Accessing Clinical Wisdom

Mapping Clinical Students' Experiences of Integrated Learning

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A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in Health Sciences, The University of Auckland, 2015.

Abstract

The principal aims of this study were to investigate integrated learning and access to clinical wisdom by health professional students, and to identify whether differences in specific experiences and discernment of critical elements of these experiences contributed to this. An additional aim was to document participants' evaluations of the ease of use, convenience and suitability as a learning tool of modified concept mapping which was developed specifically to capture integrated learning in clinical experiences. Based on views of clinical learning and wisdom informed by systems theory, embodied phenomenology and integrative dualism, this study used systems theory, visual, ethnographic and phenomenographically-informed methodologies to develop a modified concept map data collection tool and to analyse the data collected.

Eleven participants from Occupational Therapy and Medicine took part in the study over an eight month period. Data analysis suggested varying integration of emotions/feelings, actions/artefacts, thinking/knowing, beliefs, attitudes and values in clinical learning. This variability related directly to the participants' accounts of their clinical experiences and is expressed in two diagrams. The first, "The Who, What and Where of Clinical Learning" represents the critical contextual factors of clinical learning, the most important of which was "Interpersonal interactions". The second diagram, "(Re)forming Identity", represents the "How" of clinical learning as six critical elements of experience, the most prevalent being "Changing or revealing beliefs, attitudes, values" and "Building or negotiating relationships". These diagrams suggest that students' beliefs and values are revealed to them and sometimes changed through relationships with patients, clients and educators. Awareness of integration and relationship-based revelation or change to beliefs and values appear to be central to the (re)formation of student identity and to shape students' becoming as persons, graduates and members of identifiable professions. Integration of three or more critical elements sometimes appeared to indicate access to clinical wisdom which is theorised as an external resource comprising all the information relevant to each unique, situated interpersonal interaction. The soul is proposed to function as the mediator of this access.

The study suggests that health professional students appear to have the capacity for integration of learning across domains and contexts, and for some this is proposed to allow access to clinical wisdom mediated by a functional soul. The implications for increasing access to clinical wisdom in clinical education are that a systematic, embodied and integrative

approach to learning in complex interpersonal contexts needs to be taken across the curriculum. To enhance integration a whole-person-centred focus on increasing awareness and engagement with becoming for students, educators, patients and clients is proposed. Specific teaching attention to integrating the psychomotor and affective domains with cognition, attitudes, values and beliefs is suggested to increase access to clinical wisdom for a greater number of students.

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Chapter One: Introduction

But where can wisdom be found?
Where does understanding dwell?
No mortal comprehends its worth;
it cannot be found in the land of the living.
The deep says, "It is not in me";
the sea says, "It is not with me."
It cannot be bought with the finest gold,
nor can its price be weighed out in silver.
It cannot be bought with the gold of Ophir,
with precious onyx or lapis lazuli.
Neither gold nor crystal can compare with it,
nor can it be had for jewels of gold.
Coral and jasper are not worthy of mention;
the price of wisdom is beyond rubies.
The topaz of Cush cannot compare with it;
it cannot be bought with pure gold.

Where then does wisdom come from?
Where does understanding dwell?
It is hidden from the eyes of every living thing,
concealed even from the birds in the sky.
Destruction and Death say,
"Only a rumor of it has reached our ears".
God understands the way to it
and he alone knows where it dwells,
for he views the ends of the earth
and sees everything under the heavens.
When he established the force of the wind
and measured out the waters,
when he made a decree for the rain
and a path for the thunderstorm,
then he looked at wisdom and appraised it;
he confirmed it and tested it.
And he said to the human race,

Introduction

The pursuit of wisdom has occupied the thought and energy of men and women for thousands of years, yet the urgency of the quest and the elusiveness of the goal remain unchanged. The question "What is wisdom?" could be answered in a thousand ways, all of which might contain something of its essence, but not the thing itself. Perhaps that is why many people have chosen to view it through a phenomenological lens, since wisdom is the epitome of a phenomenon; a perceptually and conceptually opaque and multi-faceted whole (Merleau-Ponty, 1942/1963) that is able to be experienced through discernment of critical elements (Marton & Booth, 1997; Pang, 2003), all of which are part of an unfathomable complexity. While personal interests have led me to seek an understanding of wisdom generally, experience in both the clinical and non-clinical teaching of students led to my interest in the particular qualities, attributes and behaviours that teachers recognised as indicators of the development, or lack, of clinical wisdom in students. The difficulties clinical educators encounter in trying to formulate or fit indicators of clinical wisdom into assessment frameworks were the initial catalyst for considering whether or not clinical wisdom might be related to integration of the bodily, affective and cognitive domains of clinical learning with beliefs, attitudes and values. In this thesis, integrated learning refers to contextualised synthesis of some or all of these aspects of a learning experience to create a personally coherent meaning or interpretation.

In preparing to investigate this integration in a study of final year Occupational Therapy and fifth year Medical students' clinical experiences, the existing more narrowly defined concept of integrated learning was extended to include the domains of beliefs, attitudes and values, and contextual factors. This reflected the desire to capture as much breadth and depth of the being and doing of clinical learning as possible since all elements may be important for clinical wisdom. The aims and objectives of the study, the methodology and methods used to gather and analyse data, and the findings of the study are briefly summarised in this introduction which concludes with an outline of the theoretical position underpinning the study and thesis.

Aims and objectives

This study sought to investigate health professional students' integrated learning and access to clinical wisdom as processes conceptualised on the basis of certain theoretical

understandings. The study aims were to: illustrate the connections students made between cognitive, psychomotor and affective elements of their subjective clinical learning experiences and their beliefs, values and attitudes; stimulate the self-reflexivity that characterises higher order processes (Procee, 2006) so that connections between ontological and epistemological beliefs might be captured; identify specific experiences and critical elements of these that produce such connections; investigate the potential of concept mapping as a more whole-person process by modifying it and using it longitudinally; generate findings that would give insight into how and when clinical wisdom is accessed. In order to achieve these aims, the objectives of the study were to:

1. Assess participants' perceptions of the connections between and integration across the domains of learning in clinical settings.
2. Identify specific experiences and the discernment of critical elements of these experiences amongst participants.
3. Assess whether the learning and experiences indicated the development of access to clinical wisdom.
4. Document participants' evaluations of modified concept mapping as a learning tool including ease of use, convenience and suitability for capturing integrated learning in clinical experiences.

The hope was that individually, temporally and collectively, the data might show whether, how, and in what situations integrated learning and access to clinical wisdom occur so that educators might better understand the critical elements of these processes, and the contextual and student factors that enhance or inhibit these. Understanding these factors could then guide the development of specific learning and assessment strategies to increase clinical students' awareness of and engagement with integration and access to clinical wisdom.

Data collected

The empirical data for the study were collected from three third-year Occupational Therapy student participants and eight fifth-year Medical student participants. Concept mapping was chosen as the data gathering tool because it allowed visual, tactile and cognitive engagement with and expression of connections, and the complementary analysis of visual and textual representations of experience. A modified version of C-map®, a computer-based concept mapping tool, was used. It encouraged participants to use and link concepts from all domains of clinical learning and to give detailed annotations of their clinical experiences (see Figure 4, p. 82, for an explanation of mapping terms). Each participant produced one to three maps over

a period of eight months. This repeated mapping sought to capture changes to structure and connections over time that might indicate the development of access to clinical wisdom.

The focus question used for the generation of the maps was "From my experiences, what are the relationships between thinking, feelings, behaviour, attitudes, values and beliefs in clinical learning?" This question attempted to make explicit to participants that connections between doing and being in clinical situations were being sought, while avoiding the use of terms such as "wisdom" which might limit students' exploration and documentation of their experiences. The data collected included perceptions of the connections between cognition, affect, psychomotor function, beliefs, attitudes and values, what clinical experiences the participants identified as contributing to these connections and whether change occurred over time. Evidence for access to clinical wisdom was sought in unique and general features of connections and in participants' integration of critical elements of experience and context.

Data analysis

In keeping with the theoretical approach to the study both quantitative and qualitative analyses of the data have been conducted. This includes comparisons of the number of connections between domains and word frequencies and scoring of the quality and relevance of connections and experiences using a modified version of previous researchers' scoring systems to allow comparison with their findings and show trends in map complexity. Map patterns and content were focused on in ways that have not been used before, with a systems theory, phenomenographically-informed visual analysis of the maps as an interrelated set to determine the main structural patterns represented. This analysis is presented in a C-map® of the factors potentially influencing map structure, as a visual interpretation of the visual relationships of the data. Findings from the analysis of the annotations are also presented in a new way using diagrams which illustrate the contexts and critical elements and the importance of these for each discipline. As a result, textual and visual data analysis is reflected in findings expressed in both textual and visual forms. This has been done to provide more embodied and holistic representations of the participants' experiences and the researcher's interpretations of them.

Findings

Visual analysis and interpretation of the set of maps indicates five structural patterns. The C map® of the factors influencing structure suggests that these patterns arise from a focus on process or relationships, linear or non-linear thinking, awareness of domain integration, and the significance of domains and experiences. A small overall increase in the scores between

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the first and third maps is consistent with other concept mapping studies, but slightly higher and more sustained scores for the Beliefs and Emotions/Feelings domains suggest these domains were more important to the participants. Despite a general pattern of increasing score and increasing percentage contribution to the overall score by the annotations, there were differences between participants in the scores for propositions compared with annotations. This has implications for interpreting the meaning of concepts in traditional concept mapping applications and may indicate differences between being able to conceptualise integration well compared with recognising it in experience.

The main findings from the analysis of the propositions are that all participants included predominantly unidirectional connections to and from all domains in each map, suggesting awareness of specific connections. The more frequent links to and from beliefs and the frequent annotation of these suggest that the participants as a group perceived beliefs to be important. Some connections are more likely to be recognised as causal, especially by the Medicine participants and especially those to emotions/feelings. Disciplinary comparisons suggest greater awareness of connections to actions/artefacts for Occupational Therapy participants and connections to attitudes for Medicine participants. The more frequent use of the words "self", "knowledge", "professionalism" and "observing" in the propositions and of "learning", "patients", "work" and "supervisors" in the annotations highlight differences in conceptual and experiential connections between domains of significant clinical learning.

Analysis of the annotations identified six categories of context, of which three were interpersonal interactions, and six critical elements of experience. These categories and elements are represented as two diagrams. The first is "The Who, What and Where of Clinical Learning". The second, "(Re)forming Identity", represents the "how" of clinical learning and is summarised in three Becomings: "Becoming the person I want to be", "Becoming a member of an identifiable profession" and "Becoming ready to graduate". These diagrams demonstrate how often the categories and elements have been identified and how frequently they overlap, which is somewhat different for each disciplinary group. For all participants, the primary context of clinical learning is interpersonal, especially "With supervisors or the education team" for the Medicine group and "With patients or clients" for the Occupational Therapy participants. The most frequently identified critical elements of these experiences overall are "Changing or revealing beliefs, attitudes, values" and "Building or negotiating relationships", suggesting that the supervisory and patient/client relationships of clinical learning are of primary significance to students in shaping beliefs, attitudes and values.

The discussion of the findings covers three areas and their implications for clinical education. Firstly, the critical elements and the three Becomings of (Re)forming identity have been

explored through a systems theory, embodied phenomenology, integrative dualist lens to suggest that individual awareness of how the critical elements are integrated in becoming as a person, a member of the profession and a student ready to graduate is variable. Integration of all critical and contextual elements of clinical learning by whole-persons is suggested to be most likely to produce access to clinical wisdom, but the dominance of "Changing or revealing beliefs, attitudes, values" indicates a need to provide more space for students' to explore their relatively stable, mostly tacit values and beliefs, and how they interact with other critical elements to affect practice. To increase the likelihood of access to clinical wisdom educators need to focus on providing person-centred relationships that assist students to develop a coherent identity, manage emotions and be more aware of their bodies.

 Secondly, the findings have been used to support the conceptualisation of clinical wisdom as an external resource consisting of all the unique information needed for a particular situated clinical interaction. This theorisation is presented along with a model for the soul as a functional complex of the instinctual and spiritual, inner and outer, conscious and unconscious person at any given moment that mediates access to clinical wisdom. The implications for clinical education from application of these theorisations are that increasing integration of the domains of clinical learning and access to clinical wisdom will require whole-person-centredness where clients, students and educators are becoming together in supportive relationships.

Thirdly, the use of modified concept maps as data gathering, self-evaluation and analysis tools suggests that such diagrams are more integrated visual-verbal ways of approaching practice-based settings and have potential as learning and research tools if modified to suit the contexts and goals of learning.

Researcher position

Ashwin (2012) notes that the generation of theory from empirical research is hampered by insufficient questioning and clarity around differences between implicit, unstated researcher positions and what outcomes suggest. In response to this, I have laid out my position as a researcher.

My personal worldview is primarily that of a theistic and realist systems theorist; I believe in an overarching system which contains all other systems, is seamlessly material and immaterial, not a human construct, and created, sustained and loved by God. As suggested by the passage from Job at the beginning of this chapter, all wisdom including clinical wisdom is built into this overarching system and is only completely known by God. Within this system other material and immaterial systems of living and non-living things, including humanity, have

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their own ways of being, becoming, knowing and doing. Thus people may have little or no access to how other systems know and understand themselves.

My view of people is that they experience and understand themselves and what exists through perceptual, intuitive and meta-cognitive human processes; therefore, alongside (and including) my realist view of existence, I regard human interpretations of reality as exactly that. More importantly, I view people through an embodied integrated dualist lens as individually and collectively precious material/immaterial body-mind-soul beings with purpose. I endeavor to take a whole-person-centred approach to both research and practice.

My position as a researcher, while founded on a personal worldview proceeding from a relationship with God, has also been influenced greatly by particular theorists. The most important of these are: Gregory Bateson, whose work on overarching systems and patterns within systems and whose unfinished search for the place of the sacred have been primary influences on my theorizing of clinical wisdom as an external accessible source of information; Maurice Merleau-Ponty, whose development of perceptual theory, focus on the body, and wrestling with the nature of the soul have influenced how I view the body-mind-soul as an indivisible part-whole and how this relates to clinical learning; Carl Jung, whose pursuit of self-regulating systems to balance the polarities of personhood has deepened my understanding of Bateson and provided a platform for a model of the soul as a functional integrator, and as a potential mediator of access to clinical wisdom.

As a result of this researcher position, the research is an interweaving of three approaches:

- Systems theory. This is a way of thinking about the interconnected, interdependent dynamic nature of all parts of a system as a whole by focusing on the big picture of patterns and relationships within the system through time and space (Bateson, 1972/2000; Maani & Cavana, 2007).
- Embodiment phenomenology. This is based in Merleau-Ponty's theories of ambiguous perceptual relationships with the world and conscious embodied soul-mind beings. Patterns of meaning are interrupted by discontinuities of experience (Merleau-Ponty, 1948/2004, 1945/2002, 1970). How situated, social elements of embodied experience are perceived and integrated with other aspects of being is of particular importance in embodiment phenomenology (Dall'Alba, 2009a).
- Integrative dualism. As functional body-soul unities with conscious thoughts, people's beliefs, values and relationships reflect a purposeful existence with material and immaterial elements (Goetz & Taliaferro, 2011). This has parallels in

> a purposeful universe of orderly dynamic complex systems and inseparable intertwined opposites (Bateson 1972/2000; Gadamer, 2000).

The effect of these different theoretical lenses on the research conducted for this thesis is that it takes an integrated, whole-persons-within-whole-systems view of clinical learning and clinical wisdom. In clinical learning this view suggests that the integration of psychomotor, cognitive, and affective elements with attitudes, values and beliefs is the process of being, doing and becoming most likely to produce access to clinical wisdom. From an embodied phenomenological perspective, clinical wisdom is ambiguous and unique to every situated embodied clinical interaction. From a systems theory perspective, wisdom and clinical wisdom are complex systems of partially accessible information about all possible human and non-human, material and immaterial elements of existence. This suggests that they are extra-human immaterial entities. From an integrative dualist view all learning processes are soul-body experiences and since wisdom is an immaterial resource, it is possible that access to it is mediated by the immaterial soul. These theoretical propositions are elaborated on in this thesis and used as lenses through which to view the relationship of the findings to clinical wisdom.

I acknowledge that these positions have been influenced by the traditions of medicine, science, education and philosophy and a theistic worldview, all of which have shaped the interpretation of theory, data and findings. I have sought to engage with rather than ignore the ontological and epistemological tensions between these influences, between science and art, numerical data, diagrams, stories, and philosophical interpretations. The aims of the study were ambitious and the evidence of success, like clinical wisdom itself, always just beyond grasp. This thesis does not offer proof to confirm or refute any hypothesis about integrated learning or clinical wisdom. It documents an exploration of students' perspectives of their clinical learning experiences and explains the use of new ways of investigating and theorising the links between integrated affective, cognitive, psychomotor, belief, value and attitude learning that may lead to access to clinical wisdom.

Chapter outline

The thesis includes two literature review chapters. The first outlines the literature on wisdom and clinical wisdom and the second reviews literature on the context of clinical education. These chapters provide the background context for the study which helps to explain the choice of methodologies. The philosophical considerations behind these choices are explored in Chapter Four which also outlines the relevant principles of ethnography, self-assessment,

mapping, concept mapping and phenomenography informing the methodological approach. This chapter also includes considerations of methodological triangulation and trustworthiness.

Chapter Five presents the context, method and modifications made during the study to attempt to improve data collection. This chapter includes information on ethical approval given for the study and explains the various quantitative and qualitative methods used to analyse the structure and contents of the maps collected. Findings from the analyses of map structures and scores, participant evaluations, propositions made between domains and annotations attached to them are presented in Chapter Six. This includes numerical findings such as word and coding frequencies, visual findings such as the diagrams, and textual findings such as the participants' responses to questions about the mapping process. This range of more qualitative and more quantitative findings demonstrates the benefits and limitations of the data collection tool designed for the study, a theme which is developed further in the discussion.

Chapter Seven, the first discussion chapter, examines the findings through the theoretical lenses. It elaborates on the three diagrams, the connection and integration of critical elements and contexts and the possible implications of these findings for clinical education. Evidence for integrated learning from the findings supports Chapter Eight in which a theory of clinical wisdom as an external, accessible resource and the soul as mediator of this access is proposed. Chapter Nine considers the suitability, internal validity and trustworthiness of modified concept mapping as a data gathering tool.

In concluding the thesis, Chapter Ten summarises the main findings and implications for the clinical education of healthcare professionals. It suggests future directions for research and potential uses for the tools developed for the study, in particular modified concept mapping and diagrams, which may have value for further exploration of beliefs, values and clinical wisdom.

Chapter Two: Literature Review of Clinical Wisdom

Introduction

The review of the relevant literature is broken into two chapters, the second of which, Chapter Three, discusses literature on clinical education. In this first chapter, a selection of literature relating to wisdom in general and to clinical wisdom in particular is explored and discussed. A full discussion of wisdom in general is not the intention here, but some discussion is nonetheless included as background to the three theorisations of clinical wisdom considered: clinical wisdom as a meta-cognitive capacity, as phronesis or practical wisdom, and as transformation or spiritual engagement. Each of these is explored in some depth and its potential weaknesses as an explanation of the phenomenon of clinical wisdom are considered. The chapter summary compares the theories and their limitations, suggesting that there may be other ways of theorising clinical wisdom that integrate and expand on these three views.

What is wisdom?

Most scholars use Aristotelian terms in distinguishing between *sophia*, the theoretical wisdom that has to do with an advanced capacity to reason, understand and explain, and *phronesis*, the practical wisdom that has to do with living and acting well (Baehr, 2012; Osbeck & Robinson, 2005). Both are seen as desirable but uncommon human traits, one as an epistemic virtue or good, and the other as the practical outworking of what benefits self and others; thus arguably phronesis is contingent on some degree of sophia (Baehr, 2012). Accordingly, some philosophers view phronesis as an intellectual virtue (MacIntyre, 1990). In Western society, theoretical wisdom could be thought of as a kind of "ontological acuity" (McKenna, Rooney, & Boal, 2009, p. 185), the ability to discern the threads of ontological similarities and differences that cross and intertwine with the multiple perspectives inherent in complex situations. Practical wisdom is more likely to be regarded as a form of self-development or self-transcendence that produces distributed leadership and action reflecting concern for the collective good (Taylor, 2011). Implicit in these descriptions is the conclusion that theoretical wisdom is related to a system of beliefs and values, and practical wisdom to a moral understanding of what constitutes the good of the other (Baehr, 2012).

In many psychological theories of wisdom, knowledge and the moral condition of the knower are the focus. The same is true in many major religions, with the exception of the Upanishads which depict wisdom as inaccessible via the intellect or senses (Birren & Svensson, 2005) and the Old Testament which describes it as an attribute and companion of God. Late twentieth

century emphases on the significance of decision-making as the highest level of mental and emotional functioning and on mastery of behaviour and thinking have resulted in strongly metacognitive and metabehavioural (top-down) explanations of wisdom (Birren & Svensson, 2005). Wisdom may be viewed as an individual or societal, implicit or explicit transformative characteristic (Osbeck & Robinson, 2005). Traditionally, Western cultures have emphasised the cognitive and spiritual benefits of wisdom while Eastern interpretations have been more transformative and inclusive of all domains of human existence (Takahashi & Overton, 2005).

The relationship of wisdom to morals, values and beliefs is particularly complex. For Kupperman (2005), values alone are insufficient for wisdom since they may simply reflect what society generally appreciates at the time, whereas wisdom requires judgement as to when and how best to apply specific value-related principles. Kupperman suggests that morality is more important, and that this is based in an individual's appreciation of the points of view of others and a commitment to their concerns. In their study of persons considered by others to be wise, Pasupathi and Staudinger (2001) found that the calibre of moral reasoning correlated positively with wisdom performance, and that this relationship was mediated by personal characteristics such as creativity, cognitive style, intellect and personality. McKie et al. (2012) note that many of the numerous theories of wisdom found in the psychology literature emphasise the relationship between wisdom-related knowledge and emotional qualities linked to personal virtue. Perhaps it is personal characteristics that determine to what extent other-centred views develop and how strong moral convictions become.

In a professional context, one feature distinguishing morals from values is their less general, more context-specific nature. This is likely to be due to the strong social structures of professional groups which are like those of heroic societies of old with their tacit "rules" of conduct and character that created specific moral expectations within which virtues such as courage were displayed (MacIntyre, 1990). There is also likely to be significant internal pressure to conform to these moral codes (Kupperman, 2005). Penny and You (2011) found that formalised codes of conduct, ethics and social norms assisted occupational therapy students to make rule-based moral decisions, but did not reduce the angst felt over complex practice dilemmas that require the gradually developed use of more universal moral principles. It is the use of such post-conventional moral reasoning that is recognised in the complex deliberations of the expert practitioner (Penny & You, 2011) and is therefore indicated also in clinical wisdom. In support of this, MacIntyre, (1990) ties morality to the slow development of "internal goods of practice" (p. 191), that is, to virtues like wisdom achieved through subordinating oneself to others in the relationships of practice, even if the moral code of that practice is not congruent with personal, institutional or social morals. Conceptions of life as a sequence of events and of the self as multiple roles acted out according to specified moralities

support this adherence through subordination, but are incompatible with the development of virtues such as wisdom that require a unified, single-purposed whole-life pursuit (MacIntyre, 1990).

Since most of the literature subscribes to depictions of wisdom as an internally developed or acquired characteristic, it is pertinent to explore how this is related to one's view of and interactions with others. Rather than commitment to the common good of humanity in general, other-centredness is commitment to the particular good of individuals; this features in a limited number of theories of wisdom, some of which also include spiritual elements or connections with the natural world (Birren & Svensson, 2005; Osbeck & Robinson, 2005). Bateson and Bateson (2005) for example, state that self-awareness of the entire biological world is "…Enlightenment…a sudden discovery or realization of *life*" (p. 74, italics in original), which leads to a personally relevant other-centred wisdom. Jaspers (1954) frames the search for wisdom as a pre-occupation with finding ways of overcoming or enduring the constant, daily threats of failure and sources of doubt. This, he suggests, drives learning and generates a heightened awareness of being which, in spite of the constant less-than-ideal reality, inclines us toward a deep unity with others. Cunliffe (2009) picks up on this in her description of wise leadership as a moral activity of self-dialogue by those who "... are always selves-in-relation-to-others" (p. 95). Practical wisdom in a spiritual framework also reflects other-centredness in its focus on interpersonal skills and qualities manifest in actions such as compassion and love (Leathard & Cook, 2009). By way of caution Shapiro (2008) points out that the distinction between self and others demarcates people by creating dichotomies of definition via an inherently value-laden process. This may work against other-centredness and wisdom, especially in practice socialisation processes. In this situation, "other" may denote inclusion or exclusion, as in descriptions of practice community membership or workplace identity (Illeris, 2014). Thus the relationship between one's view of others and wisdom is not necessarily straightforward.

In further relating wisdom and one's views of others to the world of professional work, it is of note that wisdom has also been proposed to exist not only within individuals but also within, or emerging from, systems and organisations. Hays (2010, p. 72) uses the term "wisdom ecosystem" to denote the origin of organisational wisdom within a living system of mutually dependent people and their environment. This occurs as a product of dialogue, collective intelligence and a communal mind (Hays, 2010). Adherents of the ecological paradigm envisage system capacities, such as wisdom, emerging from the unpredictable evolving realities, embedded knowledge and dynamic social intelligence and skill of practice (McKenna et al., 2009). While these ideas are compatible with systems theory approaches to understanding human interactions, what the resultant wisdom and collective intelligence

actually look like is often unclear. Their emergent nature is also disputable since what eventuates can usually be explained retrospectively from knowledge pre-existing within the system (Little, 2013a). Despite this, the ecological emergent view of wisdom has widened the understanding of practice-based wisdom because it acknowledges that interactions between people and their human and non-human environment mix perceptive, intuitive and social relationships, trust and paradox (Hays, 2010).

When the development of wisdom, values and morality is considered in a learning context, there is synergy between Bateson's conception of the types of learning and Barnett's depictions of the relationship between knowing and becoming. Bateson (1972/2000) separated learning into three types: type I in which one learns to choose within a set of alternatives; type II in which one learns to change the set of choices in a transferable way (learning to learn); and type III in which a foundational change in the whole system of sets relocates the self as less significant within a larger system. Using this classification of learning, the development of professional morality, phronesis and even sophia could be envisaged to result from advanced forms of type II learning, but could equally reflect type III learning in which the self is redefined, and reshaped (Bateson 1979/2002). Barnett (2009) is critical of the widespread enthusiasm for learning to learn, suggesting that being and becoming imply qualities of character, self-criticality and ethical properties of knowing that are more than adopting new ways of understanding the world. From this perspective, the development of professional morality, sophia or phronesis could be forms of becoming; however, Barnett (2011) predicates this on the ability to stand outside and critique thought and action in the present moment, which is actually very much like Bateson's type III learning.

There is considerable polarised debate over whether universities are or are not, should or should not be, in the process of instilling morals and values. The graduate attributes of many institutions espouse purely scholastic or professional competence values (see for example Barrie, 2012), but some academics still believe the university has a duty to expose students to moral ideals and provide explicit teaching that develops moral reasoning. For instance, Sample (2010) argues that the morality of most students is incompletely formed yet every profession that involves working with others expects moral autonomy of its members. Despite this imperative, Harland and Pickering (2011) note that it is actually very difficult to separate morals from values, explore conflicts between them, and avoid indoctrination; additionally, even in an atmosphere of trust there is no guarantee students will feel safe exploring morality. This may be why some institutions avoid the specific teaching of morals or values, and why there is little evidence of attention to wisdom in current educational structures and processes (McKie et al., 2012). Arguably, to choose *not* to teach something is a value-based choice, and this may be because the values behind competency-based outcomes do not accommodate

those of personal development (McKie et al., 2012). Jaspers (1954) suggests that one of the reasons wisdom is often not developed is because of the continued vacillation of *not* choosing rather than any immorality or poor choice. This fits with the Aristotelian view of phronesis which suggests that it is in the continuing practice of making good moral decisions that one acquires moral excellence and thus the ability to effect wise action (Kinghorn, 2010). This is especially relevant to the development of clinical wisdom discussed in the following section.

