows a student it supports participation because they know the student's level so are more comfortable taking responsibility for them and can safely involve them in clinical activities.

...it's very difficult to weigh them up in a very short space of time and figure out what you can give that student to do responsibly and what they're capable of or what they need perhaps supervision for. (E12, CT-M, NL)

Having the opportunity to get to know students also makes the teaching experience more enjoyable for teachers because they are able to adapt their teaching to the student's level and gain satisfaction from seeing the student develop over time as a result of their teaching.

I think it's rewarding for the teachers as well, but also you can personalise the teaching that you're doing and help them from where they are and move them forward. (E30, CT-M, L-U)

Conversely, when teachers are unable to get to know their students they are less able to adapt their teaching to the individual students.

I don't get to spend a huge amount of time with students, and so unfortunately... you just end up having to treat them all the same because you can't quite see those individual differences. (E02, CT-M, NL)

Another organisational factor affecting teachers' ability to know students is the frequency with which they rotate around different environments. In a rotational placement structure students are frequently moving around between placements and sites, so they do not often spend a long time on the same ward. This is further compounded by changes to working patterns within the National Health Service (NHS), meaning that the clinical teams working on a ward are less consistent. However, rather than time on a placement, being known seemed to depend more on the consistency of contact, as some students were able to get to know teachers even in short placements.

...it was actually one of the shorter ones. ... I think it was just the consistency... It was the same ward so after a couple of weeks I knew who everybody was and I felt comfortable and I knew I had somebody that was aware of what I was doing ... familiarity and sense of belonging is like really important... (CS09, GEM, CP2)

Welcoming learning climates that support participation can be experienced on short rotational placements, but the student needs to have the opportunity to see the same staff and teachers consistently. This facilitates them becoming known and a part of the team on the placement. It is the absence of opportunity for students to become part of the team that inhibits their experience.

...you're not actually there for very long in the grand scheme of things, you don't really get to insert yourself into the team. (CS13, GEM, CP2)

...they're not seen as part of the workforce. So unlike nursing students, they don't have like a formal role because they've got to jump and be everywhere. (E14, AD, NL)

This can leave students with the sense of no one taking responsibility for them or not being known by anyone. Therefore, students can feel like they have to look after themselves, rather than being incorporated into the team and supported by others.

I feel like as a medical student it's just there's no responsibility in that sense. You go to a few weeks on a placement, you're forgotten by the time, you never build a relationship, only see a doctor max three times maybe. You never really build any relationship with anyone, with any patients as well. I don't really like that per se, it all seems very fending for yourself, there's no teamwork, per se. (CS21, UG, CP3)

Another factor contributing to the extent to which students are known on their placements is the student-to-teacher ratio. Two examples from educators highlighted this issue. One teaching fellow worked at a large teaching hospital and experienced challenges getting to know students.

...we ideally would like to kind of induct the students into the environment ... The reality actually is that it's not very easy to do that because we work across different sites and there isn't enough teaching fellows or administrative members of staff to be able to do that for large student numbers. (E02, CT-M, NL)

Another teaching fellow working at a district hospital with small numbers of students was able to get to know them well.

And some of us would take the lead at one site and some at the other, so we knew the students really well, we were seeing them multiple times a week... (E18, CT-M, NL)

This aligns with students' better experiences in district hospitals because the ratio of students-to-teachers is smaller. This is especially the case on GP placements because only one or two students are typically placed in a practice at once, so they find it much easier to

get to know the team. These insights were integrated into realist review CMOC 3 and 4, supporting the theories and developing the context and mechanism interactions.

CMOC 3: Numbers of students and placement structure
When there are smaller numbers of students on placements (Context), there is less pressure on clinical services and teachers to accommodate students and to manage the numbers of students in the clinical environment, so placements can be less structured (Mechanism). Students can spend more time in the clinical environment having immersive clinical experiences and getting to know teachers (Outcome).
CMOC 4: Teachers knowing students
When the teacher is able to get to know the student on a placement (Context), then they feel more confident assigning tasks to the student and taking responsibility for the student's participation (Mechanism). The teacher feels more able and willing to involve students in clinical activities (Outcome).
In the same context, the teacher can adapt their teaching to the individual student. The teacher feels more invested in the student's development and gains satisfaction from seeing the student's development over time (Mechanism). The teacher finds teaching more rewarding and enjoyable and wants to engage in teaching activities (Outcome).

7.3.3.2. Teaching cultures

Interlinked with the characteristics of different placements, there were also perceived differences between the cultures of placements, which contributed to the general engagement with students and teaching. As one student highlighted, different placement sites have different approaches to clinical education, including their perceptions of students.

...all the sites have different philosophies, not just different activities and different amounts of teaching, but actually quite different philosophies of how they deliver information and what their opinion of medical students is. (CS08, GEM, CP3)

Similarly, one educator questioned the extent to which students are actually accepted into the clinical environment and highlighted this as a potential part of the hidden curriculum.

You have to be accepted into that environment, or have to be authorised to be in there, if that makes sense. And although medical students are officially authorised, in the hidden curriculum are they? Do the wards accept them. Because if the wards don't accept you, you're going to turn around and go. (E27, CT-M, L-U)

Many students described instances where they seemed to have experienced a lack of acceptance from staff on a ward, echoing the question of whether they are accepted within the hidden curriculum. Students need to participate to learn optimally and this is hindered if they are not accepted within the clinical environment. One student thought that the extent to which teachers were welcoming might depend on whether the teacher felt a part of the team, linking to the local culture.

It's definitely a culture. ... I think it's quite often if they identify as a team. ...it's those places that seem to want to sort of take you in, and make you part of that and show you what they've got. And I think when people work in isolation it's very much like well you're not my responsibility so I'm not accountable to anyone for having you. (CS04, GEM, CP2)

This suggests that the teacher's own well-being, relating to the degree of connection and support that they themselves feel, is a contributing factor to the extent to which they welcome and involve students, and can impact the student's well-being. Furthermore, the extent to which teachers feel autonomous in their teaching role (i.e. volitional) also seemed an important factor. One educator explained that GPs 'opt-in' to having students and they are not financially dependent on having medical students.

Just the fact they're opting into it means that they intend for it to be a positive experience. ... A teaching hospital is a teaching hospital, isn't it, so you can't get out of it! (E26, CT-M, L-U)

GP educators may be more welcoming because the nature of the system means that they are interested in teaching. Whereas other teachers, for example in teaching hospitals, may have to teach regardless of their interest in doing so. This point aligns with the implications of the resourcing of clinical teaching on the student experience. In England, hospitals receive funding to take medical students on placements, called Service Increment For Teaching (SIFT) funding. However, given the resource constraints of many NHS Trusts, the way in which this funding is used varies. Often, as explained by one educator, the funding is absorbed into the

Trust's deficit so it is unavailable to transparently allocate to teaching within job plans. This means that teaching in those situations is dependent on the goodwill of teachers.

So there are a lot of Trusts where the funding comes from Health Education England, and it goes into the Trust coffers as you like, and then basically just disappear into the deficit. And a lot of the teachers in the Trust do it essentially out of goodwill really as part of their role. (E08, CT-M, L-L)

Whereas, when SIFT funding is allocated more transparently into job plans, there can be a greater expectation that teachers deliver quality teaching to students.

So for example if you're a normal jobbing consultant on a full-time contract, 10% of your contract may actually be paid by SIFT monies. So you're expected to spend 10% of your time teaching medical students, and providing quality teaching as well. (E08, CT-M, L-L)

Clear allocation of SIFT funding into job plans is not always the case due to the historical tradition of consultants teaching as part of their role and the financial status of different NHS Trusts. In situations where teachers are expected to teach within their role, but not explicitly remunerated for it, then it seemed less likely that those individuals would welcome and involve students. These insights were used to build on realist review CMOC 2 to develop the CMOC below.

CMOC 5: Resourcing for teaching affects teaching engagement

When a teacher is provided with adequate resources (e.g. financial, time, information, support, training) to engage in clinical teaching (**Context**), they perceive the organisation values their teaching role and they feel more able and willing to engage proactively and positively in teaching (**Mechanism**), so are more likely to welcome and involve students in the clinical environment (**Outcome**).

7.3.3.3. Teaching attitudes and skills

The previously discussed organisational contexts interact with teachers' own attitudes to teaching, also affecting the learning climate. For example, in the absence of explicit funding, teaching engagement becomes more dependent on teachers' own attitudes and beliefs. Students commented that they could understand why some teachers were not engaged with teaching them, given the pressures of having to constantly teach students while trying to navigate their own jobs.

...they probably get a bit anxious themselves thinking wow we've got all these students, but how can they help us? How can we help them? ...yeah it's difficult when you've got lots of visitors on the ward and you're still trying to do your job. (CS03, GEM, CP3)

One educator summed up the challenge for clinical teachers who have to teach medical students amongst the pressures of multiple other aspects of their role.

The hospital environment is very different to the classroom in that everybody that's there to support a student has probably got about six other jobs to do all at the same time as well. And I think that's the hard bit really. (E22, AD, NL)

There seemed a variety of perspectives on whether busyness influences teachers' engagement with students. Some educators highlighted that teaching places additional pressures on the clinician because it takes longer to support a student to do something, especially early on when their knowledge is limited.

...so when they've got limited knowledge and limited things they can help with, it can be quite tricky to get them involved and get them to actually do something helpful that is going to reduce the workload of the doctors. (E16, CT-M, L-L)

Others thought that more acute environments may be less conducive to getting students engaged, because they are often very busy. However, others perceived that while busyness might affect engagement with students, it goes back to the culture of the placement and the team dynamic.

But some wards are just inherently welcoming to anybody and others are just not quite the same. I think it just is the dynamic of the ward. (E15, CT-NM, NL)

One student reflected that in her experience it seemed more to be about the teacher rather than their busyness because some teachers had not engaged with her even during quiet clinics. This perspective was shared by an educator who voiced a similar perspective.

And it doesn't seem to be related to how stressful or stressed the clinic is or how busy people are ... it's more of an attitude thing. Like you can be someone who hasn't really got much on in a clinic who wouldn't really engage with you at all and you'll just be sat there in a corner. ... it seems to be more ... how they feel about you being there in the first place and teaching. (CS04, GEM, CP2)

I think the people who enjoy teaching will teach ... whatever environment they're in, will take any opportunity to do that if they can and the people that aren't interested will persistently not be interested. (E18, CT-M, NL)

Those who are interested in teaching are likely to make efforts to teach regardless of how busy they are. But other individuals who are less interested in teaching are likely to find it more challenging to engage with students in the context of the pressures of their clinical role. It seemed from students' accounts that junior doctors were more likely to welcome and involve them in the clinical environment. So it is possible that in addition to an interest in teaching, having empathy for students' challenges engaging clinically also facilitates teachers welcoming students.

He remembered what it was like to be a student. That was really apparent and he didn't have that complex that some doctors can have where they're separate from you. And it never really felt, I think he was very empathetic. (CS17, GEM, CP2)

Another factor might be the teacher's knowledge of teaching. Those who are more confident in their teaching practice might be more willing and able to engage in effective teaching, even under challenging circumstances. For example, one educator talked about how she engaged students even during busy clinics.

Even if I'm busy I normally say to them, OK, this is going to be a really busy clinic but you can shadow me everywhere and there are always opportunities... (E11, CT-M, L-U&L)

Another educator talked about how she had educated nurses about how students can help them, which changed their attitude towards students and engagement with them.

Some of the nurses suddenly in our practice they love having a student now because they're an extra pair of hands. ...and the students have loved it even more because they're useful. (E20, CT-M, L-U)

Those in teaching roles need to know how, and be confident in their ability, to involve and guide students, especially in difficult circumstances. However, most clinical teachers have not been taught to teach, so many may lack teaching knowledge to effectively support students within the clinical environment.

There's no trained teacher there to slowly introduce you ... not much planning has gone into welcoming you and giving you specific tasks in the clinical

environment. It's just like go and see that patient, go and see that patient. You know, remember that clinical teachers aren't teachers. They're not trained and that's the biggest problem. (E23, CT-M, L-L)

When considering the teacher level factors that influence their engagement with students, it seemed most helpful for students when teachers enjoy teaching and empathise with the challenges students have. Education of teachers in the science of learning is also beneficial to support better teaching and knowledge of how to guide students in the clinical environment. These insights were developed into the CMOCs below.

CMOC 6: Interest in teaching affects teaching engagement
When the teacher is interested in and enjoys teaching (Context) , then even when there are resource constraints (e.g. time, finance) on their teaching activities (Context) , they value teaching so remain willing to engage with students (Mechanism) . The teacher is more likely to welcome and involve students in the clinical environment (Outcome) .
CMOC 7: Empathy for students' challenges engaging in the clinical environment
When the teacher understands the difficulties of the student experience in the clinical environment (Context) , they empathise with the challenges that students have engaging in the clinical environment and seek to support the student (Mechanism) . So they make efforts to welcome the student and involve them in clinical activities (Outcome) .
CMOC 8: Teaching knowledge
When teachers have received formal educational instruction on teaching (Context) , then they know the principles and science of teaching and learning, so they feel more confident engaging in teaching (Mechanism) . They are more likely to support and guide students in the environment and implement strategies that promote student learning (Outcome) .

7.4. Theory Area 2. Differences in student participation

This theory area explores the student contexts that affect their capacity to participate in the clinical environment in the absence of guidance from teachers. In considering students' accounts of their experiences in the clinical environment, it became apparent that not all students find less welcoming clinical environments (CMOC 2) problematic for learning and well-being. Some students seemed unfazed by the clinical environment and generally reported positive experiences. This prompted further exploration of the student contexts affecting perceptions of learning environments and implications for well-being and learning. This theory area builds on realist review CMOC 7, which identified that some students were less negatively affected by unwelcoming learning climates, however the context was not clear.

7.4.1. Educator expectations

Before exploring the student contexts, it is necessary to outline a relevant educator context that influences the experiences of students with different contexts. Through the data it became apparent that there is a general expectation amongst educators that students should be independent learners within clinical training, i.e. self-directed learners. They were expected to take the initiative in finding and engaging with learning opportunities in the clinical environment, and take responsibility for managing their own learning. This expectation was also implied in some of the realist review documents (e.g. Balmer et al., 2015; Blitz et al., 2019), but it was less salient to the realist review analysis. Within the data of the realist investigation this expectation was commonly voiced through the use of the term 'adult learners'.

...they're adult learners, we're not going to spoon feed them to the same degree as they were in year one for example in pre-clinical years. And they're at the stage now where if they don't make the effort, they won't get that experience.
(E08, CT-M, L-L)

Educators often emphasised the importance of students being enthusiastic and proactive to do well in clinical training and get engagement from teachers. This implied an assumption that when students are not participating or learning optimally in the clinical environment, then this is because they are not trying hard enough or they are expecting to be given

information by teachers.²¹ However, it became apparent through examining the student accounts, that successful participation in the clinical environment was not solely dependent on students' enthusiasm and self-directedness. There were several factors (student contexts) that could inhibit students' ability to engage in the clinical environment, even if they were self-directed learners. Therefore, in addition to the extent to which students are self-directed learners, students' engagement in the clinical environment is also affected by their readiness and their psychological resources. Different patterns of student learning and well-being were seen with different combinations of student contexts, and these are described within this theory area.

It should be noted that, firstly, other contexts will of course also affect students' experiences, but the three presented here (readiness, SDL, psychological resources) seemed the most salient through the analysis. Secondly, although discussed in three specific combinations for explanatory purposes, it is acknowledged that this is an oversimplification; all three contexts are continuums, so each student will have a different combination of the three contexts, leading to different experiences.

7.4.2. High readiness and self-directedness

Educators highlighted that the students who are typically best able to engage with the clinical environment are GEM students who have prior healthcare experience, for example as healthcare assistants (HCAs).

... a good chunk of those have worked on a ward before so they know and they then can immediately be useful ... they were prepared to help take a patient to the toilet and they knew about how to do that, etc. in a way that an undergraduate student who left school at 18 and went straight to university may well never have done. (E18, CT-M, NL)

Prior healthcare experience facilitates students' engagement in the clinical environment because those students feel comfortable in the clinical environment and have existing knowledge that enables them to participate independently and help teachers. They also

²¹ It is important to note that these expectations were expressed to different degrees by educators, and some appeared to have a much greater appreciation for the challenges facing students. This links to CMOC 7 and teachers' empathy regarding students' challenges, leading to variations in the expectations and behaviour of teachers towards students in the clinical environment.

understand how the clinical environment works, such as where things are located, who different staff are and their roles, and when are good times to ask for help on a ward.

So I feel quite comfortable on the wards. I can usually work out where things are. I'm quite happy chatting to nursing staff for example, all different staff members. ... So, I think it was helpful for helping me feel orientated and also just lots of soft skills as well I think it was good for. (CS19, GEM, CP3)

These students already have a sense of belonging in the clinical environment, from their prior socialisation into other healthcare roles. Therefore, even though they have not yet been socialised into the doctor role, they have an existing healthcare professional identity. This means they already have a sense of legitimacy to their presence and participation in the clinical environment, having spent significant time in healthcare environments performing a specific role.

Some GEM students also reflected that their age helped them to engage clinically, as they felt more confident walking onto a ward and engaging with new people there. Rather than their age specifically, it seemed that this was related to having prior experiences of working and more life experience in general, so they are more confident in new situations.

...I think I'm just happier walking into a place I don't know very well and sounding like, putting on an appearance of being confident than many of the 22, 23 year olds and that's become less true as we've progressed actually ... the difference now is much less noticeable... (CS19, GEM, CP3)

The student's reflection highlights the initial advantage for students with prior work experiences, although as the course has progressed the differences have become less pronounced as all medical students have gained experience engaging in different environments.

Furthermore, in addition to greater comfort and familiarity in the clinical environment, prior healthcare experience increases students' existing knowledge (i.e. readiness) and having existing caring skills and knowledge means that they can provide assistance to teachers without needing to be shown how to do so. When they do this they gain the favour of teachers, who then provide greater access to learning opportunities. This also required a recognition by the student that helping teachers is a good strategy to access further learning opportunities, linking to SDL.

So they gave me an opportunity to do two skills that I hadn't really had chance to practise much, and they took the time to show me how to do it because I'd

*helped them, and so they helped me, which was very generous of their time.
(CS11, GEM, CP2)*

Not only do these students feel more comfortable in the clinical environment and are more able to participate independently, but teachers also respond favourably to them because they are able to do this, so they gain further opportunities. Educators also reflected on how this helps students.

...they'll just go somewhere and say oh it was really busy, so I just said to the nurses, shall I just go round and do obs on every single patient. Which is going to make you a nurse's best friend... They just want to be involved and they get a lot more out of it, because people will remember them... (E24, CT-NM, NL)

Although most of the GEM students had prior healthcare experience, not all of them experienced the clinical environment in the same way. Even those familiar with the clinical environment sometimes perceived it to be unwelcoming or unhelpful for their learning. When considering those students who seemed to have had the most optimal experiences, it seemed to be the combination of prior healthcare experience that has increased the student's readiness and also their self-directedness and expectations around learning that aligned with the design of the course and the expectations of educators. As can be seen from the student quotes, being self-directed in the clinical environment is facilitated by having some degree of readiness for clinical learning; without this students may want to help to support teachers and gain their help in return, but they are less able to do so (see section 7.4.3.2).

Students with high readiness and self-directedness also seemed more likely to have an appreciation for needing to learn to work as a doctor, rather than focusing solely on accumulating knowledge to pass exams.

So it doesn't make much sense in being ready to pass your exams, but not actually work as a doctor. ... So don't just think of passing your exams, try and aim at being able to use it competently. (CS11, GEM, CP2)

These students seemed better able to see what they are learning for within the bigger picture of their current and future roles, which links into understanding of the need to learn through participation in clinical training. Therefore, this is likely to help them to make sense of their experiences and to support increased readiness for foundation training.

CMOC 9: Self-directed learners with high readiness

If the student is a self-directed learner so they take initiative for their learning (**Context**) and they have higher readiness including existing knowledge, familiarity, and socialisation into healthcare settings (**Context**), then the student has an existing sense of belonging in the clinical environment and perceives legitimacy to their participation within it, and some activities in the clinical environment are within their ZPoD. So when the student is not actively welcomed and involved in the clinical environment (**Context**), then they feel comfortable participating independently and helping teachers and patients. This satisfies the student's basic psychological needs for autonomy, competence and relatedness (**Mechanism**). The student experiences improved well-being (**Outcome**), both *functioning*: connection to teachers and supporting the team (*CO+*), learning and participation are intrinsically motivated (*AR+*), accomplishment in their role and confidence in their ability to do well (*PC+*), and a sense of becoming a doctor (*PG+*); and *feeling*: comfort and enjoyment working in the clinical environment and with teachers and patients (*EM+*), sense of meaning through helping patients (*ME+*), and feeling useful, valuable and more confident (*SP+*).

In the same student contexts, the student is more likely to recognise that they are learning for a job, so they seek out immersive clinical experiences, such as getting involved in the daily tasks that a foundation doctor completes. The student has the opportunity to practise their skills and knowledge beyond their sign-offs alone, so they refine their existing knowledge and remain on the growth pathway (**Mechanism**). The student's readiness is further improved in all three domains of knowledge (**Outcome**), and they are likely to be more comfortable in the role of a foundation doctor when they transition to working as a junior doctor (**Outcome**).

In the same student contexts, and when the teacher expects students to be self-directed in their clinical engagement and learning (**Context**), the student's proactive participation aligns with the teacher's expectations of students and frees up their time, so the teacher appreciates the student's help and feels more able and willing to engage with the student (**Mechanism**). The teacher welcomes the student into the team and involves them clinically, further supporting the student's access to learning opportunities (**Outcome**).

It should be noted that although these students are able to maintain their well-being and learning in less welcoming learning climates (CMOC 2), welcoming learning climates (CMOC 1) are more beneficial for learning and well-being in all students.

7.4.3. Low readiness

There is little clinical exposure within the pre-clinical curriculum, so when students do not have prior healthcare experience then they are unfamiliar with the clinical environment. This means that they can find it overwhelming and are often unsure what is going on around them or how to engage in learning. In the earlier stages of the clinical course, many students struggle to engage when they are not welcomed and guided by teachers.

Yeah it's kind of you walk in and everything sort of going on around you, people flying past doing this that and the other, and you just kind of stand there like: what do I do now? I was told to come here, I am here, now what? (CS14, UG, CP2)

And certainly when they're CP1s, they haven't got a clue who they can go and see. ...they just haven't got the confidence, knowledge and skills yet, they just need some support. ... They're just hanging around looking out of place, feeling out of place. (E15, CT-NM, NL)

Unlike students who have already been socialised into the healthcare environment through prior work experience, these students feel like newcomers to the healthcare CoP. They do not have an existing sense of belonging or legitimacy in the clinical environment, and they are therefore dependent on existing members to welcome them and provide them with that sense of belonging and legitimacy. These students therefore feel less able to participate independently, so they are less able to help teachers, as they require guidance to clarify how to engage in even basic clinical activities. Compared to students with higher readiness, these students seem less willing to engage and help teachers out, so they can be perceived less favourably by teachers and therefore receive less support.

I think that that often can give those students a disadvantage because it looks almost like they're not prepared to do stuff, but actually they may not know how to do that... (E18, CT-M, NL)

The students often perceive themselves as a burden to teachers, so if teachers do not actively welcome them then they remain unsure of whether they are wanted by teachers.

They are therefore less inclined to ask teachers for help participating because they feel uncomfortable and do not want to be a nuisance.

You just feel like a bit of a nuisance really. You feel like you've put people out of their way and that your presence is actually, not harming the service, but it's adding to someone's burden. (CS13, GEM, CP2)

These students are less likely to perceive being in the clinical environment as beneficial for their learning (unless they are being welcomed and involved by teachers as in CMOC 1). This is because they remain in the ZPoD without the guidance of teachers, so cannot learn as much. Therefore, students can find themselves in a negative cycle where their confidence and readiness can decrease.

...the opportunities that you got to practise skills or do something were quite sparse. So when you don't practise things you get worse at them and you get less confident at them. (CS12, GEM, CP3)

But then it becomes a self-perpetuating circle because the ones who find it uncomfortable then avoid it and continue to feel uncomfortable. (E23, CT-M, L-L)

How these students choose to engage with less welcoming environments was found to depend on the extent to which they are self-directed in their learning and therefore recognise the need to be independent and proactive, and also whether they have the psychological resources to persevere through their discomfort. These combinations of contexts are now explored.

7.4.3.1. Low readiness and low self-directedness

There was variation in the extent to which students recognised the requirement to be self-directed learners and this affected their overall learning and well-being experiences. When students have low self-directedness their expectations of clinical learning are misaligned with the course design; they often expect to be taught knowledge directly and be teacher-directed, rather than learning through participation and self-direction. Therefore, they are more likely to prioritise studying over engagement in the clinical environment, especially if their participation in the clinical environment is inhibited by the absence of guidance from teachers. This can lead to dissatisfaction and frustration with the course.

I think at this point it just feels annoying and it feels like timewasting. I'm kind of used to the fact that you have to be very independent with your studying and

you can't rely on people teaching you, you have to teach yourself everything and I didn't expect that maybe... (CS20, GEM, CP3)

Although the student says she is used to having to be independent, the rest of her narrative suggested that this is not the case and she is unhappy with the expectation of being self-directed in her learning, reflecting a lower preference for self-direction. The difference in being less self-directed seemed to be a desire for external direction of their learning, which when absent meant that the student felt unclear of how to engage in both the clinical environment and learning within it. Therefore, students were more likely to withdraw and study. Studying gives the impression of being more productive and helpful for learning and is more comfortable and familiar (Bjork and Bjork, 2011). Students can learn to become more self-directed in their learning, however this can use up resources that they would otherwise prefer to be directing towards studying.

I've grown, I'm used to having to organise my own time now. I had to learn that skill. ... But I've probably benefited from it, even though it has been difficult and I have had to use a lot of my own time and learning time, time that could have been spent doing revision to organise things. (CS03, GEM, CP3)

The feelings of frustration and difficulties learning related to lower self-direction can also lead to students becoming fixated on knowledge acquisition and their exams, missing the longer-term goal of working as a doctor.

...so it feels like at the moment I don't care about anything else, I just want to pass those exams. (CS20, GEM, CP3)

This may be because exams are seen as a threat to some students, so they feel unable to see beyond exams to working as a doctor. Even some students who felt more confident in their ability to work as a doctor felt threatened by their exams.

But I feel because I've worked I know it's going to be fine ... I'm not worried about foundation programme. I'm just worried about passing my exams. (CS06, GEM, CP3)

This highlights that even those who have prior experience in healthcare can find medical school challenging, as there is a complex interaction of contexts and mechanisms affecting learning and well-being. Additionally, students with lower self-directedness may have less favourable interactions with educators because their actions do not align with educators' expectations of what students should be doing. Therefore educators are less likely to support them, which inhibits their learning and well-being.

And the more you have that positive attitude, the more you're going to get out of it, the more experiences you're going to be given and opportunities. So I think some of it is definitely self-driven I think. (E12, CT-M, NL)

However, students' capacity to be positive might become limited when they are feeling threatened and less able to learn in the clinical environment. Additionally, when students have lower readiness they are unable to participate independently and do not recognise the need to do so, so in the absence of educator guidance, being in the clinical environment is less helpful for learning. These students then perceive the course less favourably because they perceive they are not being taught. These students are more likely to disengage from the clinical environment, which paradoxically supports better well-being in the short-term, although not in the long-term.

CMOC 10: Low student readiness and low self-directedness

The student has lower readiness and is unfamiliar with the clinical environment, and does not realise that they are expected to be self-directed in their learning (**Context**). When the student is not welcomed into the clinical environment (**Context**) the student feels that they are unwanted and that they do not belong in the clinical environment; they perceive themselves to be a burden and nuisance to teachers. They feel unclear of their role and how to participate and/or unable to accomplish it as participation in the clinical environment is beyond their ZPoD. So the student's basic psychological needs for autonomy, competence and relatedness are not satisfied (**Mechanism**). The student experiences diminished well-being (**Outcome**), both *functioning*: feeling isolated, rejected, and a lack of support (*CO-*), uncertainty in their role and lack of accomplishment (*PC-*), perceived poor progress in becoming a doctor (*PG-*); and *feeling*: negative emotional experience, e.g. discomfort and anxiety, frustration at not being taught (*EM-*), and feeling useless, lost and less confident (*SP-*).

In the same contexts, the student feels unable to engage in effective learning and acquire new knowledge, so they are more likely to revert to the well-being pathway (**Mechanism**). They are more likely to withdraw from the clinical environment and engage in alternative learning approaches, such as book learning (**Outcome**), and their readiness is not optimally improved (**Outcome**).

When the student is not self-directed in their participation in the clinical environment and the teacher expects them to be (**Context**), the student's behaviour does not align with the

teacher's expectations. The teacher is less likely to perceive the student favourably and they feel less willing to engage with the student (**Mechanism**). Therefore, the teacher continues to not welcome and engage with the student, further reducing the student's access to learning opportunities (**Outcome**).

CMOC 11: Examinations perceived as a threat to becoming a doctor

When the student continues to have fewer resources (e.g. readiness, confidence) to help them meet the demands of the course (**Context**), then they are more likely to perceive the course as overwhelming and stressful and be less confident in their ability to pass their exams, so exams are perceived as a threat and barrier to progression past medical school. The student is less able to recognise the bigger picture of their learning (i.e. for the foundation doctor role), instead focusing on acquiring knowledge to pass their exams (**Mechanism**). Therefore the student continues to find it difficult to participate meaningfully in the clinical environment, inhibiting their readiness and well-being in the longer-term (**Outcome**).

CMOC 12: Studying supports perceptions of well-being

If the student finds being in the clinical environment unhelpful for learning (**Context**), then the student disengages from the clinical environment and focuses on learning to be a doctor by studying. They feel more comfortable with this learning activity and perceive themselves to be acquiring more knowledge to become a doctor. So the student's basic psychological needs for autonomy, competence and relatedness are satisfied (**Mechanism**). The student experiences improved well-being (**Outcome**), both *functioning*: accomplishment in their learning activities (*PC+*), and a sense of gaining knowledge to become a doctor (*PG+*); and *feeling*: greater comfort (*EM+*). However, their readiness is not optimally improved for future placements or for working as a doctor (**Outcome**).

7.4.3.2. Low readiness but self-directed

In-between the experiences of students with high and low readiness and self-directedness, were other students who seemed to be comfortable with self-direction (personal component of SDL) but were inhibited in self-directed participation (behavioural component of SDL) in the clinical environment because of their lower readiness. Therefore, a preference for self-direction did not appear to be enough on its own to support independent participation. It

seemed that students with lower readiness experienced the lack of welcome as awkward and uncomfortable, but were aware of the need to remain there.

But then you're also like I'm not learning anything right now, it would be more productive to go and stick my head in a book. But also I know that being on the ward's better because you see more stuff, but it's difficult. (CS05, UG, CP2)

Whether they stay in the clinical environment and engage or not seemed to be affected by the availability of psychological resources to support them to maintain psychological flexibility to push through their discomfort and maintain goal-directed behaviour.

...when I sort of muster up the courage to be really confident and just walk up and say hi I'm [name], I'm one of the medical students. I'd like to do this that and the other today, do you know how I could make that work? That works, or occasionally when you look really lost and frightened people tend to take pity on you. (CS14, UG, CP2)

This is in contrast to students with high readiness and self-directedness who had both the preference for SDL and sufficient readiness to be self-directed. Those students therefore did not seem to find the clinical environment uncomfortable, so did not need to be psychologically flexible to stay in it. Although, actively unwelcoming or hostile environments would likely elicit such feelings even in high readiness and self-directed students, so they too would need to draw on their resources to maintain their well-being in such situations.

CMOC 13: Self-directed with lower readiness and insufficient psychological resources

When the student recognises the need to be self-directed in their learning, but they find the clinical environment uncomfortable (low readiness) and perceive themselves to be a burden to teachers (**Context**), then if the student is not welcomed into the clinical environment (**Context**), and the student has lower psychological resources (**Context**), then the student has insufficient resources to draw upon to be psychologically flexible and persevere through their discomfort to maintain goal-focused behaviour (**Mechanism**). Therefore, the student withdraws from the clinical environment and reverts to learning through studying (**Outcome**), although they are likely to recognise that this is less optimal for becoming a doctor (**Outcome**).

CMOC 14: Self-directed with lower readiness but sufficient psychological resources

When the student is not welcomed into the clinical environment (**Context**), and they feel uncomfortable there but they recognise the need to be self-directed in their learning (**Context**), and the student has good psychological resources (**Context**), then the student has sufficient resources to draw upon to remain psychologically flexible and persevere through their discomfort to stay in the clinical environment (**Mechanism**). The student may gradually increase their familiarity and comfort in the clinical environment (**Outcome**).

The teacher recognises the student over time and gets to know them (**Context**), so they feel more invested in teaching the student and more willing to engage with them (**Mechanism**). The teacher engages with the student and welcomes them into the clinical environment, guiding them to participate (**Outcome**).

7.5. Theory Area 3. Well-being patterns

This theory area explores the factors affecting patterns of well-being over time and how students can influence their well-being through engagement with various well-being supportive activities. This theory area builds upon Theory Area 4 from the realist review where CMOC 18 and 19 theorised why some students are able to engage in well-being supportive activities and others are not. However, this was not fully clear from the available sources, so this was explored in more depth in the interviews with students to gain a better understanding of the context and mechanism interactions at play.

This theory area was developed further by exploring students' resources and how longer-term patterns of well-being develop over time through the resource cycles mechanism, as short-term well-being and learning experiences accumulate and develop into long-term patterns. This arose from considering why different students had different experiences of the course, as explored in Theory Area 2 in the previous section. Some students appeared to perceive primarily good experiences and described positive developmental trajectories through the course, whereas others seemed to struggle to maintain their performance and found it more difficult overall. So the factors relating to these experiences were explored in the analysis.

7.5.1. Well-being supportive activities

Most students recognised the benefits of various activities for their health and well-being, such as exercising, eating well, getting enough sleep, socialising, and having hobbies. Engaging in these activities was found to support improved well-being through physiological mechanisms (e.g. exercise improving mood (EM) through endorphins), or well-being mechanisms (e.g. hobbies supporting feelings of accomplishment (PC), being part of a team (CO), improved mood (EM), and flow/engagement (EN) through basic psychological need satisfaction).

Students engaged in a variety of well-being supportive activities. Most students recognised the benefits of physical activities, like exercising, eating well, sleeping enough, which had both physical and mental benefits and could help to counteract the stress that students felt on the course.

And then with cooking I know that I can eat badly for a while, but I think eventually you've got to be like I've got to eat something more homemade, more nice. So it's not essential, but it's something that definitely maintains a certain level of happiness. (CS01, UG, CP2)

Some students also talked about reaching a balance between studying and their other activities, reflecting a more balanced approach to life, work and studying.

So I try to separate work and relaxation, so I'll give myself protected time to do a bit of work and then protected time ... do something completely different, make a nice meal, watch an episode of something on TV or go to the gym, things like that. (CS18, UG, CP3)

A similar approach was taken by some students who valued having hobbies outside of medicine, because this helped them to feel their life was well-rounded. Some valued maintaining these activities going into their careers because they considered having a balance to their lives as important for being a good doctor, as it would enable them to rest and recover from work. These activities positively influenced well-being, for example relaxing them, providing a sense of accomplishment or connection to others.

Yeah and then just keep up interests outside of medicine so it doesn't become your entire life. ... And plus as well as the activities themselves it's also sort of seeing friends, getting some fresh air and exercise and all that kind of stuff. ...

Yeah puts me in a better mood. And then you feel more able to face your challenges. (CS14, UG, CP2)

While students did not mention experiencing engagement or flow (EN) during their learning activities, some experienced this in their hobbies.

I could literally be [hobby] for three hours and I won't even realise time has passed, because, I don't know, it's just like when you're doing it everything just melts away and it's quite nice. (CS07, UG, CP2)

Conversely, another student reflected on how their problems in medicine seemed worse now because they had not maintained their participation in outside hobbies through clinical training.

Whereas now it's eat, sleep, drink. And especially in fifth year where all my non-medic friends, none of them are here anymore. It is all, if medicine is going wrong then it feels like everything's going wrong with it. (CS16, UG, CP3)

This highlights that when students have only medicine in their life, then problems arising in that area can seem magnified. This illustrates the situation described above that other students sought to avoid by ensuring they maintain their outside interests. However, the structure of the clinical course leaves little time for rest and breaks, and the demands of the course are high so students have to prioritise these activities to engage with them.

But I feel like there is time to do all the studying, but then also I feel like other things take a detriment, like your relaxation time or your socialising, your sports or your sleep. There is a bit of a balancing act. (CS05, UG, CP2)

Proximity to exams also had an impact on students' engagement with well-being supportive activities. Some students felt that they needed to stop or minimise the activities they engaged in, so that they could spend more time studying. Other students continued to engage in some or all of their activities because they recognised the benefit that this had for their studying and performance. Although most students talked about having to resist some kind of pressure to focus solely on studying near to exams. Perception of the demands of the course were also different between students based on other factors, such as those outlined in Theory Area 2 like readiness and confidence, i.e. whether exams are considered manageable or threatening (CMOC 11).

An important factor for whether students engaged with these activities despite the other pressures on their time seemed to be the perceived value of different activities to help them

achieve their goals. So the perceived benefits of the activities needed to outweigh the time required for them, which was taken away from studying. For example, the student below noticed the benefits of going to the gym to help with his studying.

...I would stop going to the gym and focus on work. And I think that actually had a negative effect. ... So even the week before exams I still try and go to the gym, just because I do feel refreshed and it helps me in that sense. (CS02, UG, CP3)

This approach often seemed to interlink with students' general perceptions about what makes a good doctor and their goals and motivations associated with this (linking to PL and AR). Students who considered having a balanced life and being well as central in their perception of being a good doctor tended to also talk about balancing their work and other life activities. Students tended to be able to find a better balance between work and rest when they adopted a 'good enough' mindset, in which they were focused on becoming a good doctor, not the highest achieving student. These students seemed to engage regularly in well-being supportive activities and found the course more satisfying (LS) and enjoyable (EM), experiencing improved well-being overall. This also depended, however, on the student feeling confident in their ability to become a good doctor, which interlinks to the other two theory areas and their readiness and experience of the course.

...in my mind being the best doctor that I can be is about more than scoring 80% in every exam. ...I feel that part of being a doctor, part of your responsibility to your patients is keeping yourself physically and mentally well. And I think sort of being able to say OK that's good enough is a really important part of that, I've done enough for today I am going to rest now. (CS14, UG, CP2)

Other students seemed to be more extrinsically motivated in their learning, either due to a desire to attain prestige (e.g. high grades and a competitive specialty) or due to perceiving exams as a threat. These students found it difficult to reach a balance between their work and rest because they were fixated on working hard to achieve the highest grades and maintain their status at the top of the year or to get through their exams. Therefore, they were less likely to prioritise well-being supportive activities over studying and found the course less satisfying (LS) and enjoyable (EM), experiencing lower well-being overall. For example, one student talked about striving to get the highest grades so that he could get into a competitive specialty and the sacrifices that he perceived this meant he had to take in terms of not engaging with well-being supportive activities as much.

Even though I know it makes me a better medic if I joined the [sports] team, see my mates, do that, go for a run. Either I'm too tired or the other part of my brain's like but you should, if you've got this spare time make the most of it [by revising]. ... For the [specialty] thing I always think well I can always revise more for my exams and be the better doctor. ... I do have a feeling that almost this, if you sow the seeds now then life becomes easier later. (CS16, UG, CP3)

This student was prioritising studying over other life activities because they perceived that was the most beneficial to them achieving their goals, and they would then defer well-being and enjoyment of life to a later point. Therefore, even when students recognise the benefits of engaging in activities outside of medicine, they sometimes still struggled to prioritise engagement with well-being supportive activities.

Other students had additional pressures on their time, such as having to work, which then increased the challenge of engaging with well-being supportive activities.

And then by the time I get back [from placement] I had to go straight to work, I didn't really have time to run. And then sometimes you're just quite tired when you come back so. (CS06, GEM, CP3)

Commuting to placements was a common factor that students talked about reducing the time available to engage with well-being supportive activities. Commuting was also found to be inherently stressful itself in terms of negotiating the additional logistics and traffic. Therefore, students experience pressures on their time from the course, their own expectations, and external activities or events. Without the capacity to prioritise their well-being, they struggle to develop healthy habits on the course and into their careers.

It's a bloody tough course. They need to make sure they have some down time. They come with this breadth of skills, this down time ability and then we snatch it away from them. ...they're going to be working much longer than I am in terms of retirement. ... We need to maintain them. (E20, CT-M, L-U)

Students need to be able to adopt a healthy approach to looking after themselves so that they can remain healthy within their future careers. However, the demands of the course make it challenging for students to prioritise these activities, so students are at risk of de-skilling in well-being management.

Students also need awareness to notice the benefits of engaging in well-being supportive activities and how they are generally spending their time and what works for them in terms of helping them to engage with them. Having a routine of doing specific activities on specific

days was found to be helpful to make sure they did those activities. Some students found that when they started to disengage with some well-being supportive activities, then it became harder to do other things, and they would experience a downward spiral and end up with a lower mood. Sometimes students would experience poor well-being following disengagement with well-being supportive activities. In those situations, if students noticed the downward spiral in their mood, then they could re-engage with activities to improve their well-being.

I've noticed like I've started trying to make an active effort to go to the gym more and ... I went back to the [hobby] ... And I've actually been a lot happier. ... I don't think you notice the impact it has until it gets really sort of, you don't feel as good. It can get quite bad before you notice it's a problem, I think. (CS04, GEM, CP2)

Two CMOCs were developed, one relating to students' engagement with well-being supportive activities, which developed realist review CMOC 18. The other built on realist review CMOC 20 and related to how students can draw on psychological resources to notice diminished well-being and support re-engagement with well-being supportive activities.

CMOC 15: Engaging with well-being supportive activities

When the student recognises the benefits of engaging in well-being supportive activities and feels confident in their ability to do well on the course (**Context**), then even when the student feels the demands of the course are high (**Context**), they perceive that engaging in well-being supportive activities aligns with their goals and the benefits outweigh the time required, so they prioritise well-being supportive activities despite the time pressures (**Mechanism**). The student engages in well-being supportive activities (**Outcome**), which satisfy their basic psychological needs (and sometimes physiological needs*) (**Mechanism**) leading to improved well-being** (**Outcome**), both *feeling*, for example: enjoyment and more energy (*EM+*), engagement in the activity (*EN+*), and more confident (*SP+*); and *functioning*, for example: sense of control and accomplishment in their life and feeling better able to manage the demands of the course (*PC+*), sense of progress and development (*PG+*), alignment with what is important to them (*PL+*), and sense of connection to others and being part of a team (*CO+*).

CMOC 16: Psychological resources supporting re-engagement in activities

If the student experiences cumulative negative well-being experiences on the course resulting in diminished well-being (**Context**), but has relevant psychological resources (e.g. awareness and reflection skills) (**Context**), then they are able to notice their experience and reflect upon it, maintaining psychological flexibility despite their distress, and identifying an alternative strategy, such as establishing a routine for well-being supportive activities (**Mechanism**). The student implements the change and engages in more well-being supportive activities (**Outcome/Context**). This satisfies their basic psychological needs (and sometimes physiological needs*) (**Mechanism**), leading to improved well-being** (**Outcome**), as outlined in CMOC 15.

*Depends on the activity. **Specific attributes of well-being depends on the activity.

7.5.2. Psychological and social resources

In addition to managing well-being by using well-being supportive activities, students also talked about the importance of social support and the use of psychological strategies. Social support from friends and family was important to help students to manage the challenges of the course.

I feel a lot more confident and sort of more secure in my life knowing that there's always someone I can go to for help. ... Kind of almost having a safety net. ... It makes me feel more able to go out and do things knowing that there'll always be help there if I need it. (CS14, UG, CP2)

Having a strong social network that the student knows they can rely upon can provide them with the sense of having a safety net. In addition to friends and family, some students found their friends within their peer group a good source of support, because they were able to understand the experiences they were having.

And I'm lucky that I've got really good friends on the course because otherwise it would be really difficult because I think you don't really acknowledge what you're seeing every day. ... having the chance to talk about it with people that get it is really like really valuable. (CS09, GEM, CP2)

However, not all students seemed to have a good social support network, and when this was absent it seemed to have a detrimental impact on the student.

I have students I'm close with who like, but a lot of them don't necessarily get along with loads of people on the course. ... It's like that, I don't know whether it's socioeconomic, I don't know whether it's racial but there's a different way you have to interact when you're in a middle class environment ... you just have to think about every interaction. (CS06, GEM, CP3)

These students felt like they did not fit in with their peer group in general because they had different backgrounds to them, and this could present additional challenges, such as cultural differences. Students without a strong social network are also lacking a key resource to support well-being, the sense of having a safety net. Other students reported having friends on the course, but found that the degree of support diminished to some extent as other students became busier.

People are just so stressed at this point ... I've really noticed that this year friends that I used to just go to and say, arrgghh I'm having a bad time, they're less inclined to give the full, let me help you, blah, blah, blah. So yes people are busy with their own stuff. (CS03, GEM, CP3)

Other students talked about learning to prioritise those friendships that are a positive influence and will be available to provide support.

So it's that support network that you need and I think support network is the biggest thing for me now. Making sure that I'm keeping people around me that are positive people, that are good for me, that I feel like I can tell them my problems if I feel like I need to. (CS12, GEM, CP3)

Social support is an important resource because it helps students to feel that they can engage with a difficult event, day or week, because they have someone they can share it with afterwards or something to look forward to. Social isolation is problematic for well-being and the timing of students' poor well-being experiences was often during the CP2 year when they were isolated from their peers, in addition to a very demanding year with few breaks. Within the course students frequently rotate around different locations and people, so they continually have to adjust to new environments, where they also do not typically receive social support because of the limited consistent contact. They therefore do not have consistent support, and often feel isolated from their peers and the teachers on their placements.

Whereas coming into CP2, you're split up from all your friends, it's very nomadic. ... And I think I found that really difficult because I didn't have like a normal

routine and then didn't have people that I knew in my group sort of to debrief with and that sort of thing. ... So it's quite isolating, it's really isolating. (CS04, GEM, CP2)

Together, increased workload in CP2, social isolation, and a long year with very few breaks contributed to several students having a very challenging time and experiencing diminished well-being.

So just being isolated, not having much of a break, a very difficult curriculum as well trying to cover. During the summer you only had two weeks off, all that I think made me feel a bit down at that time. (CS02, UG, CP3)

Sometimes instead of being able to reflect themselves on their poor well-being, students were supported by others (e.g. family members) to recognise low well-being experiences and identify and implement strategies to improve this. For example, CS02's sister helped him to gain perspective during the difficult period in CP2.

And she broke it down and said you worked hard to get there, why do you want to stay? And that really helped me put things in perspective and help me. (CS02, UG, CP3)

Other students found these challenging periods of low well-being prompted them to learn new psychological strategies to help them manage their well-being, either through self-learning or from external sources, such as therapy.

I started doing a bit more in terms of mindfulness and trying to address what exactly was bothering me and trying to listen to myself and my body a bit more. (CS12, GEM, CP3)

Other students seemed to have existing psychological strategies or skills that helped them to maintain their well-being throughout the course, either in a specific situations day-to-day (e.g. cancelled teaching) or more generally to improve their experience on the course.

I think self-awareness does help, being aware of what works for you and what doesn't in terms of learning. Also being aware I think emotionally and in terms of fatigue how you're doing ... getting too tired to be productive, but then actually saying, so I'm just going to write off the next two or three days and rest up and then come back with renewed vigour... (CS19, GEM, CP3)

There is an implicit assumption that students have or will develop the psychological skills to manage the demands of their course and their profession. However, these are not taught,

and the environment the students experience is not always resource-supportive. So, students who do not naturally have these resources upon entering clinical training may struggle, especially if they also lack other key resources like social support. CMOC 17 below built on realist review CMOC 21 and 22 which focused on emotional support, while CMOC 18 considers the importance of psychological resources generally, beyond specific instances of these being applied.

CMOC 17: Students with good social support networks
When students have a social support network of friends and family who they trust and who they can be themselves with (Context) , then the student is able to access emotional and instrumental support from these people, gaining new perspectives on their problems and helping them to feel like they can get through difficulties. So their basic psychological needs for relatedness, competence and autonomy are satisfied (Mechanism) . This improves their well-being (Outcome) and supports resource acquisition, helping with subsequent difficulties (Outcome) .
CMOC 18: Psychological strategies used to manage well-being
When students have good psychological resources (e.g. reflection, reframing, emotion regulation) (Context) , then when the student experiences a difficult situation during their day, they are able to remain psychologically flexible and draw on their skills to manage their response and approach so they maintain goal-directed behaviour (Mechanism) . Therefore, the student is able to continue to engage proactively with the learning activity, so they are able to continue to learn and develop (Outcome) . This supports the satisfaction of their basic psychological needs (Mechanism) and maintains their well-being (Outcome) .

In addition to specific types of resources, it also seemed that different students were having generally having very different overall experiences of the clinical training transition. This was interpreted using the resource cycles mechanism, to consider how students' resource pools affect their longer-term experiences.

7.5.3. Resource pools

Students all enter medical school, clinical training, placements, teaching sessions etc. with different resource pools, and their experiences in and outside the course are both influenced

by, and influence, this resource pool over time. A student's resource pool affects their capacity to manage the challenges that they face, so this capacity is different between students. Therefore, in addition to the shorter-term influences on well-being described above and in the other theory areas, it was also important to consider the longer-term patterns of well-being, which were linked to students' resource pools.

Some students reported having generally positive experiences, and they were also often those who seemed to have plenty of resources, such as high readiness and self-directedness (CMOC 9) and social support (CMOC 17). These students seemed to go from strength-to-strength, and were able to overcome challenges without detrimental outcomes for their well-being. Additionally, their positive experiences were reinforced by favourable interactions with teachers, supporting further resource acquisition and a continued positive trajectory of well-being and learning.

I would very rarely say I have a bad day, in fact if ever. ... I think I get a lot of essentially positive feedback ... that's probably why I work hard, so it feeds into it, so I enjoy it because I'm doing well and because I'm doing well I work harder I think. (CS22, GEM, CP2)

The more positive they get the more positive and it just escalates and escalates. (E29, CT-M, NL)

Conversely, other students experience challenges, perhaps starting the course with fewer resources which become further depleted for various reasons, such as not being able to participate on their own in the clinical environment.

...the pace is relentless, particularly for CP2 and CP3. And if you get behind or if you get, it's hard to then, because then you've got to make extra effort to catch up and then carry on again. ...you don't feel part of the team and then you don't turn up and then you don't see the patients properly and then that affects your confidence and then you're in this vicious cycle. (E29, CT-M, NL)

Resource loss might be due to the course itself or due to additional challenges outside of the medical course, which they have to overcome. These can be positive but intensive experiences, such as high-level sports competition, or negative experiences, such as exam failure, mental illness, financial difficulties, or family illness. Furthermore, some students seemed to lack certain resources, which seemed to have led to them experiencing additional challenges, such as teachers not responding to them as favourably. For example, one student

from a lower socioeconomic background described how she often felt that teachers were expecting her to perform poorly.

I feel like I come on placement a lot and consultants just think I'm going to be stupid for some reason and then I'm not and they're really surprised. I feel like I always surprise, people always look at me like they're surprised that I know things. ... I feel like I'm almost constantly not understood by people. (CS06, GEM, CP3)

Compared to CS22 above who talked about receiving positive reinforcement from teachers, CS06 felt she constantly had to prove herself to her teachers. This could potentially link back to realist review CMOC 8, which explored how some students experience a need-frustrating learning climate when they are stereotyped by teachers. It may also be that the student is more likely to perceive interactions negatively because they are already feeling vulnerable. There are many interacting factors affecting students' experiences, but it was clear that some students have more positive experiences overall than others.

There seemed to be a narrative within the medical school around students needing to become resilient to manage the demands of the profession and health service.

I suppose the thing, one of the things the medical school's quite worried about is the resilience issue of students and doctors. And so I guess that comes from having setbacks or failures or adverse events happen that you then bounce back from and recover from and then so you can get back and learn from it and not be completely crushed by it. ... But giving them too much stress and difficulty isn't going to help them either. (E05, CT-M, L-U)

This reflects the perception that overcoming challenges in medical school means the student is resilient, but this misses considering how students become resilient and the role of resources in this.

I don't think we can expect necessarily students to have the emotional life tools that we have ... and yet somehow I kind of think we do. ... So then throw them into a course like medicine and no wonder so many students struggle. Whether we hear about them or not or whether they just get through by the skin of their teeth. (E28, CT-NM, NL)

These implicit expectations that students should be resilient to manage the demands of the course and the profession assume that students have the existing resources to be resilient. They also do not take into account the lack of environmental resources that many

students experience. If students are not receiving resources from their environments (e.g. CMOC 2), then their individual resources can become depleted over time, so students can really start to struggle and it then becomes difficult to recover without external support. These perceptions likely reflect the wider medical culture around needing to be strong as a doctor, considered in realist review CMOC 1.