Clinical wisdom

There is variety of opinion in the literature as to what clinical wisdom is, but interestingly the word "clinical" is not defined. In most cases it relates to professional healthcare settings and since the word clinical derives from the word for bedside, usually means any activity that involves actual patients (Oxford Dictionaries, 2014). In the educational literature and of relevance to this study's participants, "clinical" is often equated with hands-on care contexts and time periods during student learning (Bebeau & Monson, 2012). This definition includes place, but it should be noted that the clinical wisdom literature reviewed does not always define its exact context or refers generally to healthcare practice settings. Within this literature three reasonably distinct schools of thought can be distinguished: clinical wisdom as a metacognitive capacity, as phronesis, and as inner transformation or spiritual engagement. Each of these is considered here.

Clinical wisdom as meta-cognitive capacity

In much of the literature, clinical wisdom is described as a predominantly rational capacity involving superior discernment applied primarily in reasoned decision-making. From this perspective wisdom is a cognitive or meta-cognitive ability for dealing with complex problems that involves the greater or lesser consideration of all the variables of and participants in a situation (Edmondson, Pearce, & Woerner, 2009). This has parallels with business and psychology models where wisdom is explained as the ability to evaluate dynamic unfolding situations and balance needs and outcomes (McKenna et al., 2009). Cognitive logical agility and a facility for synthesising and balancing multiple options are often mentioned as personal skills associated with this kind of clinical wisdom (Jenkins & Thomas, 2005). Some researchers of the cognitive and meta-cognitive aspects of clinical decision-making have focused on the knowledge elements of complex clinical problems, the links that connect them and the transformation of these into meaning (Charlin et al., 2012). Others have produced sets of questions expert clinicians ask of themselves in such situations (Delany, Golding, & Bialocerkowski, 2013), or have examined the interaction of cognitive and meta-cognitive

elements of clinical reasoning in the development of expertise (Kinchin, Cabot, & Hay, 2008b; Kinchin, Lygo-Baker, & Hay, 2008c).

What these approaches have in common is their focus on deliberative rational processes and the implication that wisdom requires a highly developed, uncommon intellectual capacity for processing and integrating knowledge presented in multiple ways. As Ryan (2012) explains, there is an expectation in most universities that this capacity is associated with attitudes of openness and criticality and the pursuit of a wide and deep knowledge of subject matter that has been read, studied, contemplated, analysed and internalised into reliably supported rational beliefs. From a systems theory perspective this is problematic since the change in thinking from the events, patterns and messages of evidence to the mental models of beliefs is also a change from explicitly expressible symbols and concepts to implicit incompletely expressible ones (Maani & Cavana, 2007). Knowledge too is not a single static entity, but a dynamic network of concepts overlaid with memory, intuitions and beliefs (McKenna et al., 2009). This somewhat undermines claims of a straightforward transformation of complex clinical knowledge into meaning (Charlin et al., 2012), or of being able to reduce expert clinical decision-making to a set of explicit questions (Delany et al., 2013).

In attempting to address these problems, some meta-cognitive theories of clinical wisdom also include tacit knowledge and intuition. Both are kinds of knowing clinicians frequently rely on without being conscious of them or able to express exactly how or why they know what they know (Nyatanga & de Vocht, 2008; Polanyi, 1974). Intuition involves bodily or sensory elements, emotions and memories and may facilitate the bringing together of tacit and explicit knowledge (Braude, 2009), a feature of meta-cognitive facilities such as wisdom. Meaningful and effective interpersonal interactions in which valued character qualities such as clinical wisdom may appear depend upon the participants' tacit agreement as to the nature of their relationship with each other, an agreement primarily negotiated through typically unconscious bodily postures, gestures and the nuances of speech (Bateson, 1972/2000). Such situations are also influenced by the material environment which in clinical settings may be impersonal or highly technical, thus increasing patients' awareness of interpersonal difference and distance. Clinical wisdom may be exhibited in health professionals' use of intuition and tacit knowledge for decision-making, but more importantly in comfortably relating to patients as human beings with equally important tacit and intuitive knowledge of their own (Thomas Moore, 2010). This view of clinical wisdom, as advanced metacognition, fits a more holistic sum-greater-than-the-parts model.

A number of authors describe clinical wisdom in terms of a cognitive progression from data, through information and knowledge to wisdom. Also known as the DIKW framework, this is

thoroughly explained by Matney, Brewster, Sward, Cloyes, and Staggers (2011): data ("…the symbols representing objects, events and their properties", p. 7), is transformed into information (contextualised and structured data), which becomes knowledge ("…information that has been synthesized so that relationships are identified and formalized", p. 8), which is used in the exercise of wisdom, "…the application of experience, intelligence, creativity, and knowledge as mediated by values, toward the achievement of the common good" (pp. 8-9). From this description of wisdom, it is clear that the first three levels actually only provide the intellectual raw material and much more must be included to develop clinical wisdom. Unless one is willing to accept the argument for wisdom as a kind of emergent property that is of a totally different nature from its constitutive elements but determined by them (Little, 2013a), purely linear relationships from data and information to knowledge and wisdom seem implausible. Data to information to knowledge transformations can be correlated with a purely metacognitive clinical reasoning framework, but to extrapolate this to a linear relationship between knowledge and wisdom would be to ignore the epistemological and axiological frameworks of knowledge (Barnett, 2009) and exclude intuitive and perceptual knowledge that use different non-rational pathways (Kahnemann, 2003).

As a meta-cognitive model, DIKW has another important limitation for the systems theorist, phenomenologist and integrative dualist. Collected data are inseparable from the uncollected data by which they are defined. When transformed into information, data are not placed back into their original whole but into a context that gives them a particular meaning to the interpreter, a meaning that determines what relationships will be identified and formularised as knowledge. Two clinicians given the same data or information may derive different knowledge. The primary reasons for this are that data, the symbols we create to represent fragments of observation or measurement, are not the way we perceive and interact with world, and information provides only the contextual elements and not the meta-context. Data and information are like snapshots of machine parts and assembly diagrams rather than real components and a working model (Maani & Cavana, 2007). The working model of clinical wisdom may include what a DIKW framework would exclude as non-data. An example of this can be found in the effective health professional patient dialogue which Gadamer (1996) describes as akin to an everyday conversation. Edmondson et al. (2009) take this further, observing that the seemingly meaningless talk that occurs during a clinical consultation is actually "… part of an extended, interactive reasoning process with complex characteristics." (p. 232). People perceive and respond to wholes and when they cannot, may lose their primordial grip on the world (Merleau-Ponty, 1942/1963). A meta-cognitive rational type of clinical wisdom based on careful linear processing of selected data is undoubtedly relevant for

diagnosis and technology-dominated aspects of healthcare but not for other aspects of the complex whole that is human health (Thomas Moore, 2010).

Overall, the metacognitive superiority model of clinical wisdom has some relevant applications but also serious limitations. Most importantly, it does not recognise the significant change in level from data and information which are structural and derived from observation, to knowledge and wisdom which are axiological and value-dependent symbolic socially influenced networks of concepts (McKenna et al., 2009). Additionally, it does not recognise the ontological incongruence of reducing subjective, big picture influences to primarily objective, specific information and then reversing that process, despite the fact that some theorists acknowledge that rationality, like wisdom, is a "vague concept" (Ryan, 2012, p. 111).

Clinical wisdom as phronesis

As Baehr (2012) and Ryan (2012) point out, espoused theories of wisdom can never be completely disconnected from the practical applications they underpin. Clinical wisdom is no exception. This leads to consideration of the second school of thought in the literature on clinical wisdom which likens it to phronesis, the Aristotelian practical wisdom aimed at achieving virtue or social justice on the basis of a well-developed moral compass (Kinghorn, 2010). The focus here is on outcomes, especially those with socially just or ethically superior value, and thus phronesis is a predominantly behavioural mode of clinical wisdom. This literature overlaps with literature on medical professionalism and graduate attributes in that demonstrable attitudes and actions are also the basis for the definition and assessment of membership of professional communities (Hilton & Southgate, 2007) and of graduate capabilities (Sample, 2010). The difference is that most Aristotelian views of clinical wisdom stress the importance of links to episteme as a wide, deep form of intersecting knowledges (McKie et al., 2012), and to values or moral excellence as the source of the development and sustainability of clinical wisdom (Kinghorn, 2010). The ability to balance the needs of self and others and a commitment to social justice so that action is taken for the benefit of all are typical features of phronesis versions of clinical wisdom (Haggerty & Grace, 2008; Sternberg, 2005; Welie, 2006). Self-reflexivity and intention to act are added by some authors (Kuczewski, 2007; Uhrenfeldt & Hall, 2007), although as Baehr (2012) notes, these capacities may equally lead to selfish or even evil action.

Haggerty and Grace (2008) have described nursing wisdom in terms of knowing not simply what can be done, but what ought to be, attributing this capacity to a high level of emotional engagement and relational attunement of the nurse toward the patient. This, they suggest, is based in the shared subjectivity of understanding oneself as an embodied practitioner.

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Referring back to Merleau-Ponty's (1964/1968) insistence that the body is implicit in all interactions, actions and outcomes, Burwood (2006) premises all intellectual activity and ways of knowing on the body's pre-conscious grasp on the world. Phronesis, as a "doing" kind of clinical wisdom ought to include attention to the bodily aspects of actions towards the common good. Phenomenologically, wisdom cannot but include the spontaneous, environmentally initiated responses of the body to situated interpersonal learning experiences (Yakhlef, 2010). These responses are innate but not fixed, so that Marcum (2009) can suggest that through commitment to training in observation, they may become perceptual virtues exercised for the patient's benefit. Since body-mediated perceptual knowledge generated in interpersonal and environmental interactions drives learning (Yakhlef, 2010), embodied clinical phronesis would be linked to learning. This learning could be about the system itself (type III learning) which would be expected to give a more holistic appreciation of the whole situation, producing wise clinical decisions about action.

A phronesis view of clinical wisdom places it firmly in the realm of interpersonal interactions and relationships and the ethical dimensions of these (McKie et al., 2012). The relationship aspect of clinical wisdom as phronesis is of particular importance in long term relationship settings such as primary care (Marnocha, 2009) in which phronesis is based on a deep trust akin to that found in other close human relationships that people rely on when they feel vulnerable (Kinghorn, 2010). Edmondson et al. (2009) posit specific connections between the emotional and cognitive worlds of clinicians who demonstrate phronesis, arguing that clinical wisdom is a strongly social process. Interpersonal skills such as mindfulness, empathy and active listening are frequently mentioned in descriptions of clinical phronesis. From an integrative dualist perspective, these skills are inseparable from the moral implications of their use, especially since clinical phronesis as part of the Western narrative of action to overcome the evils of disease cannot help but be "…imbued with attributes of goodness" (Shapiro, 2008, para. 10) that reflect individualised interpretations of prevailing values and beliefs.

While seldom explored in the clinical wisdom literature, beliefs, values and moral excellence were central to phronesis for Aristotle (Kinghorn, 2010). He believed that the virtuous exercise of judgement resulted from excellence in intellect and in all of one's character, which neatly demonstrates how phronesis depends on a tacit view of virtue according to the values and moral order of society (MacIntyre, 1990). In our evidence-based society, phronesis is more likely to be judged by outcomes, and on the basis of purportedly morally neutral criteria. Virtuous action for the current health professional thus comes to be defined by the authority and value perspectives of the standards of practice of the discipline (MacIntrye, 1990). This may have pragmatic value in a culture of pluralism, but only within the rather narrow confines of practical reasoning, which is not clinical phronesis (Kinghorn, 2010). Phronesis requires

self-control, the ability to clearly explicate one's own beliefs and values as a basis for ethical action, and positive care for others based on the consideration of their values; hence morality and values for clinical wisdom need to be about more personally derived convictions than the assumed values behind standards of practice (Clouder, 2005; McCance, Slater, & McCormack, 2008; McKie et al., 2012).

Little, Lipworth, Gordon, Markham and Kerridge (2012) note that practice values are complex but that survival, security and flourishing are irreducible foundational human values. Using these values, the authors create a model to show how deeply held commitments are shaped by agents and discourses to become expressed principles and practices. Because healthcare seeks to address needs that arise from threats to these basic values, the model helps practitioners to negotiate the tensions between biomedical solutions that address the first two and philosophical inquiry that speaks to the second and third (Little et al., 2012). The model is proposed as a framework for whole health values at the personal and cultural level (Little et al., 2012) and would therefore be relevant to clinical wisdom as phronesis since this seeks the individual and the common good. At the same time, the connection between phronesis and the foundational values of patients, families and communities is weak since the values themselves only justify practice on the basis of shared human need. This in itself does not necessarily produce intention to act or commitment to social justice; in short, these values lack a moral dimension. In support of this, Little (2013a) has since noted that the framework provides no direction as to how to enact these values.

Overall it appears that the phronesis view of clinical wisdom, while providing a more holistic perspective of what clinical wisdom is, still does not explain why virtuous excellence motivates action or why a practitioner might pursue the common good other than as part of the shared human pursuit of basic values. If moral formation is missing as Kinghorn (2010) suggests, then an even wider framework is needed.

Clinical wisdom as transformation or spiritual engagement

The third way in which the literature presents clinical wisdom is as inner transformation or spiritual engagement (Egnew, 2009; Kuczewski, 2007; Leathard & Cook, 2009; Purnell, 2009). Spiritual engagement, found most often in literature related to nursing, oral health or general practice, is linked strongly to caring, compassion and holistic practice (Leathard & Cook, 2009), and thus to affective capacities and phronesis. Less frequently, a spiritual element is associated with the meta-cognitive view of clinical wisdom, usually in connection with ways of knowing (Edmondson et al., 2009; McKie et al., 2012). This suggests that for some, clinical wisdom has both ontological and epistemological dimensions. As Burwood (2006)

summarises it, wisdom is not the product of either logic or immersion in practice, but of the judgement that draws them together into an integration of feeling, knowledge, disposition and action, enabling self-changing learning. Such learning is variously described as transformative (Illeris, 2014), self- or personal transformation (Barnett, 2011; Burwood, 2006; McKie et al., 2012), identity transformation (Clouder, 2005) and critical transformation (Grootenboer, 2010). The common essential elements are an individual's perception of an integrated, holistic change to self or one's way of being, proceeding from experience, context, authentic relationships, self- and interpersonal dialogue and reflection (Illeris, 2014). As an umbrella term, this thesis uses "inner transformation" which Purnell (2009, p. 109) describes in the context of clinical wisdom as change to embodied deep knowing through an intentional focus on what matters, but which also implies all the other elements mentioned.

The inner transformation literature around clinical wisdom has several interrelated threads, the first being the concept of becoming. While Burwood (2006) suggests that wisdom can be formed by imitation and the social process of becoming in which the beliefs and values of the discipline are assimilated, Macfarlane and Gourlay (2009) question the authenticity of assertions of such "transformation" in students. Coulehan (2005) takes issue with the assumption that shared professional values related to moral virtue are personally transforming for all practitioners, claiming that a particular kind of personal and professional becoming is needed for virtuous action. Confronting established practices that are morally questionable and immersion in a range of narratives of being are keys to this (Coulehan, 2005). Descartes (1641/1964) noted that the search for wisdom should be conducted with an open attitude and willingness to change one's mind, both of which can give more authentic access to deeper truths about who practitioners, students, patients and clients are becoming (Gadamer, 1996). The student's and the expert practitioner's total experience of clinical learning is very different, and yet how this changes them as people is largely unexplored.

Barnett (2011) describes becoming as a process of dealing with the epistemological and ontological doubt generated from confrontation with new ideas, perspectives and frameworks. Many authors recognise that doubt and uncertainty are central to conceptions of wisdom and to what can be known of the world and of self (Savin-Baden & Major, 2010). Edmondson et al. (2009) concur with Barnett (2009) in stating the importance of doubt, humility and constant self-assessment as necessary for the formation of both moral and intellectual character and of personal transformation in general. This fits a systems theory approach to inner transformation and clinical wisdom because any interpersonal communication in a health setting can involve not only noting the other's communicative habits to assess the sort of person they are, but also simultaneously self-observing and enquiring into oneself (Bateson, 1991). Personal transformation for Bateson (1991) also implies humility and an "inner ecology"

(p. 256) that links one's thoughts, affects and perceptions of self to the total situated life of the individual. Any theory of clinical wisdom must include recognition of the disruption of this vital connection in illness for the patient (Gadamer, 1996), but also in moral and ethical issues for the healthcare practitioner. This again has parallels with theories of learning as personal transformation in which experiences are processed as events, perceptions, ideas, and biography that change the body-mind-self (Jarvis, 2012) and, through progressive organisation, form the characteristically fuller view of the world of the expert or wise person (Dewey, 1938/1997).

Changes to the body-mind-self are important to phenomenological views of becoming and clinical wisdom. Because phenomenology sees the self as embodied and situated, it often pays attention to performance, social practices and context and ignores conscious reflection (Yakhlef, 2010); however, for health professionals, reflexive practice is central and personal change is driven by confronting both cognitive dissonance and the persistent ambiguity of being based in a perceptual relationship with the world (Dall'Alba, 2009b). Purnell (2009) links both cognitive understanding and embodied experiential knowledge to the inner transformation that produces clinical wisdom, thus emphasising its integrated, dynamic and evolving nature. By contrast, most of the literature on transformative learning focuses on the mental self and meaning (for example Illeris, 2014). That the body continues to be overlooked in considerations of clinical wisdom reflects these dominant views, but also the difficult nature of interrupting thinking and cognitive ways of practising to attend to the body. This same difficulty arises when attending to spiritual elements such as the inner self or soul.

From an integrative dualist perspective, descriptions of clinical wisdom that include spiritual elements fit with a view of the person as a body-soul unity that nonetheless has distinct physical and spiritual capacities and concerns (Gadamer, 1996). This applies to the sick but also to healers who have traditionally been expected to demonstrate a spiritual element, as in ancient Judaism where the words healer and deliverer are the same (Green, 2005). The spiritual element of clinical wisdom can be linked to systemic ideas such as Bateson's definition of the sacred that is always looking for and attempting to unite the larger whole, inspiring awe and humility (Bateson, 1991; Bateson & Bateson, 2005). Bateson (1979/2002) also links wisdom to a wider vision of human purpose that sustains love and resists hatred, which has resonance with clinical phronesis.

As a component of current practice, spirituality is still regarded with deep suspicion in many healthcare settings despite being recognised as essential for some patients and of value for health professional students in palliative care settings (Bennett, Bridge, & Shepherd, 2014; McKie et al., 2012). This may reflect the suppression of spiritual considerations by dominant

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Western secular discourses of scientific knowledge utility and universality in academic settings, and tensions around what constitutes knowledge (Shahjahan, 2005). It is also a justified rejection of what is frequently an ill-defined and misused concept. In an excellent elucidation of this issue within nursing Pesut, Fowler, Taylor, Reimer-Kirkham and Sawatzky (2008) point to two significant conceptualisation issues. Firstly, spirituality has been universalised as a secularised human characteristic and disconnected from religion which alienates entire groups of people for whom theistic or non-theistic religion is their collective spirituality. The resulting narrow, culturally-bound, individualistic definitions of spirituality are of questionable value in healthcare. Secondly, personal, economic and political motives for the therapeutic use of spirituality in healthcare have subverted its moral application to practice (Pesut et al., 2008). The authors suggest that these forces have stripped spirituality and religion of their rich philosophical and theological heritages, language and knowledge resulting in impoverished understandings and usage. As a result, cynicism and rejection of spirituality in healthcare seem well justified, but there are still strong reasons to reconsider this.

Leathard and Cook (2009, p. 1320) define spirituality as "…the essence of who we are and our connection to that which is beyond self", and outline the essential elements of a holistic care approach to phronesis: attentive presence and a theoretical and practical understanding of human sciences. This they maintain reinforces the importance of connections between theory and practice and of being rather than doing. It is this spirit–body-practice integration that Shahjahan (2005) identifies as central to resisting loss of purpose and the separation of the "how?" and "why?" of practice. Kuczewski (2007) further suggests that in bringing together heart, soul and mind, the inner life of practice can be nurtured, while Egnew (2009) claims that a sense of awe and mystery in the face of the unknown allows affective engagement and awareness of how one relates to patients. These are spiritual responses but also indicative of the critical self-reflection that Cunliffe (2009) identifies as the key to moral change in a general wisdom sense.

While some clinical wisdom literature, for example Kuczewski (2007), includes reference to the soul, the precise meaning of this is seldom made explicit. Kinghorn (2010) refers to Aristotle's statement that the activity of the soul should be as befits the best of the virtues and directed toward the good of mankind, but proceeds to translate this into excellence of an intellectual, moral and character-related nature without referring to the soul again. This is more like Plato's version of the soul as an entity that has a capacity for knowledge that can be directed toward what is right (Field, 1961). In his work, Gadamer (1996/2000) spends some time explaining the origin of the mystery of the soul as a life principle and as that which connects the life and the body. In the context of healthcare he appears to relate it more closely

to consciousness and the capacity for thought (Gadamer, 1996). The place of the soul will be returned to in the discussion of the literature around person-centred care.

An alternative view of clinical wisdom

In educational settings, the possibility of capacities such as clinical wisdom emerging from human interactions is based in social constructivist pedagogy and theories such as distributed cognition and activity theory (Daniels, 2008), sociocultural theory (Warford, 2011) and situated learning within communities of practice (Lave & Wenger, 1991). These theories can be traced to Vygotsky's assertion that interpersonal, social collaborative activity precedes and mediates all individual, intrapersonal higher mental function through the use of cultural tools, signs and symbols, particularly language (Daniels, 2008; Warford, 2011), and to Dewey's (1938/1997) framing of knowledge as meaningful only within practice relationships. In practice-based education, adult learners bring their own, often tacit and entrenched, ways of knowing and being and beliefs into social dialogue with disciplinary theory and their experiences and observations of practice (Warford, 2011). In their study of zoology students' development of critical thinking, Wass, Harland and Mercer (2011) note that this involves beginning to take ownership of knowledge, learning to think like a zoologist and increasingly student-led inquiry.

Vygotsky's concept of the Zone of Proximal Development (ZPD) represents the distance between what learners can accomplish alone and what they might reach with appropriate scaffolding, collaboration and the negotiation of meaning with more capable others (Daniels, 2008). Formal and informal collaboration with more capable educators and peers and socialisation into a discipline gradually make the ZPD more of a shared space of mutual learning. Taking this idea one step further and emphasising the emergent and whole-person nature of learning, Balakrishnan and Claiborne (2012) conceptualise collective moral learning as emerging from a Zone of Collaborative Development (ZCD) that includes emotions and actions as well as cognition. The authors use the ZCD to explain the successful collaborative clarification of values, enhanced understanding of moral decision-making and development of a shared moral language in a multicultural multi-ethnic young adult moral education class.

While the examples in Balakrishnan and Claiborne's (2012) study are sparse and not particularly convincing, the model of the ZCD is of interest because it links collective exploration of beliefs, values, affective, cognitive and psychomotor elements to greater individual self-reflection and the internalisation of situated morals and values. This resonates with inner transformation but also with transformative learning as described by Illeris (2014), and provides a potential model for the development of practice-based integrated meta-capacities, such as clinical wisdom. The fundamental principles of the ZPD (and by extension

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those of the ZCD) support situated learning and communities of practice as sites for the development of such individual characteristics and capacities through social co-creation of emergent meaning and action (Daniels, 2008; Lave & Wenger, 1991; Warford, 2011; Wass et al., 2011).

If non-cognitive and non-human elements of situated practice interactions are equally essential for clinical wisdom development the ZCD model could be adapted to produce an alternative view of clinical wisdom as a dynamic collective resource of all information relevant to any interaction. People might engage together with this resource within a Zone of Collaborative Development using cognition, affect, action, beliefs, values and the material and immaterial environment to access the particular kinds of information relevant to that interaction. This would produce differing transformational learning and outcomes for individuals since the ZCD would include elements that only some people are aware of or internalise, as well as elements that can only ever be partially accessed or understood. It is important to note that this is not the same as socially constructed meaning mediated through language or activity, nor distributed cognition which involves the concept of shared, co-ordinated or emergent mental processes (Daniels, 2008). What is envisaged here is not collective mind or consciousness, but collectively facilitated access to "information" in its widest sense.

Summary

The general wisdom literature reflects the fact that Aristotle split the rational scientific wisdom of deliberated choice that uses sensation, intellect and intuition from the theoretical non-rational wisdom of the higher good which has inherent value (Osbeck & Robinson, 2005). Descartes (1641/1964) further dissected rationality into the perceptual, cognitive and social, leaving the realm of first principles or truths to philosophy and communion with God, although he did also identify intuition as the effortless and passive grasp of the natural world that can form the basis for an ethical life (Osbeck & Robinson, 2005). This has led to the predominance of rationalist agendas for the pursuit of scientific explanations and the assumption that the answer to wisdom lies inside man and with the increase of knowledge (Jaspers, 1954).

Despite this assumption the literature suggests diversity in theoretical understandings of clinical wisdom. The framing of clinical wisdom as an internal, acquired ability or characteristic associated with superior decision-making, phronesis and inner transformation does not entertain the possibility of interpersonal or external aspects as proposed in some of the general wisdom literature. There appears to be recognition that values have some place in the consideration of both general and clinical wisdom, but this is confounded by ontological and

epistemological debates about their place in higher education and the difficulties associated with teaching them. Since an active conscience is recognised as related to both reasoning and moral capacities (Harland & Pickering, 2011), values are nonetheless an appropriate subject of empirical research, (Little et al., 2012), a conclusion which helps to justify the study done for this thesis.

Clinical wisdom could be thought of as a disciplinary version or subset of general wisdom but this is problematic since the connection between them does not appear to be straightforward. Many applied disciplines appear to favour a view of wisdom as a practical facility for applying discernment to the use of contextualised knowledge to achieve the best outcomes. This is more akin to Aristotelian phronesis than to the Platonic or Socratic search for the meaning of life. As Osbeck and Robinson (2005) point out, the critical question is whether one is seeking "right" principles on which to base the life of an essential human nature or whether one is seeking specific situated agreements on appropriate conduct that furthers societal or situational goals.

The literature on clinical wisdom also illustrates the unconscious switch between personal attributes and knowledge types (structures) and internal and external activities (processes). This switch is unimportant if wisdom is part of an internal experience of being as an error-capable organism, but if wisdom is to do with wider external processes then the distinction is pivotal since internal and external structures and the processes by which they are accessed will be different. Some systems theorists have encouraged a wider, more collective view of what wisdom is (Hays, 2010), but it has not been explored as a larger extra-human entity.

Viewing clinical wisdom as a collaboratively developed resource might allow clinical wisdom to be theorised in an alternative way, but it does not address all the issues raised. From a phenomenological realist and integrative dualist point of view, the role of the body in clinical wisdom development has been under-researched and limited to behavioural considerations, while the place of beliefs and value in clinical wisdom is restricted by non-integrated views of the body-soul-self. Accordingly, the study focused on embodiment, beliefs, values and integration, seeking their significance for clinical education. In the following chapter the literature relevant to this particular context is reviewed.