<p>CMOC 19: Students with larger resource pools</p>
<p>When a student has a large resource pool (e.g. social support, psychological skills, readiness, confidence, finances) (Context), then they have sufficient resources to draw upon and invest in overcoming challenges, both on the course and in their life, and are likely to experience benefits for their learning and well-being, so they gain further resources, strengthening their resource pool, and developing into a resource gain cycle (Mechanism). This leads to a positive developmental trajectory as learning and well-being are improved and reinforce one another (Outcome) and the student is likely to experience the course as manageable and positive overall (Outcome).</p>
<p>CMOC 20: Students with smaller resource pools</p>
<p>When a student has a small resource pool (e.g. lack of social support, fewer psychological skills, low readiness, low confidence, limited finances) (Context), then they have fewer resources to draw upon to overcome challenges, both on the course and in their life, and are likely to experience resource loss, weakening their resource pool and developing into a resource loss cycle (Mechanism). This leads to a negative developmental trajectory as learning and well-being are diminished (Outcome), and the student is likely to experience the course as difficult and stressful (Outcome).</p> <p>If the student does not receive environmental support (Context) to acquire resources and improve their resource pool (Mechanism), then they are likely to struggle to keep up with the learning for course and to experience poor well-being (Outcome).</p>

7.6. Discussion

The realist investigation sought to answer the question: in what circumstances, for whom, how, and why does the process of transitioning through clinical training affect medical students' well-being and learning? Theory Area 1 explained how different learning climates affect the opportunity for students' participation, belonging and role clarity, supporting or

hindering the activation of student's innate capacities for well-being and learning. When students are welcomed and involved in the clinical environment, this facilitates their well-being and learning. Conversely, for many but not all students, not being welcomed is a detrimental experience that hinders their learning and well-being. Teachers' willingness and capacity to welcome and involve students is affected by organisational factors such as the number of students on their placement, opportunities to get to know students, and resourcing of placements. Teachers' own preferences for teaching, attitudes towards students, and skills and knowledge of teaching also affect their engagement with students and therefore the learning climate.

Theory Area 2 explained how different combinations of student contexts can interact to change students' participation in less welcoming learning climates. Educators generally expect students to be self-directed in the clinical environment. When students have high readiness and self-directedness then they are able to participate independently because they recognise the expectation to do so and have existing knowledge that supports their participation, belonging and role clarity, enabling them to maintain their well-being and learning. In comparison, students who have low readiness and low self-directedness are less able to participate independently and may not recognise the expectation to do so. Therefore, they find unwelcoming clinical environments detrimental for learning and well-being and are more likely to disengage. Another group of students who are self-directed learners, but have lower readiness, recognise the need to be independent in the clinical environment, but their capacity to do so is limited by their lower readiness. Whether these students are able to engage with the clinical environment depends on the availability of psychological resources to enable them to maintain psychological flexibility to persevere through the discomfort that they feel there.

Theory Area 3 explained how, as well as being influenced by the experiences outlined in Theory Areas 1 and 2, students can influence their well-being through engaging in well-being supportive activities. However, this depends upon their goals, motivations and perceptions of the course, and therefore the perceived benefits of engaging in well-being supportive activities over studying. Well-being is also influenced by the resources that the student has available to them, such as social support and psychological strategies. Shorter-term changes to well-being can develop into longer-term patterns through the development of resource gain or loss cycles, which affect students' developmental and well-being trajectories over time. Students with larger resource pools have greater capacity to overcome the challenges of clinical training so are more likely to have beneficial experiences that improve well-being

and resources; they are consequently more likely to develop resource gain cycles and have positive developmental and well-being trajectories.

7.6.1. Strengths and limitations

The realist investigation was implemented in accordance with the RAMESES II Quality Standards for realist evaluations (Greenhalgh et al., 2017), with appropriate adaptations for the problem exploration focus. This facilitated the development of theories of generative causation, which explained how the relationships between the environmental and student contexts and mechanisms interact affecting well-being and learning outcomes during the transition. The realist investigation built on theories from the realist review, developing them in relation to the interaction between the context and mechanism, and more explicitly incorporating learning mechanisms and outcomes alongside well-being mechanisms and outcomes. Building on existing theoretical foundations from the realist review focused the analysis enabling more nuanced causal insights to be developed.

Rigour in realist research relates to the trustworthiness of the data used to develop theories and the plausibility of those theories (Wong, 2018). Therefore, research quality extends beyond the design and procedures of the research, including also the interpretations and conclusions (Maxwell, 2012). This links back to objectivity in realist research (section 2.3.3.2), which relates to the reasoning underpinning research, transparency and accumulation of evidence, rather than specific types of evidence (Pawson, 2013). The strengths and limitations around the rigour of this research are discussed.

Incorporating both student and educator data was beneficial to obtain different perspectives on student experiences through transition, as well as improving the theoretical insights obtained. Through the educator data it was possible to gain information relevant to the patterns across students, while the student data provided in-depth information about specific experiences. The insights obtained from the interviews in this study built upon existing theoretical insights from the prior analyses of the TIR and realist review, and also from the literature. This enabled the development of a causally rich narrative of the ways in which students' well-being and learning are affected by transition experiences. Therefore, while the data in the investigation was all interview data, it came from different sources and was triangulated with the data from the prior analyses, which encompassed a range of research designs.

The findings are from one particular medical school, which has a different course structure than others, with the BMedSci compressing the length of clinical training (Figure 6-1). However, the findings built upon the realist review which involved data from a variety of countries and medical schools, so this indicates transferability to other settings. This was further enhanced by the focus of the review on the general processes of transition, rather than specific local initiatives, which means that the theories are likely to have greater relevance to medical students going through transitions in other medical schools.

The participants in the study, especially the student cases, were self-selected based on their interest in the research. It is difficult to determine how this might have influenced the data that was obtained. Regarding the student sample, those who participated may have been those who had strong opinions about their transition experiences, although a range of experiences were found in the sample. The sample of students was fairly balanced between GEMs and UGs, however in terms of overall pool of potential students, GEMs were more likely to take part compared to UGs. It is unclear why this might be; perhaps GEMs were more opinionated about their transition experiences or may have had more resources, and so more capacity to engage in additional activities beyond their course. Therefore, although a range of transition experiences were found in the sample, including within the GEMs, it is possible that some transition experiences were not found within the data based on the sample. Regarding the educator sample, the cases reflected those with formal educational roles. Medical students interact with a variety of teachers in the clinical environment, and those without specific educational roles were not included in the sample. Therefore, it is possible that further educator contexts could be found through extending the sample to all teachers interacting with medical students, although accessing those with more informal teaching roles would be more challenging, and this was not the primary focus of the research.

The data collection and analysis were primarily conducted by AM, so the resulting theories were largely based upon her interpretations and conclusions. However, to check the credibility of the theories and improve the trustworthiness of the processes, the analysis and theories were discussed with others (including supervisors, colleagues in medical education, peers, and Justin Jagosh, a realist methodologist) at various points to provide the opportunity for alternative interpretations to come to light. Furthermore, the processes through which the data was obtained, organised and analysed were clearly documented and described within the methods and findings. Therefore, it should be possible for others to judge how the theories have been developed through the work and trustworthiness and plausibility of the data and theories.

The realist investigation developed theories around well-being and transition. Some of the theories from the realist review were tested and refined using the data, but the overall focus was on theory development. Therefore, future research needs to test and refine these theories using a range of research methods, as outlined within the scientific realism paradigm.

7.7. Chapter summary

The realist investigation sought to answer the question: in what circumstances, for whom, how, and why does the process of transitioning through clinical training affect medical students' well-being and learning? The findings answered this question through the three theory areas. In Theory Area 1, the influence of different teacher interactions with students (i.e. more or less welcoming and involving) either support or hinder basic psychological need satisfaction for well-being and learning mechanisms through the degree to which participation, belonging and role clarity are supported. Wider contexts indirectly affect well-being and learning through their influence upon the extent to which teachers feel able and/or willing to welcome and involve students.

In Theory Area 2, combinations of three contexts – readiness, SDL, and psychological resources – explained students' participation in the clinical environment through their capacity to facilitate their own participation, belonging and role clarity. Students with more resources are better able to create their own conditions that support well-being and learning, or are better able to draw upon their resources to maintain psychological flexibility in the face of challenges and continue to persevere with learning in the clinical environment.

Finally, Theory Area 3 built on the other areas to consider how students' well-being patterns develop over time. Students' well-being is affected by their transition experiences, such as those described in Theory Areas 1 and 2. Students can also influence their own well-being to some extent through engagement with well-being supportive activities. However, students' capacity to do so is interlinked with their wider learning and well-being experiences. Overall, students with larger resource pools tend to have better learning and well-being experiences and outcomes, because their resources support them to meet the demands of the course and overcome challenges. Their positive experiences support further resource acquisition and the students are more likely to enter resource gain cycles, facilitating positive developmental and well-being trajectories.

Chapter 8. Discussion

8.1. Introduction

The importance of well-being for students and doctors is increasingly evident, however, our understanding of well-being has been limited by issues of conceptual and theoretical clarity. Well-being can be affected by experiences throughout medical education and practice, but transitions have been particularly associated with issues related to poor well-being, such as higher levels of stress and anxiety (Atherley et al., 2019; Radcliffe and Lester, 2003; Teunissen and Westerman, 2011). While transitions can be a struggle for learners, they are also opportunities for development, however clarification was needed around the underlying causes (Teunissen and Westerman, 2011). In this work, well-being was conceptualised from a positive psychology perspective, meaning well-being concerns optimal human experience, including growth and development (Ryan and Deci, 2017; Seligman and Csikszentmihalyi, 2000). Therefore, establishing how and why well-being is affected by transition should also provide knowledge of how to optimise the developmental opportunities presented.

The aim of this research was to improve the knowledge of how well-being is affected by transition, firstly clarifying the concept and then taking a theory-building approach, exploring how both student and environmental factors affect well-being during transition, and the links between well-being and learning. Transition was conceptualised as an ongoing process of social and psychological development and the transition through clinical training was chosen for exploration, as it lays the foundations for the subsequent transition into clinical practice.

In order to explore how and why well-being is affected by the processes of transition, the research was conducted within the scientific realism paradigm, as this facilitates exploration of causation through theory-building. The research question was: *in what circumstances, for whom, how, and why does the process of transitioning through clinical training affect medical students' well-being?* Three research components were designed to answer this question. Firstly, a TIR was used to conceptually and theoretically clarify well-being through the development of a concept definition and theory of well-being. Secondly, a realist review explored the contexts (environmental and student) affecting the activation of different well-being mechanisms during the transition through clinical training, using the well-being theory as a foundation for initial theorising. Finally, a realist investigation developed key theories from the realist review, while also considering how well-being and learning experiences were linked during the process of transitioning through clinical training. Through the clear

conceptualisation of well-being and the use of a theory-building approach rooted in realist principles, the findings of the research described in this thesis contributed new knowledge by moving beyond describing the problems students experience around transition, to a theory explaining how and why transition affects well-being and learning.

This chapter firstly discusses the conceptual and theoretical foundations of well-being underpinning this work. A refined theory of well-being and learning through the clinical training transition setting (Figure 8-1) was developed to summarise the findings and the key aspects of this are discussed in relation to the wider literature. The chapter then goes on to outline theory-based recommendations for supporting well-being and learning generally and at different points within the transition (Figure 8-2). It finishes by considering the strengths and limitations of the research as a whole. The key conclusions argued throughout the discussion are that to understand and resolve problems related to well-being medical education should adopt a proactive approach, consider the role of environment as well as individual factors, and embrace complexity.

8.2. Conceptual and theoretical foundations of well-being

Concepts represent our knowledge of phenomena (Podsakoff et al., 2016) and therefore form the basis of theories, which explain aspects of the world around us (Varpio et al., 2020). Understanding the processes causing and sustaining the problems we seek to address is necessary to resolve them (Ajjawi and Eva, 2021; Pawson and Tilley, 1997). Theories communicate this understanding and are therefore beneficial for practice because they explain why a problem occurs and how we can address it (Artino and Konopasky, 2018; Varpio and Ellaway, 2021). Therefore, establishing the conceptual and theoretical foundations of well-being was an important first step to theory-building around well-being and transition.

Clear concept definitions are often lacking in the medical education literature (Bynum et al., 2021). This can be seen with well-being, as the term is often undefined and is used interchangeably with, or as a 'catch-all' term for, a variety of other concepts, such as mental health, burnout, stress, depression, anxiety, and suicidal ideation (e.g. Knight et al., 2022; Ripp et al., 2017; West and Coia, 2019). Others provide definitions relating to the processes through which well-being might arise, rather than specifying what the concept means. For example, Kemp et al. (2019) draw on the definition from Dodge et al. (2012), which defines well-being as having enough resources to meet challenges. However, this does not explain what the experience of well-being is. Outside of medical education, the positive psychology

literature contains multiple, often contrasting, definitions of well-being that are much debated, so further conceptual clarity was needed to support knowledge development around well-being.

This work developed a new concept definition by synthesising conceptual insights from a range of definitions from the positive psychology literature. Well-being was defined as a dynamic, multidimensional concept reflecting an individual's subjective experience of their life, with two dimensions – feeling and functioning – each with multiple attributes (see 3.3.3.1). The definition facilitated interpretation of both positive and negative well-being experiences. It also clarified the interlinking nature of well-being and learning, with the functioning dimension, reflecting perception of functioning, linked to students' perceptions of their learning and development during the transition. For example, students commonly described experiences of perceived competence and personal growth (attributes within the functioning dimension) in relation to fulfilment of their learning role. Positive feeling experiences were also related to learning experiences.

Clearly defining well-being in research is important to communicate what we mean by the term for ourselves and others. Concepts travel between people, disciplines, and uses so we cannot assume shared meaning (Bal, 2009). For example, recent calls for action on well-being have not defined the term (e.g. Knight et al., 2022; Ripp et al., 2017), so it is unclear what the authors mean by well-being and whether they are talking about the same phenomenon. Similar issues have been found elsewhere in medical education. For example, Young et al. (2018) described the clinical reasoning literature as fragmented, with authors' definitions originating from diverse perspectives. Research literature should be thought-provoking, stimulating consideration of our own and others' work (Regehr, 2010). When phenomena are complex different perspectives will be found, and we cannot expect others to share our definitions (Eva, 2017). By providing definitions we can acknowledge and situate our own and others' perspectives on the problems we seek to address, facilitating the development of our knowledge base. The perspective of well-being in this research was clearly communicated through the concept definition, enabling others to interpret the findings in relation to the wider literature. The definition could be adopted by those who share the perspective it takes. It could also be used by others to prompt consideration of what well-being means to them.

Concept definition is also an important part of theory-building (Rycroft-Malone et al., 2012; Shearn et al., 2017). Given the issues around the definition of well-being in medical education, the theoretical explanation of well-being has also been limited. Some models of well-being exist in medical education, but these have not clearly conceptualised well-being

or explained the processes through which well-being changes. For example, Dunn et al. (2008) described the internal and external inputs affecting students' capacity for coping, but the mechanisms through which this occurs were not indicated and the conceptualisation of well-being was mixed up with burnout and resilience. Within the psychological literature, several substantive theories relevant to well-being were found, for example SDT (Ryan and Deci, 2017) and B&B theory (Fredrickson, 2004). These each explained different aspects of well-being, but had not been integrated within one explanation of different causes of changes in well-being. A theory of well-being was therefore developed within this work, building on the concept definition and integrating theoretical insights from several substantive theories. The resulting theory of well-being provided a new and comprehensive explanation of well-being, specifying three mechanisms through which well-being changes (see 3.3.3.2). Together the definition and theory of well-being developed new insights about well-being and provide a conceptual and theoretical foundation for theory-building. In this programme of research they were found useful to explore how well-being is affected by transitions, and other researchers could similarly use them for theory-building elsewhere.

8.2.1. Embracing well-being as a concept

The conceptual and theoretical foundations of well-being established above clarified the relationship between well-being and other concepts often used interchangeably in medical education, specifically stress, burnout and resilience. Both stress and burnout can be considered in terms of demands and the resources available to overcome them (Arnold et al., 2020; Bakker and Demerouti, 2017). Similarly, resilience relates to the process of using internal and external resources to overcome significant sources of stress or trauma (Windle, 2011). Upon reflection therefore, resilience relates to similar processes underpinning stress and burnout, but within a more acute application. The concept definition in this thesis described well-being beyond demands and difficulties, referring to what makes someone's subjective experience of life good. Therefore, well-being is important to consider as a concept in its own right, with its conceptual domain focused on the positive side of human experience. We can consider resilience important for maintaining well-being in particularly difficult situations, but the two are separate concepts. Stress and burnout are negative outcomes arising from difficult situations, including lower resilience. Similar conditions are responsible for both, and burnout is an extreme outcome of poor well-being. Given the shared focus on resources, well-being, resilience, stress and burnout likely share underlying psychological processes. Psychological flexibility and resource cycles might be similar to the

mechanisms underpinning the experience of 'being resilient', as both relate to having and using resources but in different applications to resilience.

Differentiating well-being as a separate concept from others reflecting 'problems' is important. The goal of medical education is to develop doctors who can deliver high-quality patient care, part of which relates to their competence and capability (Fraser and Greenhalgh, 2001). However, another part is well-being and work-related attitudes, such as job satisfaction and organisational commitment (Arnold et al., 2020), which will help sustain doctors' work throughout their careers. In embracing well-being as a concept, it is argued here that a proactive, as opposed to reactive, approach should be adopted. Proactive approaches have been championed elsewhere in medical education. For example, Sandars et al. (2014) have argued for a proactive developmental approach to student support to realise the opportunities for all students' personal growth, rather than limiting support to those who struggle. The argument for a proactive approach to well-being related issues is not new (e.g. Slavin et al., 2014, 2012, 2011; Thomas et al., 2018), however this work clarifies the conceptual and theoretical foundations for such an approach. Given their likely shared mechanisms, proactively promoting well-being should mean that fewer problems (e.g. burnout) arise, as these problems often occur in the absence of conditions that promote well-being. Ultimately, it is argued here that we should be aiming for more than a reduction or absence of problems, as this does not mean that doctors are flourishing in their work.

Currently, medical education policy in the UK does not specify what is meant by well-being. For example, current GMC policies state that medical graduates should be able to manage their well-being (GMC, 2018) and medical education institutions should support learners to do so (GMC, 2015). Therefore, it remains open to interpretation by medical education institutions whether well-being therein refers to reducing the prevalence of problems like burnout, or actively promoting learner well-being and flourishing. As the following sections argue, problems with well-being are sustained by a range of environmental and individual factors, so system level change is needed to address the causes (Thomas et al., 2018). It could be argued that it is not the role of regulators like the GMC to prescribe what is meant by well-being or how to improve it. However, in the context of widespread well-being related issues in medical education and practice, and wide-ranging implications for individuals, organisations, and ultimately patient care (see 1.1), perhaps greater direction through policy is necessary for change. This research provides information for policymakers seeking to address problems with well-being. Specifically, the refined theory explains how environments and individuals interact to affect well-being and learning during

the clinical training transition. Specific and general recommendations for supporting well-being and learning were developed from the refined theory, and could be used to inform both educational practice and national and local policy.

8.3. Refined theory of well-being and learning during transition

The refined theory of well-being and learning in the clinical training transition setting (Figure 8-1) summarises the key findings from this programme of research. It indicates the types of contexts (individual and environmental) that influence well-being mechanisms in the transition setting (both directly and indirectly), and the links to learning. In particular, well-being and learning are affected by contextual interactions changing the extent to which: (1) students' participation, belonging and role clarity are supported; and (2) students have sufficient resources to overcome challenges.

8.3.1. Participation, belonging and role clarity

The transition to clinical training is a difficult and stressful experience for students, who often report feeling unprepared for it (Atherley et al., 2019; Surmon et al., 2016; Teunissen and Westerman, 2011). Various factors contribute to these experiences, including students' perceived gap in skills/knowledge, difficulty applying theory into practice, not understanding the clinical environment, role ambiguity, and increasing time and workload pressures. However, the reasons why these factors contribute to well-being was not established. The refined theory offers insight into this.

The findings explain that for better learning and well-being during the transition, students need participation, belonging, and role clarity, however environments varied in the extent to which they facilitated these. Welcoming learning environments, where students were involved in clinical activities and guided by teachers, were beneficial for learning and well-being because they provide these conditions, activating the basic psychological satisfaction well-being mechanism, and the learning mechanisms. While less welcoming learning environments generally hinder the activation of students' well-being and learning mechanisms, some students were able to self-facilitate participation, belonging and role clarity, particularly those with higher readiness and SDL. However, the students with these resources had developed them through their past experiences, such as working previously in healthcare settings, rather than the pre-clinical curriculum.

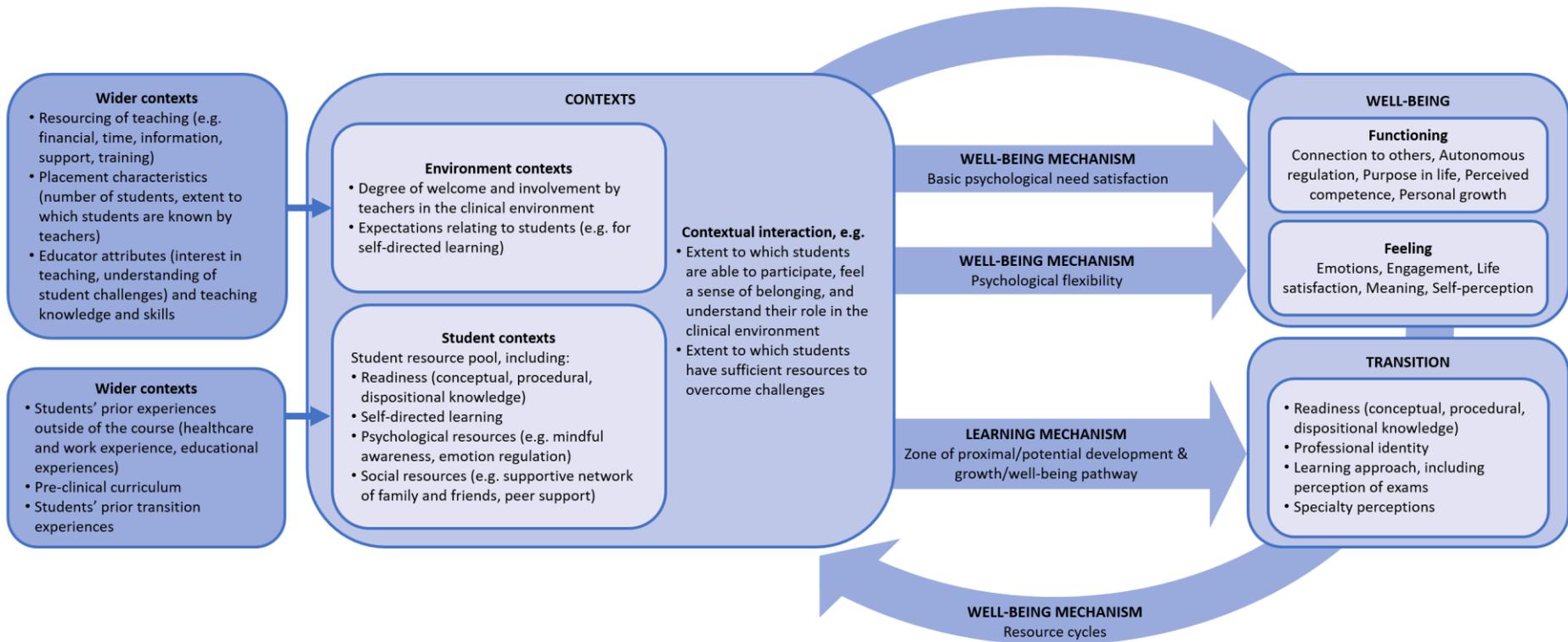


Figure 8-1. Model of the refined theory of well-being and learning in the clinical training transition setting.

The findings from this research explain why students often feel unprepared for transitions. If they have limited resources, especially readiness (Billett, 2015), then they have insufficient knowledge to learn in the clinical setting, particularly in the absence of welcome and guidance from teachers. Readiness as a concept was found beneficial to extend our understanding of preparedness, which can be conceptually muddled (Ottrey et al., 2021). Although readiness is also focused on knowledge, this is broadly conceptualised and the dispositional domain, relating to knowledge of social norms and values and socialisation, seemed particularly relevant to students' experiences. Others have also found the socialisation side of the transition is challenging for students (Malau-Aduli et al., 2020; Pitkala and Mantyranta, 2003). The realist investigation found that students had greater comfort in the clinical environment if they already had existing knowledge of the social norms and practices there from prior socialisation, which has been found elsewhere too (Walker et al., 2017). Future research might also benefit from using readiness, as well as the other resources identified in this work, to help understand preparedness and develop the knowledge base around transition.

The majority of the clinical training transition literature has focused on the initial transition and the preparation before this, reflecting the more typical conceptualisation of transition in medical education as an event, rather than as an ongoing developmental process (Gale and Parker, 2014). The findings herein extended the conceptualisation of transition from an event to an ongoing process, in alignment with others (Gordon et al., 2020; Teunissen and Westerman, 2011). This facilitated a longer-term understanding of transition experiences, highlighting how the difficulties experienced early on in transitions can extend into clinical training. For example, if students with lower readiness coming into clinical training are not supported by teachers to develop their readiness, then they will continue to have difficulties engaging in effective clinical learning, affecting their preparation for clinical practice.

Considering transition as an ongoing process aligns with related areas of research, such as professional identity formation, which Jarvis-Selinger et al. (2012) have argued occurs over time, not as a gradual change but in a series of identities throughout the different roles of medical education. Professional identity formation occurs through emerging 'crises', each of which "profoundly influences the aspiring physician's understanding of what it means to 'be' a doctor" (Jarvis-Selinger et al., 2012, p. 1186). The findings from this thesis indicated that professional identity is also formed during positive experiences, in which the student was inspired by a teacher. Therefore, it seemed that the processes beneficial for well-being also

support professional identity formation, through the psychological processes of identification and integration, which underlie socialisation (Ryan and Deci, 2017). This suggests that supporting well-being will also facilitate students' professional identity formation, aligning with the dispositional knowledge domain of readiness (Billett, 2015), helping them understand what it means to be a doctor, and therefore supporting their wider learning.

Other researchers have also highlighted the importance of considering the clinical learning environment and its impact upon learning processes. The findings from the work in this thesis around the learning climate are aligned with other medical education research, highlighting the importance of psychologically safe learning environments that provide the conditions and opportunities for optimal learning, such as high-quality feedback, connection, and participation (Bynum and Haque, 2016; Caverzagie et al., 2019; Lefroy et al., 2015; Torralba et al., 2016; Torralba and Puder, 2017). Psychologically safe environments enable students to engage in the difficulties and risks of learning medicine, without having to focus on performance (Bjork and Bjork, 2011; Bynum and Haque, 2016). These same conditions have also been discussed as necessary for the optimal development of readiness and capability, which are necessary for later clinical practice and learning (Billett, 2015; Fraser and Greenhalgh, 2001). These findings align with other areas of research, such as the importance of civility in clinical practice (Katz et al., 2019). In the absence of welcome and civility from people in the clinical environment, or a sense of psychological safety, it is unsurprising that many students find engaging with clinical learning challenging and problematic for both learning and well-being.

8.3.2. Overcoming challenges

Medical students report experiencing difficulties maintaining their well-being into and through the clinical training transition. The findings of this work indicated that student well-being is affected throughout the transition by their learning experiences, engagement with well-being supportive activities, and their resource pools, which are all interlinked. Clinical training often contains difficult experiences, whether relating to the environments students find themselves in or the general difficulties of learning medicine (Bynum and Haque, 2016), and resources help students to overcome those difficulties. As outlined above, learning resources, such as readiness and SDL, make the transition experience easier because students are already familiar and comfortable with the new environment. Other resources,

such as psychological and social resources were beneficial to help students overcome difficult environments or situations through psychological flexibility or external support.

Students can exert some influence over their own well-being by engaging in well-being supportive activities, which improve well-being through basic psychological need satisfaction and sometimes physiological need satisfaction. Students reported engaging in a variety of activities, aligning with other research that has also showed students' self-care activities to be wide-ranging (Ayala et al., 2017). However, the pressures of the course (time, workload) mean that students have to prioritise these over other activities like studying, which depended on their wider learning experiences and resources, such as motivation and performance. For example, students with higher exam self-efficacy felt more able to prioritise well-being supportive activities over studying than those who feared failing, indicating lower self-efficacy. This aligns with Bandura's (2006) work in which personal agency is dependent on resources and circumstances; those with higher self-efficacy attain more highly and are more able to influence their own development. Similarly, in medical education, higher self-efficacy in medical students was associated with mastery approach goals related to improvement and gaining competence (Babenko and Oswald, 2019). This further highlights the interlinked nature of learning and well-being, as learning resources are supportive of engagement in activities promoting well-being.

Students' resource pools also influenced their well-being, both directly and through their influence on other experiences. Students with larger resource pools are more likely to be able to overcome challenges, drawing on psychological, social and other types of resources to help them to get through difficult experiences. The points above highlight this, as students with more resources have better transition experiences and are better able to prioritise their well-being, so this becomes self-perpetuating. It is important to recognise the role of resources, and how these can influence students' experiences, as many may not be within students' ability to access or control. Hobfoll (2002) argued that resources not only facilitate success but often the route to success is made easier for individuals with certain resources. Therefore it is important not to misattribute success or failure to an individual and their efforts, when social biases may have benefited or hindered them. This could be seen within the findings of the work in this thesis; students with stronger resource pools are at an advantage in many ways and this translates into their success, while other students have less favourable experiences because they do not have certain resources. This has also been found by other researchers, for example, some students are better able to speak the 'insider' language of medicine due to their background, providing them with an advantage, as learning

this language is part of the hidden curriculum (Wong et al., 2021). These findings, alongside those from the thesis, further supports the idea of considering both the environment and student context interactions and their role in determining student participation and performance.

Resources, both internal and external, are central to well-being and learning. Medical schools have less influence over students' resource pools as they come onto the course. However, by proactively developing resource-rich environments and facilitating resource acquisition, students can be supported to develop stronger resource pools. The findings herein have highlighted the interlinked nature of well-being and learning, so improvements to learning experiences promote better well-being. This will also support the goal of medical education to develop not only competent doctors, but also those who enjoy their roles and can sustain them across their careers. However, this requires a change in the focus from individual responsibility for learning and well-being, to a shared responsibility and acknowledgement of the role of the environment.

8.3.3. Considering environments and individuals

The refined theory from this work highlights the importance of considering how both environmental and individual contexts are affecting the activation of the three well-being mechanisms. However, the discourse around the profession often emphasises individual responsibility for things like well-being, rather than the shared responsibility of systems and individuals. For example, the GMC policies discussed earlier talk about learners being responsible for their own learning, health and well-being (GMC, 2018, 2015). This individual focus can also be seen in transition courses that aim to provide specific skills or knowledge to learners to increase their perceptions of preparedness ahead of transitions (O'Brien and Poncelet, 2010; Poncelet and O'Brien, 2008).

Others have highlighted and challenged similar discourse focused on the individual in the area of competence (Lingard, 2009), through the dominance of cognitive learning theories (Morris, 2019), and the emphasis on individual factors through transitions (Kilminster et al., 2011). The refined theory arising from this work supports these authors' challenge of the individual focus, providing evidence for the importance of both environmental and individual contexts in well-being. While individuals can and should take responsibility for their well-being, this cannot be in the absence of environment support, as the environment has significant impact and individuals alone cannot overcome difficult environments. The findings from this work and others' highlight how the absence of these basic conditions is

detrimental and the interaction between the student and the environment needs consideration to optimise learning and well-being. Perhaps these basic requirements seem too obvious to include in policy; but as they are not consistently offered, their importance should be emphasised.

8.3.4. Wider issues affecting contextual interactions

The findings from the realist review and investigation indicated that environmental contexts are not consistently providing students with the conditions to optimise their learning and well-being. Several wider contexts were found to inhibit the availability of those conditions, further illustrating the role of environmental factors, and these are discussed in relation to the wider issues of learning and well-being.

8.3.4.1. Wider issues with learning

Several challenges for learning and well-being were identified in the current practices of clinical training through the realist investigation. Chiefly, there seems to be a contradiction in the design and delivery of clinical training; students are expected to be self-directed learners and facilitate their own learning and participation, but the pre-clinical curriculum does not typically prepare them to do this. Educators respond more favourably to students who can meet these expectations, but those students are already well prepared for learning, given their prior experiences and resources. In contrast, students who need educator guidance to develop their learning resources are perceived less favourably, inhibiting their learning. This can be linked back to the earlier point about misattributing student learning engagement to their capacities rather than their resources (Hobfoll, 2002); students should not be blamed for poor participation and self-direction when their capacity for these is limited by their available resources.

This expectation for independence of learning contradicts learning theories relevant to work-based learning, in which learning is a social process requiring engagement from the teacher and student (Morris, 2019; Stockdale and Brockett, 2011). There are two perspectives of learning, learning-as-acquisition and learning-as-participation (Sfard, 1998). Learning-as-acquisition views learning as an individual pursuit, in which the learner acquires knowledge from outside sources. Learning-as-participation views learning as a social process, in which the learner develops knowledge through their interactions with other people, environments and situations. Medical education has historically been dominated by the learning-as-acquisition perspective, neglecting the importance of learning-as-participation,

especially for work-based learning (Morris, 2019, 2018). While both approaches are important for learning (Sfard, 1998), in clinical training, learning to become a doctor involves participating in the practice of medicine, or learning-as-participation, which increases students' readiness and capability for working as doctors (Billett, 2015; Fraser and Greenhalgh, 2001; Lave and Wenger, 1991). However, learning-as-participation seemed to be problematic for students in several ways.

While educators talked about the importance of students participating in the clinical environment, students often did not understand this or know how to do this. Additionally, there seemed some mixed messaging. Educators, while promoting the learning-as-participation approach, often also emphasised how students needed to be self-directed in their learning. But there seemed sometimes an absence of recognition that SDL still requires guidance from the teacher (Stockdale and Brockett, 2011), especially early on when students are novices. Other research has also emphasised this, for example Blitz et al. (2019) found that students struggled to direct their own learning in the clinical environment and therefore suggested teachers guide this. The curriculum can also play a role in reinforcing the learning-as-acquisition approach through knowledge-based learning objectives and assessments, and placement design emphasising formal teaching over participation (Kaufman, 2019). Upon reflection, the previously discussed emphasis on individual responsibility in medical education can be seen here too, as educators are not recognising the interaction between the environment and the individual in determining student engagement with learning in the clinical environment. Students need to be guided to develop the self-direction and readiness that facilitate their own learning.

Some of these issues may have roots in historical changes to teamworking in the NHS. Previously, traditional medical firms functioned as a team environment in which medical students and others could learn, although the experience was inevitably variable (RCP, 2018; Rimmer, 2019). However, teaming working in the NHS has changed for various reasons, including the introduction of the European Working Time Directive and changes to medical education in the UK, resulting in dissolution of the firm (Black and Jones, 2010; Clarke et al., 2014; Rees and Stephenson, 2010; Rimmer, 2019). Previously the medical firm structure would have naturally provided the conditions for a learning-as-participation approach through an apprenticeship model. However, in the absence of firms, clinical learning environments inconsistently provide the conditions needed for these processes, so students have difficulty learning-through-participation. The findings of this work highlight some of the distant and closer contexts inhibiting well-being and learning processes for students.

The learning climate that students perceive is determined by the willingness and ability of teachers and/or members of the clinical team to welcome and involve students, which was found to be affected by wider environmental contexts. These wider contexts include the teacher's own attitudes and skills, aspects of placement design affecting the degree to which students are known by teachers, resourcing of teaching affecting the extent to which teachers feel able to engage in teaching, and the wider culture and values around teaching within the organisation. Literature considering the nature of the clinical learning environment in postgraduate settings has also reported similar factors affecting the clinical contexts in which teaching is delivered, affecting the processes of learning (Caverzagie et al., 2019; Chan et al., 2019; Gruppen et al., 2018; Philibert et al., 2019). While teaching and learning in clinical settings will always present challenges, change is needed to consistently facilitate the conditions that support learning and well-being. Without change, it will continue to be difficult to achieve the goals of medical education and optimally develop future doctors.

8.3.4.2. Wider issues with well-being

The findings from this work and the wider literature indicate that students are not being optimally supported to manage their well-being, which is a required outcome for medical graduates in the UK (GMC, 2018). In this programme of research, students talked about the challenges they perceived in learning how to manage their well-being when this was sometimes met with scepticism from senior doctors, or they observed NHS staff not looking after themselves. Therefore, it is necessary to consider what students are learning about managing well-being through the hidden curriculum of medical school.

The practices and discourse around well-being reflect the culture of medicine. Traditionally, medicine has emphasised the physician as self-sacrificing, placing the interests of patients above their own (Bishop and Rees, 2007). This culture is based on historical contexts and values, such as few doctors caring for many patients (Shanafelt et al., 2019). However, this historical perception of the doctor as self-sacrificing is no longer serving the profession, given the high prevalence of problems like burnout (Bishop and Rees, 2007; Shanafelt et al., 2019). In one study, physicians felt the compassionate values of the profession did not extend to themselves, and that professional and organisational norms inhibited aspects related to well-being (LaDonna et al., 2022). Reflecting upon this, when self-sacrifice leads to problems that reduce doctors' capacity to deliver high-quality patient care, then the goals of medical education are hindered, and culture change is needed. A supportive

approach to well-being is needed that emphasises well-being as part of being a doctor and actively promotes resources to build students' and doctors' well-being and capacity for resilience.

Others have talked about the problems associated with components of the medical culture in terms of well-being, and how there needs to be wider system level change rather than the continual focus on the individual to cope with the challenges (Atherley and Meeuwissen, 2020; LaDonna et al., 2022; Shanafelt et al., 2019). The emphasis on individual responsibility for well-being and resilience was also seen within this research, around the dialogue about students needing to develop their resilience through difficult experiences. However, as discussed earlier, resilience depends on both internal and external resources (Windle, 2011), so both environment and student interact to affect their capacity to overcome challenges. The emphasis on individual responsibility promotes an unhelpful narrative that hinders rather than supports well-being. Placing the emphasis on the individual to cope, or be resilient, places further burden on them as they feel inadequate when they are unable to do so (Atherley and Meeuwissen, 2020). This can lead to doctors hiding mental ill-health and not seeking help (Carrieri et al., 2020). Furthermore, individual level interventions, for example resilience-building, in the absence of system changes can lead to resentment, as physicians can feel the wider causes of problems are not being addressed (LaDonna et al., 2022).

In contrast, interventions that improve doctors' mental health are those that encourage belonging and relationships, people-focused working cultures, and organisational commitment to improving well-being (Carrieri et al., 2020). One medical school's well-being initiative resulted in reduced adverse mental health outcomes for students in the early years of the course by recognising the learning environment as a source of stress, reducing academic load, and adopting a compassionate approach to student support (Slavin, 2019). Considering these findings alongside those from this research again highlights the importance of the environment for well-being. While individual level interventions may be beneficial in increasing individual resources, without wider environmental changes, people will continue to have problems, as they are not receiving the environmental resources needed to replenish their internal resources and promote well-being.

Most students graduate medical school, but if they are not supported by the environment to learn and develop the resources that they need or to maintain their well-being, then they are missing an opportunity to maximise their development for subsequent stages of medical education. Moreover, for optimal learning and well-being, students should be using their

resources to manage the challenges of learning to become a doctor itself, not to compensate for unhelpful environments. The learning process is already demanding (Bynum and Haque, 2016), and medicine is inevitably a challenging profession (Bynum et al., 2021), given the cognitive and emotional demands of the work. However, this difficulty need not be exacerbated by unhelpful learning and working environments, as this is counter-productive for developing doctors who can deliver high-quality patient care. Resilience and well-being are about resources, so environments need to facilitate resource acquisition not depletion, so individuals can meet the demands of their roles. This aligns again with taking a proactive approach to well-being and learning, in order to optimise doctors' development and practice.

8.3.4.3. Implementing change

To achieve the optimisation of well-being and learning, it is necessary to not only take a proactive approach that acknowledges the environmental as well as individual factors, but also to acknowledge the complexity of these issues. Medical education has tended to rush to develop solutions to problems, without first understanding the underlying causes (Ajjawi and Eva, 2021; Bynum et al., 2021; Cook et al., 2008). Complex problems, such as those discussed in this work around well-being, will not have simple solutions. Seeking out simple solutions at the individual level to address complex problems at a system level is reductionist, and likely to be an unsuccessful endeavour. Instead, our research needs to unearth the causes of problems, including how these causes vary between different people and places, using this knowledge to develop solutions that address the different elements of the system sustaining the problems, and adapting these solutions to different settings and changes over time.

There will inevitably be barriers to changing the issues outlined within this thesis and to implementing the changes suggested below in the recommendations. However, system-wide change is needed to resolve the complexity of interacting factors affecting well-being (Atherley and Meeuwissen, 2020; Shanafelt et al., 2019; Thomas et al., 2018). It is argued here that that promoting well-being would be a valuable endeavour. Others have argued similarly, highlighting for example the financial, as well as ethical, arguments for addressing physician burnout (Shanafelt et al., 2017). Institutions, both local, such as medical schools, and national, such as the GMC, need to consider what value improving well-being has for them and how the barriers can be overcome if the outcome is valued highly enough.

8.4. Recommendations

The recommendations developed through this programme of work are summarised in Figure 8-2. They concern changes to the wider contexts (environment and student) in the refined theory, in order to create the conditions needed for optimal learning and well-being. The recommendations take the form of principles based on the theory, rather than suggestions for specific interventions, as these would depend on the specific local settings. The recommendations include specific recommendations for different transition phases, as well as general recommendations for improving well-being and learning. Together with the refined theory, the recommendations can be used to develop local and national policy, as well as identify why problems might be arising in specific settings, informing the design of targeted interventions.

Some of the recommendations suggested may already be happening in some medical schools and clinical settings, however the realist review and investigation suggested that the conditions supportive of well-being and learning were not consistently implemented. Future research could compare students' transition experiences within different medical schools with different practices to establish where and for whom different interventions help well-being and learning, and also to learn how the principles from the recommendations can be applied in different settings with different circumstances, such as numbers of students.

8.4.1. Specific recommendations for each transition phase

Transition was conceptualised as an ongoing process within this research. The findings indicated different recommendations at different points within the transition. Therefore, to help structure these recommendations, Nicholson's (1990) transition cycle (Figure 1-2) was used as a framework to consider what needs to be done to support learning and well-being at different points in the clinical training transition. The preparation phase concerns the period of time before the transition into clinical training and getting students ready for the new role. The encounter phase relates to the first few days and weeks of clinical training. The adjustment phase relates to students developing and increasing their readiness for working as a doctor. The stabilisation phase is about students having obtained a steady level of performance at the required standard to graduate medical school. The specific recommendations for each of Nicholson's phases are considered in turn.

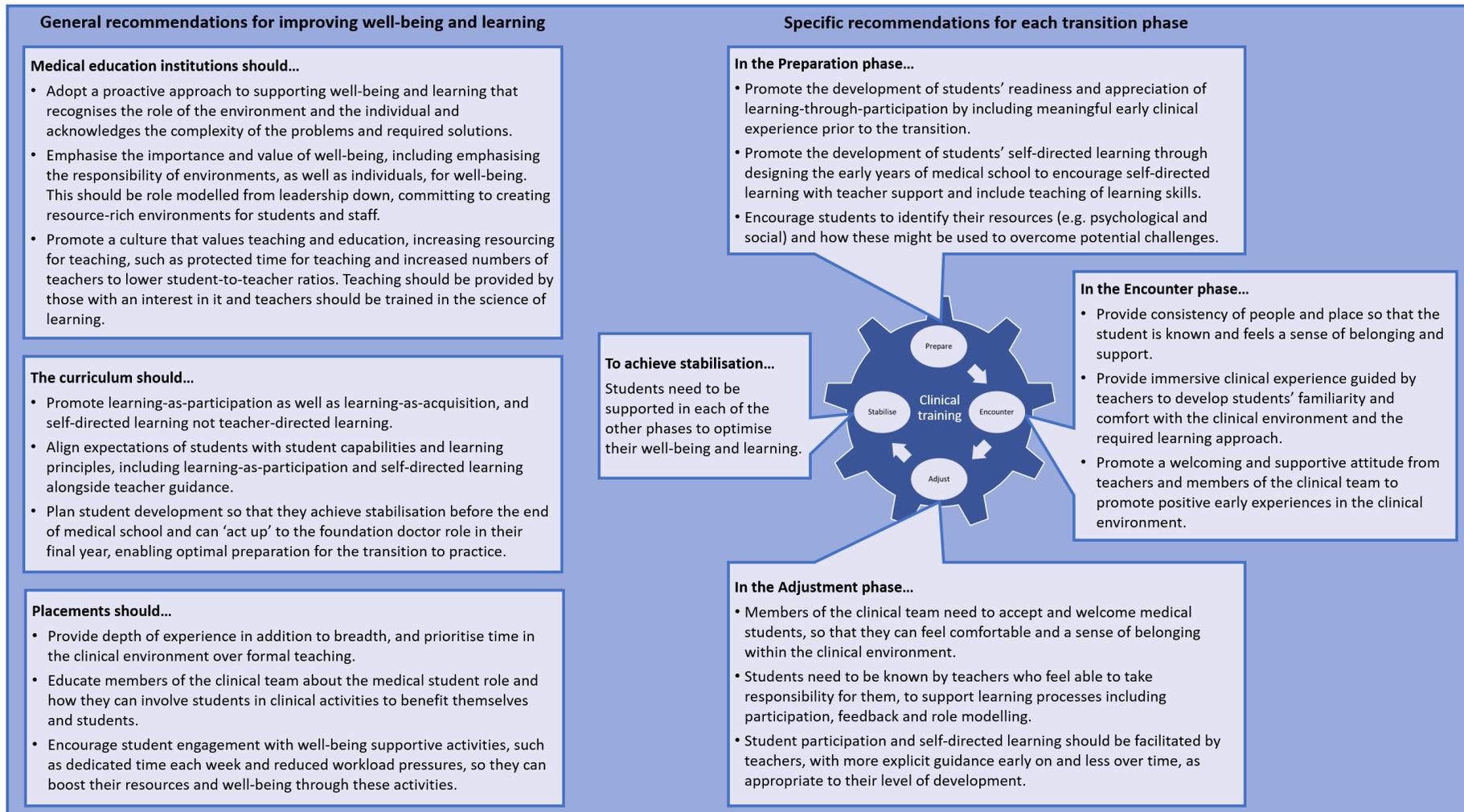


Figure 8-2. Summary of the general and transition phase specific recommendations arising from this work.

8.4.1.1. Preparation

Overall, it seemed that the students with the highest readiness for the transition to clinical training, i.e. the best preparation, had obtained this through experiences outside of the pre-clinical curriculum, rather than through the direct actions of the course. Therefore, the pre-clinical course does not facilitate the readiness needed to engage independently. The recommendations here are about what needs to be done before the move into clinical training, in the pre-clinical curriculum, to get students ready and ease the transition. In particular, the recommendations outline measures that might help promote the students' resources, especially readiness and SDL.

Readiness is improved through authentic participation (Billett, 2015), so students need authentic clinical experiences prior to clinical training to increase their familiarity and comfort with the clinical environment. However, transition courses have generally focused on skills and knowledge, without incorporating authentic clinical experience (O'Brien and Poncelet, 2010; Poncelet and O'Brien, 2008). Researchers have therefore argued for greater emphasis on clinical experience as the way to help prepare students for the transition and support their learning early on in placements (Dornan et al., 2007; Dornan and Bundy, 2004; O'Brien and Poncelet, 2010; Poncelet and O'Brien, 2008). Some interventions have considered how to provide this. One experiential transition course found improved student satisfaction, compared to a classroom-based course, however resident and faculty ratings of students were not significantly different (Chittenden et al., 2009). Others have tried to provide clinical experience through shadowing experiences with existing clinical students (Gokhale and Chudgar, 2018), as well as providing training in HCA roles (Anderson and Patel, 2020; Davison and Lindqvist, 2020). In the research in this thesis and elsewhere (e.g. Walker et al., 2017), prior work in healthcare was beneficial for increasing readiness, especially dispositional knowledge. However, it was noted that many of the initiatives to increase clinical experience ahead of the transition have been short in duration and it is unclear how much experience and what format is needed to develop a beneficial level of readiness, so this could be explored in future research. The research discussed in this thesis suggests that more than a few days of HCA training would be needed, as the students with the most readiness had worked for significant periods prior to starting medical school. Furthermore, the findings from this thesis suggest that good preparation was tied into other contexts, such as SDL, not clinical experience alone. Many initiatives, such as the HCA roles, have been voluntary, so it would also be necessary to investigate the effects of voluntary compared to

mandatory experiences, as students' motivations for such work are likely to affect their engagement and learning.

Authentic clinical experiences prior to clinical training are also likely to support students' understanding of the required learning approach in clinical training. If students have already gained experience participating in clinical environments and learning benefits of this, it would make them more likely to recognise the importance of the learning-as-participation approach in the clinical environment. However, the experiences need to be meaningful and not tokenistic, for example involving some participation on the ward or a GP clinic, rather than simply visiting.

Curriculum design can also influence students' SDL. Kaufman (2019) argued that the curriculum, including assessment, often rewards teacher-directed and fact-oriented (or learning-as-acquisition) approaches, and does not encourage SDL and participation. So teaching students the processes of SDL early on could be beneficial (Kaufman, 2019). Problem-based learning (PBL) curriculums may support the development of SDL. White (2007) reported PBL helping students to acquire the required learning approach, although others have argued that there is mixed evidence for PBL improving SDL (Loyens et al., 2008). Future research could explore this, examining how and why PBL might support the development of SDL through underlying causes, and how PBL needs to be designed to achieve this.

One of the challenges around understanding how to improve SDL is that it is not always clearly conceptualised, and is often used interchangeably with SRL (Loyens et al., 2008; Saks and Leijen, 2014). Stockdale and Brockett (2011) argue that SDL has a behavioural component, which is about being self-directed in specific learning circumstances and includes SRL, and a personal component, which is about the learner's beliefs and attitudes towards self-direction. In the findings discussed in this thesis, SDL as a context came out of the analysis of the educator data, so was not explored in-depth in the student interviews. Nonetheless, these two components did seem relevant, as there seemed to be differences in students' preferences for self-direction and in their capacity to be self-directed in their learning, with the latter linked to readiness. SDL is also conceptually interlinked with other key learning concepts, such as self-efficacy and motivation, which are argued as part of the personal component (Stockdale and Brockett, 2011). This was supported by the findings from this research which indicated this interlinked nature, with self-directed students also those who felt more confident and self-efficacious. However, these links could use further exploration to determine the causal relationship, as this remains unclear. Although Stockdale and

Brockett (2011) have operationalised the personal component of SDL with self-efficacy and motivation, these are concepts with their own causal powers, and it is unclear whether the personal component of SDL is the same as being self-efficacious and intrinsically motivated, or whether these cause the preference for self-direction. This is important as it has implications for what it means to be self-directed in learning and how this can therefore be improved. Further research can focus on exploring the two components of SDL in more detail to establish how they influence learning and well-being, and their relationship to other learning concepts and contexts.

Finally, developing students' resources in general ahead of the transition would be beneficial, but is more variable depending on the student. Helping students to identify their existing resources (e.g. psychological, social) and how they might use them to overcome common challenges, could be one approach. Individual level interventions to improve specific resources may be beneficial, for example evidence suggests that mindfulness, linked to mindful awareness, may contribute to reductions in stress and anxiety (Warnecke et al., 2011). However, as discussed earlier, individual interventions alone will not be enough, and need combining with positive changes to the environments in which students learn. For example, one initiative reduced adverse mental health outcomes using a combination of approaches, including changes to the learning environment and a resilience curriculum (Slavin, 2019). Positive experiences help to build resources generally and pre-clinical learning environments should also be supportive of students' basic psychological needs.

8.4.1.2. Encounter

Students need to have positive, supportive and guided experiences in the early stages, enabling them to develop their learning approach as an important resource for the rest of their clinical training. In the findings from this thesis, students' readiness was improved not only through prior healthcare experience but also by supportive early placements where students were known and guided to get used to the clinical environment. So a combination of prior experience and supportive early experiences seems beneficial, although this needs further exploration in the research, including investigating the benefits of one, the other or both for optimising learning and well-being.

Early placements would ideally provide consistency of place and people, with students spending extensive periods of time in a clinical environment where they are known and supported. Staff and educators need to be supportive, open and friendly towards students, so that they feel psychologically safe to participate in unfamiliar settings where they are likely

to make mistakes (Bynum and Haque, 2016; Caverzagie et al., 2019; Torralba and Puder, 2017). It is important that early placement experiences build a positive perception of the clinical environment so that students feel confident engaging with it in their subsequent placements. Students should be guided to have positive clinical experiences, through which they can improve their readiness and learning approach, gaining appreciation for learning-through-participation and self-direction. This will provide students with useful resources for later placements.

To facilitate these conditions it would be beneficial for placements to be designed with uninterrupted periods in the clinical environment, with teaching staff available to guide students. Longitudinal clerkships are more likely to provide beneficial conditions for learning and well-being, as they facilitate students knowing educators and the social processes of learning (Brown et al., 2019; Holmboe et al., 2011). Balmer et al. (2015) found that students on a longitudinal placement used their resources for learning, while those on rotational placements used them for competing and being noticed by doctors. Consistency of people and place serves to reduce students' extraneous cognitive load, enabling them to better engage with learning tasks (Colbert-Getz et al., 2016; Young et al., 2014). Reflecting upon the literature and the work in this thesis, longitudinal placements likely more closely mirror the historical firm working conditions, discussed earlier, more naturally creating conditions supportive of learning and well-being. However, longitudinal clerkships are not always feasible, and short placements were sometimes found to provide beneficial conditions. However, as rotational placements do not naturally create these conditions, they require deliberate design and teacher engagement to achieve them. The report '*Never too busy to learn*' emphasises how learning opportunities are available even in busy clinical workplaces, both within commonplace clinical activities or through novel activities (RCP, 2018). While these can fit alongside existing activities, they do require teachers' consideration to implement.

8.4.1.3. Adjustment

This work extended the existing literature by considering transition as an ongoing process affecting learning and well-being beyond the first few weeks of clinical training, because the issues experienced early on can extend into clinical training. This ties the work into other areas of medical education, such as learning environments and learning theories. To optimise the development of future doctors, there is a need to support students to have optimal learning experiences, which the findings of the work in this thesis indicated was not

happening for all students or in all environments. If students are not supported to develop optimally, then they will not have developed sufficiently to stabilise and optimally prepare for the next transition.