Chapter Three: Literature Review of Clinical Education

Introduction

In seeking to study clinical wisdom, the theorisation of which has been explored in the preceding chapter, it is also necessary to pay attention to the context in which this takes place. The clinical education contexts in which the student participants for this study were embedded shaped their experiences and arguably the people and practitioners they are becoming, with all the moral and ethical implications this suggests (Dall'Alba, 2009b). Despite differences, all these contexts are shaped by a significant body of clinical education theory and practice literature, which also influenced the design and implementation of the study. This chapter groups the clinical education context literature under four broad themes that relate to the aims of the study: patient and person-centred care; competency-based clinical education; professionalism; and the development and assessment of affective attributes. These are addressed in the following subsections.

Patient-centred care

Perhaps the most important response to concerns about increasingly technical and impersonal Western healthcare systems (Thomas Moore, 2010) has been the widespread adoption over the last thirty years of patient-centredness in clinical practice. As an alternative paradigm, adjunct to or revision of the Evidence Based Practice (EBP) paradigm, patient-centredness has reshaped the clinical environment and therefore clinical learning significantly, although the meaning of patient-centred care within and amongst the disciplines has diverged widely (Miles & Mezzich, 2011). Key concepts of patient-centredness are responsiveness to individual differences (Little et al., 2012), respect for patients' rights, including their right to dignity (Kuczewski, 2007), and attention to human elements that patients value in the practitioner-patient relationship (Donetto, 2012; Marnocha, 2009). Patient-centred care has been adopted by most health disciplines and is enshrined in documents such as the Ottawa Charter, with its particular concern for public health, social justice and patient empowerment. Patient-centredness also has important implications for the development of clinical wisdom which is most often defined by or assumed to be about the good or virtuous care of others (McKie et al., 2012).

While patient-centredness is strongly and mostly positively represented in the education literature from nursing, it has been associated with some less positive developments in medical education. This, it has been suggested, results from competing practice narratives of

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closeness and distance, such as mastery and humility, empathy and detachment, that can be traced to tacit reinforcement of patients as "other" and insufficient attention to identity and emotional gaps during medical training (Shapiro, 2008). More recently, as a result of an emphasis on communication skills, and professional values, medical students have been reported to have a greater understanding of the value of a patient-centred approach, but worryingly, they also frequently see it as a "soft" skill, inferior to scientific knowledge and of instrumental value for improving patient satisfaction and adherence rather than of intrinsic value (Donetto, 2012).

While the EBP focus on the value of collective evidence could be implicated in the loss of patient-centredness, it is not in itself incompatible with patient-centred approaches to care, clinical education or clinical wisdom, as is recognised in nursing (Haggerty & Grace, 2008; McKie et al., 2012). In the apprenticeship model in medicine, there is still a distinct emphasis on the use of evidence for reasoning but in association with consideration of the whole patient and reflective collaboration (Sheehan et al., 2010). Ethical and moral considerations and efforts to make thought processes explicit are included to improve both the quality of learning for the apprentice and outcomes for the patient (Sheehan et al., 2010), suggesting that patient-centredness and EBP are synergistic when integrated. Similarly, in occupational therapy practitioners are expected to act on evaluativist or rationalist decisions made using research evidence in conjunction with client-centred consideration of the individual's context (Witt Mitchell, 2013).

In defining a patient-centred approach Gadamer's (1996) distinction between clinician-patient relationships focused on simply reducing disease and improving outcomes and those focused on a shared sense of responsibility is useful. Marnocha (2009) explains that patient-centred primary care is exhibited in empathy, authenticity and a positive respectful attitude toward patients, all of which require a time-rich, non-threatening setting and none of which are amenable to objective measurement. By contrast, Purnell (2009) notes that in some clinical settings such as peri-operative practice it is a constant struggle for the clinician to keep sight of the patient's humanity. In the education of health professionals, most universities seek to expose students to a range of clinical settings that would describe themselves as patient-centred, but as Donetto (2012) points out, dominant health professional discourses such as EBP may lead students to interpret what they experience in a way that does not match their educators' ideas of patient-centredness.

One of the difficulties facing clinical educators seeking to develop clinical wisdom in students is how to teach and evaluate the relevant skills and qualities needed. It is easy to see how a patient-centred approach might be linked to clinical wisdom. If the focus is on outcomes such

as arriving at a decision for action that is approved by both client/patient and practitioner, then it is possible to teach the skills of reasoning and evaluate the quality of the decisions made (Delany et al., 2013); however, if clinical wisdom is presented only as a rational or outcome-based process, the connection to actual practical patient-centred care might not be made. Additionally, a focus on patient outcomes can lead to very process-oriented fragmenting and dehumanising clinical pathways in which the patient progresses from one practitioner to the next (Kuczewski, 2007). This is a particular danger for students who are themselves on process-oriented educational pathways similarly characterised by abrupt changes of personnel and settings and focused on points of assessment.

Patient-centredness is more obviously linked to clinical wisdom through clinical phronesis because of its focus on the good of the other. The patient-centred attitudes and values that sustain this focus and the ongoing development of clinical phronesis are difficult to make explicit and cannot be summarised as a neat set of practice protocols (Donetto, 2012). As Bebeau and Monson (2012) demonstrate, morally exemplary practitioners can readily define their moral and individual goals, but these are not something students necessarily recognise in either their mentors or the curriculum. Students may also struggle to put patients' interests before their own and to admit errors of judgement (Bebeau & Monson, 2012). These issues could inhibit phronesis both because they corrupt good decision-making in practice, and because despite the efficacy of mentoring in developing moral excellence in students, the latter is still dependent on internalisation and character change that cannot be prescribed by codes or explicitly taught (Kinghorn 2010). While a patient-centred approach may assist the development of clinical wisdom it does not replace the need for a pre-disposition or motivation to learn from the attitudes of others such as role models and to maintain moral growth because it has intrinsic value (Bishop & Rees, 2007). What may be missing is a person-centred approach that pays attention to the person of the practitioner as much as to the person of the client or patient (Marnocha, 2009).

Person-centred care

Person-centred practice has been adopted by a number of health disciplines and there is a small but growing body of evidence to support its efficacy. Finset (2011) reports that it appears to be positively correlated with patient satisfaction, compliance and service utilisation as well as with improvements in some health indicators. As with patient-centred care, communication skills and a trusting relationship are central to person-centred approaches (Finset, 2011). The most important distinctions between person- and patient-centred approaches are the framing of the patient as first and foremost a person, and the reciprocity of the relationship. Person-

centredness still focuses on the patient's best interests but it also opens up the possibility that the person of the practitioner may learn from and be influenced by the person of the patient.

In medicine, Miles and Mezzich (2011) define person-centred care as "…a science-using and compassionate practice, centred upon the persons of the patient and the clinician(s) engaged in a mutual and dialogical process of shared decision-making, focussed on the patient's best interests, within a relationship of equality, responsibility and trust" (Miles & Mezzich, 2011, p. 213-214). Person-centred medicine combines patient-centred care and evidence-based medicine, both of which improve patient outcomes, and extends doctors as people within ethical relationships (Miles & Mezzich, 2011). Research into person-centred care in nursing suggests that it is more respectful in identifying what matters to the patient and utilises collective knowledge better, but also that it is contingent on establishing a relationship rather than just rapport (McCance et al., 2008). This is supported by Bonsaksen Grana, Celo, Ellingham and Myraunet (2013) who found that occupational therapy students who built better relationships and communication with mental health clients also became more self-aware.

Miles and Mezzich (2011) maintain that the dialogical decision-making process at the centre of person-centred care better addresses current healthcare issues of a lack of compassion, care, knowledge and cost-effectiveness than other models available. Little (2013b) warns that there are questionable grounds for avidly embracing person-centred care. He cites the intractable fallibility of human nature, the ill-founded trust placed in many health professionals and lack of evidence that increasing their knowledge addresses their shortcomings, and the general lack of trust of the health system. Again the problem of values and morals underpinning the approach seems to be at the heart of this (Little et al., 2012).

From a systems theory point of view, a key element of person-centredness relevant to clinical education and wisdom is that any moral framework needs to include the inescapability of human error. This need not be viewed negatively; Shapiro (2008) notes that acceptance of limited control and imperfection in life allows the practitioner and the patient to be both capable and vulnerable. Through trust a relationship can be built that creates synergy through collective understandings of the patient's concerns (McCance et al., 2008). Clinical wisdom and its development, as previously noted, are very much dependent on the relationships that exist in the clinical practice setting. Relationships between patients, students and mentors based on shared capability and vulnerability have the potential to increase trust and honesty which could in turn improve the openness to exploring underlying morals and values (Ursel & Aquino-Russell, 2010). As Miles and Mezzich (2011) observe, there is much research still needed into aspects of person-centred care such as values and beliefs in order to further elaborate what produces maximum benefit and efficiency.

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Drawing on Aristotle's concept of *entelechia*, Gadamer (1996) encouraged full recognition of the life of the body immersed in the daily rhythms of ordinary life and culture in all aspects of healthcare. In person-centred care, this is frequently confined to consideration of the social relationship context (as in Miles & Mezzich, 2011). To ignore the physical and material elements of the life of the whole person, patient or practitioner, is to limit the forms of collective knowledge that can be shared and therefore the learning that can take place. Taylor (2011) links the emergence of learning for wisdom with the mostly tacit time- and place-contingent meanings and values of embedded embodied knowledge. These meanings and values are based on beliefs and assumptions that generate one's world-view and way of being in that world (Taylor, 2011). Thus situated bodily patterns of being would be expected to impact on person-centred clinical wisdom.

In an educational context, a person-centred approach acquires an interesting extra dimension since student- or learner-centredness is an accepted pedagogy in clinical learning. Unlike patient-centred approaches in which the student is analogous to the patient on a pathway, the person-centred approach frames the student as an integral contributor to the dialogue, and as allowably capable and vulnerable. In terms of how clinical students view themselves, this could provide a powerful alternative to the more typical discourses of competency and confidence that may conflict with those of caring (Clouder, 2005; MacLeod, 2011). Perhaps the most promising aspect of the person-centred approach to clinical learning and wisdom is the potential for it to better support inner transformation at the level of beliefs and values. Depending on whether or not the learning environment includes acceptance and affirmation by credible others, the inevitable doubt and disorientation that initiate the transformation process lead to either withdrawal from authentic interpersonal interaction or reframing and reconnection (Taylor, 2011). In supportive person-centred supervisory contexts, reframing and reconnection of beliefs and values could result in the moral transformation that Kinghorn (2010) associates with clinical phronesis.

While it is recognised that role-modelling of the normality of error, not-knowing and shared humanity are critical for health professional educators (Shapiro, 2008), a person-centred perspective suggests that effective clinical educators are able to express their becoming and their capability and vulnerability (Ursel & Aquino-Russell, 2010). Bonsaksen et al. (2013) note this effect in their study; excellent occupational therapy supervisors enjoyed being "novices" and co-learning a new client assessment tool with students. Students commented that they reflected more deeply on the situation and the patient when supervisors welcomed disagreement and co-learning. Taken further such openness could lead to the articulation of belief and value connections to their whole lives - physical, social, spiritual, moral and cultural. The motivation to be committed to, but critical of, one's own practice rests on the ability to do

an honest moral self-assessment at the level of beliefs and values (Bebeau & Monson, 2012). Based on the preceding chapter, it would appear that self-reflexivity at this level is also important for clinical wisdom.

Person-centred care and the soul

Much of the literature on person-centred care includes reference to either spirituality or the soul. Miles and Mezzich (2011) trace the person-centred approach back to an essay, "The Soul of the Clinic", which Peabody included in his book on the doctor-patient relationship. Peabody (1930) believed that medicine was a synthesis of art and science, intrinsically personal and synonymous with whole-person care. Many decades before Shapiro and Gadamer, he wrote that "What is spoken of as a 'clinical picture' is not just a photograph of a man sick in bed; it is an impressionistic painting of the patient surrounded by his home, his work, his relations, his friends, his joys, sorrows, hopes and fears" (Peabody, 1930, p. 33). Peabody (1930) also noted that many patients were not threatened so much by the prospect of death but by a lack of prospects for life, and it was for this reason that medicine needed to address the whole person. Interestingly, he also recognised that practitioners and students needed insight into their own lives and characters in order to be wise and that students and mentors should be able to speak of these things freely. This "…spirit that gives life" (p. 95) in the minds, characters and personalities of healthcare professionals and students was for Peabody (1930) the soul of clinical practice. It is this sort of soul that explains clinical wisdom as "the ultimate epistemic good …as embodied knowledge or truth in an epistemic life well lived" (Marcum, 2009, p. 261).

Gadamer (1996) reiterates this view, noting that the nature of the whole of soul and body must be known by practitioners in order for the restoration to health to occur. The soul of the person, unlike the body it is united with, always has power over itself yet is in a permanent state of pre-occupation with self, others or being in the world (Gadamer, 1996). The soul has "…thin and porous borders. A person's soul bleeds over into the soul of the marriage, the family, the neighbourhood…" (Thomas Moore, 2010, pp. 4-5). Theorists who take this perspective see body, soul and spirit as distinct but inseparable entities; the material body grounded in the world, the spirit transcending the ordinary, and the soul grounded in both, giving us our true identity more clearly than the Self (Shahjahan, 2005; Thomas Moore, 2010). Practitioners who are aware of their own and others' souls are at ease with the condition of humanness, but not immune to the influence of the symbols, rituals and images of the material and social environment of clinical practice; therefore, they remind themselves constantly of the values and beliefs that sustain their person-centred caring approach (Thomas Moore, 2010).

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In their extensive review of the history of the soul, Goetz and Taliaferro (2011) note that the concept of soul has been replaced in much twentieth century literature by the self as the physical and psychological relations that define various conceptions of personhood. If the soul exists, it is as a permanent substantial foundation for the "I" that we experience as the persistence of awareness of certain powers and capacities, evidenced by our memories (Goetz & Taliaferro, 2011). From a systems theory, embodied phenomenological, integrative dualist perspective, the presence of the soul boils down to a trust in the experience one has of oneself as a unified but irreducible physical and non-physical being. This provides an adequate explanation without pretending to answer any scientific questions about the non-physical nature of the soul and, what cannot be explained by the imperfect and partial knowledge of science cannot simply be dismissed (Goetz & Taliaferro, 2011). This is the description I imply when I use the word soul in my theorising and discussion but there are other, mostly undefined, uses of the word in the literature that appear in this thesis.

From a systems theory, embodied phenomenology, integrative dualist point of view, the soul as agent or inner self can be envisaged as interacting at different levels (including the spiritual) with other people as embodied souls, but also with the non-human and the immaterial. From a person-centred practice point of view, people have intrinsic value and the soul as a source of the "I" of agency and volition can produce both the vulnerability and capacity needed to justify and sustain this approach. Whether the soul is viewed as an emotional, spiritual or functional entity is less important than the recognition that the personal experience of suffering and healing has more than purely physical and social dimensions, and so it follows that whole-person caring should also (Clouder, 2005; Thomas Moore, 2010).

Other authors, including Pesut et al. (2008), claim that since spiritual aspects of suffering or disability are integral to many patients' daily cultural contexts, health practitioners and students need awareness and understanding of these. In clinical practice, the importance of taking the spiritual preferences and beliefs of the patient as person into consideration is well recognised, especially in relation to cultural safety, resulting in some specific teaching and practice initiatives for students (Bennett et al., 2014; Leathard & Cook, 2009). What is less well understood or researched is how students process and reconcile their own beliefs and how this influences practice and the development of meta-cognitive capacities such as clinical wisdom. This requires consideration of not only patient- and person-centred care but the entire clinical education context, the dominant paradigm for which over the last fifteen years has been competency.

Competency-based clinical education

Competency- or outcomes-based training and assessment in clinical education mirror the professional expectations of institutions training clinical students. These are directly influenced by licensing, accreditation and post-registration authorities (Leigh et al., 2007). The climate of accountability to external professional bodies, increasingly pervasive monitoring of performance and consumer-centred service is reflected in educational frameworks of knowing demonstrated by measurable doing. These are based on models like Miller's pyramid (1990) which places "Action" at the apex of a clinical assessment pyramid, above "Performance", "Competence" and "Knowledge". This focus on knowledge in action is reiterated in graduate attributes framed as demonstrable, progressively acquired and institutionally-endorsed skills and qualities (Barrie, 2012). Such competency- or outcomes-based frameworks measure standards of demonstrable skills that ensure a graduate has met the requirements of the accountability authority for that skill.

There has been considerable disagreement over what competency is (Govaerts, 2008). The International Competency-Based Medical Education Collaborators group provisionally defined competence as an outcomes-based developmental, multidimensional, dynamic, multi-domain complex of abilities requiring descriptive qualifiers of the level and context of competence (Frank et al., 2010). Competency-based education allows institutions to engage students as part of a learner-centred continuum of developing expertise, and to produce graduates who will fulfil contracts with society to serve individuals and communities (Frank et al., 2010) and, in the case of occupational therapy, work toward the transformation of society (Sakellariou & Pollard, 2013). While a hierarchy of competencies and a time-flexible approach to individual progression through developmental milestones is recommended, it is acknowledged that excessive utility, reductionism, and loss of authenticity and mentoring are weaknesses of many competency-based frameworks (Frank et al., 2010).

Epstein and Hundert (2002) identify six areas of contextualised clinical competence: cognitive, technical, integrative, relationship, affective/moral and habits of mind. Interestingly, they suggest that peers or patients are in the best position to judge the affective and moral competence of practitioners, which aligns with conceptions of competency as public and professional accountability. Since contextualised assessments of performance and personal attributes such as 360° evaluations, simulations and portfolios are time- and labour-intensive, certifying bodies usually attempt to capture the complex integration of judgement and performance and assure the public of safety to practice through defined novice to expert standards (Leigh et al., 2007). Govaerts (2008) and Grootenboer (2010) suggest a lack of integration among these standards and educator uncertainty as to what they mean, which

appear to be related to conflation of the measurement of knowing and doing with that of being. This is examined more closely in the next two subsections.

Competency, knowing and doing

Knowing and knowledge are central to competency-based clinical practice and education. Rationalist theories of occupational therapy practice present sophisticated epistemic and ontological cognition as the key to negotiating the uncertainty, complexity and contextual variability of the knowledge needed to solve multi-faceted poorly structured practice problems (Witt Mitchell, 2013). This cognition is described as an integration of objective and subjective knowing, although subjectivity is defined as personal ways of viewing the sources and certainty of knowledge rather than as ways of knowing involving other domains (Witt Mitchell, 2013). Competency-based education in many clinical disciplines presents knowing and knowledge in similar ways, emphasising rational and social processes in creating disciplinary knowledge (Delany et al., 2013) and in assimilating and co-constructing the epistemologies of practice communities (Lave & Wenger, 1991).

Educational theories of contextualised construction of disciplinary knowledge relate directly to the belief in many clinical disciplines that demonstrations of competent thinking, skills and behaviours represent progressive internalisation of this knowledge and appropriate attitudes and values (McNaughton, 2013). This is underpinned by constructivist understandings of meaning-making and meta-cognitive capacities (Leigh et al., 2007). Despite this, what is actually assessed is performance or presentation of the "end-products" of meta-cognition and disciplinary attitudes, which may or may not represent authentic internalisation.

Much of the large body of accepted clinical and scientific declarative knowledge (Krathwohl, 2002) is unavoidable for safe and effective practice and must simply be committed to cognitive, bodily or emotional memory. This sort of knowledge is amenable to standards-based or categorical evaluation in the same way that hard scientific evidence can be evaluated. On the other hand, ethical scientific and clinical conduct and attitudes are based on tacit cognitive, bodily and affective procedural knowledge (Krathwohl, 2002). Tacit knowledge, what is known without knowing why or how one knows it (Polanyi, 1974), cannot be accessed at the same time as explicit knowledge (Henry, 2006) and, since higher education focuses on explicit knowledge, is often overlooked. Such knowledge may be derived from affective capabilities such as intuition and pattern recognition, and from pre-existing bodily dispositions that fundamentally alter how individuals learn physical tasks (Blackman, 2008; Epstein & Hundert, 2002; Merleau-Ponty, 1948/2004). These tacit elements are important in the bodily learning of

clinical practice, even if poorly elaborated by evidential evaluation, and require a significant amount of self-directed learning in a clinical context (Mattick & Knight, 2007).

Self-directed contextualised learning is the aim of most health professional education and the cornerstone of becoming an independent practitioner. As Bonsaksen et al. (2013) note in their study of occupational therapy students, active participation and collaboration within a practice community produces increased self-reflection and improved skills. This implies the use and learning of multiple types of knowledge, some of which are more amenable to competency-based evaluation than others. In keeping with Lave and Wenger's (1991) concept of legitimate peripheral participation, constructivist views of practice-based learning focus on socialisation processes as evidenced in the supervisory relationships common to most health professional practice education. Assessment usually involves knowledge and skill examination and sometimes reflective self-evaluation. Seldom have students been encouraged to explore their bodily, affective or intuitive knowledge, or to critique ways of knowing within the practice learning context, yet these are all essential elements of the interpersonal environment and of learning to become a health professional.

Competency-based assessments of knowing and doing are purported to capture meta-cognitive connections between the cognitive, affective and psychomotor domains, but this is questionable. Meta-cognitive engagement is signalled by epistemological doubt, alternate ways of knowing and resistance to change (Bendixen & Rule, 2004; Wass et al., 2011). While links between meta-cognition and the complex epistemological beliefs of early childhood students and medical students have been explored in some depth (Brownlee, Walker, Lennox, Exley, & Pearce, 2009; Knight & Mattick, 2006), beliefs about alternate ways of knowing involving the affective and psychomotor domains have not. Despite being included as a crucial external influence on volition, self-efficacy and meta-cognition in Bendixen and Rule's (2004) model of personal epistemology, affect is not explored. Similarly, Brownlee and Berthelson's (2008, p. 405) argument for a "relational epistemology", that is, the construction of beliefs about knowledge through interpersonal interaction, does not include affective or psychomotor influences.

Similarly, occupational therapy models for epistemic and ontological cognition include multi-dimensional or progressive development of beliefs about knowledge and knowing but predominantly ignore procedural or emotional knowledge (Witt Mitchell, 2013). This is despite findings demonstrating significant correlations between occupational therapy students' emotional capacity and their intervention skills (Andonian, 2013), and between active exploration of different ways of performing various technical skills and general clinical

competence (Bonsaksen et al., 2013). Overall it appears that for this disciplinary group too, the effect of the psychomotor and affective on meta-cognition and epistemology is unexplored.

In assessing psychomotor skills, competency-based documentation of evidence of progressively developed observable abilities reflects the view that psychomotor skills become automatic through repeated task practise (Dreyfus, 2006; Frank et al., 2010). Despite studies demonstrating the benefits of proficiency-based training for psychomotor skills such as surgical techniques (Willis et al., 2012), students perceive affirmation of skill repetition for developing procedural knowledge as conflicting with the discouragement of rote learning of declarative knowledge (Mattick & Knight, 2007). Repetition training can also reinforce views of the psychomotor domain as purely automatic and as separate from cognition and affect. To avoid this division during context-based learning, Barrow, McKimm and Samarasekera (2010) recommend a mix of outcome types from the different domains, but separation is difficult to resist. One reason for this may be that Krathwohl's (2002) widely used revised taxonomy separates factual, conceptual, procedural and meta-cognitive knowledge, obscuring the overlaps between them.

Re-integrating cognitive, affective and psychomotor elements may appear counter-productive in the face of the effectiveness of psychomotor training, but psychomotor skills are rarely used alone in healthcare practice. There is ample evidence from nursing and medicine for the need for emotional engagement and self-awareness to facilitate sophisticated procedural knowledge deployment (Clark, 2009; Edmondson et al., 2009; Haggerty & Grace, 2008; McKie et al., 2012). In occupational therapy student education, Andonian (2013) found that fieldwork performance scores for intervention skills were positively correlated with understanding of emotional responses, while the ability to manage emotions correlated with verbal and non-verbal communication skill scores. These findings point to important synergies between procedural and affective knowledge and psychomotor skills that warrant further exploration. They also suggest that competent practice involves aspects that cannot be captured by psychomotor skill assessment alone.

Purely skill-based assessments of doing may also reinforce mechanistic and functional views of the human body. A level of abstraction and deconstruction of the body is necessary for problem-solving and specialised tasks (Haque & Waytz, 2012), but this can lead to functional views of psychomotor skills. Knight and Mattick (2006) and Shapiro (2008) suggest that in healthcare, a scientific framework emphasises reason, logic and abstraction rather than humanistic stories and experience. Procedures and skills that deal with bodily function are frequently unpleasant or involve pain which may encourage distancing oneself during psychomotor tasks or seeing the patient as his/her diseased organ or as other (Haque &

Waytz, 2012; Thomas Moore, 2010). Bio-semiotic theory and neuroscience, rather than connecting knowledge and learning more firmly to bodily being, have produced even more transcendent and disembodied views of the psychomotor. The mind-matter relationship of individuals to their environment emphasises patterns, structures, networks and meanings (Bateson, 1979/2002; Capra, 2007) as the dominant way of thinking about biological and social systems. While bio-semiotics integrates the psychomotor, affective and cognitive, its strong scientific and mathematical focus can de-emphasise the individual and self-determined in favour of the collective and emergent. For clinical students it is individually determined emotions, values and beliefs that are especially relevant in being and becoming a healthcare professional.

Competency, being and becoming

The competency literature predominantly theorises capacities such as clinical phronesis as the interaction of self-directed conscious internalisation of moral and ethical standards with pre-existing character and affective attributes to produce wise thought and behaviour (Hilton & Southgate, 2007; Kinghorn, 2010; Mattick & Knight, 2007; Sample, 2010). This theoretical connection underpins the belief that competency-based criteria can adequately measure internalised and tacit attitudes, attributes and character qualities in the same way that knowledge and skills can be measured. The literature on reflective practice and phronesis suggests higher order facilitation and inhibition of the expression of affective and psychomotor content via a hierarchy in which thinking monitors, interprets and controls intuitive, emotional and automatic sensory function (Myers, 2010). This machine model of being in which the mind and cognition are privileged and the body and emotions are afforded little or no agency (Barnacle, 2009) underpins evaluations of being through observable behaviours and attitudes.

By contrast, Burwood (2006, 2009) and Barnett (2009, 2011) suggest that being and becoming in an educational setting occur predominantly outside the conventional frameworks of codified meanings assimilated through teaching and learning. They propose that discovering the self-as-learner is an identity change, the serendipitous or accidental outcomes of which include acquisition of dispositions and character (Barnett, 2011; Burwood, 2006). Barnett (2011) adds the need for faith and hope as anchors in the personally destabilising epistemological uncertainty from which becoming emerges. In clinical education Bishop and Rees (2007) claim that judgement of personal beliefs and the practice of virtues form character and shape the soul of the becoming practitioner. If one conceives of becoming in these ways, then the mind and epistemological doubt are insufficient. One might also expect affective and psychomotor uncertainty and intuitive and perceptual becoming, none of which would necessarily be concurrent with or accessible to cognition.

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Higher education theorists are divided over whether rational cognition is connected to the values and beliefs that drive being. In medical education Marcum (2009) suggests that epistemic virtues including critical cognitive abilities are inseparable from character traits such as honesty and integrity that lead to reliable and responsible practice. By contrast, Bogdan-Lovis, Fleck and Barry (2012) question whether the seamless evidence-based, expert, caring, virtuous physician ever existed or is either possible or desirable in the current performance-based climate of healthcare. In the general higher education literature, Mulnix (2012) claims that critical thinking, while useful for evaluating and even transforming moral beliefs, is detached from them, while Tim Moore (2013) suggests that there is no critical thinking without ethical imperatives and social engagement. Similarly, reflection has been proposed to be a critical metacognitive process in which an introspective distance is essential (Clark, 2009), but also a process that is emotionally invested and involves the reconstruction of beliefs (Poole, Jones, & Whitfield, 2012).