The recommendations here build on the foundations of the suggestions from the preparation and encounter phases. They highlight the need to create welcoming learning climates that provide supportive conditions for learning and well-being, building and replenishing students' resources and making a positive developmental and well-being trajectory more likely. As outlined earlier, psychologically safe learning environments provide the conditions for beneficial learning processes, such as high-quality feedback, connection, and participation (Bynum and Haque, 2016; Caverzagie et al., 2019; Lefroy et al., 2015; Torralba et al., 2016; Torralba and Puder, 2017), which support the development of desirable outcomes, like readiness (Billett, 2015) and capability (Fraser and Greenhalgh, 2001). There needs to be a welcoming attitude towards students and they should be included in the team to make them comfortable for learning. There should also be consistency in their contact with teachers and staff, so that they are known, as this is needed for connection and learning processes like feedback and role modelling. It is also important to recognise that even though students should be self-directed in their learning, this requires facilitation by others, as part of the social processes of learning-as-participation. Therefore, students need to receive guidance from teachers and be facilitated in their participation and SDL, with the level of guidance adjusted throughout clinical training to match their level of development.

8.4.1.4. Stabilisation

Students need to stabilise before the end of medical school so that they can begin preparing for practice. This means that they can then plan ahead to the next transition and begin their preparation for that new role. This phase also relates to students' perceptions of the profession following their experiences, such as organisational commitment and job satisfaction linked to retention and sustainable careers (Arnold et al., 2020). However, the findings of this research indicated variation in the extent to which students were likely to reach this phase within clinical training. Some penultimate year medical students seemed to have developed sufficiently to feel confident in their performance and think ahead to foundation training. Whereas, some final year students were unable to think beyond their exams.

The reasons that students do not reach stabilisation within clinical training relate to the factors already discussed within the other phases: students were not optimally prepared

ahead of the transition, so they had difficult initial encounters, and were not consistently supported in their learning and well-being. In these situations, students are more likely to focus on passing their exams and rely on later transition to practice courses or learning on the job, but this is missing out on an opportunity to be better prepared for practice and optimise those experiences. Therefore, while most students get through medical school, it is important to think about optimising the experience so that they are best prepared to work as doctors and able to deliver high-quality care.

Fraser and Greenhalgh (2001) have argued that preparation for the complexity of clinical practice goes beyond competence to consider capability, which is an individual's adaptability and capacity for ongoing development and improvement. Capability is similar to the idea of contextual competence, which acknowledges that competence is situation dependent (Teunissen et al., 2021). However, these outcomes require students to have developed a sufficient foundation of knowledge to then be able to consider how this is adapted to different contexts (Teunissen et al., 2021). In considering these concepts alongside the findings from this thesis, the development of capability is important to achieve the goal of developing doctors who can provide high-quality patient care. However, the opportunity for this to develop within clinical training is not being fully realised when sub-optimal environmental conditions hinder learning and well-being. Developing optimal capability requires students to be proactively supported in their learning and well-being throughout the transition in the ways outlined in these recommendations.

8.4.2. General recommendations for improving well-being and learning

Beyond the specific recommendations for different points of the transition, general recommendations for promoting well-being and learning across the transition were identified. The findings of the work in this thesis highlighted how wider contexts inhibit the contextual interactions needed for good well-being and learning, so these recommendations reflect those wider processes.

Several wider contexts can inhibit teachers' capacity to welcome, involve and guide students, loosely falling into three overlapping areas: curriculum design; approach to teaching; and placement design. With regards to curriculum design, this needs to promote learning-as-participation as well as learning-as-acquisition, and SDL not teacher-directed learning, to encourage deeper and strategic, not surface, learning (Grant, 2019). Expectations for students should be aligned realistically to all students, not just the best students, and aligned with learning principles, including teacher facilitation of learning-as-participation and

SDL. Students should also be expected to 'act up' to the foundation doctor role by their final year to prepare for practice, i.e. achieving stabilisation, rather than emphasising transition to practice courses.

Considerations around the approach to teaching include promoting a culture that values teaching and education, including wider acceptance of students in clinical environments. It also means increasing resourcing for teaching, including numbers of teachers so there are lower student-to-teacher ratios, enabling guidance of students, and training teachers in the science of learning so they are able to effectively promote student learning. Finally, educating other members of staff in the clinical team about the medical student role would better enable them to welcome and involve students.

Considerations around placement design include facilitating consistency of contact with teachers who take responsibility for students, so students are known and guided by a teacher. The nature of guidance should change throughout the course as students gain experience and readiness. Opportunities for feedback should be provided within clinical activities. Emphasis should be placed on the psychological safety in the clinical learning environment, to facilitate the social processes of learning. There should also be an emphasis on time in the clinical environment, rather than formal teaching. Finally, depth of experience, not just breadth, should be emphasised to facilitate student development. One challenge might relate to students looking forward to experiencing a wide variety of wards (Scott et al., 2022), so students' expectations need to be managed alongside designs supporting well-being and learning. While longer placements are likely to be helpful to support the suggested changes, shorter placements can also provide beneficial conditions through good design.

Furthermore, as argued throughout this discussion, a proactive approach to supporting well-being is needed within medical education. At the student-level, students should be supported to engage with well-being supportive activities, for example through dedicated time each week and reduced course pressures, so they can boost their resources and well-being through these activities. In one well-being initiative, reduced academic load in the early years supported improved mental health outcomes without affecting academic outcomes (Slavin, 2019). However, the same initiative also prioritised creating a supportive and compassionate culture. Without organisational support and change, individuals are less likely to engage with individually focused initiatives (LaDonna et al., 2022). Therefore, at a higher-level well-being needs to be valued by medical education institutions and these values need to be role modelled from the leadership and policy-level down, including recognition of the importance of environment on well-being and learning. Similarly, there needs to be

organisational commitment to improve learning environments to increase resource-provision.

8.5. Strengths and limitations

The specific strengths and limitations of each component of this programme of research have been discussed within the relevant chapters. This section considers the strengths and limitations of this programme of research as a whole.

The use of realist methodology facilitated a novel contribution to the existing literature, as the ontologically deep understanding of causality facilitated a better understanding of the causes of problems around transition relating to well-being and learning. While existing literature had identified some of the contexts and outcomes associated with transitions, this research had typically remained at the empirical level of reality (see 2.2.4.1), describing observable phenomena related to transition. Realist methodology offered a framework within which to consider the underlying causes of changes to well-being through the transition, specifically the context-mechanism interactions affecting well-being. This enabled this research to move beyond describing the problems students experience around transition, to a theory explaining how and why transition affects well-being.

Realist methodology was adapted to problem exploration within this work, and the adaptation was found beneficial as it enabled theory-building around the problem and development of theory-informed recommendations. The findings of this work can be used as a foundation upon which future research and practice can build. As part of this adaptation, incorporating the TIR approach to initial theorising was valuable to establish conceptual and theoretical foundations of well-being for the remainder of the programme of research, and for future research and practice on this important issue.

Inevitably, the programme of research was limited in several ways. It was necessary to focus the work into a scope suitable for a PhD, and the research focused on well-being from a psychological perspective and in relation to medical students. In future research it would be beneficial to explore well-being in other relevant groups, such as teachers, not only to explore how this affects students' well-being and learning, but also the impact for those individuals themselves and other wider-ranging implications. The findings would also likely serve as a useful foundation from which to investigate the well-being and learning of other student groups, with testing and refinement of the theories to integrate different contextual conditions. The research conceptualised transition as an ongoing process, but the research

design itself was not longitudinal given the exploratory nature of the work. However, the findings have theorised the longer-term implications of well-being and learning for the subsequent transition, providing initial theory ideas for future research which can develop, test and refine these. Future research might also consider linking the psychological conceptualisation of well-being in this work to other related concepts, such as wellness (Bynum et al., 2021) and quality of life (Veenhoven, 2013), which encompass broader conceptualisations of positive human experiences.

This research was undertaken through the perspective of an outsider 'looking in' at the experience of clinical training. While this presented some challenges, such as unfamiliarity with the processes involved and the wider medical education literature and practices, it also provided the opportunity to consider the issue through a fresh perspective. As an outsider the researcher was better able to question the current practices, values and norms, having not been socialised into the profession. This meant that the researcher's interpretation would likely be different than an insider conducting the same research project. This has enabled new insights, including identification of some of the contexts, such as educator expectations around self-direction, which have not been discussed in the prior literature. The findings have been presented to medical educator audiences locally and regionally at different stages of the research, and feedback from these has indicated that the new perspectives offered on the issues aligns with insider experiences, but enabled them to better understand their practice. This highlights the benefit of the outsider perspective and also indicates the credibility of the developed theories (Wong, 2018).

While conducting and reporting this research, the researcher has maintained transparency in the research processes of this programme of research, so that others can judge the logic of analysis and objectivity of the work (Pawson, 2013) and the rigour, trustworthiness and credibility of the theories produced (Wong, 2018). Scientific realism assumes the fallibility of our knowledge about reality, represented through our theories. Therefore, it is important to acknowledge that the theories presented in this work are not intended to convey the definitive truth about well-being through the transition. Rather, they provide a conceptual and theoretical foundation upon which future research can build. The theories can be used to guide new research endeavours, especially the well-being theory and the refined theory of well-being and learning in the clinical training transition, which are both presented at an abstracted level and applicable across different settings. These theories can be developed, tested and refined in other research, continuing to develop our knowledge of well-being generally, and in relation to transition. One area of helpful future research would

be to examine the practices of different medical schools using the theories from this work as a lens to identify beneficial curriculum designs and other interventions that support well-being and learning through the clinical training transition. The theories are intended to also guide the design of future interventions to target specific aspects of the context sustaining problems with well-being and learning through the transition (Pawson and Tilley, 1997). These interventions should also be evaluated within research, to test out the theories and refine them, further contributing to our knowledge base and capacity to proactively promote well-being and learning.

8.6. Conclusions

The aim of medical education is to develop the best possible doctors, and this goes beyond getting students and doctors through the medical education process, to really considering what it means to be a good doctor. This thesis has argued that this relates to the optimisation of both learning and well-being, which are interlinked. Medical education needs to develop not only clinically proficient doctors, but also doctors who enjoy their work, are satisfied with it and committed to the profession, so that they can sustain their careers in the long-term.

This thesis has argued that promotion of well-being and learning will be supported by three main changes within medical education. Firstly, there is a need for medical education to change its focus from a reactive to a proactive approach. In the area of this research, this relates to proactively working to improve learning and well-being experiences for all students, rather than focusing on fixing problems after they arise. Secondly, it is necessary to acknowledge that both the environment and the individual interact to affect well-being and learning. Research and interventions need to address both, emphasising the shared responsibility of systems and individuals for well-being and learning. Finally, to understand and improve well-being and learning it is necessary to recognise the complexity of the problems, and therefore the solutions, that will be needed to help resolve them. Complex problems cannot be fixed with reductionist solutions, so we need to prioritise understanding these problems and work to develop suitable solutions.

This programme of research contributed new knowledge of how well-being is affected by the experience of transition by drawing on the suggestions above for a proactive approach, recognition of environment and individual, and acknowledgment of complexity. Well-being was conceptualised in a proactive and positive way. Realist methodology acknowledges complexity and was used to develop a causal explanation of well-being and transition. Environment and student contexts were found to interact to affect the activation of well-

being and learning mechanisms and therefore outcomes. On the basis of this, recommendations were proposed to improve wider contexts, facilitating the conditions beneficial for learning and well-being.

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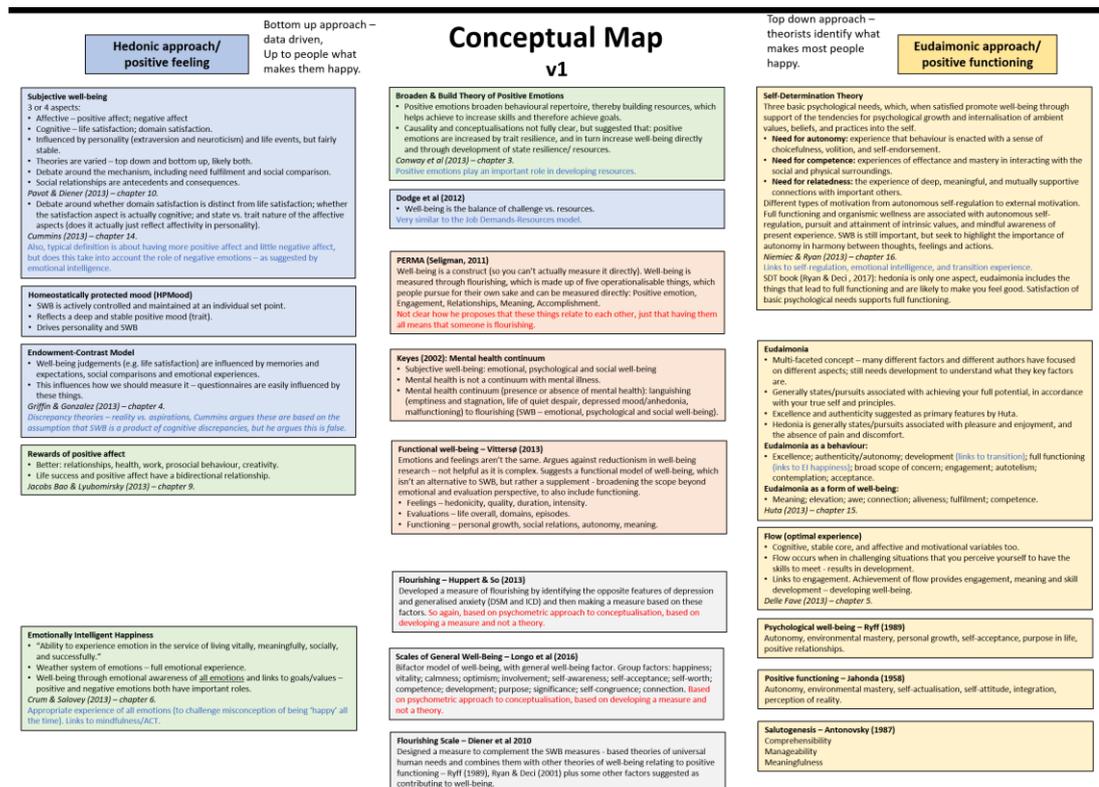
Appendices

Appendix 1. Examples of TIR analysis

This appendix shows examples of the processes involved in the TIR analysis.

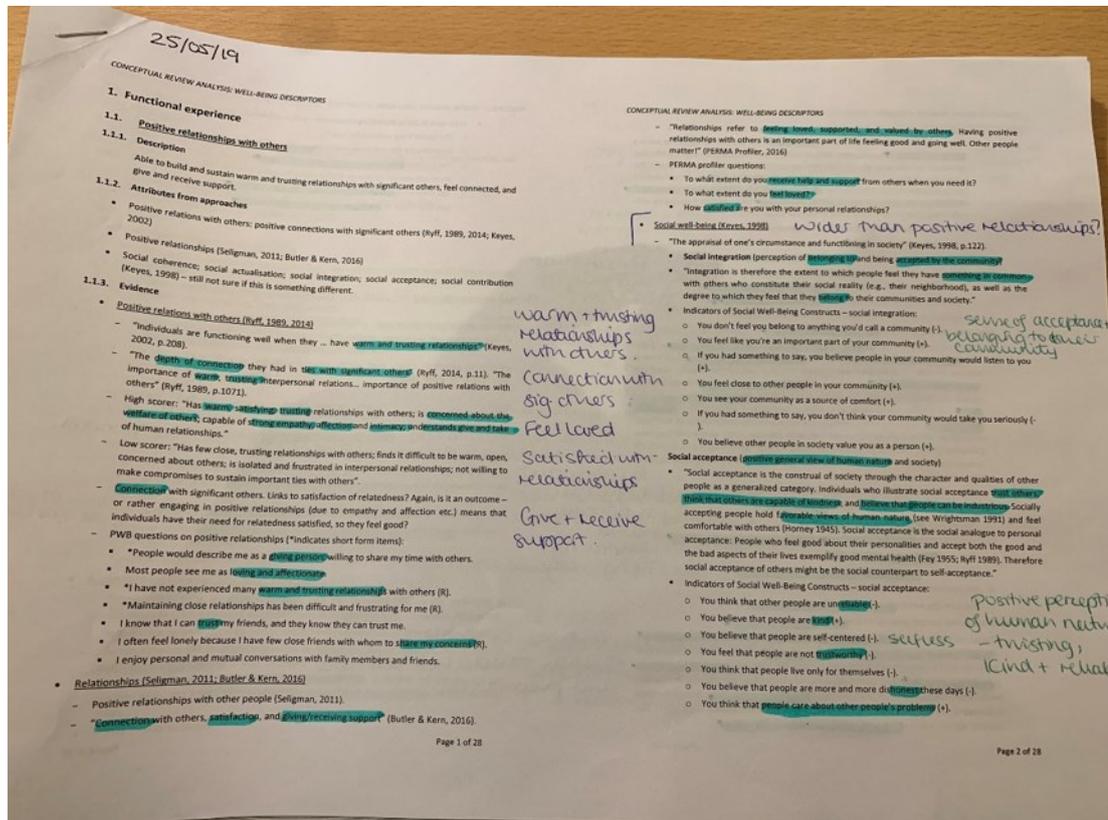
Example 1. Organising attributes (Step 2)

Showing an early mind map organising the identified attributes.



Example 2. Refining conceptual insights (Step 2)

Showing the iterative nature of the analysis. Prior analysis notes were annotated to consider the key attributes within the identified definitions, supporting refinement of the conceptual insights as thinking developed.



Example 3. Evidencing attributes, mechanisms and contexts (Steps 2 - 4)

Showing an extract of the evidence recorded for one attribute (Perceived Competence) from one definition and an associated measure. The details of the definition were included and the green text shows the key extracts for that attribute. The interpretation of the extracts was recorded and the identified attribute was listed. This process was followed for every definition and theory included in the review (Step 2), and the evidence was then collated for each of the grouped attributes, mechanisms and contexts included in the definition and theory (Steps 3 & 4).

Approach	Details of relevant aspects (including any associated measures)	Interpretation	Attributes
PERMA	<p><u>Accomplishment (Seligman, 2011)</u> “Accomplishment (or achievement) is often pursued for its own sake, even when it brings no positive emotion, no meaning, and nothing in the way of positive relationships. ... accomplishment in its momentary form, and the ‘achieving life,’ a life dedicated to accomplishment for the sake of accomplishment, in its extended form.” (Seligman, 2011, pp.18-20)</p> <p><u>PERMA Profiler (Butler and Kern, 2016)</u> “Self-efficacy, sense of accomplishment, and achieving personal goals” (Butler and Kern, 2016, p.5). “Accomplishment can be objective, marked by honors and awards received, but feelings of mastery and achievement is also important. The Profiler measures subjective feelings of accomplishment and staying on top of daily responsibilities. It involves working toward and reaching goals, and feeling able to complete tasks and daily responsibilities.” (Butler and Kern, 2013, p.1).</p> <p>PERMA Profiler accomplishment questions:</p> <ul style="list-style-type: none"> • “How much of the time do you feel you are making progress towards accomplishing your goals?” • How often do you achieve the important goals you have set for yourself? • How often are you able to handle your responsibilities?” (Butler and Kern, 2016, pp.14-5) 	Individuals are able to accomplish their daily tasks and responsibilities, and feel a sense of confidence in their ability to do so.	Accomplishment of daily responsibilities

Example 4. Refining attributes, mechanisms and contexts (Steps 3 & 4)

Showing the final analysis notes for one attribute (Perceived Competence). Details were recorded of the refined description of the attribute, mechanism or context, the contributing attributes from different definitions or theories, and any conceptual interpretations or decisions. This same process was followed for all the attributes included in the definition (Step 3), and the mechanisms and contexts included in the theory (Step 4).

PERCEIVED COMPETENCE

Description

Individuals feel confidence in their ability to actively and effectively manage their life environment, supporting their needs and values, facilitating accomplishment of their daily life activities and responsibilities, and therefore perceiving that their environment is under control, satisfying and likeable, and that they can effectively meet challenges they encounter. This sub-theme relates to being able to manage one's environment to create the conditions needed to achieve one's life purpose and goals.

Attributes from approaches

Accomplishment – *Flourishing*

Accomplishment of daily responsibilities – *PERMA*

Confidence and effectiveness – *Self-determination theory*

Environmental mastery – *Mental health as flourishing; Psychological well-being*

Conceptual issues

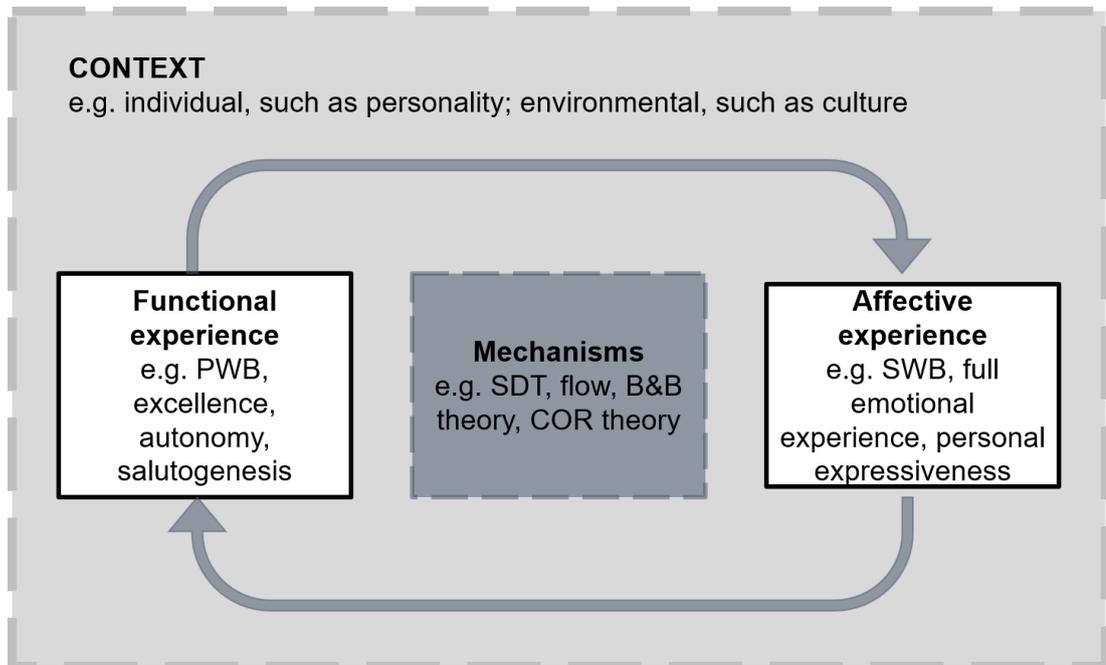
Accomplishment from PERMA (Seligman, 2011) covers aspects related to 'Perceived competence', but also specifically achievement too which has been included under 'Personal growth'.

As discussed for 'Connection to others' and 'Autonomous regulation', the description of the satisfaction of the need for competence from SDT (Ryan and Deci, 2017) has been included within this section because it (and its operationalisation) appears to reflect the conditions needed to satisfy the need for competence, rather than the process through which this occurs. Details of the associated process are included in Underlying processes (Mechanism), specifically Satisfaction of basic psychological needs. It has been included under 'Perceived competence', rather than 'Personal growth' because the description in Deci and Ryan (2004) describes it in relation to feeling confident and able to effectively manage one's interactions and opportunities to use and develop one's capacities, which aligns with this sub-theme. The need for competence is described as leading people to seek optimal challenges for their skills and capacities, therefore maintaining and developing them (Deci and Ryan, 2004). Therefore, although this links to 'Personal growth', this seems to be more as a consequence of the need for competence and the possible links with engagement/flow, which in turn facilitates self-development, therefore linking back into need satisfaction as an underlying process (mechanism).

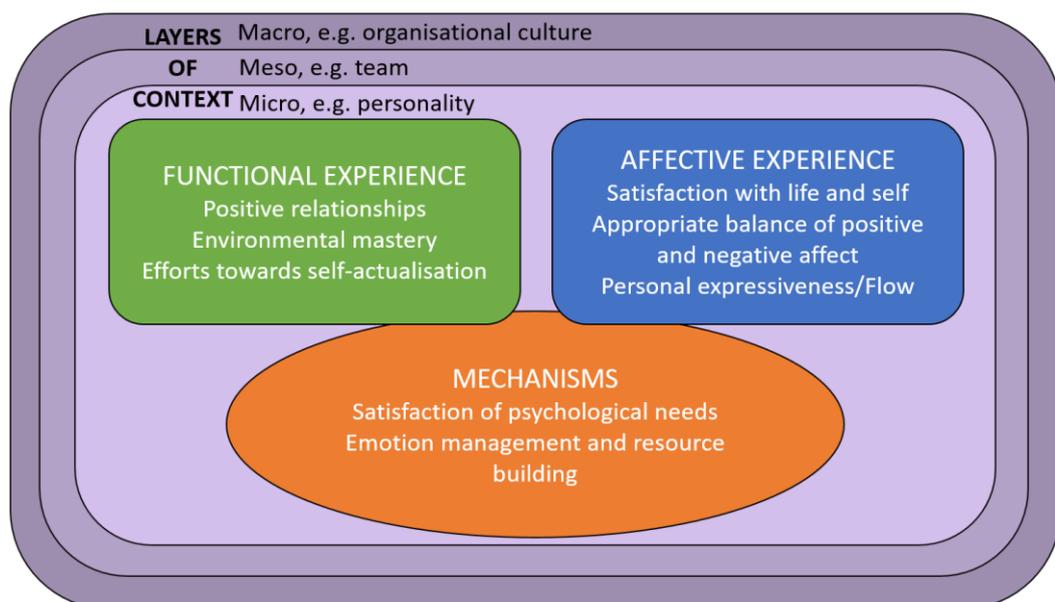
I originally has this sub-theme labelled as Environmental mastery, however, on consideration some of the approaches seemed to be discussing slightly broader conceptual aspects, also including elements of confidence and performance of tasks. Therefore I changed the name to something more inclusive.

Example 5. Developing a theory of well-being (Step 4)

Showing two early versions of models of the well-being theory. Models were used to develop thinking about the theory, visually representing the retroductive processes of working out the relationships between the components. The first was focused on representing the theorised relationships between identified components.



The second model has developed with more details specified in the attributes, mechanisms and contexts, as thinking around this developed.



Appendix 2. RAMESES Quality Standards: Realist Syntheses

QUALITY STANDARDS (Wong et al., 2014) ^a	COMPLETED	NOTES
The research problem		
“The research topic is appropriate for a realist approach”	Step 1-a	Existing research on the topic, so suitable for secondary analysis. Aim to develop causal explanation of how and why well-being varies between contexts.
“The research question is constructed in such a way as to be suitable for a realist synthesis”	Step 1-a	Question framed in realist terms; environmental (in what circumstances) and student (for whom) context interactions with the well-being mechanisms (why), that produce changes in well-being (how).
Understanding and applying the underpinning principles of realist reviews		
“The review demonstrates understanding and application of realist philosophy and realist logic which underpins a realist analysis”	Throughout	Realist philosophy guided approach and analysis; seeking to understand generative causation for well-being, specifically which contexts affect the activation of mechanisms that produce changes in well-being.
Focussing the review		
“The review question is sufficiently and appropriately focussed”	Step 1-a	Focused primarily on the outcome of well-being during transition, and the environmental and student contexts affecting this.
Constructing and refining a realist programme theory		
“An initial realist programme theory is identified and developed”	Step 1-b	An IRT was developed in the early stages of the review, and significantly developed throughout the review and presented in CMOCs.
Developing a search strategy		

QUALITY STANDARDS (Wong et al., 2014) ^a	COMPLETED	NOTES
“The search process is such that it would identify data to enable the review team to develop, refine and test programme theory or theories”	Step 2	Theory development focus; appropriate data located to support the development of theory around the problem area. Grey literature was not searched as not evaluating a programme so policy or programme documentation was less relevant, and sufficient data was located through other means. Incorporation of empirical data studies, commentaries, and theory sources.
Selection and appraisal of documents		
“The selection and appraisal process ensures that sources relevant to the review containing material of sufficient rigour to be included are identified. In particular, the sources identified allow the reviewers to make sense of the topic area; to develop, refine and test theories; and to support inferences about mechanisms”	Step 3	Appraised data sources at multiple points for inclusion based on relevance and rigour. CASP tools were used to guide thinking about rigour, but not for exclusion purposes (as in a systematic review).
Data extraction		
“The data extraction process captures the necessary data to enable a realist review”	Step 3-c	Data extraction piloted and refined through analysis focused on causal insights initially, which were then developed into CMOCs.
Reporting		
“The realist synthesis is reported using the items listed in the RAMESES Reporting standard for realist syntheses”	Throughout	Written in alignment with the publication standards.

^a Column contents quoting the Quality Standards.

Appendix 3. RAMESES Publication Standards: Realist Syntheses

PUBLICATION STANDARDS (Wong et al., 2013a) ^a	COMPLETED	NOTES
TITLE		
“In the title, identify the document as a realist synthesis or review.”	N/A	The thesis title is not specific to the realist review.
ABSTRACT		
Abstract	N/A	The thesis abstract is not specific to the realist review.
INTRODUCTION		
“Rationale for review. Explain why the review is needed and what it is likely to contribute to existing understanding of the topic area.”	Yes	4.1; Chapter 1
“Objectives and focus of review. State the objective(s) of the review and/or the review question(s). Define and provide a rationale for the focus of the review.”	Yes	4.1; Chapter 1
METHODS		
“Changes in the review process. Any changes made to the review process that was initially planned should be briefly described and justified.”	Yes	<p>Changes reflected a developing understanding of the methodology. Main changes related to incorporating previously removed documents from the abstract screen (Step 2-c-iii), due to development of thinking to extend focus beyond the ‘event’ of the pre-clinical to clinical transition and into clinical training itself.</p> <p>The other main change related to coding (during data extraction), which did not occur by C/M/O due to focusing on</p>

PUBLICATION STANDARDS (Wong et al., 2013a) ^a	COMPLETED	NOTES
		causal insights at this stage to retain the causal explanation, as it was not always clear at this stage how the causal explanation fit within the CMO framework (Step 3-c-ii). CMO configuring came during the synthesis stage of the review.
“Rationale for using realist synthesis. Explain why realist synthesis was considered the most appropriate method to use.”	Yes	4.1; Chapter 2
“Scoping the literature. Describe and justify the initial process of exploratory scoping of the literature.”	Yes	4.1.1
“Searching processes. ...state and provide a rationale for how the iterative searching was done.”	Yes	4.4; 5.1
“Selection and appraisal of documents. Explain how judgements were made about including and excluding data from documents, and justify these.”	Yes	4.5
“Data extraction. Describe and explain which data or information were extracted from the included documents and justify this selection.”	Yes	4.5.3
“Analysis and synthesis processes. Describe the analysis and synthesis processes in detail. This section should include information on the constructs analyzed and describe the analytic process.”	Yes	4.5; 4.6; Appendices 11 and 12
RESULTS		

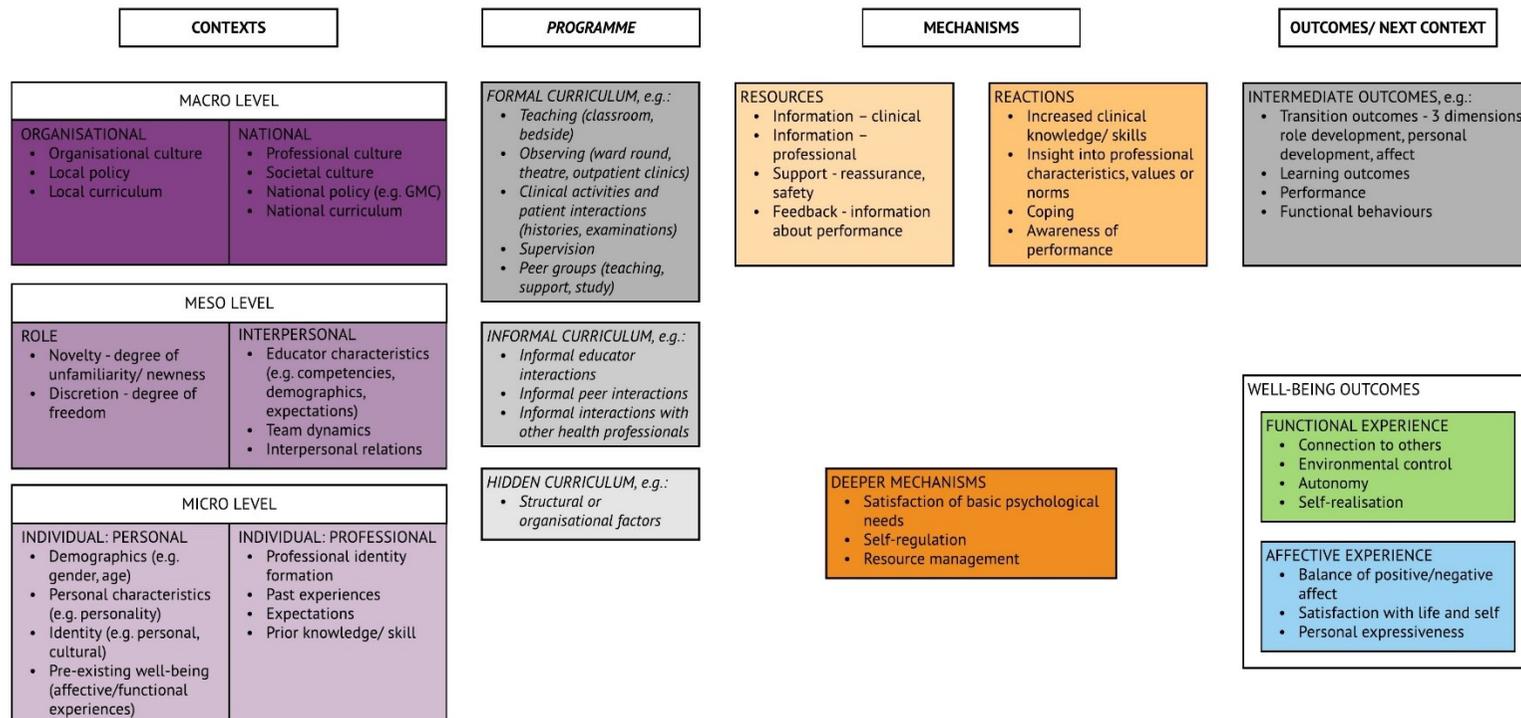
PUBLICATION STANDARDS (Wong et al., 2013a) ^a	COMPLETED	NOTES
“Document flow diagram.”	Yes	5.1 Figure 5-1
“Document characteristics. Provide information on the characteristics of the documents included in the review.”	Yes	5.1 Table 5-1
“Main findings. Present the key findings with a specific focus on theory-building and testing.”	Yes	5.2 – 5.6
DISCUSSION		
“Summary of findings.”	Yes	5.7
“Strengths, limitations and future research directions.”	Yes	5.7, Chapter 8
“Comparison with existing literature.”	Yes	Chapter 8
“Conclusion and recommendations.”	Yes	Chapter 8
“Funding.”	N/A	N/A

^a Column contents quoting the Publication Standards.

Appendix 4. Initial rough theory development examples

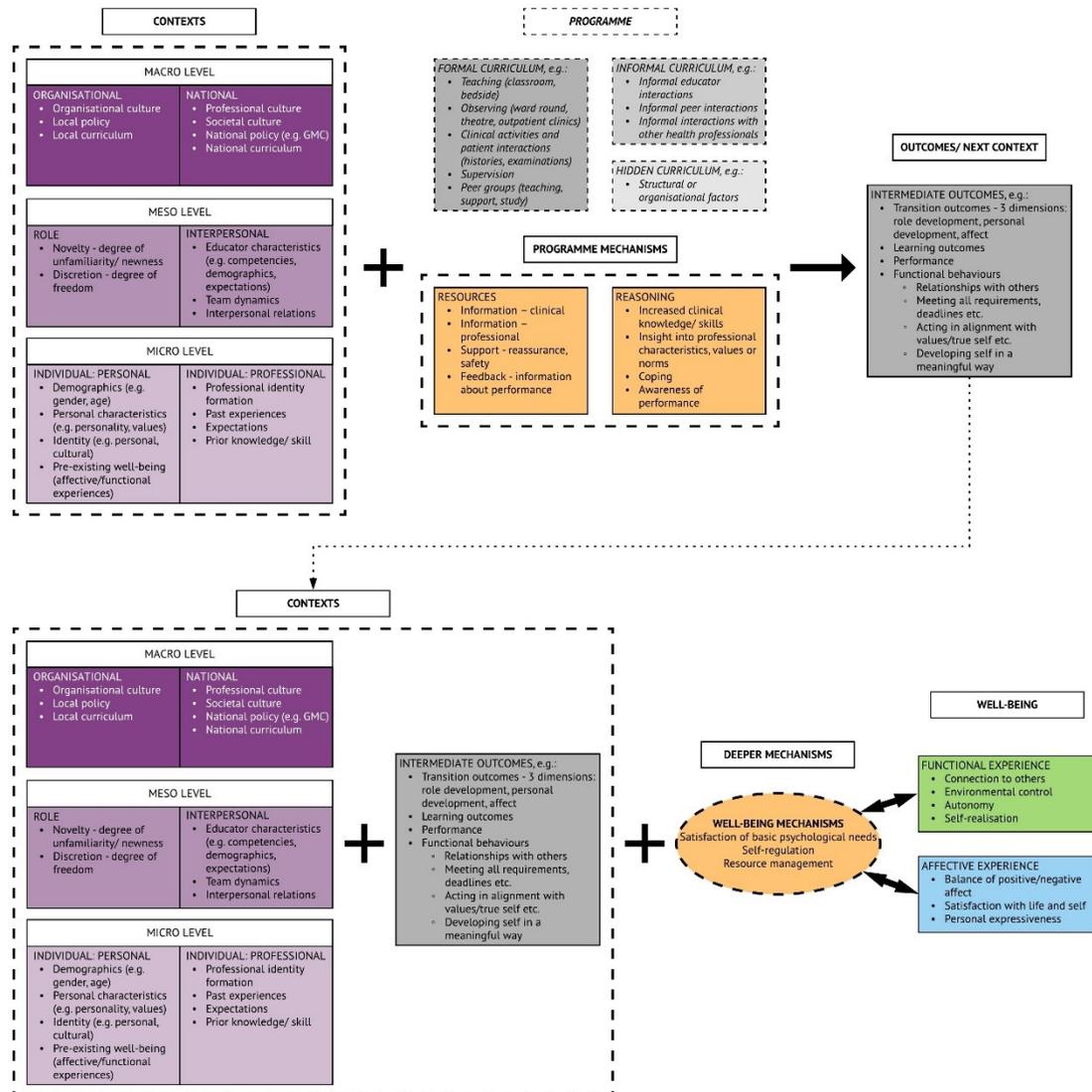
Example 1. Early IRT

Well-being was integrated alongside the transition outcomes from clinical training. Mechanisms were represented with two conceptualisations, one as resource and reasoning relating to transition experiences and outcomes, and deeper psychological mechanisms relating to well-being outcomes.



Example 2. Developed IRT

The well-being outcomes were moved onto a second line to more clearly demonstrate the ripple effect.



Appendix 5. Search strategy

Database	Specific search strategy
Ovid MEDLINE(R) ALL 1946 to October 27, 2020	transition*.mp. AND (clinical training.mp. OR medical student*.mp. OR students, Medical/)
PsycINFO	transition*.mp. AND (medical student*.mp. OR exp Medical Students/ OR clinical training.mp.)
Embase 1974 to 2019 January 22	transition*.mp. AND (medical student*.mp. OR medical student/ OR clinical training.mp.)
Web of Science	transition* AND ("medical student*" OR "clinical training")
ERIC (EBSCOhost)	transition* AND (medical student* OR clinical training)

Appendix 6. Title/abstract screen criteria

Inclusion	Exclusion
Relates to medical students AND Relates to the transition between pre-clinical and clinical training in medical school	Relates to the teaching or development of a specific skill OR Relates to developing student interest in a specific specialty OR Relates to curriculum design without relation to transition into clinical training OR Relates to medical student mental health not specifically in relation to the transition into clinical training OR Relates to clerkships for specific specialty preparation or skills, or a specific specialty clerkship curriculum (so not about the student experience of transition to clinical training) OR Relates to an educational intervention in clinical training, not transition into clinical training

Appendix 7. Abstract screen criteria

Rating	Description
1: Highly relevant	Relates to medical students AND the transition into clinical training EITHER an intervention designed to ease the transition to clinical training OR an investigation into how aspects of clinical training affect the student experience of the transition.
2: Probably relevant	Relates to medical students AND the transition into clinical training EITHER an intervention that seems like it is related to supporting the transition into clinical training (but this is not clear) OR exploring the student experience of transition (although EITHER this is not clearly grounded in the clinical training programme OR it does not clearly mention the factors affecting the experience of transition).
3: Possibly relevant	Relates to medical students AND likely the transition into clinical training BUT it is unclear from the abstract how it relates to transition EITHER it appears generally and/or abstractly related to the transition to clinical training in some way OR it relates specifically to a particular skill that may in some way be related to the transition to clinical training OR it is not clear if it relates to the transition to clinical training.
4: Likely irrelevant	Does not meet above criteria (i.e. not related to the transition into clinical training in medical school). E.g. relates to transition generally in medical education but not the transition to clinical training; relates to a medical student experience within medical school that is not related to the transition to clinical training specifically (e.g. stress, burnout, mental illness); relates to a particular skill without a link to the transition to clinical training; relates to curricular design of clinical or pre-clinical activities but without relating to transition specifically or student experience; relates to how a clerkship within a specialty affected specific skills in that area or interest in the specialty; relates to later transitions within clinical training; relates to the transition to the junior doctor role; not English.
MRT	Not relevant to the specific transition to clinical training, but rather a general theory which may be useful at the middle range.

Screening tool adapted from Davies et al. (2017).

Appendix 8. Full-text screen criteria

Rating	Description
1: Likely useful	<p>Appears relevant to the initial rough theory.</p> <p>Relates to medical students and the transition into clinical training AND has a good depth of information.</p> <p>EITHER an intervention designed to ease the transition to clinical training, which is described clearly and evaluated.</p> <p>OR an investigation into how aspects of clinical training affect the student experience of the transition.</p> <p>OR a commentary piece that provides insight into relevant theories or models to support theory development.</p>
2: Possibly useful	<p>Unclear if it is relevant to the initial rough theory.</p> <p>Relates to medical students and the transition into clinical training BUT lacking depth of information, OR not related to pre-clinical/clinical transition but contains useful information relevant to that transition.</p> <p>EITHER an intervention designed to ease the transition to clinical training with some aspect of evaluation, but that has limited details/depth of information.</p> <p>OR exploring the student experience of transition (although EITHER this is not clearly grounded in the clinical training programme OR it does not clearly mention the factors affecting the experience of transition).</p> <p>OR exploring a student experience separate to the pre-clinical/clinical transition, but the information is relevant to clinical training.</p>
3: Probably not useful	<p>Does not appear relevant to the initial rough theory.</p> <p>Relates to medical students and likely the transition into clinical training BUT it is unclear how it relates to students' transition experiences.</p> <p>EITHER an intervention study but it is purely descriptive (no evaluation aspect or link to student experience).</p> <p>OR an intervention designed to ease the transition, but which focuses on specific skill or knowledge development and therefore is not generally about the transition experience.</p> <p>OR it does not relate to the transition to clinical training, but it has potential usefulness or relevance to this transition.</p>
4: Likely not useful	<p>Does not meet above criteria (i.e. not related to the transition into clinical training in medical school or useful to understanding that transition in anyway).</p>

Screening tool adapted from Davies et al. (2017).

Appendix 9. Quality appraisal template and definitions

Realist Synthesis Appraisal Form

Record Details				
Record ID				
Reviewer and date				
Title				
Full citation				
Companion Papers				
Appraisal Assessment (complete at end)				
Overall appraisal	<i>See definitions document 'Appraisal Form Definitions (25.04.19)'.</i>			
	High	Moderate	Low	Exclude
Comments				
Summary of the paper. What is it about? What kind of data source? Quantitative, qualitative, commentary, review etc.				
What is interesting about this paper?				
<i>What are the strengths and weaknesses of the article? Reference any checklists used to inform this judgement.</i>				
<i>In what ways is this paper relevant to the initial rough theory, if at all?</i>				
<i>Describe the connection(s) between the outcomes and the programme (i.e. C+M=O or similar).</i>				
<i>Describe any unintended positive or negative impacts and their mechanism link to the outcomes.</i>				
Additional references to follow up. List any references that look potentially useful.				
Questions for the first author and research partners. List any interview questions for the stakeholder/ author that would serve to strengthen understanding of the programme theory or links between outcomes, mechanisms and contexts.				

Template and definitions adapted from Justin Jagosh's 'Appraisal Form Template 2019'; received at the CARES Realist Synthesis Masterclass 16-18th April 2019.

Realist Synthesis Appraisal Form (Second Review)

Record Details				
Record ID				
Reviewer and date				
Appraisal Assessment (complete at end)				
Overall appraisal	<i>See definitions document 'Appraisal Form Definitions (25.04.19)'.</i>			
	High	Moderate	Low	Exclude
Comments (inc. any differences in rating from Reviewer 1)				
Second reviewer comments				
<i>Comment on agreement or disagreement with the insight generated by Reviewer 1, and any additional insights.</i>				

Appraisal definitions

Rating	Description
High	This category is for sources that are highly relevant to the realist review. This means that the framing of the research and the research questions are aligned to the review questions, the empirical findings are clearly described (where applicable), and there is rich description providing insight into mechanisms, contexts or outcomes that can greatly advance the theoretical output of the review. These sources provide key insights for theory development and CMO configuring, and are therefore key informants.
Moderate	This category is for sources that are moderately relevant to the realist review. This means that the framing of the primary research is somewhat aligned to the review theories. This may mean that the article reports on a different (but related) aspect of clinical training (than the medical student experience of the transition into or within clinical training), but it relates to potential contexts or outcomes of interest. Or it describes middle-range theories that may inform the review even if there is no relevant empirical data from the paper to populate the CMO configurations, or has a few areas that are of interest even if it is not entirely clear whether they will be used in the synthesis. These sources support the theory development and CMO configuring process, but do not themselves provide the key insights.
Low	This category is for sources that have met the selection criteria in terms of relevance to the review questions and the initial programme theories (or MRT), but are relatively thin on the description of context and mechanism. It is not placed in the exclusion category because it contains at least <u>one</u> idea or statement about the context, about the mechanisms, or about conceptualising outcomes that can be used for refining the theory and building a CMO configuration. These sources support the theory development and CMO configuring, but in a limited capacity.
Exclude	This category is for sources that showed promise on the full text screen, but upon reading the source again do not correspond to the review questions, do not have any content that corresponds to the initial programme theories (or MRT), or does not describe at all the context, mechanisms (or process), or outcomes.

Definitions adapted from Justin Jagosh's 'Appraisal Form Template 2019'; received at the CARES Realist Synthesis Masterclass 16-18th April 2019.

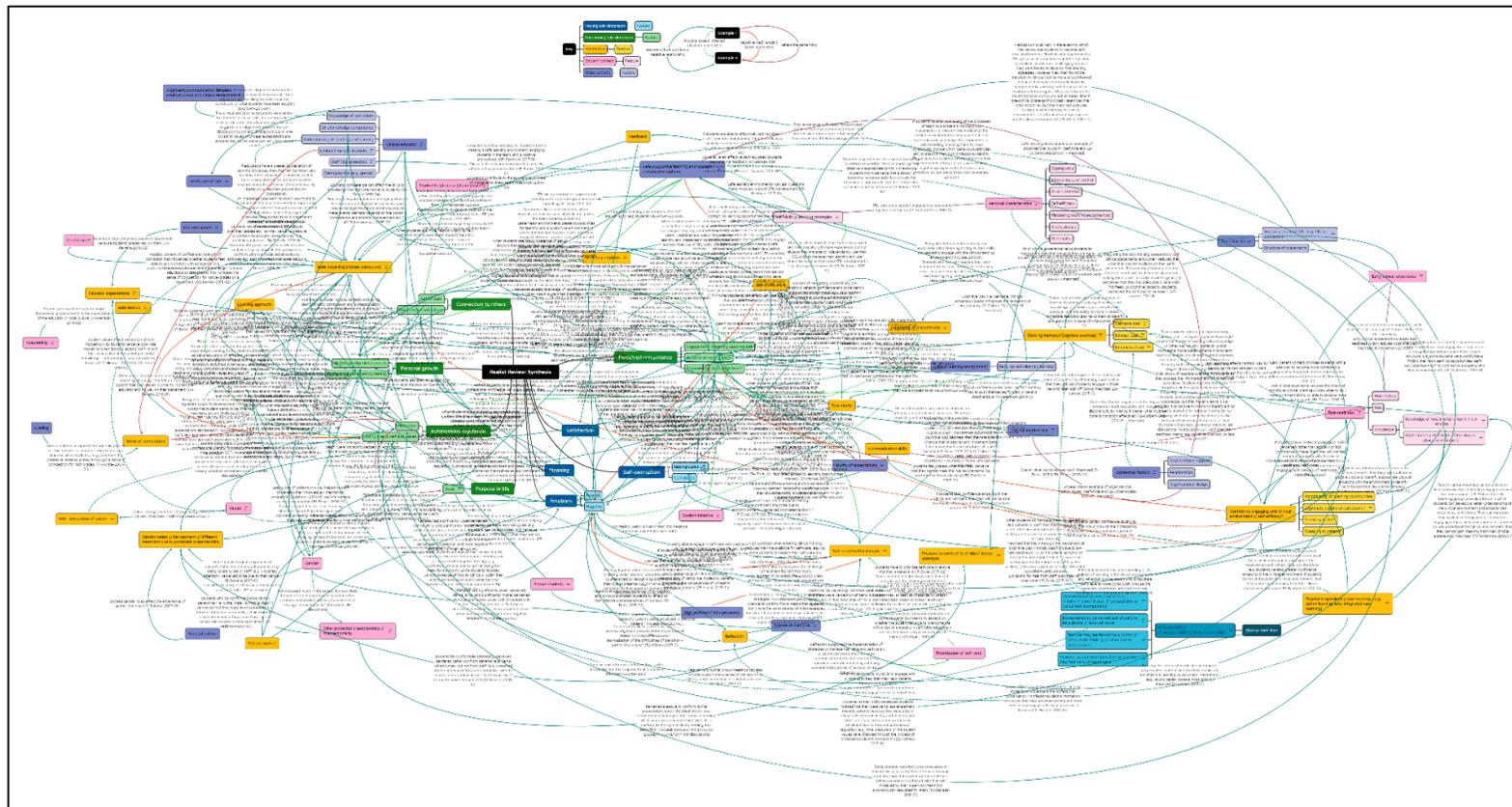
Appendix 10. Insight document template

Source	
Date	
Aspect of well-being	
Explicit or implicit	
Positive or negative	
CMOC ideas	
Links/ ripple effects	
Other related codes	
Rationale behind thinking	
Notes	
Example quote	

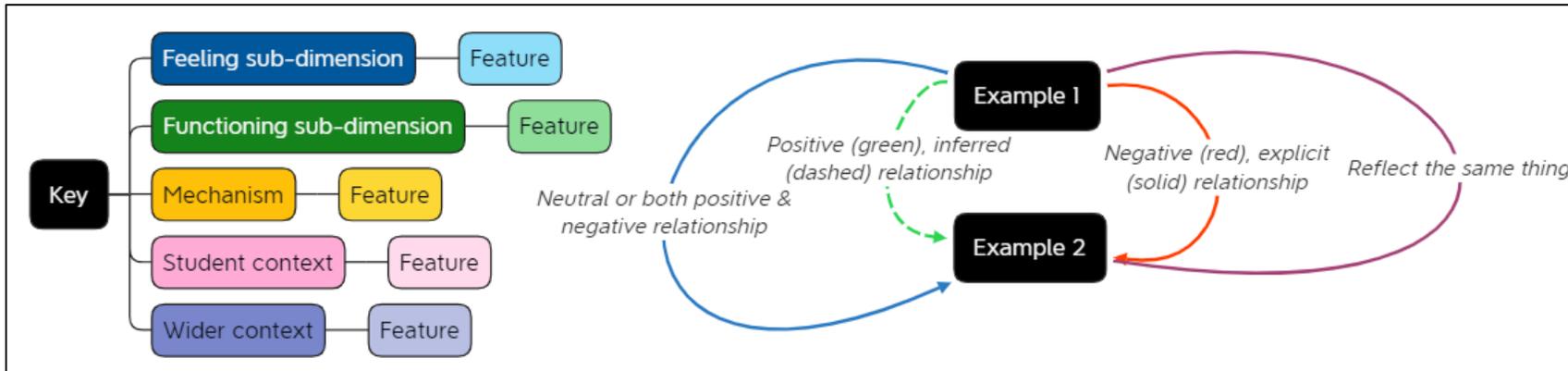
Adapted from Gilmore et al. (2019).