These opposing views mainly represent differing epistemological perspectives, but the debate in the literature around becoming a practitioner is also ontological, especially concerning social and contextual elements of practice. Accumulating knowledge and skills is often the central educational focus (Dall'Alba, 2009a), but learners, practitioners, the practice environment and practices are also interdependently shaped by their various and unfolding histories; this is critical to how and why clinical practitioners believe and act as they do (Kemmis, Edwards-Groves, Wilkinson, & Hardy, 2012). This reciprocal unpredictable interaction challenges the tacit cultures of the practice and learning environments and means that professional ways of being are in a state of constant negotiation (Dall'Alba, 2009a). Practice-based learning can be a "…highly personalised and transformative reframing" (Hodge et al. 2011, p. 180) that changes how students perceive themselves, their educators, the discipline and the world. It can also reinforce less helpful beliefs and practices such as the paradoxical beliefs of students and doctors about their own health (Ross, von Fragstein & Cleland, 2011). The role of ontological beliefs and values appears to be highly significant in such observations, but from a social perspective the dominant relational influence affecting practitioners, educators and students is professionalism. It is to this aspect of the clinical education context that the review now turns.

Professionalism

Professionalism is a powerful contextual influence in clinical education. Hilton & Southgate (2007) have defined medical professionalism as clinical competence, aspirations of excellence, fiduciary practice and personal qualities such as humility and judgement. For occupational therapists, professionalism includes competent use of knowledge and skills

within social and political advocacy as citizens for socially just occupational outcomes in the community (Sakellariou & Pollard, 2013). The similarities and stark differences between understandings of oneself as a professional in a particular discipline are almost entirely a result of social participatory frameworks and processes by which professions are demarcated and sustained (Lave & Wenger, 1991). For the clinical student it is not only role modelling that helps with learning the being of professionalism (Byszewski, Hendelman, McGuinty, & Moineau, 2012), but also specific opportunities to see the different ways in which classroom theory can translate into practice as clinical educators make visible their personally transforming critical and reflective thinking (Bonsaksen et al., 2013; Procee, 2006).

Powerful social models of participatory professionalism mean clinical educators are expected to model, teach and measure professionalism in an increasingly structured and integrated way. Despite this, medical students experience mixed messages about appropriate professional boundaries and attitudes (Borgstrom, Cohn, & Barclay, 2010). Occupational therapy students struggle too, especially with physical touch and social boundaries between therapist and friend in relationships with clients which, because of the need to build strong rapport, may be more like friendships than those in other clinical disciplines (Bonsaksen et al., 2013).

Additionally, while role modelling, both positive and negative, is more significant than classroom teaching, students identify peer role models and their own pre-existing beliefs and experience as equally important in the emergence of professionalism (Baernstein, Amies Oelschlager, Chang, & Wenrich, 2009). This diversity of influence suggests that what students actually identify with and aspire to in practice-based role models and the interaction of this with emotions and personal history is complex. By the literature's own admission this is under-researched. Character, cognitive abilities, physical or relationship skills, status or personality may figure differently in the belief and value systems of individual learners, creating very different professional ideals and emotional responses. Performance-based assessment will obscure these differences and the impact of role-modelling if students are driven by perceptions of the right way to "be" for the purposes of assessment.

As a strategy for enhancing reflection on professionalism, Baernstein et al. (2009) recommend the exploration of inner experiences, particularly those that have emotional content. Studies including reflective approaches have revealed that medical students feel they lack personally congruent emotional management strategies (Borgstrom et al., 2010). Occupational therapy students also wrestle with understanding and managing emotions related to challenging aspects of practice and this is likely to be linked to the need for authenticity for effective collaboration with clients (Andonian, 2013). O'Callaghan (2013) notes that modelling of

emotional self-awareness and emotionally congruent relationships by educators is necessary for effective professional learning. All these authors identify the need for better understanding of students' emotional intelligence, their emotional responses to challenging clinical learning experiences, and their interpretations of educators' strategies in such situations (Andonian, 2013; Borgstrom et al., 2010; O'Callaghan, 2013).

With regard to specific professional emotional capacities, longitudinal studies of students from a number of disciplines have found that crucial attitudes such as empathy may be eroded during clinical training. This has been linked to the undermining influence of health professional cultures (Ross et al., 2011; Shapiro, 2008). In occupational therapy education, low levels of empathy, particularly towards clients with conditions that are perceived "…to be the 'fault' of the patient" (Brown et al., 2010, p. 139) have been of particular concern and appear to be exacerbated by the time pressures that are almost accepted as normal for this profession. In addition, contradictory messages about empathy may result from conflicting disciplinary cultural expectations, role-modelling, and a change-resistant "hidden curriculum" that favours rationalisation (Borgstrom et al., 2010). These messages are powerful disincentives for authentic student engagement with beliefs in difficult clinical situations, yet relatively little is known about how students process and negotiate professional value and belief conflicts.

The importance of socialisation into professional ways of knowing and doing and the crucial role of supervision in this are well recognised in both medical and occupational therapy education. Less well understood is the role played by specific moral, ethical, and belief and values teaching in the development of professional identity and practice. Occupational therapy students exposed to explicit courses on ethics and moral dilemmas and to placements serving politically and socially disadvantaged groups are better able to articulate critically informed views of professional practice (Penny & You, 2011; Sakellariou & Pollard, 2013). Similarly, medical students who can justify actions on the basis of beliefs and values are more confident of their professional identity and likely to empower others (Monrouxe, 2010). While a pedagogy of transparent critical inquiry into the values and beliefs held within disciplines is not yet embraced (Donetto, 2012), there is room for progress towards it, perhaps by investigating clinical students' beliefs and values experiences. In the professionalism literature values and beliefs are often linked to desirable attitudes such as respect, and ethical and moral propriety (Hilton & Southgate, 2007). In the general higher education literature such attitudes are frequently synonymous with affective attributes which will now be briefly discussed.

Clinical education and affective attributes

Affective development and learning

Educators in both medicine and occupational therapy agree that to produce effective learning there must be constructive alignment between graduate attributes, the curriculum, teaching and learning (Barrow et al., 2010; Brown, Bourke-Williams, & Taylor, 2012). The development of affective attributes such as caring, respect and empathy is frequently mentioned while other less frequently noted attributes such as compassion are mentioned in association with practice that includes spiritual elements (Hilton & Southgate, 2007; Kuczewski, 2007; Leathard & Cook, 2009). Even with curricular alignment, the integrated development of affective attributes appears to hinge on the philosophical commitments of the individual and to be inhibited by discrete modular approaches to clinical learning, competency-based outcomes and the separation of academic and pastoral care (McKie et al., 2012).

Caring is a central but potentially personally troubling affective attribute in nursing practice (McKie et al., 2012). It depends on "…the affective development of self in relation to others, which forms the threshold through which students must pass to recognise both their capacity to care for others as well as for themselves" (Clouder, 2005, p. 506). MacLeod (2011) notes that while discourses of caring and competence are both present in medical education the caring professional identity is subsidiary and left to individuals to develop outside the curriculum. In the occupational therapy literature, caring tends to be associated with actions that produce occupationally just outcomes, particularly social and political change (Sakellariou & Pollard, 2013), suggesting that in this discipline also, the affective nature of caring is more of a personal endeavour.

Other affective attributes such as empathy and emotional capacity are linked to positive patient and practitioner outcomes (Haslam, 2007; Neumann et al., 2011), but also to increased likelihood of depression (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003) and greater negative affect and self-doubt (Kingston, 2008). Marnocha (2009) notes the difficulty of maintaining "ordinary" empathetic caring in medicine with its strong focus on innovation and curing, while O'Callaghan (2013) suggests that emotional openness is systematically undermined by tacit cultural acceptance of distancing as essential for effective clinical reasoning. Brown et al. (2010) note that "hard science" approaches to occupational therapy practice appear to encourage a detached view, reinforced by social influences such as the low esteem afforded to some clients which makes students less likely to connect affectively with them. Overall, it appears that a better understanding of how affective attribute learning takes place and its relationship with other aspects of clinical practice is needed.

Literature Review: Clinical Education

In recent clinical education literature, there is a trend toward reframing affective attributes in cognitive terms. In nursing for example, Ward, Cody, Schaal and Hojat (2012) describe empathy as understanding, intention and communication. Clouder (2005) notes that caring has been reframed as recognition of need and decision-making responsibility rather than the affectively demanding physical and emotional care-giving increasingly delegated to lower level healthcare workers. In occupational therapy, reflection-in-action, a practice usually regarded as having affective components, is instead linked to "…the development of evaluativist [epistemic ontological cognition] …enhancing their ability to solve ill-structured occupational performance problems" (Witt Mitchell, 2013, p. 16). This trend reflects an emphasis on improving cognitive problem-solving, which has been related to a decline in empathy in medical and dentistry students (Haque & Waytz, 2012; Yarascavitch, Regehr, Hodges, & Haas, 2009). In a systematic review of this issue, Neumann et al. (2011) conclude that the main reasons for empathy decline appear to be self-protecting down-regulation of pain perception, personal experiences and traits, and increased distress over discrepancies between the real and the ideal. Cognitive reframing of affective attributes is unlikely to address these aspects of empathy decline, while increasing linking of affective phenomena to neuroscientific and quantitative measurement (Haque & Waytz, 2012) will only reinforce cognitive and mechanistic views of affect.

By contrast, literature from psychology on the affective domain suggests other ways to view affective learning. Seidel, Perencivich and Kett (2007) highlight the difference between the procedural learning of how to interpret, express and control affect, attitudes and self, and the context-dependent affective traits and states experienced during cognitive, psychomotor and interpersonal learning. All everyday experiences include an affective state that influences how we access, store and recall information, thus motivating or inhibiting learning (Seidel et al., 2007). Working together, states and traits allow growth, beginning with learning basic self-control and new knowledge, then conditioned habits and automatic knowledge use, and finally self-determined engagement, meta-cognition and knowledge transfer. Since conditioned emotional states and attitudes to learning set in early childhood are modified by subsequent affective learning, emotional aptitude develops best in settings of mastery, motivation and feeling that the task is of social worth (Csikszentmihalyi & Nakamura, 2005; Seidel et al., 2007); however, maintaining motivation can be especially challenging in the clinical education environment (Neumann et al., 2011). Rees (2004) and Barrow et al. (2010) suggest motivation comes from students having choice and control over learning within an outcomes-based curriculum. This view is supported by the finding that occupational therapy students given choice over their placement settings score better on performance-based assessments than those who have limited or no choice (Andonian, 2013). The literature indicates that most

clinical educators subscribe to motivational higher education principles of student choice, alignment and consideration of learning styles (Biggs & Tang, 2007), but strategies to target affective states and traits appear to be less well developed.

Affective traits and states are especially relevant to the use of intuition, "…our effortless, immediate, unreasoned sense of truth..." (Myers, 2010, p. 371). In clinical settings intuition has often been regarded as somewhat primitive and less reliable than rational capacities (Braude, 2009), yet when associated with expertise or practise over time, intuition can be highly accurate and valuable. In complex situations, intuition can provide astute non-conscious insights from brief, thin experiences that rational conscious deliberation overlooks (Kahneman, 2003; Myers, 2010; Nyatanga & de Vocht, 2008). Awareness of both affective traits and states has been shown to improve the switching between the two pathways (Sinclair, Ashkanasy, & Chattopadhyay, 2010), but encouraging intuition within evidence-based practice that is epistemologically founded on eliminating it is a challenge (Braude, 2009). Nyatanga and de Vocht (2008) suggest including cognitive attention to visceral physiological responses to the emotion-generating patterns of unfolding events, but Dreyfus (2006, 2007) suggests that it is folly to attempt to give mental content to the unconscious processes of intuitive performance and coping. This literature suggests that the affective and the psychomotor are linked by the autonomic and conscious, optimising rational function, but there is disagreement as to the value of and best way to use intuition. Both rational and intuitive cognition are fallible, yet integration of them could reduce the error of each individually.

Finally, it must be noted that the development of affective attributes is not purely a clinical, psychological or educational concept. While it is not within the scope of this work to elaborate on the sociological or cultural meanings of affective attributes, these also play a significant tacit role in institutional and interpersonal understandings. They may also conflict with disciplinary views of appropriate or desirable affective attributes or attitudes in clinical practice learning (O'Callaghan, 2013). Universally applicable prescriptions for affective attributes are neither desirable nor achievable as the literature amply demonstrates, and this at least partially explains why the assessment of them, considered next, is a thorny issue.

Assessment

If the development of affective attributes is beset with problems, then the assessment of them is even more so. One reason for this is that affective perspectives are linked to specific personal events stored in episodic memory, creating a strong but implicit effect that is not amenable to explicit critical cognitive evaluation (Grootenboer, 2010). Buissink-Smith, Mann and Shephard (2011) endorse Krathwohl, Bloom and Masia's (1964) hierarchy of affective

outcomes (receive, respond, value, organise values, internalise) as suitable for assessing learners' affective development in ecological science. This assumes that the values and behaviours espoused in assessments are those actually held by the student. Similarly, in the clinical disciplines, professionalism emphasises moral and ethical *practice* (see for example Hilton & Southgate, 2007), but this could be demonstrated in ways of doing that do not necessarily proceed from affective attributes.

Within disciplines, the value of assessment is foundational to the ways in which knowledge is expressed and identified (Hyland, 2009). Tacit disciplinary-specific meanings and form preferences steer the design of assessment tasks (Hughes, 2009) and it is not difficult to see why, in the unavoidably messy interpersonal context of clinical education, affective attribute assessment has become synonymous with demonstration of knowledge and behaviour. Despite this, Barnett (2009, p. 436) insists that "…the identification of worthwhile dispositions and qualities raises both ethical and epistemological issues; which is to say that the matter is fundamentally philosophical in character." From a philosophical perspective, universities are accountable for generating and protecting what counts as knowledge in society and equipping students with employable skills and qualities (Green, Hammer, & Star, 2009). Thus debate over how one can know whether attribute learning is actually happening and what value it has is very significant (Barnett, 2011; Burwood, 2009; Hodge et al., 2011). Higher education material and symbolic values are reflected in teaching, learning and assessments (Hyland, 2009); currently knowing and doing are used to teach and assess affective attributes.

Another reason that affective attribute assessment is difficult is that these attributes are often expected to underpin or become graduate attributes. These are subject to embedded historical and tacit values in the policies, practices and culture of the institution in much the same way that professionalism is subject to embedded disciplinary values (Borgstrom et al., 2010). It is not surprising that some institutions have adopted graduate attributes such as scholarship, global citizenship and lifelong learning (Barrie, 2012) that can be more objectively defined and assessed with tools meeting "reasonable psychometric standards" (Leigh et al., 2007, p. 471); however, this is hampered by qualitative intra- and interdisciplinary differences and a lack of systematic institutional approaches (Barrie, 2012; Green et al., 2009). The discourse of graduate attributes as dispositions and qualities appropriate to a world of abundant complexity, uncertainty and engaged citizenship is prevalent (see for example Barnett, 2009), but mainly supported by objectively assessable generic *skills* such as research or communication capacities and ethical decision making (Barrie, 2012). Clinical wisdom and clinical graduate attributes would be incomplete if they did not include feelings, beliefs, character, identity and values that are all aspects of being rather than doing. Assessing these without resorting to

behaviour alone suggests a more philosophical, process-oriented, formative approach that can accommodate the messy interpersonal world of clinical practice learning.

While assessing affective attribute development appears to require something other than external assessment, self-assessment has been equally plagued with issues. These include: strong correlations of self-assessed cognitive learning with affective factors but poor correlation with other measures of achievement (Sitzmann, Ely, Brown, & Bauer, 2010); personality related over- or under-estimation of capability and lack of self-awareness (Rees & Shepherd, 2005); lack of reflective capacity due to fixed tacit beliefs (Grootenboer, 2010); validity only at the point of assessment and within the assessment requirements (Struyven, Dochys, & Janssens, 2005); questionable authenticity due to the summative power of assessment (Macfarlane & Gourlay, 2009); and student perceptions of self-assessment as difficult (Rees & Shepherd, 2005). Various solutions have been proposed, such as the use of video diaries to give students enriched feedback on their performance (Rees, 2010) and formative rather than summative self-assessment (Sitzmann et al., 2010), but most still rely on doing as a sufficient measure of being.

Tools such as objective structured clinical examinations and even simulation reflect Miller's (1990) pyramid, reinforcing the use of behavioural and cognitive assessments that can only indicate the presence of an affective attribute within the parameters of the assessment. Students naturally try to produce what has been associated with success; in the case of reflective self-assessment this may be what reinforces theoretical hegemony, is suitably self-revelatory or transformative, or what they genuinely believe of themselves but do not necessarily practise (Brown et al., 2010; Macfarlane & Gourlay, 2009). Self-assessment inevitably means giving experience a personal meaning that may include negative emotional content and perhaps criticism of institutional elements (Woodman, Pee, Fry, & Davenport, 2002) but students may not reveal this in assessments where what educators emulate or espouse is rewarded (Macfarlane & Gourlay, 2009), or where the framing of incompetence as failure discourages authentic self-assessment.

Affective attribute and character assessment through portfolios, reflective journals and other recommended tools, gives windows into whatever the student chooses to show. What they cannot do is guarantee affective maturity or depth. As Hilton and Southgate (2007), Uhrenfeldt and Hall (2007) and Haque and Waytz (2012) note, in demanding work situations where the presence of affective attributes and character might be critical, clinical graduates report returning to affectively disengaged functional levels of survival. In occupational therapy, failure in placement settings has been linked to difficulties with accepting or responding to feedback suggesting that some students lack emotional maturity and self-reflexive capacity (Andonian,

2013). Medical students' illness behaviour indicates early and persistently negative attitudes towards physical, mental or academic failure again implying a certain fixity of beliefs (Ross et al., 2011). Self-directed self-assessment appears more likely to promote real affective exploration and character growth but students perceive it to be difficult or too time-consuming (Mattick & Knight, 2007). Additionally, since self-assessment is correlated with intrinsic motivation but less often linked to the power of summative assessment (Sitzmann et al., 2010) it is probable that the students who most need to engage with affective and character change will be the least likely to do so.

Overall it appears that affective attribute development is very difficult to capture and assess and may be hindered by an overly cognitive or professional focus. Additionally, some affective qualities such as caring and empathy have conflicting or negative associations for students. Especially concerning is the positioning of affective attributes as demonstrable skills or cognitive capacities, and professionalism as behaviours and knowledge that can be acquired without confronting the subjective value conflicts endemic to clinical practice.

Summary

This brief review of the context of clinical education has examined and discussed a range of clinical education literature from a systems theory, embodied phenomenological, integrative dualist perspective. As a capacity or property of person-centred practice-based learning, clinical wisdom might be expected to arise from integration of critical reasoning, reflection, affective and psychomotor elements to not only confront and change self-schema and beliefs (Poole et al., 2012) but also to produce virtuous character and practices (Bishop & Rees, 2007; Marcum, 2009) and beneficial outcomes for patients, clients and society (Miles & Mezzich, 2011; Sakellariou & Pollard, 2013). Educating professionals to these ends raises ethical questions about shaping the becoming of others (Dall'Alba, 2009b), and about the moral and ethical implications of clinical practice education for students themselves (Penny & You, 2011). For these reasons, it is perhaps not surprising that clinical wisdom is more readily viewed as a metacognitive and individual character capacity with less focus on other aspects of the learning context.

The review suggests a number of important reasons why the integrated learning of affective, psychomotor and cognitive skills, knowledge and attitudes has been problematic and it has identified a number of research gaps. Most significantly, the interesting relationship between affective, psychomotor and cognitive domains and the development of epistemological and other beliefs and values in clinical learning has not received sufficient attention. While competency- and outcomes-based approaches have strengths they also have a fragmenting

effect on the integration of the psychomotor and affective in particular, which is exacerbated by the difficulties around assessing affective attributes and the role of emotions. The literature reveals tensions between views of clinical practice and education as patient- or person-centred and/or outcomes-based, and pressures to produce graduates who demonstrate affective attributes and also acceptable standards of practice congruent with professionalism. The contextual rationale for this thesis was not that these things are undesirable, but that individually and collectively they are not enough as a base from which to access clinical wisdom. Investigating this gap requires going beyond the well-researched visible, doing experience of clinical education and the person of the patient, to probe the value-laden, belief and affect-bound, bodily, thinking, becoming of the developing practitioner from his or her perspective. This means asking participants to provide detailed accounts of the specific personal, educational, professional and contextual elements of clinical learning being and doing.

Secondly, the literature raises the question of how apparently divergent but equally important aspects of clinical practice education such as clinical reasoning, skills, character formation, beliefs, professional values and virtuous practice can be learned and taught in an integrated way, and whether this might increase access to clinical wisdom. The study undertaken explores the participants' perceptions of these aspects of practice-based learning and relates these to their experiences within a person-centred competency-based curriculum. It further seeks to explore the gaps in understanding of the connections between knowing and doing, being and becoming, and how competency-based educational approaches might be modified to improve epistemological and ontological integration.

Finally, the literature indicates that the role of learners' ontological beliefs and values in clinical education is highly significant but poorly understood. One example of this is the documented need for more research into pre-existing personal beliefs about the nature of professionalism and the conflicts students experience in the role modelling of professional practice. The study was designed to further explore such ontological issues and associated experiences in order to increase understanding of them and inform clinical teaching around beliefs and values.

These are some of the research spaces into which this thesis steps. The following chapter describes and discusses the methodologies that informed the design of the resultant study and how these relate to its aims and intentions.

Chapter Four: Methodology

Introduction

The methodologies a researcher selects reflect his/her theoretical and philosophical understandings of research and of the research subject which are influenced by the epistemological and ontological premises of previous research into it (Bryman, 2008; Denzin & Lincoln, 2010). In this thesis, a number of different methodologies with contrasting underlying premises are threaded together to support the use of existing and new methods. This chapter begins with the philosophical and theoretical justification for, and reasoning behind this. Based on a systems theory, phenomenological approach to human experience and an integrative dualist understanding of persons, this approach reflects the desire to expand understanding of clinical learning and wisdom in a methodologically integrated way. This chapter discusses how each methodology fits within this and contributes to a single unified method of investigation, the modified C-map®, which derives from but does not wholly belong to any one of them. Figure 1 on the following page is a navigational guide for this chapter and for Chapter Five, which explains the study and data analysis methods. It identifies the theories, perspectives, methodologies, data and analyses behind the modified concept mapping method, and the relationships between them.

Philosophical considerations

Any researcher of human experience must contend with the issue of whose account of the phenomenon in question carries most weight; that of the immersed and totally subjective participants or that of the objectively situated but theory-laden and subjectively interpreting researcher. Human experience of events would suggest that these accounts are likely to be as divergent as they are convergent. The researcher's account is hermeneutic, focused by a research question and framed by theoretical constructs founded in his/her epistemology and ontology (Bryman 2008). The participants' accounts are descriptive or narrative ways of seeking a meaningful unity in the lived action of personal and social existence (Polkinghorne, 1988). Ironically, whether one, the other, or neither is considered "truer" depends on the reader's interpretation and context, which may differ from that of the researcher or the participants. As Denzin (2010, p. 424) has summarised it, "There are no ironclad criteria regulating the production of knowledge or the validation of inquiry findings".
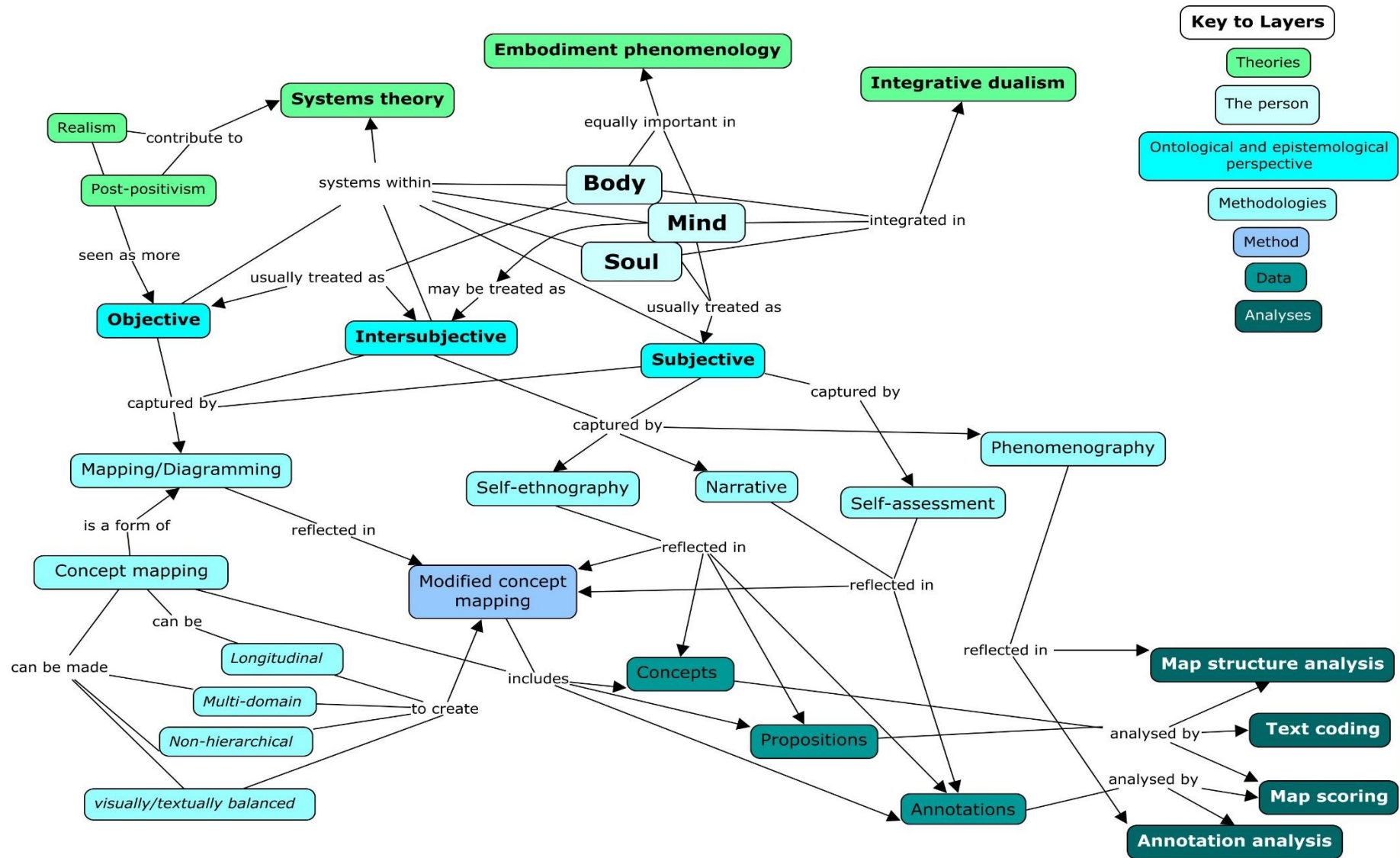
Figure 1: C-map of Relationships Between Layers of Theory, Methodology, Method, Data and Analyses

Methodology

Although interpretive and paradigmatic unity would make research very straightforward, Lather (2006) has suggested that neither is possible nor perhaps ultimately in anyone's best interest. There is merit in maintaining a gap between the researcher's theoretical position and other positions the data may suggest because this better reflects the dynamic nature of research as a system and creates a place from which theory can be interrogated, produced or reformulated (Ashwin, 2012). In order that the gap might remain visible, I have attempted to present the participants' raw data wherever possible, bring methodological triangulation to the interpretation of the data, and make explicit the social, historical and biographical lenses of my theoretical approach and interpretations.