Appendix 11. Examples of realist review analysis

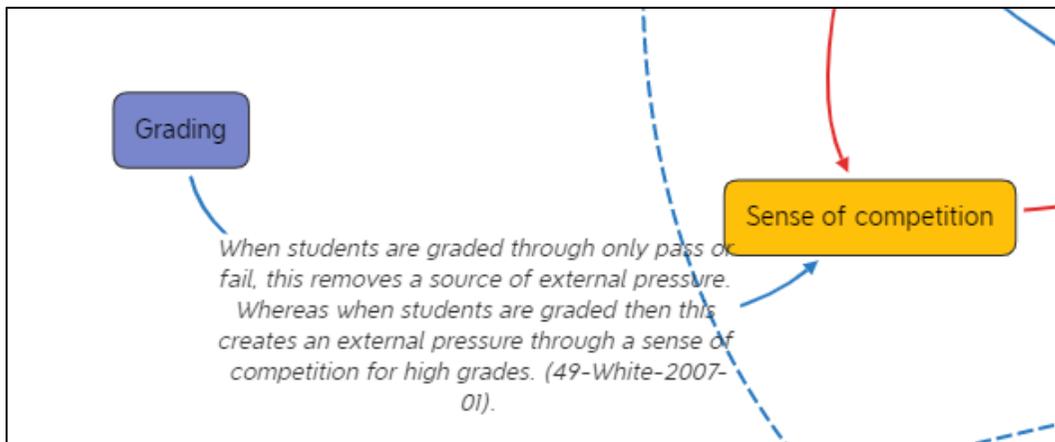
Example 1. Original mind map



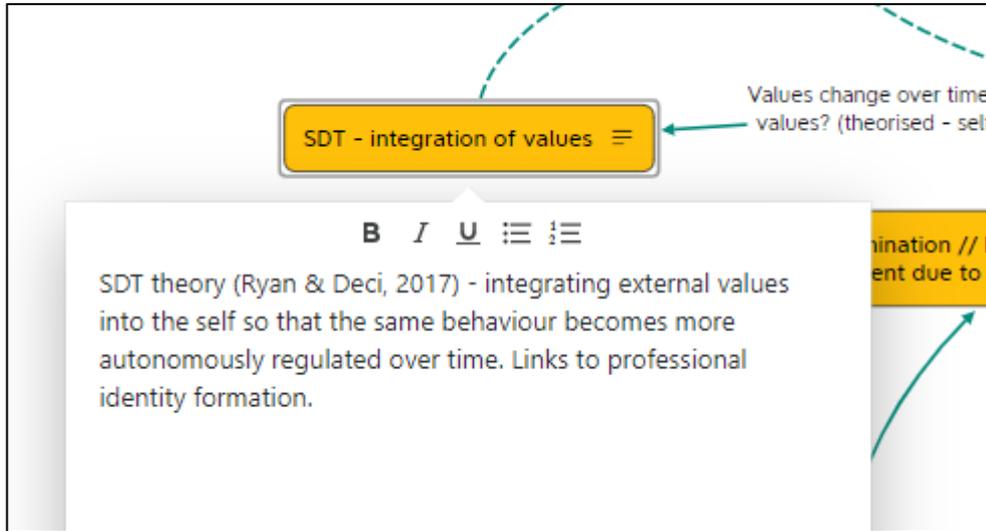
Example 2. Original mind map key



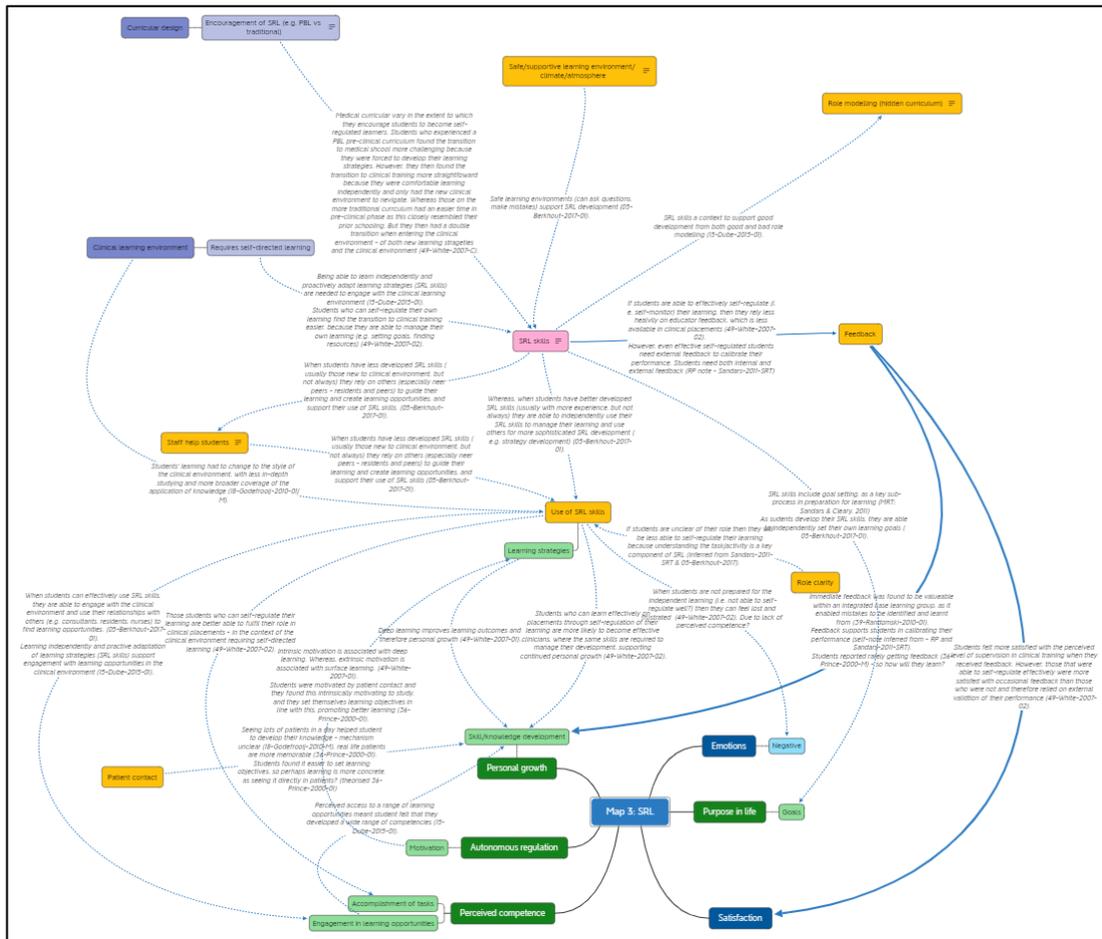
Example 3. Original mind map detail



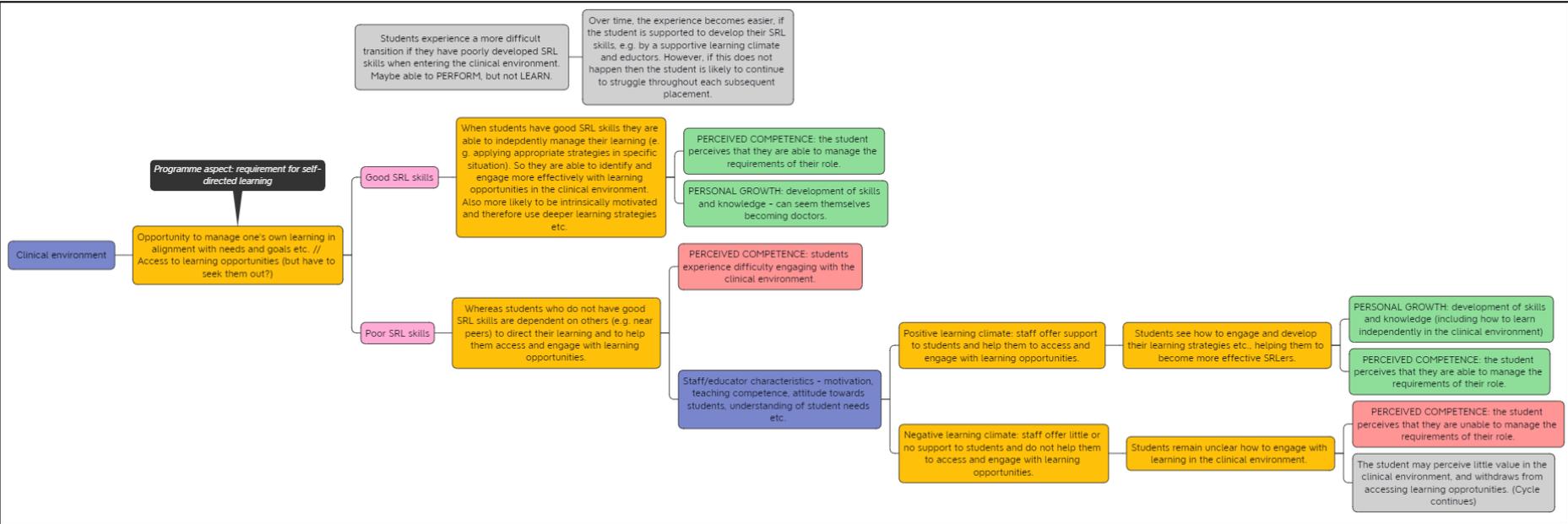
Example 4. Original mind map note



Example 5. Topic mind map



Example 6. Topic CMOC drafting



Appendix 12. Worked example of CMOC development

This section contains a worked example of the development of two CMOCs to illustrate how they were developed and refined through the realist review analysis and the retroductive processes involved in this. CMOCs 5 and 6 from Theory Area 2 are used, as these were some of the key theory insights around transition and well-being. The two CMOCs explored how different environmental contexts activate more or less supportive learning climates, which differently affect well-being. The process of developing and refining these two CMOCs will be described in alignment with the relevant steps and tasks of the review method.

Initial rough theory (Step 1-b) and general thinking development

In the IRT, ideas relating to this theory area were included as Context at the ‘meso level’ under ‘Interpersonal’, which included educator characteristics, team dynamics and interpersonal relations. This reflected early thinking about how the placement environment was likely a relevant context. Ideas about the mechanisms through which transition experiences might affect well-being relevant to this context were the resources of ‘support – reassurance and safety’ and reasoning of ‘coping’, which would positively affect functioning, for example feeling connected and supported (CO) and feeling able to manage challenges (PC).

The IRT also represented early thinking about the relationship between functioning and feeling (two dimensions of well-being) and the well-being mechanisms. Originally, transition experiences were considered to generate changes in functioning, which then became the context activating the well-being mechanisms that generated changes in feeling. However, during the development of the CMOCs, this relationship was reconsidered and SDT (Ryan and Deci, 2017), a substantive theory, was revisited to clarify thinking about the relationships. Subsequent thinking considered basic psychological need satisfaction (mechanism) as generating changes in both functioning and feeling.

Alongside the development of thinking about well-being, the conceptualisation of mechanism in this work was developing and changing (see 2.5.3). The early thinking reflected a ‘resource and reasoning’ conceptualisation of mechanism (Pawson and Tilley, 1997) for the transition experience (or programme at that point in the thinking) and psychological feedforward processes for the well-being mechanisms (Westhorp, 2018). However, later in the development process, the psychological feedforward process conceptualisation of

mechanism was integrated into the reasoning component of the ‘resource and reasoning’ conceptualisation.

Extracting insights from the documents (Step 3-c)

As documents entered the review at various points, they were appraised (Step 3-c-i) and, if considered relevant, insights relating to the IRT were extracted in the appraisal document for each document (Step 3-c-ii) and these insights were then collated into the insight document (Step 3-c-iii). Examples 1 and 2 show excerpts of the insights extracted from Document 08 and Document 51. These were based upon the original extractions from the Quality Appraisal process.

Document 08 was from the original database search (Step 2-b) and entered the review at an early stage. Document 51 was located through reference searching (Step 2-c-i), so entered the review at a later stage. The examples show the development of theorising as the review progressed; the insights extracted from Document 51 are more focused and developed, compared to those of Document 08.

Example 1. An insight extracted from Document 08 and collated in the Insight Document.

08-Brown-2010-01 (Connection to others and perceived competence)	
CMOC ideas	Supportive clinical environments where students are valued, make students feel part of a team (connection to others), which supports student engagement in the clinical environment and therefore learning and development. This is likely because the team engages the student in the clinical environment, creating greater learning opportunities, for example through supported patient contact, and creating a more enjoyable learning environment.

Example 2. An insight extracted from Document 51 and collated in the Insight Document.

51-Barrett-2017-02 (Learning climate and engagement with learning opportunities)	
CMOC ideas	A positive learning climate is created when the student feels a sense of legitimacy in their role. This comes from being assigned (i.e. attached) to a specific person, group or place, which means that at least one member of staff has responsibility for the student, and therefore interacts with and involves the student in the clinical environment. The student feels a sense of belonging as a result (connection to others), and feels more comfortable accessing learning opportunities (perceived competence).

Twenty-three documents contributed to the CMOCs 5 and 6, plus the insights generated from the TIR. The contribution from each of these documents is described in the table in Example

3. The importance of each document's contribution is labelled. 'Central' documents were the sources of key insights into the development of the CMOC, usually due to a rich description of ideas central to the theory. 'Supporting' documents contained similar ideas to the 'central' documents but with less detail. 'Periphery' documents contained minor insights that related to the learning climate in some way but were not essential for theory development.

Example 3. Table of documents contributing to CMOCs 5 and 6.

Document	Contribution to CMOCs 5 and 6 (importance and description)
Central	
TIR	Identified the mechanisms underlying well-being changes from experiences in different learning climates.
08	Learning environment characteristics; implications for learning and well-being.
41	The idea of positive and negative educational climates and characteristics; implications for student experience.
51	The idea of legitimacy for participation; characteristics of more and less supportive environments; implications for student experience.
52	Participation in the clinical environment; characteristics of more and less supportive environments; implications for the student experience.
68	Participation as a learning process within a CoP.
Supporting	
01	Relationships with senior doctors influence access to learning opportunities; implications for student experience.
02	Staff provide access to learning opportunities.
05	Factors affecting safe learning environment and positive atmosphere; differences in experience depending on student SRL skills.
15	Implications of participation for the student experience.
29	Students experience challenges engaging in the clinical environment.
38	Implications of different environments for the student experience.
40	Clinical teams support student involvement in patient care.
53	Implications of staff interactions for the student experience.
54	Exploration of the educator context.
55	Characteristics of less supportive learning climates.
58	Contexts affecting learning climate; characteristics of different environments; implications for the student experience.
59	Contexts affecting learning climate; the role of doctors in facilitating participation; implications for the student experience.
60	Characteristics of more and less supportive learning climates; implications for the student experience.
61	Role of participation in learning processes.

Document	Contribution to CMOCs 5 and 6 (importance and description)
Periphery	
12	Wider contextual factors influencing transition experiences.
18	Influence of educators on student motivation.
30	Nurse educators influence students' ward experiences.
47	Educator and student contexts affecting experiences (expectations).

Origins of the 'learning climate'

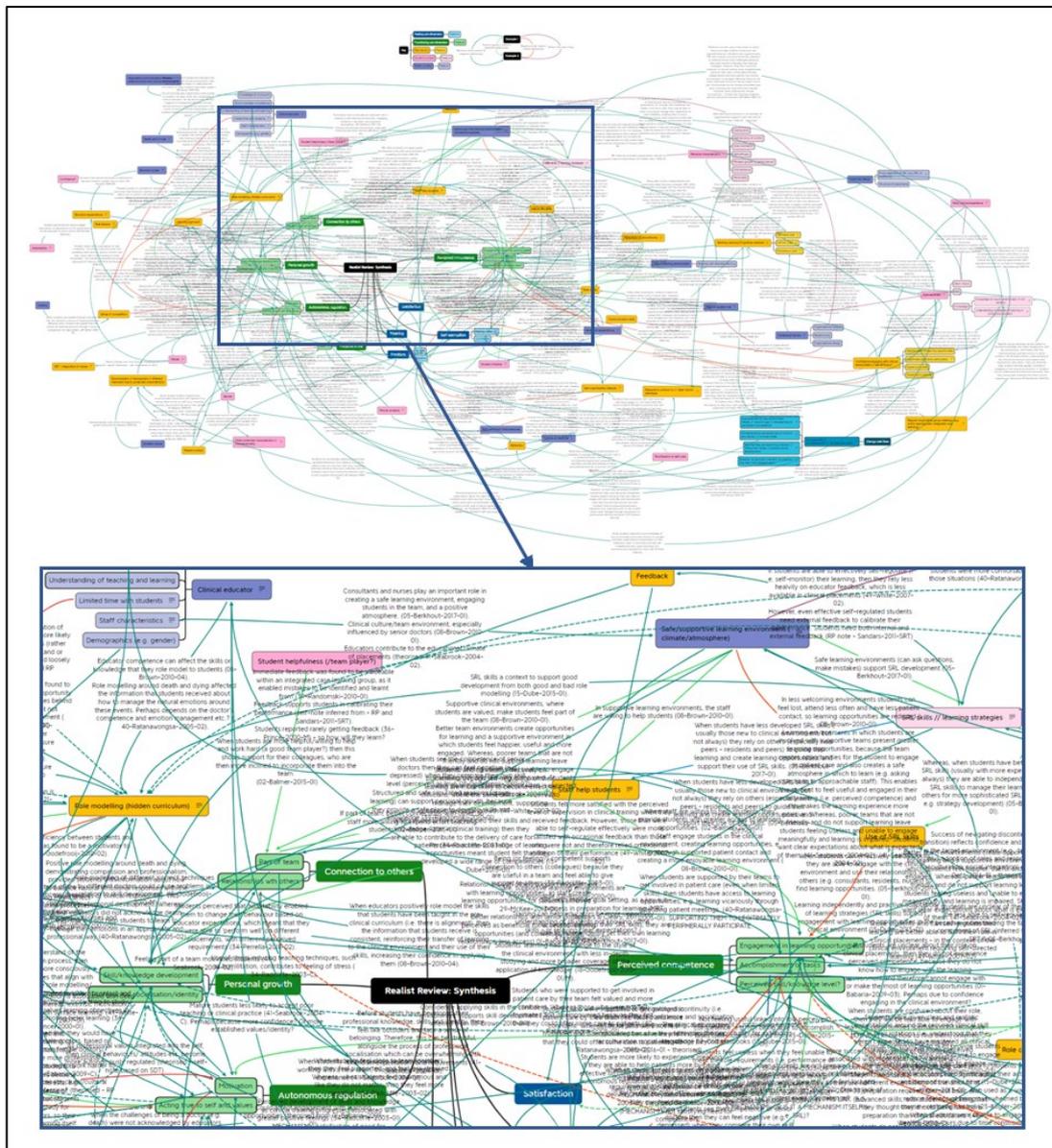
During the initial synthesis (Step 4-a) insights from the initially synthesised documents were collated into one mind map (see Appendix 11, Example 1). Within this mind map, it could be seen that several insights were grouped around 'safe/supportive learning environment (climate/ atmosphere)' and 'staff help students' (Example 4). Documents 08 and 41 were central to the initial ideas about this theory area.

These insights were grouped into one topic mind map: 'Learning Climate' (Example 5). The central ideas within this grouping were about how safe and supportive learning environments were those where students were supported by staff to engage in learning opportunities. This linked to well-being outcomes in several ways, including students being included in and feeling part of the team (CO), students being supported to engage in learning opportunities (PC), students finding it more enjoyable (EM), and enabling students to feel valuable and useful (SP).

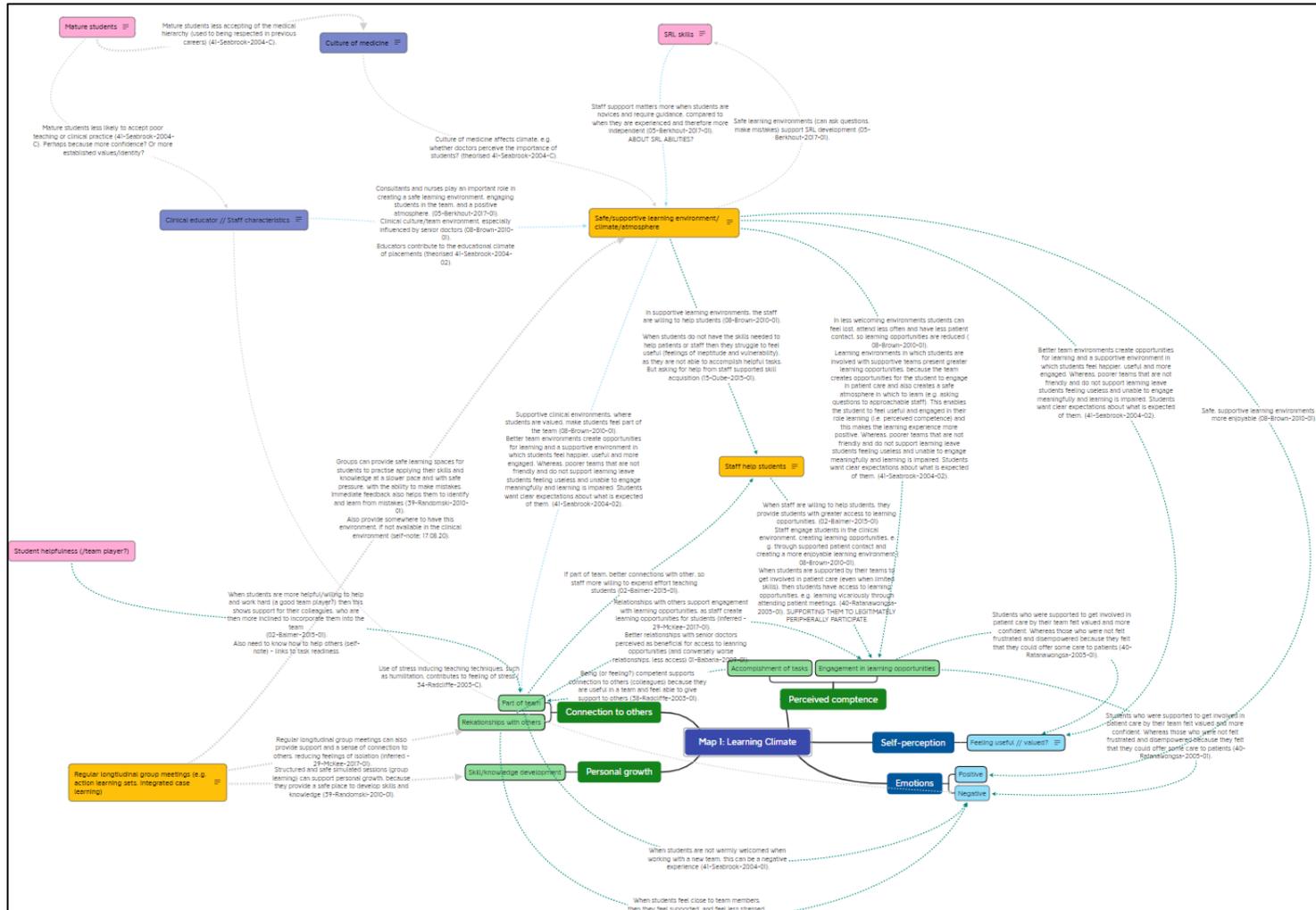
A picture began to develop of 'positive' learning environments, where students feel safe and supported, which are beneficial for learning. The term learning climate was used to describe the phenomenon being theorised. This term was derived from Seabrook (41), who discussed the educational climate, and Ryan and Deci (TIR), who discussed interpersonal climate as part of SDT. The term refers to the intangible atmosphere within a clinical environment, which is created by the actions of the staff members, both directly involved in teaching medical students or otherwise, and it affects how students feel in that environment.

The idea began to develop into a CMOC by considering the mechanism that links the learning climate with changes to well-being. SDT discussed the importance of the interpersonal climate in an environment for basic psychological need support (Ryan and Deci, 2017), and these elements had been incorporated into the well-being theory as context and mechanism, respectively (TIR). Therefore, it seemed plausible that different learning climates

are more or less need supportive, affecting the satisfaction of the student's basic psychological needs, which produces changes in well-being.



Example 4. Insight grouping within the original mind map.

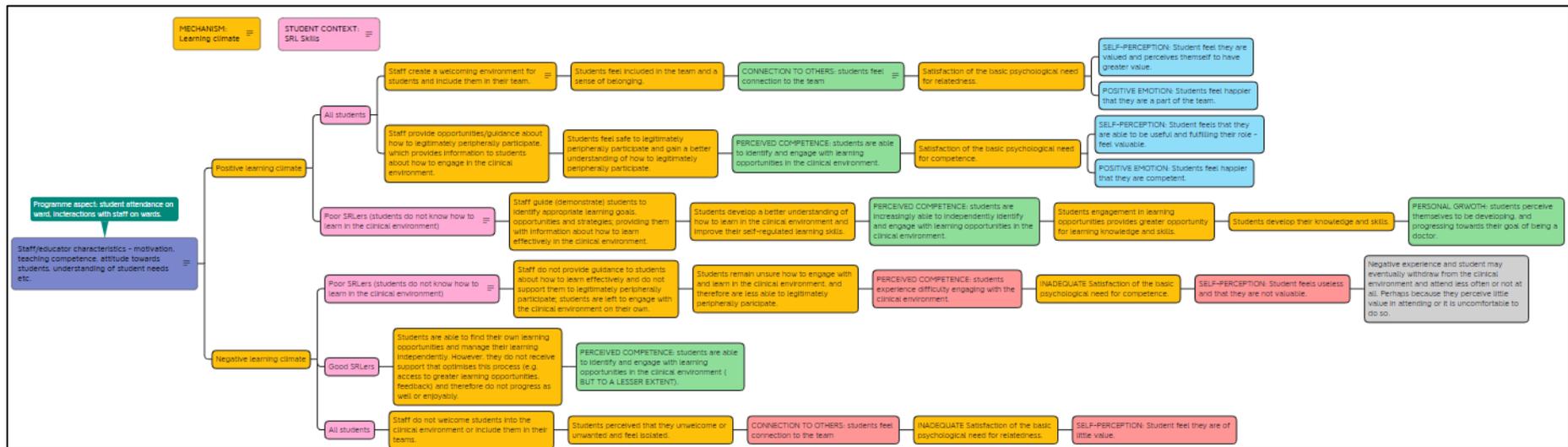


Example 5. Learning climate topic mind map.

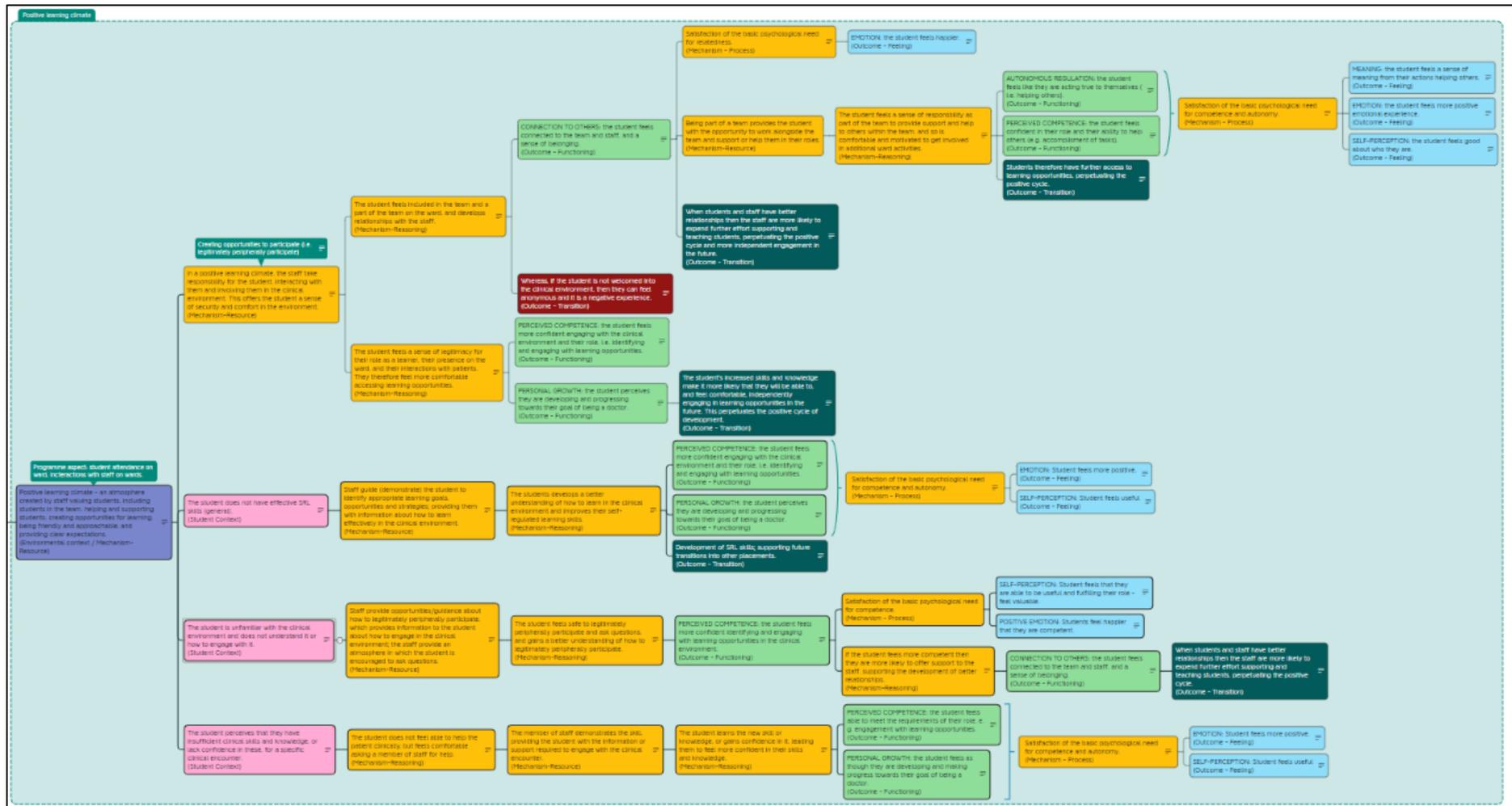
Moving from insights to CMOCs

The topic area mind map was developed into draft CMOCs (Example 6) to reflect the links between educator characteristics, learning climate, basic psychological need satisfaction, and the outcomes of functioning and feeling. The CMOCs continued to be developed within the mind mapping software as further documents entered the review (Example 7), for example, those from the hand searching of reference lists (Step 2-c-i). The different elements of the explanation were incorporated into the draft CMOCs using colour coding.