To fit my ontological and epistemological positioning, capturing integrated learning and perhaps clinical wisdom required mixing subjective and objective. My view of reality and the knowable, as noted in the researcher position section on page six, is illustrated in Figure 2.
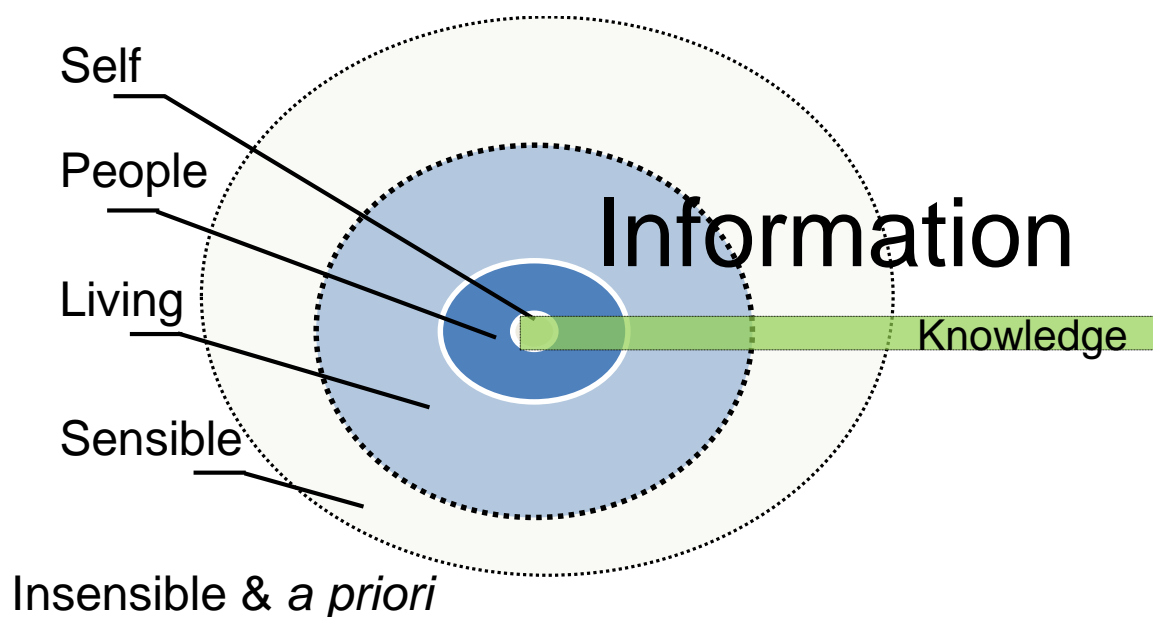
Figure 2: Personal Ontology and Epistemology

I understand what exists and how we know it to be a partially accessible, sensible and insensible, chaotic but meta-ordered system of objective information, within which knowledges are subjective systems of concepts and ideas describing that information. Thus in Figure 2, the green bar represents what people can know about self, people and all living things within the blue circle. Knowledge becomes proportionately smaller as one moves outward through increasingly less subjectively accessible and authentically interpretable realms of living things, and even smaller and less bounded as one moves beyond this. The non-living organic or

inorganic systems allow access to almost limitless *information* about them, but we have little *knowledge* of them, and what we have comes primarily from scientific investigation extending our perception through technology. Since to know something from an embodied phenomenological perspective is to experience it, people are incapable of even sensing most of what lies outside the living realm. Similarly, to know something from a realist or systems theory perspective is to be able to step outside it objectively. Thus for people, bound within the living and organic, what lies beyond is mostly unknowable from this perspective too.

This epistemology and ontology is based on: the Judaeo-Christian view of reality as found in the books of Isaiah and Ecclesiastes; the works of Plato and Bateson; systems theory depictions of the inter-relationships between and within systems (Maani & Cavana, 2007); and the embodiment phenomenology of Merleau-Ponty and Jung in particular. Echoing what Sheets-Johnstone (2009) has said about Luria, I identify with both classical and romantic science, seeing people as anatomical and physiological realities, but equally as integrated beings experiencing observable phenomena. Johnston (2005) calls this the fundamental tension between faith in realist explanations of cause and effect and belief in a human-centred source for the meanings of lived experiences, which accurately describes my worldview and researcher position outlined earlier.

This tension between purely inner- or outer-framed conceptions of reality or knowledge resonates with lived experience in which subjective and objective are neither mutually inclusive nor exclusive but deeply and inextricably interrelated (Johnston, 2005). Ontology and epistemology are inter-woven threads in a single fabric that is 'being in the world'. Gregory Bateson summarised this well: "…because what *is* is identical for all human purposes with what can be known there can be no clear line between epistemology and ontology" (Bateson & Bateson, 2005, p. 19, italics in original). These interrelationships are illustrated by the layers in Figure 1 which also demonstrates how these perspectives derive from the three theoretical approaches underpinning this thesis:

> Systems theory: All human systems are set within bigger systems (Maani & Cavana, 2007), the understanding of which is limited by the unobservable nature of most of the universe and by unavoidable error in human interpretations of reality (Bateson 1972/2000, 1979/2002; Jaspers 1971). Research into the complex entities that exist within these bigger systems accepts ontological and epistemological uncertainty and, in the case of wisdom, it accepts moral, intentional, procedural and corporeal uncertainty as well (Savin-Baden & Howell, 2010). For a systems theorist, the participant, researcher and reader perspectives are part of the whole unfinished account of research that is in turn part of the larger system of human social activity.

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> Embodiment phenomenology: People have ambiguous relationships with their world mediated by perception and conscious embodied interpretations of experience. Embodiment phenomenology seeks patterns of meaning from both lived experience and discontinuities of experience, as part of 'being-in-the-world' (Merleau-Ponty, 1945/2002, 1948/2004, 1970). Situated, social elements of embodied experience contribute to both meaning and discontinuities, while constant becoming means unpredictable interaction with the world and a constantly shifting sense of self (Carel, 2011; Dall'Alba, 2009a). All embodiment phenomenologists affirm body-mind integration in experience and most identify an inner self. Some, following Merleau-Ponty, extend body-mind integration to include the soul.

> Integrative dualism: People have intrinsic value because their functional body-soul unity reflects a purposeful existence and universe (Goetz & Taliaferro, 2011). Theistic versions link this purposefulness to a purposive God but with or without this, integrative dualism is based on the first-hand experience of a material body/immaterial mind and soul as a persistent identity or self that cannot be explained by physics or physical reduction (Goetz & Taliaferro, 2011). This is characteristic of a universe of inseparable intertwined opposites in which principles of order are immanent yet being and knowing are a constant unfinished dialogue (Bateson 1972/2000; Gadamer, 2000). This view reflects persistent widespread beliefs in immaterial and sacred aspects of being as co-existent with complex neuroscientifically investigable physicality (Bateson, 1991; Green, 2005).

For those who subscribe to a purely physicalist understanding of existence, knowing is the product of biological, physiological or neurological processes and no immaterial entity such as the soul is required (Green, 2005). By contrast, from an integrative dualist embodied phenomenological perspective, to know something is to experience it as a perceptive, integrated body-mind-soul (Figure 1), while for a systems theorist, different systems will "know" in their own ways. To express what is known in a way that would satisfy a systems theorist or phenomenologist would require understanding the "internal language" of that system, which the researcher as a human does not have access to. As an example, I can experience my dog jumping up and licking my face and I can observe this repeated act and take it to mean that he is pleased to see me, but without dog system understanding and "dog language" I cannot know if he is pleased to see me, tasting me, showing displeasure at having been left alone for six hours, or something else. The idea that the extra-human realm has its own knowledge and language is common in so-called primitive and religious cultures; in the Bible (New International Version, [NIV]), a stone, having heard the words of God, is said to be a witness to the Israelites faithfulness or otherwise. In the face of so much that is still unknown within

the human realm, and the insights developing into the non-human (for instance communication between plant roots and microbes – see Bais, Park, Weir, Calloway & Vivanco, 2004), it seems arrogant to assume that ways of knowing stop at people.

Central to this study are unknowns in the relationship between body-mind-soul persons and clinical wisdom. The predominant models in the literature frame clinical wisdom as a meta-cognitive skill or personal attribute and exclude or marginalise the soul and body as mediators of beliefs, characteristics and behaviours. The methodological approach for this study combined integrative dualist and embodiment understandings of the person with phenomenological and systems theory onto-epistemology, accepting that this would generate tensions between empiricism and rationalism, absolutism and relativism, deduction and induction, materialism and idealism, naturalism and humanism and transcendent things (Merleau-Ponty, 1942/1963; Teddlie & Tashakkori, 2009).

Methodological considerations

The methods for the study needed to be capable of revealing students' ways of knowing, doing and being and the integration of these with their beliefs, values and dispositions. Initially, the capturing of integrated ideas, beliefs, attitudes and behaviours during contextualised experiences of practice suggested the use of either an ethnographic or phenomenological framework. Both understand experience as singular and holistic and seek to capture the deeper meanings embedded in situated experiences (Hammersley & Atkinson, 1995; Murchison, 2010; Silverman, 2001). Both also support an approach that seeks to situate research in naturally occurring contexts and allow the gathering of rich subjective detail as well as data that reveal more objective patterns and sequences (Silverman, 2001, 2007). A more reflective ethnography could capture such experiences, but the ability of diagrams to reveal more quantifiable patterns and chronological changes (Tufte, 2006) suggested the use of visual as well as linguistic methodology.

One visual tool, concept mapping, has been used extensively to develop insights into concept learning by clinical students (Hay et al., 2008a). The methodology behind concept-mapping combines post-positivist interpretation with deductive analysis of data (Figure 1), yet concept-mapping is epistemologically grounded in "learning-as-change" (Hay, Wells, & Kinchin, 2008c, p. 222). The potential conflicts between this interpretive understanding of learning and post-positivist interpretations of concept-mapping have not been discussed. Additionally, the adequacy of learning-as-change for revealing the contextual complexity and richness of higher education learning has been questioned along with the way it frames learners (De Simone, 2007; Haggis, 2003). These concerns and methodological incompatibilities need to be

addressed in order to use concept mapping to study the contextually rich and complex entity of clinical wisdom within phenomenological and systems theory paradigms. One possible way to do this is to expand concept mapping into domains other than the cognitive; into the experiential as well as the conceptual.

Philosophically such an approach fits within a mixed methods paradigm (Creswell & Tashakkori, 2007). Pragmatist mixed methods researchers regard the complex research question as central, and qualitative and quantitative methods as ends of an interactive continuum of investigative tools (Ridenour & Newman, 2008). Despite philosophical or methodological incompatibilities, these researchers use sequential or parallel phases of quantitatively and qualitatively separate methods and then integrate them at the inference level (Teddlie & Tashakkori, 2009). This has invoked criticism from the research community, especially when the unexplored epistemological gaps behind methods have been glossed over or not addressed (Giddings & Grant, 2007). The same criticisms have been levelled at transformative mixed method research in which qualitative data is "transformed" into quantitative data and vice versa to create comparable data sets (Teddlie & Tashakkori, 2009). Other mixed methods researchers attempt systematic preservation of the complementariness of qualitative and quantitative data to illustrate both connection and divergence; however, this offers limited scope for the integration of findings and raises concerns around validity and overlaps in the strengths and weaknesses of the various approaches (Brewer & Hunter, 2006; Hesse-Biber, 2010; Ridenour & Newman, 2008).

This literature suggests that mixed methods cannot preserve and synthesise the important premises of divergent methodologies. As Denzin (2010) has noted, paradigms are human constructions steeped in ontological, epistemological and ethical assumptions that are part of wider social, political and historical conflicts influencing research and knowledge. This implies that no assumption is insignificant and all paradigms are equally incomplete; therefore, conflict, contradictions and boundary paradoxes are to be expected. As illustrated by Figure 1, my intention was not to privilege the realist or interpretive paradigms (Giddings & Grant, 2007) or force them together artificially into a single methodology. Rather it was to maintain the experiential focus of phenomenology and integrative dualism and the objectivism of systems theory thus integrating several methodologies to create a method for collecting several kinds of data using a single tool.

The requirement for a consistent, transparent and systematic iterative process to ensure maximum opportunity to address the research question did not seem to preclude any methodology or methods provided the reasoning for choices was clear, plausible conflicts were considered, and exclusion or inclusion of apparently suitable choices was explained

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(Ridenour & Newman, 2008). Quantitative research requires systematic logical reasoning that is continually self-correcting (Ridenour & Newman, 2008). Qualitative inquiry requires this same reasoning and the rejection of fixed understandings in the search for deeper ones (Jaspers, 1971). The two are philosophically compatible in their agreement on the uncertainty and propositional nature of all that is called knowledge. This is the phenomenological position taken by those who view the unified subject-object body as the central mediator of situated interactions with the material world (Carel, 2011).

A final consideration was which methodology might best further understanding of clinical wisdom from an educational perspective. The clinical wisdom literature identifies three areas that are especially relevant to clinical education: affective attribute development, patient or person-centredness and theoretical connections between critical and reflective thinking and beliefs and values. The development of affective attributes including values, beliefs, dispositions and attitude has been described as difficult to research (Buissink-Smith et al., 2011; Grootenboer, 2010), yet Bishop and Rees (2007) suggest that the soul, character and behaviour of the practitioner are reflected in this development. Higher education research suggests that students' personal values have a significant effect on their learning, while virtues, morality and affective attributes remain vital for the ongoing development of reflexive clinical professionalism and higher order capacities such as moral judgement, discernment and wisdom (Edmondson et al., 2009; Hilton & Southgate, 2007; Kinghorn, 2010; Kuczewski, 2007; Lietz & Matthews, 2010; McKie et al., 2012; Pasupathi & Staudinger, 2001; Purnell, 2009; Sample, 2010). Assessment of these processes was a central aim of the study.

As previously noted, the methods for the study needed to focus on revealing students' ways of knowing, doing and being and the integration of these with their beliefs, values and dispositions. Relationships to affective qualities, reflective and critical capacities, patient or person-centred approaches and clinical wisdom were also sought. Based on Krathwohl et al.'s (1964) hierarchy, Buissink-Smith et al. (2011) suggest that self-reporting is an effective way of assessing what people value, how they organise these values and what internal belief systems underpin these. While clinical students' self-reflexivity is not always well developed (Andonian, 2013), collaborative clinical practice settings are conducive to improving this (Bonsaksen et al., 2013). The self-reporting of experiences within this environment appeared likely to maximise the possibility of capturing participants' beliefs and values, their understandings of the role of tertiary learning in the development of affective attributes, and perhaps clinical wisdom.

Professional and expert attitudes and beliefs are believed to develop most effectively in complex, situated learning such as that encountered on clinical placements (Kinchin, Baysan,

& Cabot, 2008a). Roegiers (2007) has linked complex contextualised learning to an integrative pedagogy that aligns with integrated learning as a multi-domain version of the conceptual expansion of Åkerlind (2008). Methodologically, integrative pedagogy and learning align with a flexible, subject-driven, phenomenological and systems theory-based approach; therefore, situated, embodied, emergent and changing values, attitudes and beliefs should be investigated in both more objective and subjective ways. Integrated whole systems approaches to higher education learning research may allow this and provide insight into the role of capacities such as critical thinking and reflection. If these and other higher order capacities or resources such as clinical wisdom are integrated and holistic then capturing them must include an attempt to reveal the interaction of critical and reflective thought processes with the bodily, affective, moral, ethical and spiritual. Research using concept mapping has thus far been aligned with views that exclude emotion, character and beliefs.

In summary, this study takes a whole-systems, integrative, phenomenological, ethnographic approach to concept mapping to capture more fully the participants' lived experiences and how these were shaped by the strong social, cultural and contextual elements of clinical placement learning. If more objective and more subjective methodologies are seen as parts of a single man-made system of research, then bringing them together to develop a data gathering tool reflects and preserves their complementary aspects, which is likely to more adequately capture the complexities of clinical practice. Modified concept mapping, which arose from this approach, draws on the perceptual, conceptual and reflective elements of the existing methodologies of self-ethnography, self-assessment and phenomenography. These inform the use of the visual methodologies of mapping and diagrams, including concept mapping. Each methodological element and the relationships between them is discussed in detail in the following sections.

Self-ethnography

Ethnography is an established research technique; when participants speak or write about their lives as part of a social or cultural group or community they produce such data, even though traditionally ethnographic researchers observe and document the everyday social worlds of others (Hammersley & Atkinson, 1995; Silverman, 2007). With foundations in positivism and naturalism, ethnography is especially suitable for describing and foregrounding dynamic and inter-related patterns of behaviour within a prescribed setting, and for highlighting both shared and individual meanings given to the symbols of everyday practices (Hammersley & Atkinson, 1995; Murchison, 2010). Postmodern ethnography appears to have a philosophical and axiological base in the constructivist belief that people express their thoughts and ideas because they are actively engaged in building knowledge by adding to,

deleting from and modifying individual and collective cognitive schema (Bryman, 2008; Fox, 2001). It also reflects the phenomenological belief that people are constantly in the process of constituting themselves and their world through perception and interpretation of experience (Bryman, 2008; Dall'Alba & Barnacle, 2005). These constructing and constituting activities produce observable behaviour and communication that ethnographers seek to elucidate through careful observation (Murchison, 2010; Silverman, 2007). Ethnographic data collection using semi-structured interviews, journaling, focus groups, artefact examination and video-recording offers participants the opportunity to explore experiences, construct meanings and express their emergent lived realities through individual and collective reasoning or narrative (Merleau-Ponty, 1942/1963; Murchison, 2010; Polkinghorne, 1988). Constructivist belief places value on verbal and cognitive function which is interpretive while phenomenological belief values the situated mind-body-emotion whole which is perceptive. Both paradigms offer important insights into the role of educational, social and collective influences on integrated experience.

It seemed appropriate to conduct a participant-led form of ethnography, for which I chose the term self-ethnography. This distinguishes it from ethnography, in which the researcher observes the life of a particular group or culture, and auto-ethnography in which the researcher observes her own participation in that group or culture. With an appropriate data-gathering tool and instruction on the main concepts of interest, it seemed possible that research participants could record their own data and use it to shape further data collection based on observations of their own experiences over a period of time. This would allow documentation of their own knowing and becoming journeys (Barnett, 2009) and provide data that had already been interpreted and shaped by the participants (Murchison, 2010). Allowing participant choice over data collection also shifts the balance of research power in their favour and helps preserve the gap between theory and data (Ashwin, 2012).

Using a participant-driven open self-ethnography is appropriate for investigating a complex and contested subject such as clinical wisdom and may reduce any design bias arising from seeking instrumental or pragmatic educational value from the research (Biesta, 2007). The strengths and weaknesses of self-ethnography are reciprocal; as a subjective account, any form of self-reporting is authentic and irrefutable, but also unverifiable and unreliable. This is appropriate for the research of clinical wisdom which the literature suggests is personally acquired but neither defined or taught, and thus contradictory or paradoxical. For this study, it was hoped that self-ethnography would capture self-identified changes in concepts, values and beliefs related to specific experiences to reveal something about the nature of the development of clinical wisdom. Changes in attitudes, values, beliefs, and identity are facilitated by the development of meta-cognitive and reflective abilities through the learner's

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increasing capacity to evaluate and modify his/her own epistemological beliefs as she/he wrestles with complex issues (Brownlee et al., 2009; Wass et al., 2011). This is underpinned by the development of internal knowledge connections (Brownlee & Berthelson, 2008). The self-ethnographic tool for the study focused on making these epistemological and the equally important ontological beliefs and connections more visible.

Self-assessment

Methodologically, self-assessment could be regarded as the complement to self-ethnography – a self-evaluation perspective complementing a self-description process. While not a comfortable fit within an ethnographic framework, self-assessment does have fit within a phenomenological framework as an interpretation of one's lived experience of a phenomenon at a particular moment. From a phenomenological psychological point of view, the self is an evolving construct based in a referential relationship with others. Through constant interaction with the world, self-consciousness creates an ever-shifting meaning that appears as "…the felt sense of continuity over time and experience through memory" (Spinelli, 2005, p. 102). Self-ethnography describes this chronological continuity, while self-assessment is more of a snapshot of what has accumulated in experience memory and how self-consciousness interprets this.

Formative and summative self-assessment of learning has been widely used in higher education. Self-assessments are challenging for medical and occupational therapy students and assessors, although students respond positively to them as a source of intrinsic motivation and recognise that they align with autonomous professional function (Andonian, 2013; Mattick & Knight, 2007; Rees & Shepherd, 2005). A significant issue with self-assessment has been its relationship to learning approaches and outcomes. In a review of thirty-six studies across a range of higher education disciplines, Struyven et al. (2005) found strong correlations between student perceptions of the appropriateness and value of the assessment, their learning skills and deeper learning approaches. A meta-analysis of such studies notes that motivation (striving to apply new knowledge) and satisfaction are the only variables significantly correlated with self-assessment of knowledge, despite the fact that over one third of studies interpreted self-assessment as evidence of cognitive learning (Sitzmann et al., 2010). In support of this, the self-assessment of knowledge in medical education and of performance in occupational therapy education have been rated as poor indicators of learning and predominantly inaccurate (Andonian, 2013; Rees & Shepherd, 2005). While valid and reliable instruments have been developed to self-assess perceived cognitive, psychomotor and affective learning (for example see Rovai, Wighting, Baker & Grooms, 2009) the results have not been shown to correlate with those from other forms of assessment.

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This literature suggests that self-assessment is useful only as a formative, motivational tool, but this may be because the self-assessment tools were not fit for purpose or because self-assessment might be better used for assessing something other than the learning of disciplinary knowledge. Unrealistically high expectations appear to be at the root of difficulties with self-assessment of personal and professional performance, suggesting mismatched understandings between students and assessors as to what constitutes a good performance, and between student self-beliefs and performance (Rees & Shepherd, 2005). Using a reflective, extended, context-based form of self-assessment, Woodman et al. (2002) found self-assessment of training experiences by dental students produced in-depth insight into student self-concepts and emotions. The authors note that successful self-assessment requires practice and time and may be more valuable for exploring changes in attitudes and beliefs than for assessing knowledge or performance.

Productive self-assessment appears to include Kantian reflective judgement, the evaluation of particular experiences in order to deliberately connect them to broad, internally held beliefs or rules (Procee, 2006), and critical reflection that recognises the role of emotions in creating reconstructed versions of events (Poole et al., 2012). With this in mind, the study methodology includes reflective, emotionally inclusive self-assessment to assist in exploring the deeper meaning of learning experiences and connections to clinical wisdom. Nonetheless, a significant limitation of self-assessment and also of self-ethnography remains; the possibility that participants, especially those involved in stressful situations, may retrospectively alter their interpretation of their own behaviour to fit perceived acceptable social norms (Silverman, 2001). Since the past is reconstituted in the context of the emerging present it is continuously given a new and different meaning (Merleau-Ponty, 1945/2002). As Lather (2006) notes, the deliberate contemplation of past action and thought can produce incomplete or even distorted views of participant realities, including themselves. These are unavoidable aspects of subjective self-assessment and self-ethnography. Drawing on phenomenographic principles to inform the approach to the collective data provides some counterbalancing of these problems.

Phenomenography

Phenomenography seeks to discern and systematically sort variations in people's experiences (Marton, 2000; Marton & Booth, 1997; Pang, 2003). Documenting significant clinical experiences and differences in discernment of critical elements of these provides the opportunity for a phenomenographically-informed evaluation of learning. Marton, Runesson and Tsui (2004) have outlined a theory that links the variations in awareness of the critical elements of learning experiences to superficial or deep approaches to learning. Clinical

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wisdom could be considered to be related to the phenomenographic concept of deep learning for at least three reasons. Firstly, both represent increased awareness of the number and diversity of aspects of a given phenomenon or situation such that these elements are no longer taken for granted (Åkerlind, 2008; Henry, 2006; Leathard & Cook, 2009). Secondly, both involve seeking to understand the hidden connections integrating aspects of a phenomenon into an inclusive hierarchical whole, rather than to become familiar with a disconnected set of elements (Åkerlind, 2012). Thirdly, both involve making affective, social, moral and epistemological judgements (Brownlee et al., 2009; Edmondson et al., 2009; Pang 2003). This suggests there is methodological sympathy for applying phenomenographic principles to integrated learning analysis.

Embodiment phenomenology and systems theory accept that the phenomenon of interest exists somewhere along an interactive continuum between descriptive, more objective, and interpretive, more subjective views. Fixed absolute meanings or pure, unreferenced descriptions are impossible because of inherent ontological and epistemological uncertainty in the whole system (Savin-Baden & Major, 2010; Spinelli, 2005). Phenomenography makes room for uncertainty through bracketing, in which the researcher seeks to step outside all perspectives on meaning and suspend judgement for as long as possible so the data can suggest meanings and relationships (Ashworth & Lucas, 2000). This methodological principle may reduce the likelihood of excluding possibly relevant interpretations of the participants' data and make room for a more comprehensive picture of the connections between cognition, affect, behaviour, attitudes, values and beliefs in clinical learning.

Another justification for this approach is the fitness for analysing narrative texts such as the participants' clinical context stories in the annotations. In pure phenomenography, the outcome space is a total expression of the phenomenon as the participants experience it, expressed as the minimum number of logically related categories of variation needed to represent all the data collected (Åkerlind, 2012; Dahlin, 2007). An open, contextualised kind of phenomenographic analysis (Ashworth & Lucas, 2000) constantly returns to the data set within which inter-related categories of experience are nested, processing it iteratively until all experiential variations have been satisfactorily identified and examples documented to sufficiently represent each (Åkerlind, 2012). This allows thorough exploration of narrative data.

While phenomenographic analysis specifically searches for structural relationships between meanings, each discerned variation is expected to be exclusive of all others (Åkerlind, 2012). The methodology for this study needed to accommodate the search for structural relationships within a wide range of individual expression and perspectives, but also the search for commonalities and overlaps as evidence of integration. Since phenomenographic analysis

does not allow this, the analyses carried out in this study were not phenomenographic. The study remained congruent with systems theory and narrative theory in seeking meanings for the whole and patterns within and between data through integration, while being informed by phenomenographic principles related to the part-whole nature of phenomena (Bateson, 1972/2000; Polkinghorne, 1988).

Criticisms of phenomenographic research highlight the fact that it does not distinguish between what is perceived and what this is interpreted to mean (Dahlin, 2007), and that it takes a detached "mining" approach to the data, ignoring affective elements (Cousin, 2009). By analysing independently produced visually organised material (the maps), the role of "interpreting the perceived" has already been fulfilled to a significant extent by the participant, leaving the researcher to "sort" these interpretations. By deliberately focusing on the integration of domains, participants were encouraged to include them all, including affective elements. It was anticipated that these features would reduce researcher misinterpretation or neglect.

The "whole data set" perspective of phenomenographic studies increases researcher reflexivity which is especially important when visual and textual analysis and interpretation of diagrammatic data must be held in mind (Cousin, 2009). Recently, Buckley and Waring (2013) report the use of diagrams in the research process of a grounded theory study with methodological similarities to phenomenography as a stated response to Cousin's (2009) comments. They observed increased researcher reflexivity, especially in awareness of alternative and multiple interpretations, and improved transparency as a result of a diagram-based research approach. The authors conclude that this allowed them to show less obvious relationships between categories and concepts, and to develop and present unforced emerging theory in easily digestible forms. Despite a different worldview and methodological purpose, the phenomenographically-informed diagram-driven approach used in the study documented here has almost identical aims. The following sections outline the relevant theory behind diagram-based approaches informing the data collection method of modified concept mapping.

Visual methodologies: maps and diagrams

As expressive data, maps and diagrams reflect diverse visual methodologies. They are tangible and processed visually, they can be focused on in detail and as a whole, intuitively and rationally, revisited in their original and altered states, touched and related to aesthetically, and dwelt on through sight in ways that verbal data cannot. Cousin (2009) emphasises the implicit emotional dimension of visual research as compared with text-only data while Gourlay

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(2010) notes the power of visual images as exploratory tools that are more open to interpretation than textual sources when dealing with complex subjective experiences. Emmison and Smith (2000) conclude that while visual data have superseded written data as the primary force in social formation, the more subversive and visceral elements associated with visual expression have resulted in this medium being under-represented in research. The computerised concept mapping chosen for the study allowed for some bodily, spatial and motor self-expression in visual format to partially address this imbalance.

Visual methodologies are based on the underlying epistemological premise that since people see the world uniquely as individuals but also within collective social and cultural frameworks, both are expressed in all forms of visual artefacts (Wee, DePierre, Anthamatten, & Barbour, 2013). When applied to education, this means that in visual representations students individually and creatively express their beliefs and understandings, but also the more tacit socio-cultural influences of their learning environments. This is particularly relevant to the clinical learning practice setting and to research that investigates the inter-related identity-forming aspects of healthcare student learning in these settings. Such research, as Monrouxe (2010) points out, is not only lacking but also lacking in creative methodologies such as ethnography that are more appropriate for researching interactional aspects of practice, and concepts like identity. This study sought to use an integrated visual-textual tool in an ethnographic way, allowing research that explored complex situated interpersonal learning "…*with* rather than *on…* students" (Rees, 2010, p. 6, italics in original).

From an ethnographic perspective maps are meaningful everyday visual objects, yet they are under-researched (Hindmarsh & Heath, 2003). Maps, charts and diagrams have been used for both the collection and organisation of ethnographic data, traditionally to record details of movements and physical or conceptual elements of the context or setting (Murchison, 2010). To capture self-ethnographic data that included the emotions and attitudes associated with lived experiences a less object-based kind of mapping was used. Computer-based visual mapping tools allow participants the freedom to record thoughts, activities, beliefs and behaviours using space, words, colour and shapes, and to add, delete, change and reconfigure within relatively short time frames. Since the positioning of elements in visual images communicates what we believe about the ideal and real, new and known world (van Leeuwen & Kress, 2011), the spatial dimensions and multiple elements of maps and diagrams offer a way to present complexities of relationships and layers of meaning in one integrated form (Tufte, 2006). They also allow research participants to add personal "signatures" to the data through creative use of the tool.

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The choice of mapping as a method for this research was thus philosophical and conceptual. Maps and diagrams are visual, linguistic, spatial organisation systems that express fully embodied and perceptually engaged experiences of physical, cognitive and affective interaction. As a goal-directed integrated activity, mapping authentically represents the way in which bodily intentional relationships with material objects are the vehicle for consciousness and the formation of mental concepts (Carel, 2011). Maps are examples of perceptual artefacts that reflect the emotional significance attached to experiences of self and others and the development of self-consciousness (Merleau-Ponty, 1948/2004). This significance was sought in the study to give insight into the inner self and its relationship to clinical wisdom. Merleau-Ponty (1935/1992; 1942/1963) claims that perception does not communicate with the soul through the intellect, thus morality is apprehended by others not as intellectual, emotional or volitional acts but as the spiritual values and beliefs behind them. This indicates that perception gives access to the inner self or soul and beliefs of self and others in ways that cognitive processes cannot; thus maps can be concrete visual representations of how people *feel* and what they *believe* about things, not simply how they *think* about them.

Methodologically, maps and diagrams allow the analysis of purely quantitative aspects such as the number of words or connections and of qualitative data such as experience descriptions, thus potentially addressing some of the issues of data comparability (Brewer & Hunter, 2006). They also allow participants to connect and balance social concepts and experiences in a visual format using motor skills and including actions, thus restoring the body to the social theorising process of interpreting experience (Emmison & Smith, 2000). Thus mapping has the potential to balance the predominantly dialogue-based research approaches to social realities such as clinical education (Silverman, 2001). If the mapping method integrates textual and visual elements well, a balance of dialogic and visual interpretation of experience can potentially be gathered in a single map. This possibility led to the modification of concept mapping, an established mapping tool that integrates visual and textual elements in specific limited ways.

Concept mapping

In order to explore the methodology behind concept mapping, an example of a concept map about clinical learning is presented in Figure 3 on the next page. This was constructed using Cmap®, a free, relatively easy to learn, computer-based concept mapping tool developed by Novak and Cañas (2008). This example is typical of a network type concept map, showing hierarchical relationships between knowledge concepts. The concepts are linked together to form phrases called propositions. Annotations (the yellow boxes in Figure 3) can be added to the concepts or propositions to explain them further.
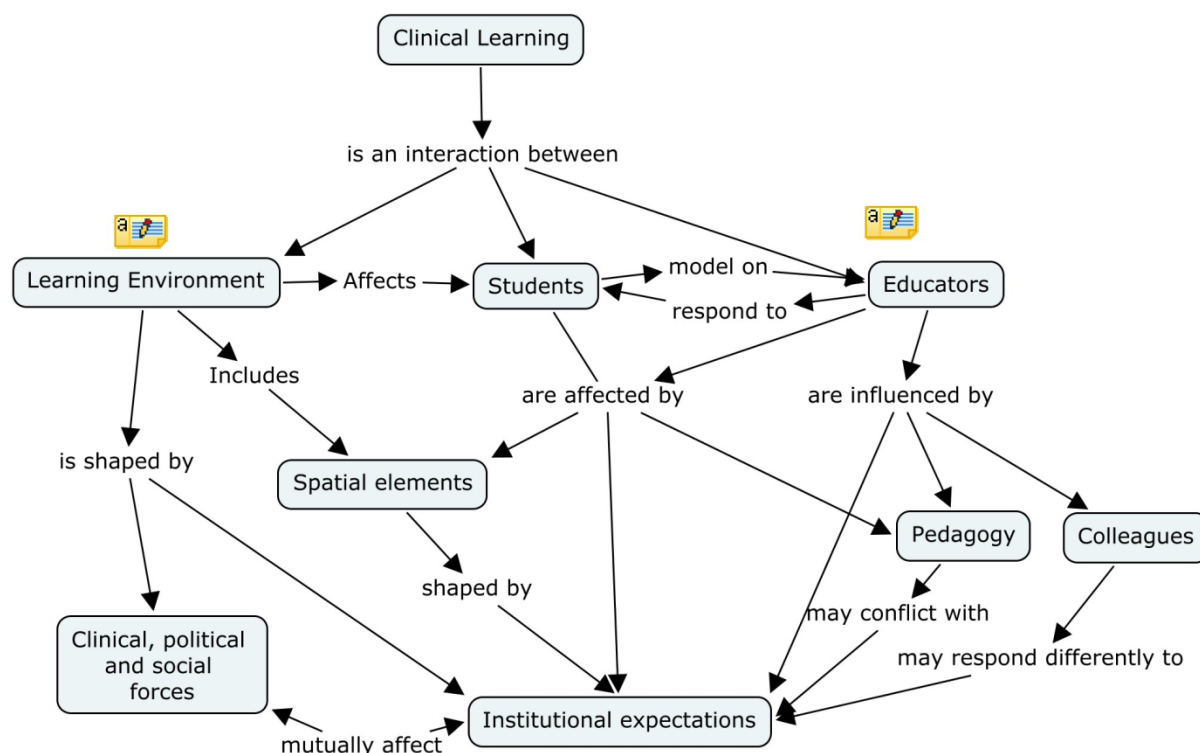
Figure 3: Example of Concept Map of Clinical Learning

Concept mapping is grounded in the theory of meaningful learning which was first proposed by Ausubel (Novak, 2002) and is readily identifiable as constructivist. According to Ausubel and Fitzgerald (1961), a body of hierarchically organised accumulated prior knowledge exists that is organically related to current learning, and transfer can occur between the new and the established on the basis of "...stability, generalisability, inclusiveness, cohesiveness and discriminability..." (p. 501). As new material is assimilated into an existing structure it may become subsumed under an existing durable category, become a sub-category to which further new knowledge may be added, or may completely replace meaningful prior learning thus eliminating it from the structure (forgetting) (Ausubel & Fitzgerald, 1961). As Ivie (1998) notes, the concept of organised knowledge structures has had profound effects on pedagogy. With the advent of the computer age it is evident that the hierarchical structures of information trees, folders and mind-maps have drawn heavily on Ausubel's concepts. The parallels drawn between human and machine cognition (Novak, 2002) are based in this highly structured approach to information organisation.

Novak (2002) based the method of concept mapping he developed on Ausubel's theories of meaningful learning and Gowin's Knowledge V, a social constructivist heuristic of knowledge construction (Gowin & Alvarez, 2005). At the point of this V lies a phenomenon. On one leg of the V are increasingly complex theoretical/conceptual layers from simple concepts through to worldviews, and on the other increasingly complex actions from recording observations

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through to making value claims (Gowin & Alvarez, 2005). Despite the fact that Gowin's Knowledge V balances thinking and doing and founds them in world views and value claims respectively, the central elements of concept mapping as explained by Novak are entirely cognitive. Concepts are defined as "... *perceived regularities in events or objects*, *or records of events or objects designated by a label* (usually a word)" (Novak, 2002, p. 550, italics in original). In their technical report on the theory and application of C-map®, the computer-based concept mapping tool they developed, Novak & Cañas (2008) no longer refer to Gowin's work but instead focus on concept mapping as a scaffolding tool to facilitate meaningful learning and create new knowledge. They identify strongly with memory systems and the role of emotion in modifying these as a way to explain the hierarchical structures of information organisation (Novak & Cañas, 2008).

Changes in the methodological approach behind concept mapping have become obscured by the widespread use of C-map® in many clinical disciplines as a tool to show students' cognitive conceptual understanding, declarative knowledge, differences between knowledge structures, and progressive development of knowledge and expertise (Hay & Kinchin, 2006). C-map® has featured prominently in the clinical learning literature in the United Kingdom since the beginning of this century, and is claimed to have specificity and reliability for showing conceptual changes over time (Hay, et al., 2008a; Kassab & Hussain, 2010; Kinchin et al., 2008a; Srinivasan, McElvay, Shay, Shavelson, & West, 2008). Maps like the one in Figure 3 have been used to reveal connections between concepts and the hierarchical arrangement of these concepts in subject-specific chains and networks (Hay et al., 2008c; Hay & Kinchin, 2006; Novak & Cañas, 2008). The maps have included concepts from declarative, procedural and tacit knowledge (Hay, Kinchin, & Lygo-Baker., 2008b; Novak, 2002), although tacit knowledge has been interpreted to mean a particular kind of cognitive knowledge related to expert reasoning (Kinchin et al., 2008a). The visualisation of chains of practice and networks of understanding is particularly relevant to clinical practice and the assessment of expertise development (Kinchin et al., 2008b; Kinchin et al., 2008c; Kinchin & Cabot, 2009, 2010). These authors demonstrate methodological allegiance to Jarvis's notion of adult learning as personal change (Hay & Kinchin, 2006), but again this has been interpreted to mean change in cognitive structures and skills.

Interpretation of C-map® has been predominantly quantitative or structural and few studies have made full use of the written annotations to explore situational aspects. Kinchin and Cabot (2009, 2010) have shown that structural and complexity changes can be used to trace clinical students' progress from novice to expert, but the many other contributing individual and contextual variables have not been considered. Affective or psychomotor concepts have

seldom been asked for and longitudinal studies have been limited to assessing changes in knowledge structures.

This study used concept mapping in a modified way to allow the horizontal, non-hierarchical mapping of "concepts" from all the domains of learning including actions, emotions, beliefs, values and attitudes, and propositions connecting all areas of clinical doing and being. Annotations explored the specific contexts and critical features of them that contributed to the connections made. The study design was longitudinal in order to show map changes over time, and participants were allowed to keep, revise or use the maps as reflective tools between mapping sessions. From a systems theory, integrative dualist and phenomenological perspective, this combination of repeated mapping and annotating provided a verbally-visually balanced form of holistic formative self-assessment. Modified concept mapping developed as a targeted methodological approach to clinical learning *in situ* and to systematic elaboration of detailed participant experiences.

Modifying concept mapping to reflect the proposed nature of integrated learning is an attempt to use an inventive, yet rigorous and practically relevant methodological approach as recommended by Silverman (2007) in a holistic way. It also tests moving mapping from the strongly cognitive framework of constructivist theory toward a more holistic view of individual development. Justification for this comes from a phenomenological and ethnographic approach to clinical wisdom as a phenomenon of daily clinical practice, but also from the original development of concept mapping using Gowin's Knowledge V. The theoretical/conceptual layers of constructs, principles, theory, philosophy/epistemology and worldview are balanced by a shift from recording to transforming knowledge, making value claims and changing the meaning of experience (Gowin & Alvarez, 2005). The authors acknowledge the important role of feelings even though they "…do not yet have any way to ensure that feelings can be correctly shared, negotiated, or reliably repeated" (Gowin and Alvarez, 2005, p. 7).

The Knowledge V perspective allows a more holistic view of "concepts" that includes psychomotor and affective concepts. Methodologically this restores being and doing to concept mapping and frames learning as not simply changes to knowledge but also to behaviours, values, beliefs and affective attributes. To address the exclusion of emotion, character and beliefs, concept mapping was modified to include the theoretical and lived-out deeper layers and horizontal relationships of experience-based understandings, rather than only the vertical ordering of cognitive knowledge. Changes to the C-map® method to reflect this included the use of key words as prompts for each area, a focus question specifically

mentioning all domains of learning and more detailed annotations of context to encourage deeper more integrated reflection.

The use of concept mapping to explore the cognitive dimension is not altogether unproblematic. A review of the reliability of concept mapping by Schmidt (2006) suggested that concept maps more accurately reflected changes to underlying knowledge structures when repeated across multiple contexts. Later studies using repeated mapping show increases in map scores and qualitative improvements in complexity but these do not correlate with other measures of knowledge acquisition (Kassab & Hussain, 2010; Hay et al., 2008a; Hay et al., 2008b; Torre et al., 2007). This suggests that concept-mapping captures different aspects of content knowledge, perhaps general connections preceding more specialised understandings or perhaps cognitive changes not supported by changes or connections to underlying epistemological beliefs, about which little is known (Brownlee & Berthelson, 2008). It is also possible that clinical educators' "correct" meanings for concepts in maps are not the meanings students ascribe to them, or that prescribed meanings constrain student exploration of alternative meanings (Haggis, 2003). This constraint may be exacerbated by concept mapping that isolates conceptual from affective and performance aspects of clinical practice.

To further understanding of the utility of concept mapping and allow comparison with existing credible literature, the scoring systems informed by post-positivist methodologies needed to be modified rather than completely abandoned. Valid criticisms of this aspect of concept mapping as reductionist, incomplete or producing contradictory findings were considered. This led to the conclusion that content could be scored in a manner similar to previous research but with more attention to relevance, and complemented by analysis of the structural arrangements. Structures could be compared between participants and over time to see whether certain patterns were common and whether "pattern saturation" was reached. These modifications to map assessment offered a way to potentially deepen the analysis of the propositions and concepts while reflecting the visually-verbally integrated methodology.

In summary, modified concept mapping was developed to fit a systems theory phenomenological integrative dualist framework and enable the collection of data on cognitive, psychomotor, and affective aspects of learning and beliefs attitudes and values. Using non-hierarchical mapping with annotations gave scope for written and diagrammatic expression, captured details of context and was interactive, tactile and technologically simple. It gave busy students in complex situated learning a lot of autonomy in terms of design, content and control. Concept mapping is relevant to situated clinical learning because it is based on Jarvis's theory of learning as personal change and Ausubel's theory of meaningful learning by assimilation.

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Methodological triangulation

The use of post-positivist and interpretivist methods of data analysis provided some methodological triangulation which, though considered unnecessary by some researchers, has been seen as desirable in qualitative research (Silverman, 2007; Leech & Onwuegbuzie, 2008). Brewer and Hunter (2006) contend that when aspects of the experience studied are linked theoretically but best accessed with two different methods, both should be used. In this study, there was the possibility of a theoretical link between concept arrangement and the elements of experiences contributing to this. For this reason, the more quantitative method of collecting data to produce map scores was combined with the more qualitative method of collecting free text thus potentially improving the rigour of the study through methodological triangulation (Silverman, 2001). Both "objective" and "subjective" tools were used at all stages of analysis to maintain a systems theory approach to the data and achieve a complementary synergy between more qualitative and more quantitative approaches and between connection and divergence (Brewer & Hunter, 2006; Hesse-Biber, 2010).

From a systems theory perspective, the resultant integrated visual, numerical and textual data of the map structures, propositions and annotations provides support for adopting complementary methodologies as a form of triangulation. Qualitative inquiry researchers who have used concept mapping as an analytic tool suggest that as a relational way of representing rational ideas, concept mapping is an adjunct to textual analysis and should not be separated from it (Butler-Kisber & Poldma, 2010). The inclusion of textual annotations and non-hierarchical propositions within the maps tests whether modified concept mapping can effectively gather integrated textual and visual data. It also allows patterns and themes representing the relationships between textual and visual expressions to be seen more easily.

Trustworthiness

Rigorous qualitative research is dependent on the choice of appropriate methodologies and methods, the fitness of these for purpose and the reflexivity of the researcher (Denzin, 2010; Silverman, 2001, 2007). The study undertaken for this research included many opportunities for the three supervisors to contribute their perspectives and interpretations to enhance the trustworthiness of the approach (Stenfors-Hayes, Hult, & Dahlgren, 2013). Analysis of the data included several reviews of the emerging numerical and structural findings, and a collaborative analysis to confirm the categories I identified as emerging from the annotation data. This was particularly important for maintaining a reflexive stance toward the data (Cousin, 2009), especially since the methods and analyses were not typical of existing examples for the methodologies. Sharing the annotation analysis diagrams with my supervisors and adjusting

them in response to their feedback was a critically important aspect of the whole research process. This confirmed the interpretation of the data and resulted in a clearer view of the findings and their clinical implications. Sharing is integral to a diagram-based approach and provides a form of interpretation triangulation (Buckley & Waring, 2013). Since good diagrams of evidence include high quality content, show comparisons and explain mechanisms or relationships in relevant, unambiguous ways (Tufte, 2006), the scrutiny of others who had interpreted the data in their own way was imperative.

The main limitations on researcher reflexivity are my own assumptions and beliefs. Theoretical concept formation and interpretation are interactions between self-understanding and ubiquitous societal ideals and norms, while behaviour, attitudes and values have powerful Western configurations (Kavanagh, 2005). Cultural emphases on efficiency and deductive logic may make it difficult for researchers like me to resist reductionist, dualistic simplifications and categorisations that blur or suppress continuums and contradictions (Kavanagh, 2005). Using self-ethnographic concept-mapping could be seen as a reductionist simplification of a complex reality, but this was preferable to postmodern methodologies that might further obscure the enigma of clinical wisdom. Eliciting data that flowed naturally from the participants needed to be balanced with rigor and epistemic worth (Smythe & Giddings, 2007). It is hoped that the relatively participant-driven way of creating data and participant evaluation of the study process has allowed their voices to be heard more directly so the reader may judge the adequacy and trustworthiness of the conclusions drawn.

Summary

While there is much about the way this study was conducted that is new or different from previous uses of the methods chosen, this chapter has attempted to show that there are both consistent and justifiable methodological reasons for this. Ultimately a systems theorist, phenomenological perspective drove how the study was approached, although constantly tempered by an integrative dualist understanding of individuals and the desire to build on and extend existing research into integrated clinical learning and wisdom. The degree to which the mixing of philosophies, methodologies, methods, analysis and interpretations is successful can be judged by the reader from a full description of the methods which are outlined in the following chapter, and consideration of how well the findings illustrate the utility of this approach.

Chapter Five: Study Context, Methods and Data Analysis Methods

Introduction

This chapter describes the context of the study, the methods used to conduct it and how the data were analysed. It discusses some of the limitations of the study method, some difficulties encountered and modifications made to address these. The chapter explains how the structure and content of the maps were analysed, how the scoring system was developed and the resulting scores analysed. It concludes with information on the process used to analyse the participants' evaluations of the study.

Study context and participants

The background context and the nature of the participants must be made explicit in order for data analysis to be situated and interpreted with integrity (Silverman, 2001). For this study, participants were three occupational therapy students in their third (final) year at one New Zealand university and eight medical students in their fifth (penultimate) year at another. The New Zealand university year runs from February/March to July (Semester One) and July to November (Semester Two). These two groups were chosen because of the comparability of their previous clinical experience and the number, duration and potential location (community and institutional) of their clinical placements over the eight months of the study. This is a form of convenience sampling with the potential to reduce confounding issues associated with clinical experience differences.

The Occupational Therapy participants attended lectures and tutorials to complete four compulsory papers in Semester One. Lecturers marked their assignments and presentations. Two full time fieldwork placements of ten weeks each in practice settings including rehabilitation facilities, hospitals, special schools or mental health facilities began in June, with a one week break between them and a two day debrief at the end. Placement supervisors were responsible for all fieldwork assessments which were moderated by the paper leaders. These included guided written reflections on set topics during the first placement and a 30-minute case presentation during the last placement.

The fifth year Medicine participants attended lectures and completed assignments for three of the 35 weeks of the teaching year. Most teaching and learning occurred in four clinical practice attachments with medical teams throughout the year. Apprentice-style and self-directed

learning included on average four or five tutorials per week. University lecturers marked written assignments and examinations while clinical supervisors were responsible for clinical examinations and reports. Table 1 briefly outlines the courses and assessments undertaken by the two participant groups.

Occupational Therapy		
Paper Title and (Semester)	**Content (abbreviated)**	**Assessments**
Promoting occupational justice and participation (1) Enabling systems change (1) Professional reasoning for Occupational Therapy (1) Preparation for Occupational Therapy practice (1)		Written report Written report Written proposal and viva Demonstration/reflection
Transition to Occupational Therapy Practice (2)	Transition from student occupational therapist to beginning practitioner. Builds on and integrates skills, knowledge and attitudes for autonomous practice. Supervised practice within a fieldwork setting	Fieldwork assessments Case study presentation
Professional Reasoning for Occupational Therapy V (2)	Preparation for placement and transition to practice. Supervised practice within a fieldwork setting	Fieldwork assessments
Medicine		
Paper Title	**Content (abbreviated)**	**Assessments**
MBChB 501A and B – MBChB Part V	**Clinical Practice:** General Practice Geriatrics Obstetrics & Gynaecology Ophthalmology Paediatrics Specialty Medicine Specialty Surgery Selective Medicine & Surgery **Project work:** Laboratory Medicine Ethics Quality Improvement **End of Year Examinations** Paper A and Paper B	Supervisor's reports Assignments, Case reports, Objective Structured Clinical Examinations, Multiple Choice Questions, Mini Clinical Examinations, Competency examinations, Short Case Clinical Examinations Assignment Assignment Assignment Short answer and multiple choice questions (3 hours each)

Table 1: Final Year Paper Outlines for Occupational Therapy and Medicine

As students approaching graduation, all participants were actively involved in client or patient care with supervision by individuals (Occupational Therapy) or a medical team (Medicine). These specific contexts were pivotal to this research because the values and principles

supporting the dominant clinical educational framework tacitly shape how clinical students view their learning and participate in practice.

The participants chose pseudonyms for use in all reporting of the data and findings: Claire, Jane and Marble Rose (all female) Occupational Therapy participants and Taro M (male), Adele, Anna, Leah, Liz, Mary, Sarah Jane and Shelly (female) Medicine participants. Examples are identified with these names and a map number (1, 2 or 3).

Study method

Pilot phase

A pilot study was conducted to test the acceptability of the data gathering tool. Two third year occupational therapy students who had been on clinical placements responded to the online advertisement. The volunteers were sent information sheets and consent forms by mail (see Appendices 1 & 2). Consent forms were returned prior to attendance at a single session where participants received training in the use of modified C-map® and completed a map and an evaluation of the ease and convenience of the mapping tool. Based on the volunteers' evaluations and maps, only minor modifications to mapping instructions and processes were made.

Study phase

A fully online process was used for the study phase to reduce the time needed to re-organise maps and allow gaps to be seen more easily (De Simone, 2007). This was particularly helpful for this study of clinical students in various locations and with different times available for mapping. It allowed ease of use, storage and collection of electronic maps and gave participants an increased sense of data ownership.

Up to twenty, third year occupational therapy students and up to twenty, fifth year medical students were sought as participants for the study phase. Recruitment and obtaining consent were conducted as in the pilot study. Eight participants (5 medical students and 3 occupational therapy students) completed one (1), two (1) or three (6) maps in 2012. On the basis of preliminary analysis of the data it was decided that more participants should be recruited to provide sufficient data for analysis. A second set of three maps was collected in the same manner from a further three volunteers (all medical students) between February and August 2013. The timing of the third map was changed to avoid proximity to student final examinations which had been an issue in 2012. Two of the 2013 participants completed all three maps and one completed two maps.

Study Context and Methods

All participants were provided with written mapping instructions, emailed to them by the researcher, for completing their C-Map® training and first map at home in February-March. They were asked to respond to the focus question: "From my experiences, what are the relationships between thinking, feelings, behaviour, attitudes, values and beliefs in clinical learning?" Concept names representing each of these domains of learning were provided (thinking/knowing, emotions/feelings, actions/artefacts, attitudes/values, beliefs). Participants placed these five concepts in a map along with optional concepts (see Appendix 3) and any of their own choosing. Participants were instructed to form propositions by linking concepts with short statements describing the relationship between them, and to annotate these propositions with short reflections on the clinical experiences that had prompted or illustrated them. Second and third maps were completed at the mid-year and end of year intervals in the same way. All participants retained copies of their own maps so they had access to previous maps and to the instructions at each mapping.

Evaluation of the modified concept mapping tool was completed with the end of year map (see Participant Evaluation section for details of questions asked). The evaluation was designed to take five to ten minutes in order to encourage participants to complete it, but provided enough space for some in-depth comment. All completed maps and evaluations were emailed to the researcher who saved them in a folder on a secure university server.

Ethical approval

Ethical approvals for both the pilot study and full study were sought and obtained from both institutions where volunteers were sought. The appropriate approvals were:

University of Auckland Human Participants Ethics Committee approval 7432, dated 7 September 2011, valid until 7 September 2014.

Auckland University of Technology Ethics Committee approval 11/247, dated 11 October 2011, valid until 10 October 2014.

Data analysis

Twenty-nine maps and nine evaluations of the study tool were completed altogether. This section describes the methods used to analyse the structure and content of the maps and the participant evaluations of the mapping process. This included:

- Map structure analysis: the entire set of maps was analysed to produce a limited number of categories of structure and to identify key aspects determining structure.

- Modified map scoring: an existing scoring system was used to score the number and quality of the propositions, and modified to also score the annotations for quality and relevance.

- Coding and cluster analysis of the propositions: NVivo 10® was used to code the links between domains represented in the propositions and for cluster analyses of linking patterns and words used.

- Analysis of the annotations: participants' documented experiences were analysed to produce a limited number of categories of context and of critical elements of experience.