During the later stages of the review, the CMOCs were transferred to Word for refinement. An 'evidence document' was created to record the details of the evidence for the CMOCs from the contributing documents and refinement notes. An example of the evidence notes for the refined learning climate CMOCs are shown below (Example 8), the CMOCs were then refined and recorded in a table. The final CMOCs can be seen in section 5.4.1.



Example 6. First draft Learning Climate CMOCs.



Example 7. A later draft of the 'positive' learning climate CMOCs.

Example 8. Supporting evidence notes for the learning climate CMOCs.

EVIDENCE FOR LEARNING CLIMATE CMOCS

Realist review sources

- Characteristics of positive learning climate (or the things that happen that create a positive learning climate?): value students, include students in team, help students, create opportunities for learning, friendly, clear expectations.
- Learning climate terminology comes from Seabrook (2004) paper, which discusses this, and also SDT which talks about interpersonal climates (Ryan & Deci, 2017 - CET Part 2 p.159-60). For a mechanism it is about something less tangible, and the climate is more the atmosphere created on a ward/placement, or the feeling that people get when they go there, which can be more or less positive.

01-Babaria-2009-01

- Better relationships with senior doctors perceived as beneficial for access to learning opportunities (and conversely worse relationships, less access).
- When students are able to help patients and/or staff, then they feel positive about their experiences and themselves, and they feel useful.
- 01-Babaria-2009-03: If students are unclear about their role on clinical placements, then they do not experience perceived competence, because they do not know how to engage with the learning environment and therefore cannot engage with or make the most of learning opportunities. This is experienced as challenging and therefore may lead to negative emotional experience, e.g. frustration.
 - Perhaps due to confidence engaging in the clinical environment?

02-Balmer-2015-01

- When staff are willing to help students, they provide students with greater access to learning opportunities.

05-Berkhout-2017-01

- Consultants and nurses play an important role in creating a safe learning environment, engaging students in the team, and a positive atmosphere.
- Safe learning environments (can ask questions, make mistakes) support SRL development.
- Staff support matters more when students are novices and require guidance, compared to when they are experienced and therefore more independent.
- Students rely on staff to help them when they are less experienced/able to SRL independently. However, the safety of the clinical environment becomes less influential on student engagement in learning opportunities once they are more experienced (i.e. able to apply their SRL skills more independently).

Appendix 13. RAMESES II Quality Standards: Realist Evaluation

QUALITY STANDARDS (Greenhalgh et al., 2017) ^a	COMPLETED	NOTES
1. The evaluation purpose		
“A realist approach is suitable for the purposes of the evaluation.”	Yes	Adapted for realist investigation, but realist approach suitable as seeking to develop theory of underlying causes.
“The evaluation question(s) are framed to be suitable for a realist evaluation.”	Yes	Adapted for realist investigation, but realist question elements present.
2. Understanding and applying a realist principle of generative causation in realist evaluations		
“A realist principle of generative causation is applied.”	Yes	
3. Constructing and refining a realist programme theory or theories		
“An initial tentative programme theory (or theories) is identified and developed. Programme theory is ‘re-cast’ and refined as realist programme theory.”	Yes	Theories from realist review were initial theories that were tested and refined through the realist investigation.
4. Evaluation design		
“The evaluation design is described and justified.”	Yes	
“Ethical clearance is obtained if required.”	Yes	
5. Data collection methods		
“Data collection methods are suitable for capturing the data needed in a realist evaluation.”	Yes	Rationale for interviews only given in Chapter 6.

6. Sample recruitment strategy		
“The respondents or key informants recruited are able to provide sufficient data needed for a realist evaluation.”	Yes	Described in Chapter 6, potential limitations of the sample discussed in Chapter 7 discussion.
7. Data analysis		
“The overall approach to analysis is retroductive.”	Yes	
“Data analyses processes applied to gathered data are consistent with a realist principle of generative causation.”	Yes	
“A realist logic of analysis is applied to develop and refine theory.”	Yes	
8. Reporting		
“The evaluation is reported using the items listed in the RAMESES II reporting standard for realist evaluations.”	Yes	
“Findings and implications are clear and reported in formats that are consistent with realist assumptions.”	Yes	

^a Column contents quoting the Quality Standards.

Appendix 14. RAMESES II Reporting Standards: Realist Evaluation

REPORTING STANDARDS (Wong et al., 2016) ^a	COMPLETED	NOTES
TITLE		
“In the title, identify the document as a realist evaluation”	N/A	The thesis title is not specific to the realist investigation (RI).
SUMMARY OR ABSTRACT		
Abstract	N/A	The thesis abstract is not specific to the RI.
INTRODUCTION		
“Rationale for evaluation. Explain the purpose of the evaluation and the implications for its focus and design”	Yes	Chapters 1 & 2; 6.2
“Programme theory. Describe the initial programme theory (or theories) that underpin the programme, policy or initiative”	Yes	Chapter 5; 6.1; 6.2
“Evaluation questions, objectives and focus. State the evaluation question(s) and specify the objectives for the evaluation. Describe whether and how the programme theory was used to define the scope and focus of the evaluation”	Yes	6.1
“Ethical approval. State whether the realist evaluation required and has gained ethical approval from the relevant authorities, providing details as appropriate. If ethical approval was deemed unnecessary, explain why”	Yes	6.2
METHODS		

REPORTING STANDARDS (Wong et al., 2016) ^a	COMPLETED	NOTES
“Rationale for using realist evaluation. Explain why a realist evaluation approach was chosen and (if relevant) adapted”	Yes	6.1; 6.2
“Environment surrounding the evaluation. Describe the environment in which the evaluation took place”	Yes	6.3.1
“Describe the programme policy, initiative or product evaluated. Provide relevant details on the programme, policy or initiative evaluated”	N/A	RI focused on problem exploration, recapped in 6.1
“Describe and justify the evaluation design. A description and justification of the evaluation design (i.e. the account of what was planned, done and why) should be included, at least in summary form or as an appendix, in the document which presents the main findings”	Yes	6.2
“Data collection methods. Describe and justify the data collection methods – which ones were used, why and how they fed into developing, supporting, refuting or refining programme theory Provide details of the steps taken to enhance the trustworthiness of data collection and documentation”	Yes	6.4
“Recruitment process and sampling strategy. Describe how respondents to the evaluation were recruited or engaged and how the sample contributed to the development, support, refutation or refinement of programme theory”	Yes	6.3
“Data analysis. Describe in detail how data were analysed. This section should include information on the constructs that were identified, the process of analysis, how the programme theory was further developed, supported, refuted and refined, and (where relevant) how analysis changed as the evaluation unfolded”	Yes	6.5

REPORTING STANDARDS (Wong et al., 2016) ^a	COMPLETED	NOTES
RESULTS		
“Details of participants. Report (if applicable) who took part in the evaluation, the details of the data they provided and how the data was used to develop, support, refute or refine programme theory”	Yes	7.1
“Main findings. Present the key findings, linking them to contexts, mechanisms and outcome configurations. Show how they were used to further develop, test or refine the programme theory”	Yes	7.2 – 7.5
DISCUSSION		
“Summary of findings. Summarise the main findings with attention to the evaluation questions, purpose of the evaluation, programme theory and intended audience”	Yes	7.6
“Strengths, limitations and future directions. Discuss both the strengths of the evaluation and its limitations. These should include (but need not be limited to): (1) consideration of all the steps in the evaluation processes; and (2) comment on the adequacy, trustworthiness and value of the explanatory insights which emerged”	Yes	7.6.1; Chapter 8
“Comparison with existing literature. Where appropriate, compare and contrast the evaluation’s findings with the existing literature on similar programmes, policies or initiatives”	Yes	Chapter 8
“Conclusion and recommendations. List the main conclusions that are justified by the analyses of the data. If appropriate, offer recommendations consistent with a realist approach”	Yes	Chapter 8

REPORTING STANDARDS (Wong et al., 2016) ^a	COMPLETED	NOTES
“Funding and conflict of interest. State the funding source (if any) for the evaluation, the role played by the funder (if any) and any conflicts of interests of the evaluators”	Yes	Transcription funded by an ASME Small Grant 2020, but the funder had no role in the RI.

^a Column contents quoting the Reporting Standards.

Appendix 15. Topic guides

Student topic guide

<p>In what ways is medical students' well-being affected by transition into and within clinical training?</p>
<ul style="list-style-type: none">• Can I start by checking what stage you are at in your clinical training?• Before we start, some of the literature suggests that medical students' personal characteristics might affect their experiences, so please can I check a few demographic details with you? You don't have to give me this information if you don't want to, and we can just start with the interview.<ul style="list-style-type: none">○ Age, gender, ethnicity, nationality, GEM/direct entry (if GEM what before), current placement.• What interested you in the study so you are here today?
<ul style="list-style-type: none">• What do you do to take care of yourself day to day?<ul style="list-style-type: none">○ Physically; Psychologically/ mentally; Socially; Professionally/academically; Personally (give example)• What sorts of things affect the way you feel about yourself?<ul style="list-style-type: none">○ Physically; Psychologically/ mentally; Socially; Professionally/academically; Personally (give example)• What sorts of things do you do to get the most out of yourself?<ul style="list-style-type: none">○ Physically; Psychologically/ mentally; Socially; Professionally/academically; Personally (give example)
<ul style="list-style-type: none">• Talk me a through a typical day.<ul style="list-style-type: none">○ What would make a really good day?○ A difficult day?• You are coming up to a new placement ... what do you do beforehand ...<ul style="list-style-type: none">○ 1 month before○ 1 week before○ The day before○ On the day○ During the placement○ Afterwards• Foundation training is coming up ...<ul style="list-style-type: none">○ How are you feeling about it?○ What will you do beforehand ...

Educator topic guide

General prompts

Points raised will be followed up to explore Cs, Ms, and Os through the use of questions, such as:

- What is it about X that Y? (mechanism exploration)
- How do you think X affects students' feelings about training? (outcome exploration)
- What impact do you think X has on students' feelings/functioning on placement? (outcome exploration)
- Is this the same for all students, or do some have different experiences? What do you think it is about them that makes their experience different? (context exploration)

Area of theory	Questions
General/opening	Clarify their role and involvement with students, years (CP1-3), and site(s).
	Can I start by asking what interested you in taking part in the study?
	What are thoughts on how your role supports students with their progression through clinical training?
Perceived Competence: role demands/ learning opportunities	How do you design placements/teaching to help them fulfil their learning objectives? <i>Clarification (if needed):</i> Students have lot of learning objectives/sign-offs that they need to get done – how do you provide those opportunities day-to-day?
Perceived Competence: role clarity	In the literature it talks about how students often struggle to understand their role on placements, what are your experiences of this? <i>Clarification (if needed):</i> For example, some students talk about how, unlike other professions, they do not have a clear role clinically and this can be difficult for them to understand. We know that students can struggle to feel valuable or useful on placements and can find this difficult to manage, what are your thoughts on this?
Perceived Competence /Autonomous Regulation: SRL	We know that the clinical environment is a very different learning environment than the pre-clinical environment, what do you think makes a good learner in the clinical environment? <i>Follow up (if applicable):</i> In your experience, do some students find it difficult to adapt to learning in the clinical environment? Why do you

	<p>think that is? What do they find challenging? How do you support them with that?</p> <p><i>Follow up (if applicable):</i> The literature suggests the students' degree of independence in their learning is important, what's your experience of that? (e.g. self-directed, goals, interest in the topic)</p> <p><i>Follow up (if applicable):</i> How do you approach working with students who are less independent learners?</p>
<p>Connection to Others/ Perceived Competence: safe environment/ team culture</p>	<p>If we can now think about when you have a new group of students joining you for a placement, how do you approach working with them for the first time?</p> <p><i>Clarification (if needed):</i> e.g. induction activities, integration with the ward team.</p> <p><i>Follow up (if applicable):</i> In the literature there's an idea that the ward environment and culture can affect the student experience, what are your thoughts on that? (e.g. knowing names increases support seeking)</p>
<p>Autonomous Regulation: Role modelling/ professional identity development</p>	<p>How do you design placements/teaching to provide an opportunity for student to develop their professional knowledge and behaviour? (e.g. non-clinical aspects of learning, how to think/act like a doctor)</p> <p><i>Follow up (if applicable):</i> We know that students can sometimes experience differences between their own perceptions of what it means to be a doctor and their observations or experiences on placements, what are your experiences of this?</p> <p><i>Follow up (if applicable):</i> The literature suggests that one of the key ways students learn on placements is through role modelling, what's your experience of being a role model for students?</p>

Appendix 16. Examples of realist investigation analysis

Example 1. Familiarisation note excerpt (Step 1)

E15: Lack of confidence in the clinical environment – helps to have a specific educator to act like a guide and help them work out what they need to do etc. ‘Safe’ person or support – someone they know it is fine to approach. Dynamic of the ward and possibly the nature of the patients, for example there is probably less pressure on staff if they aren't looking after critically ill patients. The dynamic can depend on the mix of staff, personalities, and the local ward culture. Plus the student needs to make a good impression. They need time (which they might not have) to observe a ward and see what happens. A safe learning climate is one where the students can be themselves and relax – *so does this mean that they are learning rather than performing (Bjork)?* Motivation to be a doctor (or not) affects engagement with learning opportunities.

Example 2. NVivo coding framework (Step 2)

1 Wider factors	39	190
1.1 Medical culture	16	30
1.2 Resourcing of clinical teaching	11	32
1.3 Placement location	17	28
1.4 Curriculum or course factors	24	74
Other	12	26
2 Learning to be a doctor	53	1003
2.1 Student factors	50	431
2.1.1 Learning contexts	34	269
2.1.2 Prior socialisation & familiarity	11	21
2.1.3 Interpersonal & related skills	7	18
2.1.4 Additional challenges	1	3
2.1.5 Confidence	10	22
Other	3	3
2.2 Teacher factors	23	70
2.3 Participation in the CE	47	355
2.4 Student-teacher interaction	32	111
Other	16	36
3 Managing well-being	42	561
3.1 Self-care	25	195
3.2 Resources	33	179
3.2.1 Social support	28	94
3.2.2 Peer issues	15	35
3.2.3 Psychological resources	11	38
Other resources	3	12
3.3 Challenges to well-being	26	132
3.4 Learning to be well in medicine	22	53
Other	1	2
4 Other stuff	5	10
4.1 Covid	5	10
Other	0	0

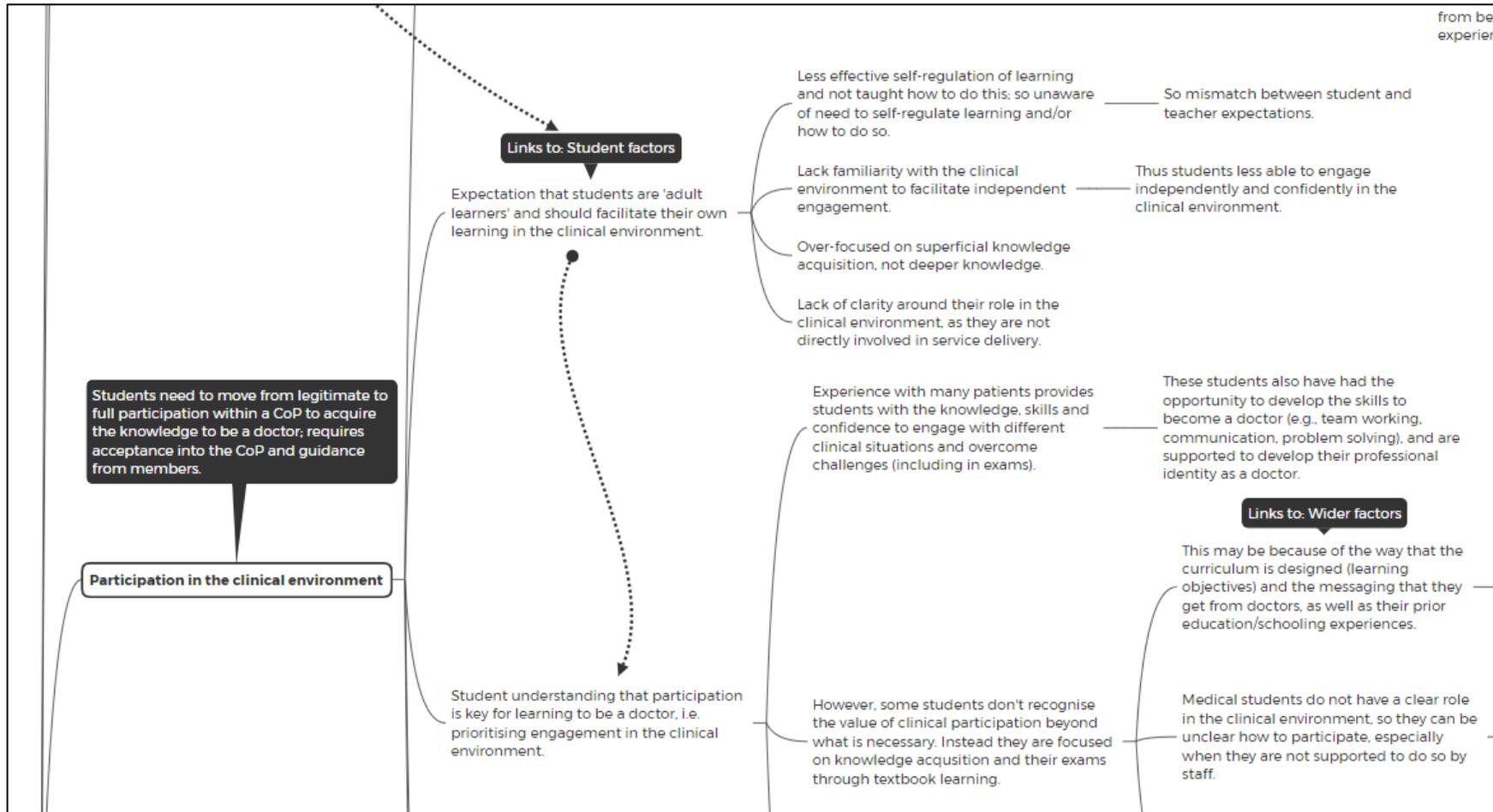
Example 3. Analysis note excerpts for data extracts coded to '2.3 Participation in the CE' (Step 2)

- CS09 (CP2 GEM). Having a consultant and teaching fellow to guide her clinically helped her to move from being spoon-fed tasks to being more independent clinically. So this enabled her to feel more relaxed and calm, so then she could engage more with opportunities and learn. Consistent contact and being known by the same teachers over time, so enabled developmental progression and support. (Links to: [Student-teacher interaction](#)). That sense of belonging has been a key thing for placements that have gone well or been better experiences.
- E15. Beneficial for students to be aware of one or two people that they can ask for help on the wards, because then they don't have to worry about disrupting someone who is busy etc., then that person can give them some direction about what to do/where to go to get the knowledge and skills they need. If they don't have this then they feel uncomfortable because they don't know what to do, so they feel awkward. Then it is even worse when the ward is unfriendly, although this is becoming less problematic.

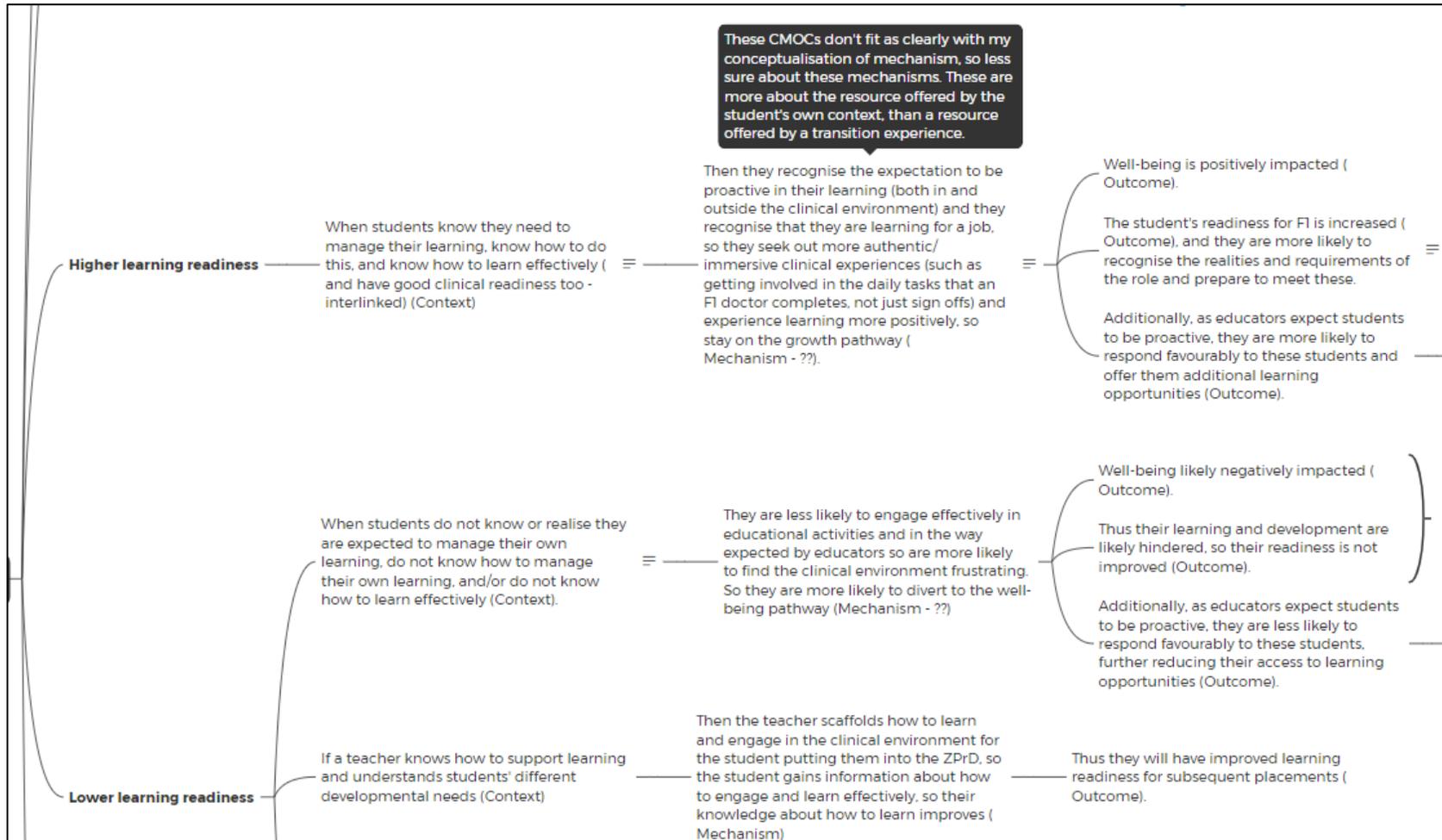
Example 4. Collation note excerpt for 'Participation in the clinical environment' (Step 2)

- Students need to be able to engage in the clinical environment to move from legitimate peripheral participation to full participation within a CoP, acquiring the knowledge (conceptual, procedural and dispositional – Billett) needed to be a doctor. They also need to be accepted into the CoP and guided by a member of the community, in order to learn how to move from a peripheral to full member of the profession. This increases their readiness to work as a junior doctor. However, students experience varying degrees of welcome from staff in the clinical environment.
- Most students when coming to the clinical environment don't understand it or have familiarity with it, and therefore struggle to engage clinically. Therefore they need a guide in the clinical environment to welcome them into it and support them to participate, i.e. legitimately peripherally participate within a CoP (guide is an existing full member). Then as they develop greater familiarity and comfort, due to socialisation into the profession, then they are better able to engage independently (as appropriate for their own level of development) and also create their own access into the environment.

Example 5. Early configuring in mind maps (Step 3)



Example 6. Later configuring in mind maps (Step 3)



Appendix 17. Reflective diary examples

Extract 1: from 'General Reflection (18.12.2019)' late in student interviews

I think overall my position as a researcher has been helped by being an outsider because the participants don't see me within the system of medicine. So therefore I'm not in a power position with regards to their studies or career. ...

I think my own biases(?)/assumptions are more around my own background in psychology so not always realising that other people don't have the same insight into emotions – theirs or others'. So sometimes I would probe about feelings and they wouldn't have anything to say about it relating to emotions.

Extract 2: from 'E08 (10.06.20) Pre-interview reflection'

Again though, I found he spoke for quite a long time and it was hard to interrupt (I didn't really). A lot of what he was saying was helpful though. More senior people seem to be used to sharing descriptions of their roles/work, so perhaps this is partly why? They kind of go into a 'spiel' about what they do. The later discussions seemed more dynamic. Perhaps I need to push myself more to interrupt, but I think this might affect the rapport, and also prevents someone from saying something relevant because I interrupt and we move on to something else and it then doesn't get covered. So maybe try interrupting later in discussion, if needed or not relevant. But early on it can be helpful to understand their background and get ideas to focus on in the interview.

Extract 3: from 'E24 (03.07.20) Post-interview reflection'

Definitely able to move onto theory testing in this interview, as I put some ideas to the participant for discussion, based on what she was saying. For example around awareness and under/over confidence, and the confidence to integrate. Little new ground covered, but we were able to get some more detail about some of the existing coverage from the interviewee. The participant was warm and open in her manner, which helps open up the dialogue and gave me more confidence to propose ideas.