- Summarisation of the participant evaluations of the mapping process: descriptive summaries of answers to each question were produced.

Some analyses, such as the modified map scoring, analysis of the annotations and the participant evaluation of the mapping process, were pre-determined. The decision to carry out these analyses was made at the time of initial study design to allow comparison with existing uses of concept mapping. This shaped the map focus question. By contrast, the analysis of the map structure and coding and cluster analyses evolved from interacting with the participants' data in an emergent responsive form of analysis. The development from theoretical perspectives behind the research question through to methodologies and the different analyses is illustrated in Figure 1 (p. 49). Figure 4 (p. 82) is a quick guide to the mapping terms.

Before describing the specific forms of data analysis, it is necessary to explain why these analyses were used. Diagrams such as concept maps exist along a continuum between the wholly verbal and the completely visual and can be used as data, as representations of quantitative findings, or as directors of data analysis (Buckley & Waring, 2013). Maps and diagrams should explain evidence through a coherent relationship between the narrative and visual elements (Tufte, 2006); taken alone, a line, image or word may suggest a meaning to the viewer that is not what the map-maker intended. Since generic elements of diagrams such as arrows can create significant ambiguity when used to connect specific concepts, explanatory text gives meaning and trustworthiness to mapped relationships (Tufte, 2006). For this reason, all elements of the maps were attended to and integrated wherever possible.

While visual data analysis is well-established in some disciplines such as anthropology and geography in which drawings and photographic data represent phenomena or ways of seeing the world (Wee et al., 2013), concept mapping has not previously been approached in this

way. The study participants produced very different maps with non-hierarchical structures and inner layers of variably integrated connections and rich text. Map content and the patterns and meta-patterns within and among the maps are both important (Bateson, 1979/2002). This variability of visual and textual expression within and among the participants' maps directed the analysis of map structure and content. As a set, the twenty-nine maps are also a visual-textual representation of the whole that is the participant groups' experiences of an extended period of clinical learning. Within this set, differences in the way that learning and context are experienced and conceptualised may be viewed in a phenomenographically-informed way as inter-related sets of categories (Marton et al., 2004; Monrouxe, 2010; Pang, 2003).

For these reasons, the data analysis and representation of the findings emerged as a response to what the maps and annotations suggested. This produced a mix of numerical and textual tables and diagrams used in novel ways. This allowed the integrated analysis of many domains including personal beliefs and values to be guided by equal attention to all the data and to maintain a balance between descriptive and interpretive phenomenological approaches (Lopez & Willis, 2004; Spinelli, 2005). The following sections explain how the analysis of structure, concepts and propositions evolved in response to the maps collected.

Map structural analysis

Hay, Kinchin and colleagues describe different structural types of concept maps (chains, spokes, networks and unclassified) and depict the progression from simpler to more complex forms over time as indicating meaningful learning (Hay & Kinchin, 2006; Hay et al., 2008a: Hay et al., 2008b; Hay et al., 2008c). When considering how to analyse the structure of the study maps their work appeared to provide a suitable approach; however, it became apparent once the data were collected that the non-hierarchical modification had produced maps that were not always typical of those seen in previous work. A few maps had chain or spoke elements but usually within a larger network form. A different approach was needed to make sense of these arrangements. In order to find a way forward and begin data analysis, the twenty-five maps that had then been collected were exported from C-map® as jpeg files and reduced in size. This preserved their structure but made the textual content too small to read, allowing attention to be focused only on map structure and shape. The text was also obviously important, but this was considered separately from the structural analysis because of its linguistic significance.

The images were arranged randomly as a screen saver on my laptop desktop and formed a constant background for nearly four weeks. An open minded, phenomenographically-informed search for similarities and differences between and among images without reducing them to

individual items and with no particular theoretical or practical lens was applied (Åkerlind, 2012). This eventually gave rise to five types or categories of map representing the main structural patterns in participants' expressions of the relationships between concepts from the five domains of learning (thinking/knowing, emotions/feelings, actions/artefacts, attitudes/values, beliefs). These five categories were then tested against the full data set of maps for sufficiency. All maps were able to be sorted into one of the five interrelated categories. This entire process was similar to the whole set reading, searching for variations and bracketing which typify phenomenographic text analysis (Marton, 2000; Marton & Booth, 1997; Pang, 2003).

While this kind of analysis does not appear to have been applied to visual data before, in this study it fitted a systems theory view of the relationships within the set of maps (Maani & Cavana, 2007) since both differences and similarities between maps were being sought, albeit in structures rather than text. The focus was on differences in structural patterns between maps made with the same basic building block (the proposition). The different patterns exist within an inter-related set of all patterns possible with this common constraining element.

This approach to overall structure was complemented by a more detailed analysis attending to visual positioning, connections and complexity within maps. This is consistent with visual methodologies in which spatial and visual elements within diagrams are taken to represent relationships and layers of meaning (Tufte, 2006). Similarities and differences in the linking and placement of the five domains and annotations and the use of space, colour and form were analysed allowing the identification of factors potentially producing these visual arrangements (van Leeuwen & Kress, 2011). A limited number of factors appeared to be influential in all maps which was somewhat expected since commonalities and differences in internal map structure are limited by what the mapping tool makes possible, while unique individual visual artefacts are expressions of collective influences (Wee et al., 2013). The common factors identified were used to create a Cmap® proposing the key elements of, and influences on, map structure.

Both analyses of map structure are similar to descriptive phenomenological analysis where researchers seek commonalities and generalised descriptions of experience to identify core concepts, relationships or categories describing the phenomenon of interest (Lopez & Willis, 2004). Paying greater attention to the analysis of the spatial and structural forms and relationships of visual data in this way may help redress the usual favouring of textual content in diagrammatic analysis (van Leeuwen & Kress, 2011).

Study Context and Methods

Modified map scoring and analysis of scores

Scoring of the maps allows some comparison with existing concept mapping literature; however, as a pedagogical tool, map scoring is used to quantify meaningful learning from changes to concept map knowledge structures over time, evidenced by new links in parts of prior knowledge structures and/or meaningful links between new and prior concepts (Hay et al., 2008b). In this study, map scoring is modified to assess not only the breadth and quality of links between concepts but also between domains of learning and experiences. My justification for this is that even though expert assessment of concept integration and the relationship of concepts to context have been shown to have good reliability (Hay et al., 2008c; Kassab & Hussain, 2010), how learners elaborate on the relationships between concepts is what matters most. Additionally, attention to the importance and quality of links improves the validity of map scoring (Pudelko, Young, Vincent-Lamarre, & Charlin, 2012; Srinivasan et al., 2008). For these reasons, the scoring system for the maps collected for this study included the concepts, propositions and annotations as seen in Figure 1 on page 49.

The modified scoring system evaluated: the relevance of concepts to a domain; the importance of links made between concepts within a domain; the quality of connections made between domains; the relevance of the contextual annotations to the connections. Each of the five domains was scored on each of these four elements using a 1-5 scale where 1 = poor, 2 = limited, 3 = adequate, 4 = very good and 5 = excellent. This gave a possible total of 100 for each map. Excellent was assigned to highly relevant, well described concepts and links and reflective annotations, adequate was assigned to relevant but ambiguous propositions and descriptive annotations, and poor to irrelevant or unclear material. Poor propositions linked two domains without a linking word, while limited annotations were unrelated to clinical practice.

Evaluation of quality and relevance was done in a phenomenographically-informed way by comparing the quality of all the propositions and annotations across the whole set (Åkerlind, 2012), then assigning scores to these before connecting them back to individuals. This allowed patterns of quality and relevance in the propositions and annotations to be seen within and between domains and across time periods for the whole data set (Bateson, 1979/2002).

In the past, scoring of concept maps has been used mainly to show changes to knowledge structures or predefined measures of understanding or learning, or to show statistically significant differences over time; this was not the intention of the map scoring for this study. Rather, since scores can also be used to show patterns and to indicate breadth and depth of interpretation (Carel, 2011), the intention was to use them to indicate trends in quality and relevance across domains and time. Allocating more of the score to the annotations was an

attempt to better represent the quality and relevance of the participants' interpretations of their clinical experiences.

The issue of whether simply learning the concept mapping process increases scores in later maps has been raised, as has the hierarchical mapping of larger numbers of concepts (Srinivasan et al., 2008). In my study, apart from the requirement to include the five compulsory domains, there was no expectation that the maps include large numbers of concepts or hierarchical arrangement. On the other hand, participants were able to re-use previous maps, potentially enabling more rapid production of more complex subsequent maps, which could have resulted in a learning effect on scores. For this reason, most of the score value was assigned to the relevance and quality of the concepts and annotations. This balanced complexity and content, ensuring that structurally simple maps with in-depth content would be scored similarly to very complex maps with generic concepts or annotations.

Map proposition analysis

Propositions are made up of domains and concepts within them that are linked by arrows and words to other domains or concepts within them, for example:

Emotions/feelings (domain) ⟶ create (linking word) ⟶ confidence (concept).

Analysis was begun using NVivo 10® to store the propositions by coding them to nodes; 'containers' for text extracts representing a particular word, theme or idea. A node was created for each of the five compulsory domains (Thinking/knowing, Emotions/feelings, Actions/artefacts, Attitudes/Values and Beliefs) and one for Other Concepts that did not fit the five domains, for example "lecturers". Under each domain node, sub-nodes were created for links to each of the other domains and for specific frequently used concepts. For example, under the Thinking/knowing node there is a sub-node for links to the Actions/artefacts domain and a sub-node for "knowledge". Separate nodes were also made for each participant so that the amount and specific nature of coding could be compared.

Analysis of the propositions involved identifying its intended direction, then coding it to nodes and sub-nodes that represented the concepts and the link. For example, the proposition "thinking/knowing is affected by fear" was coded at the sub-node for links from Emotions/Feelings to Thinking/Knowing to represent the direction of influence indicated by the proposition. It was also coded at the Emotions/Feelings sub-node of "words to describe" and at the sub-node "fear" as a frequently used concept. All of the more than five hundred propositions were coded in this way. The number of propositions recorded at each node indicates which connections and concepts were used most frequently. While the number of

participants was insufficient to justify the use of any data for statistical analysis and generalisation purposes, the large number of propositions produced some useful comparisons of coding differences and trends between and within domains and participants.

Nodes for each participant allowed identification of the spread of coding frequency for all or specific domain nodes across all the participants. When interpreting the findings, this was helpful for avoiding over-representation of participants who contributed more propositions than others. Some NVivo 10® matrix coding queries and cluster analyses were performed to show similarities and differences in coding between domains, between participants and between matched pairs of participants from Occupational Therapy and Medicine who had similar frequencies of coding.

A systems theory informed view regards numbers as symbols of meaning, just as words are (Bateson, 1979/2002). By focusing on the entire set of propositions and the discovery of patterns I sought to avoid reductionist uses of the numerical data. Other researchers who have used NVivo® with textual data from phenomenographic studies to identify, refine and organise variations and connections between them, for example Falkner, Falkner and Vivian (2013), have similarly avoided numerical comparisons. Analysis of word frequency focused on patterns of usage. As word use differences were noticed, their power for sorting the data was tested; analysis thus emerged from the data. This included an analysis of more "causal" linking words as compared with more "associative" ones to see whether the theoretical difference between a more rational, critical type of thinking that identifies inferences and draws conclusions on the basis of evidence (Mulnix, 2012) and a more reflective type of thinking that makes connections on the basis of affectively challenging experience (Poole et al., 2012) was reflected in the data.

There is disagreement amongst some qualitative researchers about the appropriateness of computer-assisted qualitative data analysis software such as NVivo®, but also the recognition that it greatly assists with efficient management of data and the representation of relationships for diagram-based approaches (Buckley & Waring, 2013). As an adjunct to the sense-making process, such software can be useful, but it is not a substitute for rigorous application of the research methodology (Buckley & Waring, 2013). Software packages allow new ways of viewing the data, but have hidden weaknesses. For example, NVivo 10® coding did not separate repeat uses of the same concepts or phrases. To address this, the propositions were also analysed manually by map for the first, second and third maps.

Map annotation analysis

To explore the relationship between awareness of the connections between domains and the clinical experiences related to them, both quantitative and qualitative approaches were used to analyse the annotations (Figure 1, p. 49). This reflects a systems theory phenomenological view of human experience and the integrated nature of the research question, mapping tool and participants' experiences. The number of participants who included annotations to propositions within or between domains and the total number of annotations were counted for the first, second and third maps. This revealed variability in the number of participants annotating particular inter-domain propositions and in the frequency of annotation at each mapping time point. The use of particular words within the annotations was analysed as for the propositions, allowing them to be compared to show alignment between connections and experiences. Specific word searching for personal pronouns in the annotations was used to assess the degree of personal identification with experiences.

Qualitative analysis of the annotation text involved harvesting each annotation and the proposition to which it was attached from all twenty-nine maps. In a manner similar to phenomenographic analysis, these were grouped by the domains of learning they connected, reflecting the study's central aim of identifying integration of domains and discernment of critical elements of experiences related to connections prompted by the focus question for the maps (Pang, 2003). This grouping emerged from the data rather than being constructed by the researcher. Individual participant's annotations were considered only after provisional categories for the set had been established and tested to ensure that all annotations fell into at least one category (Dahlin, 2007).

The annotations were read independently and repeatedly over a period of two months by all three of the supervisors and me, without any attempt to categorise or sort the content and with attention to bracketing as much as possible all previous assumptions about the connections between domains (Ashworth & Lucas, 2000). The purpose of this phase was to become familiar with the whole set of texts and to discover their similarities and differences by holding them in one's mind all at once (Åkerlind, 2012). After another month of re-reading, NVivo 10® was used to sort the annotations into provisional categories of experiences illustrating links between domains, and categories of critical elements discerned within them. These two sets were refined and re-organised and then discussed together at the end of the three months. This collaborative approach was used to provide checks on the categories I had developed and to debate and refine them (Cousin, 2009).

My supervisors and I also discussed and refined the two diagrams I had created to represent overlap and distinction between experience types and critical elements of clinical learning.

Study Context and Methods

Diagrams that show conceptual linkages are more integrative, while diagrams that show how categories can be sorted or arranged hierarchically are more logical (Buckley & Waring, 2013). Since the diagrams were produced to illustrate conceptual relationships based on logical links and numerical frequencies, they attempt to integrate logical and integrative diagramming.

Participant evaluations of mapping

In a manner similar to that outlined for the map scoring process, the participant evaluation of the mapping process used in this study was modelled on a variety of existing student evaluations of computerised mapping in higher education settings. Kostovich, Podradzisz, Wood and O'Brien (2007) used a mixed method approach to demonstrate that students' learning style preferences did not appear to affect concept mapping aptitude. Torre et al. (2007) used open-ended questions to assess medical students' perceptions of the effectiveness of concept maps as learning and teaching tools, while Amundsen, Weston and McAlpine (2008) interviewed higher education academics for their study. In their extensive review, Pudelko et al. (2012) note that student appreciation of concept mapping as a learning tool varies similarly among quantitative and qualitative survey studies, although most of the cited studies were conducted with nursing students.

Elements of the methods others had used were combined to produce an evaluation rubric which asked participants to score the ease of use and convenience of the tool. Participants were also asked about its helpfulness for learning to allow comparison with the literature. Questions included a Likert-type set of tick boxes similar to those for the scoring system and a few lines for explaining the choice made, comments on the value of the process for learning and suggestions for improvements. As the number of participants was small, the analysis of the evaluations did not take a statistical form. The Likert-style responses have been presented as raw data and the text responses as common themes which have been interpreted and discussed in relation to the relevant findings.

The following chapter presents the findings that emerged from use of the data analysis methods presented in this chapter. Much of the data related to concepts and propositions is presented as tables and NVivo 10® analyses. These should be regarded as complementary to the analyses and diagrams that interpret the structural and textual elements of the participants' maps.

Chapter Six: Data Analysis Findings

This chapter has three subsections. The first presents the findings from the analysis of the map structures and scores, the second the analysis of the propositions and annotations, and the third the participants' evaluations of the mapping process. The first two sections explain what was found and patterns that appear to exist in the set of maps as a whole. In taking a systems theory, embodied phenomenological, integrative dualist approach, interpretation of the findings is considered not as separate individual analyses but rather as different analytical perspectives on the whole of the participants' perceptions of the connections in clinical learning. The visual, numerical and textual presentations of the findings are regarded as interrelated alternative ways of looking at the data. For example, the frequencies of the words used in the propositions relate to the way domains are linked structurally in the maps and to events described in the annotations. While some interpretation of particular aspects is advanced in this chapter, this is meant to aid an overall synthesis of meaning. The discussion chapters further synthesise and interpret these interrelated findings as a whole. Figure 4 is a reminder of the names and meanings of terms used in this and the following chapters to discuss map content. Actual data examples use pseudonyms and map numbers e.g. Jane 2.

Domains
- The five learning domains: Beliefs Feelings/emotions, Thinking/knowing, Actions/artefacts, Attitudes/values (researcher generated)

Concepts
- Named ideas within each DOMAIN
- Example: "knowledge" within Thinking/knowing (researcher and participant generated)

Propositions
- Connections between DOMAINS and/or CONCEPTS
- Include two domains or concepts and a linking word/s
- Example: "Thinking/knowing changes knowledge" (participant generated)

Annotations
- Short texts attached to PROPOSITIONS. Describe context.
- Example: "When I was asked a question on a ward round..." (participant generated)

Figure 4: Terms and Meanings with Examples

Map structural analysis

Using the method described earlier, five structural categories were identified in the maps collected. Structural progression of maps from less to more integrated and from maps focused on process and causative relationships to maps focused on integration and mutual relationships can be seen in the five types. The structural types progress from a very linear chain form (Figure 5) through to a simple network (Figure 6) which is still mainly linear but has a few interconnecting links. The third pattern, the centred network (Figure 7) could be regarded as a transition form since it retains element of the linear structures but links these to a central concept. The fourth form (Figure 8) is an expanded version of this in that a focal point remains but it is part of a larger simple network. The final pattern (Figure 9) is the multi-connected complex network with multiple, more evenly distributed connections between concepts. Examples of each type and a short description of its most important features are presented below with unreadable text to assist focusing on structure:
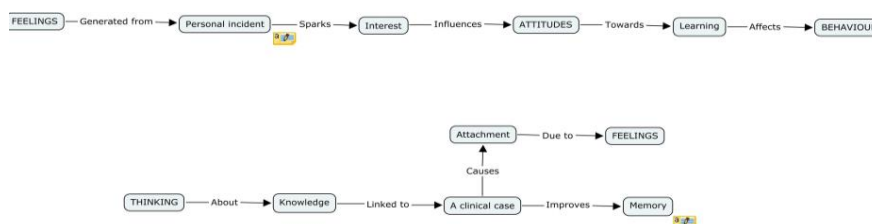
Figure 5: Chains (including circular chains) e.g. Taro M 1

In chains, each concept is linked to the next by a causative word or event.

Figure 6: Simple Network e.g. Leah 1

Simple networks have mostly chain connections with limited numbers of interconnections between chains.

Data Analysis Findings
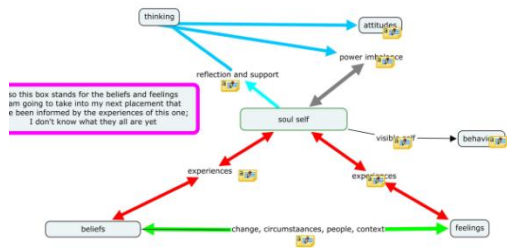
Figure 7: Centred Network e.g. Jane 2

Centred networks have a central concept to which all others are linked. Connections between the other concepts are limited by this.
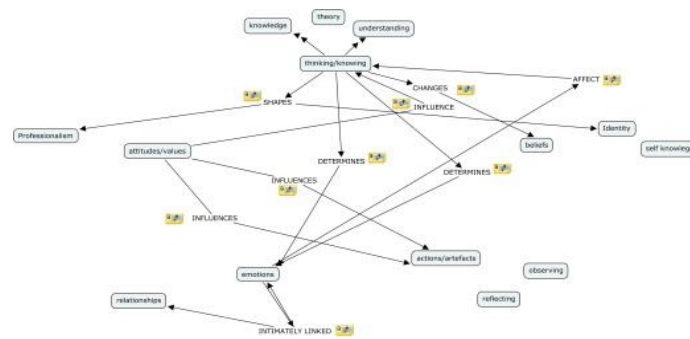
Figure 8: Focal Point Network e.g. Shelly 1

Focal point networks have a more complex network of connections but one particular domain or concept has more connections or associated concepts linked to it.
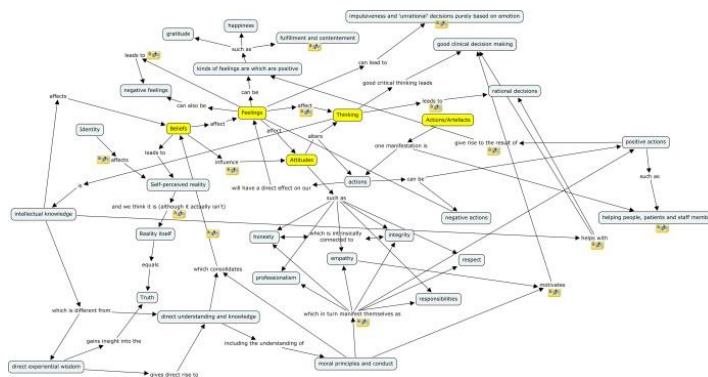
Figure 9: Complex Network e.g. Sarah-Jane 2

Complex networks have multiple concepts and connections within and between domains.

Data Analysis Findings

Each structural type allows for the fact that no two maps are identical, but that within a type the basic pattern of the map is the same and the maps of that type do not fit into the next or the preceding type. The examples for each type have been reproduced as they were when initially viewed as a complete set, with mostly unreadable text. This was a critical element of the structural analysis as it meant that the focus was on the pattern of the map rather than the content. The examples of each type also illustrate the differences in the structural choices possible when participants are not expected to arrange concepts in a hierarchy. Of the twenty-nine maps produced, none show hierarchical arrangement of the domains. The placement of any one concept or domain in any one position on the maps is not consistent between participants, and amongst the six participants who changed the structure and positioning of domains and concepts in their second and third maps there is no consistent pattern in the position changed to or from. Table 2 shows how all the maps fitted into the five categories of structure.

Type of Map	Maps fitting type
Chains	Leah 3, Liz 1, Taro M 1, 3
Simple network	Adele 1, Jane 1, Leah 1, 2
Centred network	Jane 2, 3
Focal point network	Adele 2, Liz 2, Shelly 1, 2
Complex network	Anna 1, Claire 1, 2, 3, Liz 3, Marble Rose 1, 2, 3, Mary 1, 2, 3, Sarah-Jane 1, 2, 3, Shelly 3

Table 2: Maps Fitting Structural Types

Most participants who created complex networks for earlier maps stayed with this structure for later maps. Claire, Marble Rose, Mary and Taro M re-used their first map structure and either added to it or deleted elements without changing the structural type. Liz, Jane, Adele and Shelly produced maps that changed from simpler to more complex types between the first and third maps, while Leah's final map was less complex than the preceding two. Even accounting for the fact that two participants (Mary and Marble Rose) who had difficulties running the C Map® program on their computers produced similar maps from a stripped generic map template, the complex network is the most common structural type. The remaining maps are spread fairly evenly across the first four types. Most participants' maps are of the same type over time or progress to more complex types. The one exception to this (Leah) may reflect the poor timing of the third map for the 2012 participants, and perhaps less engagement with the process since Leah's third map also includes fewer annotations than her first map.

There are nevertheless some patterns of placement across all the maps: emotions/ feelings, beliefs and thinking/knowing are usually found in the upper half of maps, and actions/artefacts in the lower half. The emotions/feelings domain is placed at the top in half of the maps. In terms of van Leeuwen and Kress's (2011) theories regarding the placement of new and ideal

concepts in the right and top of visual images and the known and real in the left and lower parts, one might expect beliefs and thinking to be in the upper half and actions/artefacts in the lower. That the emotions/feelings domain is predominantly placed toward the top and middle of the images suggests that clinical learning creates emotions that are both known and new, but that they are part of the ideal rather than the real world of practice. This may relate directly to emotional dissonance; as noted previously, clinical students reportedly feel uncertain about the appropriateness or otherwise of expressing their emotions (Borgstrom et al., 2010; O'Callaghan, 2013).

As categories of visual expression and organisation, the map structure types indicate the significance of connections and domains to the participant, expressed through visual placement. Changes in type reflect how this significance changes over time. Relating this to affective, cognitive and psychomotor learning and connections to beliefs, values and attitudes suggests that for some participants the map elements are less integrated and remain that way, while for others awareness of connections between domains increases or is restructured. The central and focal point network types are interesting, suggesting that particular domains may dominate learning experiences at certain times, possibly obscuring integration with other domains. To understand this further the type of map needs to be considered alongside the interpretation of concepts and propositions used and the annotations made to them. This will be returned to after the map content analysis has been reported.

Map structures and integrated clinical learning

The analysis of the structure of the maps as visual expressions of the organisation of integrated experiences examined positioning and form within maps. The C-map in Figure 10 represents a way of thinking about how the maps were produced and organised visually and what factors might be important in this. The figure includes five pink proposed drivers of map organisation and eight yellow structural features or "outcomes" visible in the maps. Awareness of structural possibilities and tensions between drivers is likely to produce very different sorts of maps, as seen in the study. Critical elements of experience and pre-occupation with particular domains or external factors such as learning requirements or perceived expectations are likely to impact on the mapping process. This is reflected in several parts of Figure 10 as the depth of engagement and the degree of personal response. While the mapping tool used in the study may not be ideal, Figure 10 suggests that there is potential for the inter-domain mapping process to be used to explore these drivers and tensions further. As noted in Figure 10, the structure of the maps is driven by the specific words and propositional links participants choose to include.
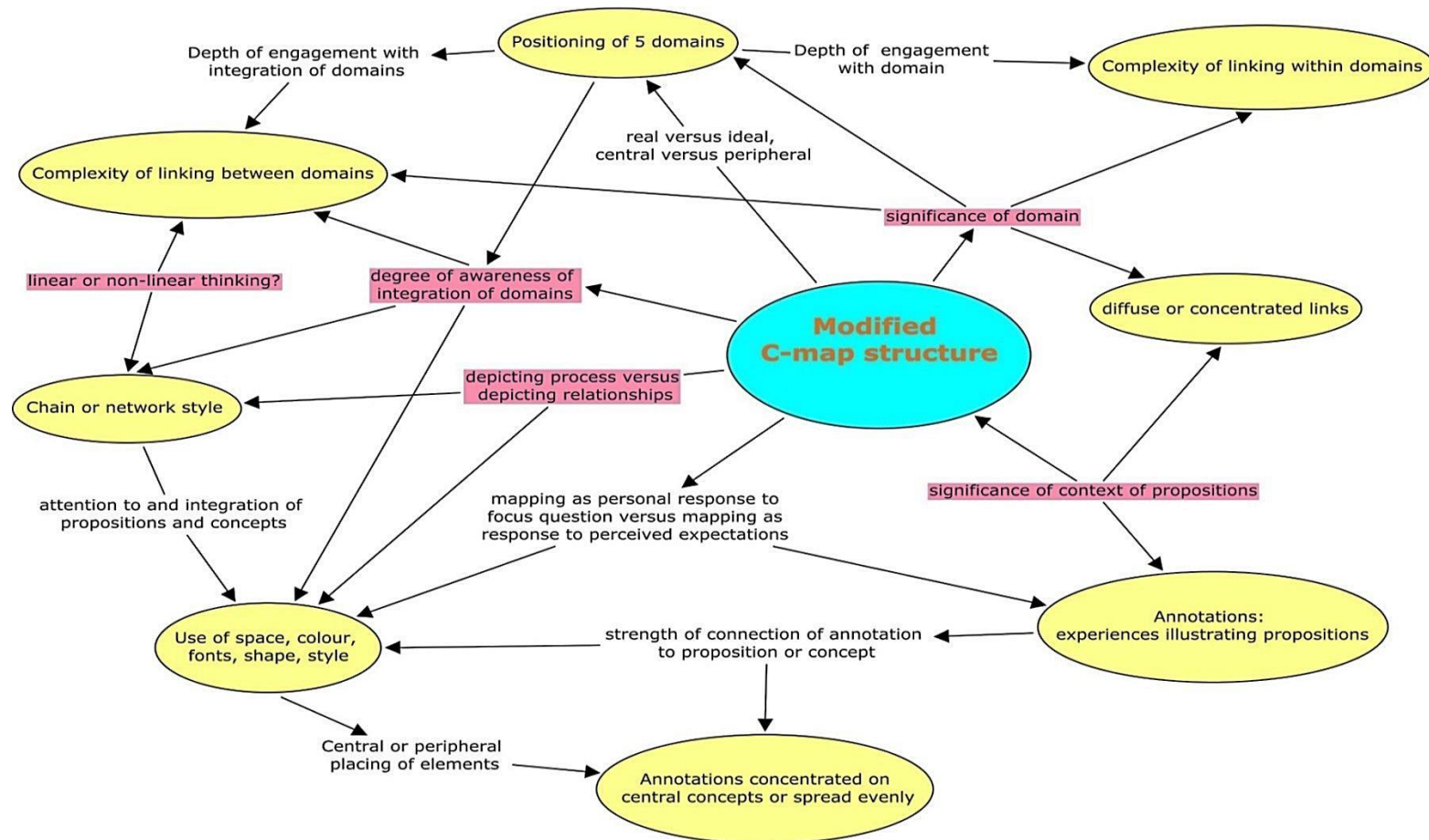
The yellow shapes are observed structural features of the modified maps or perhaps "outcomes" that are a result of the propositions. The pink shapes are proposed to be the primary drivers or "organisers" of the visual expression choices that determine the structure. Some structural features may arise as a result of the choice of positioning for the five compulsory domains, and the way the relationships between them are perceived. Structural features could also appear as the result of the desire to record a particular experience that then determines the existence of a proposition and where it is placed. Additionally, map structure may be driven by the perception of the links as parts of processes rather than relationships

Figure 10: C-map of Map Structure

Data Analysis Findings

Map score analysis

Using the modified scoring system outlined in the previous chapter, scores for concepts and connections within individual maps were allotted to each map and are presented here. The total possible score for each map is 100. It is made up of 20 points allocated to each of the five domains with 5 points each awarded for:

- relevance of concepts within the domain;
- importance of propositions within the domain;
- relevance of annotated experiences attached to connections;
- quality of connections made to other domains.

The highly relevant, well-explained concepts, connections and experiences of excellent propositions (p. 101, Taro M and Liz) and annotations (p. 123, Anna) resulted in scores of seventeen to twenty for a domain. Adequate propositions (p. 105, Marble Rose) and annotations (p. 124, Mary) produced scores of nine to twelve, while limited examples scored six to eight. Some scores were composites of excellent, good, adequate or limited elements, reflecting varying attention to concepts, propositions or annotations.

All scores were equally affected by my subjective interpretation and bias since I allotted all scores. Table 3 records changes to the total scores.

Participant	Score Map 1	Score Map 2	Score Map 3	Change 1 to 2	Change 2 to 3	Change 1 to 3 (= % change)
Adele	52	56	-	+4	-	-
Anna	57	-	-	-	-	-
Leah	44	40	39	-4	-1	-5
Liz	49	58	62	+9	+4	+13
Mary	44	59	58	+15	-1	+14
Sarah-J	47	64	62	+17	-2	+15
Shelly	44	53	44	+9	-9	0
Taro M	52	-	32	-	-	-20
Claire	54	59	61	+5	+2	+7
Jane	50	62	59	+12	-3	+9
M Rose	59	63	63	+4	0	+4
Average Score/Change	50.2	57.0	53.3	+7.9	-1.2	+4.1

Table 3: Map Scores (out of 100) and Changes to Scores

For most participants, scores increase between the first and second maps, but changes between the second and third maps are more variable. On average there are small increases in map score between the first and third maps for most participants. Tables 4 – 6 show changes to scores allotted to individual domains for each participant for maps 1, 2, and 3.

Data Analysis Findings

Participant	Thinking/ knowing	Emotions/ feelings	Actions/ artefacts	Attitudes/ values	Beliefs	Average Score
Adele	8	11	11	10	16	11.2
Anna	8	13	11	12	13	13.4
Leah	10	11	8	6	8	8.6
Liz	7	8	11	10	13	9.8
Mary	6	12	9	7	10	8.8
Sarah J	11	6	12	8	10	9.4
Shelly	11	8	8	9	8	8.8
Taro M	12	10	8	14	8	10.4
Claire	12	11	10	11	10	10.8
Jane	9	7	8	11	15	10
M Rose	7	14	12	14	12	11.8
Average Score	9.2	10	9.8	10.2	11.2	10.3

Table 4: Map 1 Scores (out of 20) for Individual Domains

Participant	Thinking/ knowing	Emotions /feelings	Actions/ artefacts	Attitudes/ values	Beliefs	Average Score
Adele	11	10	13	10	12	11.2
Anna	-	-	-	-	-	-
Leah	7	7	10	9	7	8
Liz	8	11	11	11	15	11.2
Mary	9	15	11	9	15	11.8
Sarah-J	11	13	12	14	14	12.8
Shelly	14	7	8	14	10	10.6
Taro M	-	-	-	-	-	-
Claire	14	12	11	12	10	11.8
Jane	12	10	10	10	20	12.4
M Rose	7	16	15	12	13	12.6
Average Score	10.3	11.2	11.2	11.2	12.9	11.4

Table 5: Map 2 Scores (out of 20) for Individual Domains

Participant	Thinking/ knowing	Emotions / feelings	Actions/ artefacts	Attitudes/ values	Beliefs	Average Score
Adele	-	-	-	-	-	-
Anna	-	-	-	-	-	-
Leah	10	7	7	7	8	7.8
Liz	10	13	12	12	15	12.4
Mary	9	14	12	9	14	11.6
Sarah-J	11	15	12	12	12	12.4
Shelly	9	9	8	9	9	8.8
Taro M	6	9	9	4	4	6.4
Claire	14	13	11	12	11	12.2
Jane	14	10	11	9	15	11.8
M Rose	7	16	14	13	13	12.6
Average Score	8.9	11.8	10.7	9.7	11.2	10.7

Table 6: Map 3 Scores (out of 20) for Individual Domains

Data Analysis Findings

Individual domain scores for each of the three maps show similar scores for each of the domains in each map. While there is a general increase between the first and second maps and a general decrease between the second and third maps, scores for the domains Emotions/feelings and Beliefs tend to be higher and to vary less than for other domains.

Using the breakdown of how the scoring was allocated, it is possible to analyse across the map scores to look at the expected scores and percentages for within domain concepts and propositions (50 points or 50% of score) as compared with scores for between domain connections (25 points or 25% of score). Table 7 shows the scores for concepts and propositions within the different domains as compared with the scores for propositions between domains for each of the three maps.

Participant	Map 1		Map 2		Map 3		Average	
	Within	Betw.	Within	Betw.	Within	Betw.	Within	Betw.
Adele	54	29	43	25	-	-	49	27
Anna	40	30	-	-	-	-	40	30
Leah	32	30	33	33	33	26	33	30
Liz	35	24	34	29	40	29	36	27
Mary	43	32	47	25	47	26	46	28
Sarah-J	47	28	55	23	52	24	51	25
Shelly	41	27	47	26	30	32	39	28
Taro M	44	29	-	-	59	22	52	25
Claire	37	35	34	32	33	31	35	33
Jane	46	22	35	34	31	34	37	30
M Rose	51	31	52	27	52	27	52	28
Averages	42.7	28.8	42.2	28.2	41.9	27.9	42.7	28.3

Table 7: Within and Between Domain Scores and as Percentages of Total Map Score

If equal attention has been paid to the within and between domain aspects of the connections, one would expect within domain concepts and links to contribute 50% of the map score and between domain links to contribute 25% of the score. Table 7 shows a general trend for the within domain scores to be slightly lower than expected and for between domain scores to be slightly higher, and this is consistent across the time period. There are some noticeable differences between participants; some e.g. Anna Leah, Shelly, Claire and Jane have generally higher than expected between domain scores and lower than expected within domain scores, while others e.g. Sarah-Jane and Marble Rose have percentages much closer to those expected. The latter two participants both have more propositions in total.

The scores and expected percentages for the annotations were also analysed. Table 8 shows the results of comparing the expected contribution of the annotations to the total map score (25 points or 25%) with the actual contributions. Scores for the annotations are generally higher than expected for each of maps 1, 2 and 3, especially when compared with both the

Data Analysis Findings

scores for concepts and propositional links and total map scores, which are not particularly high.

Participant	Map 1		Map 2		Map 3		Average	
	Score	% of total	Score	% of total	Score	% of total	Score	% of total
Adele	13	25	15	27	-	-	14	26
Anna	17	30	-	-	-	-	-	-
Leah	17	39	16	40	16	41	16.3	40
Liz	20	41	19	35	19	31	19.3	36
Mary	11	25	16	27	16	28	14.3	27
Sarah-J	12	26	14	22	15	24	13.7	24
Shelly	14	32	14	26	17	39	15	32
Taro M	14	27	-	-	6	19	10	24
Claire	15	28	20	34	22	36	19	33
Jane	16	32	21	35	21	36	19.3	34
M Rose	11	19	13	21	13	21	12.3	20
Averages	14.5	29	16.4	29.6	15.9	30.6	15.3	29.6

Table 8: Annotation Scores and as Percentages of Total Map Score

There is a general pattern of increase in the annotation scores over time, with the score increasing between maps 1 and 2 and the percentage of total increasing between maps 1 and 2 and again between maps 2 and 3. There are quite marked differences between participants in the percentage of the scores contributed by the annotations, with much larger contributions made by the annotations for Leah, Liz, Jane, Claire and Shelly.

Summary

What these different comparisons suggest is that while small increases in the scores between a first and subsequent modified concept map did occur as has been noted in other concept mapping studies, this is quite likely to be due to the effect of becoming familiar with the mapping process since no further increase was seen between the second and third maps. The generally lower within domain scores compared with between domains is not unexpected since the focus question for the maps specifically asked about between domain connections. That the scores for the Beliefs and Emotions/Feelings domains are slightly higher and more sustained would lead one to conclude that these domains are not only important to the participants but are especially so when they think about their clinical experiences and how the different domains are connected in these settings.

The somewhat higher than predicted scores for the annotations suggests that overall the participants readily recognised and described relevant clinical learning situations they perceived to be important in connecting the domains of learning and their beliefs, values and attitudes. The general pattern of increase in the scores for the annotations, and in the

percentage they contribute to the overall score may indicate increasing recognition of the integrated nature of their experiences, perhaps as a result of using the modified mapping, and/or increased trust or confidence in writing about these situations. Of particular note from this study is the fact that some participants who scored highly for the connection aspects of the maps e.g. Sarah-Jane and Marble Rose, scored lower for the annotations, while the reverse was true for Leah and Shelly.

Overall, it seems that the extended and specifically linked nature of the annotations strongly influenced the scores for the maps, in some cases in an opposite direction from the scores for the connections alone. This is an important consideration for further development of modified concept mapping and may also have implications for interpretation of the meaning of concepts in traditional concept mapping applications where annotations have not been used or have not been considered in the scoring. In the following section, the findings from analysis of the propositions and annotations are given in more detail.

Map proposition and annotation analysis

This section presents the findings from analysis of the propositions and the annotations to them. It includes analyses of coding, clusters and word frequencies for the propositions and annotations as well as numerical patterns. As propositions and annotations were coded to nodes for the domains and also to individual nodes for each participant, these frequencies and distributions could be compared to seek patterns within and between domains for the whole participant group, between participants, between disciplines, and over time. The chapter concludes with the findings from the analysis of the annotation content which complements the graphic and tabulated data.

Proposition analysis

Cluster analyses

Cluster analysis is an NVivo 10® tool that shows the relationships between various nodes (containers) to which text is coded. In this study the participants' propositions were coded to nodes for each of the five domains. The cluster analyses show patterns of coding and word usage among participants and domains of learning, and between disciplines. Participants who created propositions coded to the same domains or who used similar words are on the same branch or sub-branch, while participants with different coding are on more distant branches. The analysis in Figure 11 shows two groups of participants whose propositions are coded similarly to domains, one of which has two subgroups.

Data Analysis Findings
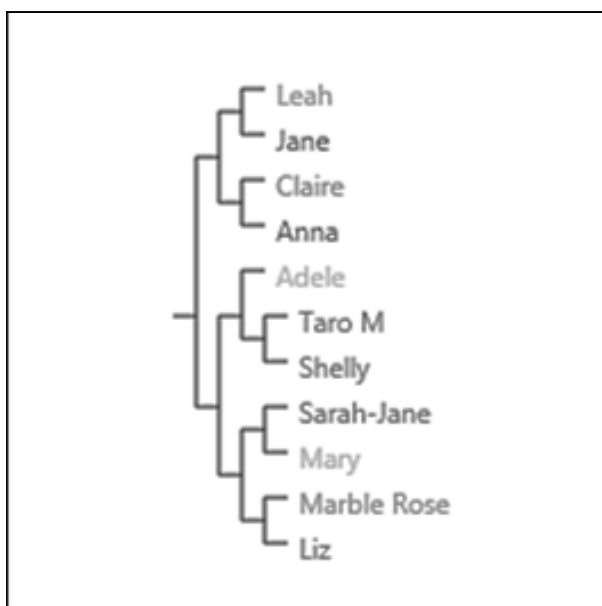
Figure 11: Similarity of Participants by Domain

This means for example, that Leah and Anna share fewer propositional links between the same domains than Leah and Jane, but more than Leah and Liz. Note that neither the Occupational Therapy participants (Jane, Claire and Marble Rose) nor the Medicine participants are all clustered together.
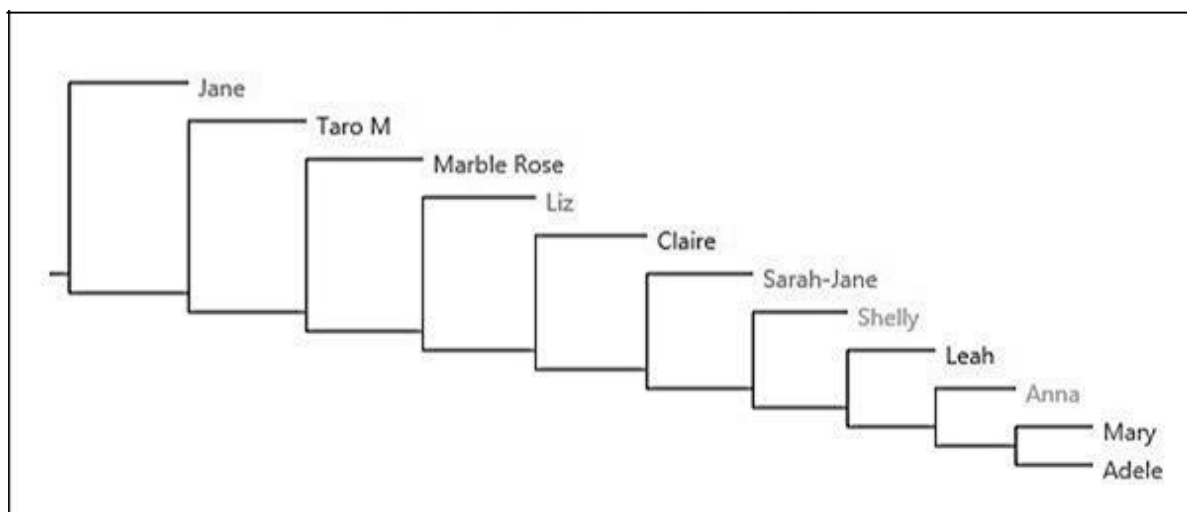
Figure 12: Similarity of Participants by Word Use

Figure 12 shows that Leah and Jane used very dissimilar words compared with Leah and Anna. With the exception of Marble Rose and Liz, clustering by word similarity amongst participants has a completely different pattern from the clustering by coding to domains seen in Figure 11 above.

Data Analysis Findings
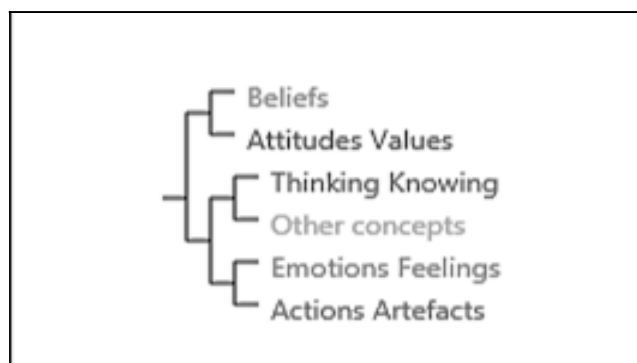
Figure 13: Similarity of Domains by Proposition Coding

The analysis in Figure 13 shows that propositions coded to the beliefs domain are more likely to have also been coded to the attitudes/values domain than to the actions/artefacts domain, while the opposite is true for propositions coded to thinking/knowing. Since each proposition was coded to both the domains it linked, this cluster analysis demonstrates how domains were most often linked.
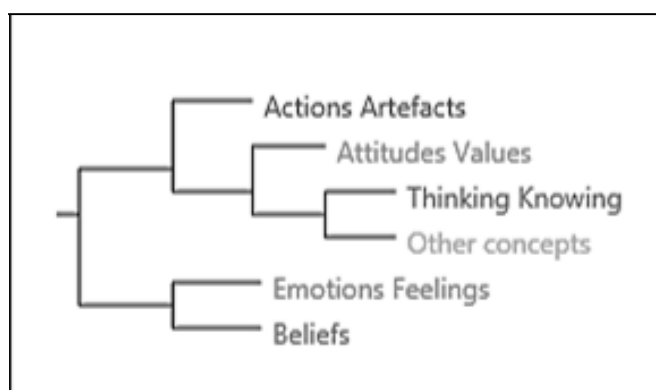
Figure 14: Similarity of Domains by Words Used

Figure 14 shows that, for example, propositions coded to the thinking/knowing domain are more likely to include similar words to propositions coded to the attitudes/values domain than to propositions coded to the beliefs domain. This pattern is dissimilar to the clustering in Figure 13 suggesting that even if domains are more frequently linked the words used to describe or conceptualise concepts or links may differ between participants or between links made in one direction or the other.

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Data Analysis Findings
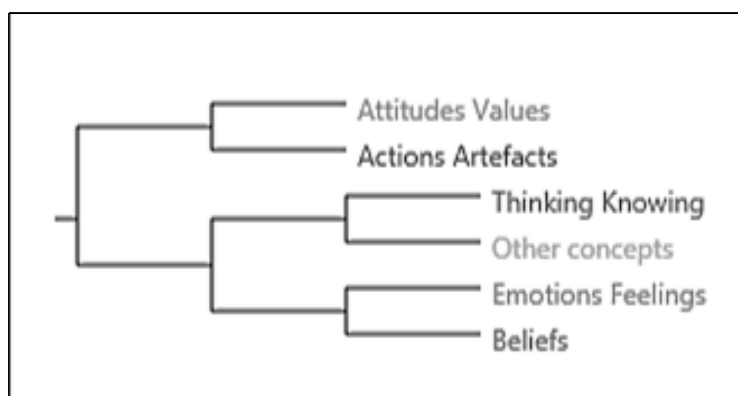
Figure 15: Similarity of Domains by Participant Discipline

Figure 15 demonstrates that coding of propositions to the attitudes/values and actions/artefacts domains is more similar for participants from the same discipline than coding to the attitudes/values and beliefs domains. This is a different pattern from either the domain or word similarity clusters for the whole group. While the clustering in Figure 13 shows coding similarity between attitudes/ values and beliefs domains and between emotions/feelings and actions/artefacts domains, clustering by discipline shows more similarity in coding to the attitudes/values and actions/artefacts domains, and in coding to emotions/feelings and beliefs. This is very similar to the word similarity clustering pattern for the domains (Figure 14), except that thinking/knowing is closely associated with emotions/feelings and beliefs for disciplinary clusters but not for word use. These patterns suggest that within disciplines, the participants link some domains in a more consistent way with particular words. This is supported by the fact that individual participants from each discipline are more closely clustered by word use (Figure 12) than by coding of propositions to the different domains (Figure 11).

Overall, these patterns show that clustering on the basis of domains linked by propositions is dissimilar to clustering based on the words used to describe proposition concepts and links. Additionally, clustering by word use is closer to clustering by discipline than domain similarity clustering for the whole group, suggesting that disciplinary differences in how participants describe and conceptualise relationships between domains are more meaningful than differences in domains linked. The pattern of word similarity clustering (Figure 12) tends to support this in that the three Occupational Therapy participants are closer together than in the domain similarity clustering (Figure 11).

Proposition frequency analyses

Table 9 on the following page shows the number of propositions used in each of the first (n=11), second (n=9) and third (n=9) maps to link within and between domains.

Data Analysis Findings

Domains linked from and to		Number of propositions			
		Map 1	Map 2	Map 3	Total
From Thinking/Knowing	to Thinking/Knowing	7	8	4	19
	to Emotions/Feelings	12	7	7	26
	to Actions/Artefacts	4	3	4	11
	to Attitudes/Values	8	9	6	23
	to Beliefs	5	3	0	8
	to Other concepts	2	3	1	6
	Total	38	33	22	93
From Emotions/Feeling	to Thinking/Knowing	8	5	4	17
	to Emotions/Feelings	9	7	6	22
	to Actions/Artefacts	6	5	4	15
	to Attitudes/Values	6	6	4	16
	to Beliefs	5	3	4	12
	to Other concepts	2	2	3	7
	Total	36	28	25	89
From Actions/Artefacts	to Thinking/Knowing	13	6	6	25
	to Emotions/Feelings	9	11	8	28
	to Actions/Artefacts	9	6	4	19
	to Attitudes/Values	5	7	4	16
	to Beliefs	3	2	2	7
	to Other concepts	4	0	0	4
	Total	43	32	24	99
From Attitudes/Values	to Thinking/Knowing	2	6	3	11
	to Emotions/Feelings	6	1	6	13
	to Actions/Artefacts	12	6	7	25
	to Attitudes/Values	6	4	1	11
	Links to Beliefs	5	5	3	13
	to Other concepts	1	2	2	5
	Total	32	24	22	78
From Beliefs	to Thinking/Knowing	7	5	7	19
	to Emotions/Feelings	8	9	11	28
	to Actions/Artefacts	4	3	5	12
	to Attitudes/Values	5	4	5	14
	to Beliefs	8	9	9	26
	to Other concepts	7	6	5	18
	Total	39	35	42	117
From Other Concepts	to Thinking/Knowing	0	2	7	9
	to Emotions/Feelings	3	4	7	14
	to Actions/Artefacts	1	0	4	5
	to Attitudes/Values	0	3	3	6
	to Beliefs	2	1	0	3
	to Other concepts	8	3	13	24
	Total	14	13	34	61
Total number of propositions		202	166	169	537

Table 9: Number of Propositions Linking Domains and Concepts

While the number of propositions generally decreased between the first and second maps and again between the second and third maps, this was not the case for the beliefs domain. The number of other concepts that did not fit neatly into the five domains also increased in the final

Data Analysis Findings

maps. Table 10 shows differences in the total number of propositions to and from different domains. Links to emotions/feelings and from beliefs are the most frequent.

Propositions to: from	Thinking/ knowing	Emotions/ feelings	Actions/ artefacts	Attitudes/ values	Beliefs	Other concepts	Total from
Thinking/ knowing	19	26	11	23	8	6	93
Emotions/ feelings	17	22	15	16	12	7	89
Actions/ artefacts	25	28	19	16	7	4	99
Attitudes/ values	11	13	25	11	13	5	78
Beliefs	19	28	12	14	26	18	117
Other concepts	9	14	5	6	3	24	61
Total to	100	131	87	86	69	64	537

Table 10: Total Number of Propositions Within and Between Domains

These differences between *to* and *from* domain totals suggest that participants see beliefs as having more influence *on* other domains, while emotions/feelings are more influenced *by* other domains. Table 11 records how many participants included at least one link from or to each domain for each of the three maps. Table 12 includes all specific concepts used by participants and the domains they were linked to.

Key for Tables 11 and 12

Map 1 Black (total 11 maps); Map 2 Red (total 9 maps); Map 3 Blue (total 9 maps)

Links To/ From	Thinking/ Knowing	Emotions/ Feelings	Actions/ Artefacts	Attitudes/ Values	Beliefs	Total Ppts Linking From
Thinking/ Knowing		5, 3, 2	2, 1, 2	6, 6, 6	2, 1, 0	9, 9, 8
Emotions/ Feelings	6, 3, 3		5, 3, 4	6, 5, 4	2, 1, 1	10, 8, 7
Actions/ Artefacts	8, 5, 4	5, 6, 4		5, 6, 4	3, 2, 2	9, 8, 7
Attitudes/ Values	3, 2, 3	3, 0, 2	8, 5, 4		4, 4, 3	8, 6, 7
Beliefs	6, 3, 4	6, 7, 6	2, 0, 2	4, 4, 3		9, 8, 8
Total Ppts Linking To	10, 7, 4	11, 9, 8	10, 9, 4	10, 9, 8	6, 4, 3	11, 9, 9

Table 11: Number of Participants Linking Domains for Maps 1, 2 and 3

Domain linked to: **Specific Concepts by domain linked from**	Thinking/ Knowing	Emotions/ Feelings	Actions/ Artefacts	Attitudes/ Values	Beliefs
Thinking/Knowing					
Knowledge	3, 4, 3	1, 2, 1	1, 1	1, 1	1, 1
Reflecting	1, 1	2, 1, 1	2, 2, 2	1	1
Understanding	2, 2		1, 1	1, 2	2, 2
Memory	1	1	1		
Decisions		1		1, 1	1, 1, 2
Theoretical model, theory, ideas	3, 1, 1				
Critical thinking, insight	1				
Clinical reasoning, how to think	1				
Thinking positively		1			
Don't know if doing it correctly			1		
Concentration, recall, uptake			1		
Paradigm, theoretical model					1
Different perspective					1
Emotions/ Feelings					
Pressure	2	4, 2, 1	1, 1	1, 1, 1	
Stress, Anxiety	1, 1, 1	2, 1, 3	2, 1, 1	1, 1	
Confidence	1	2, 1,	2		
Frustration		1	2, 2, 2	1, 1, 1	
Fear		4, 1		1	
Doubt/Uncertainty	1	3			
Sad		1, 2, 1			
Negative feelings, demotivated		2, 2	1		
Bad mood, Anger		1, 1	1		
Excitement, alertness		1, 1		1	
Fulfilment, gratitude, contentment		1	1	1	
Self-conscious	1, 1, 1				
Withdrawn				1, 1, 1	
Failure			1	2	
Shocked	1, 1				
Guilt		1		1	
Competence		1	1		
Impulsiveness	1				
Hope		1			
Confusion, isolation, alienation		1			
Motivation, interest			1		
Liking lecturers				1	
Actions/ Artefacts					
Observing	4, 3, 2	1, 1	3, 4, 3	3, 1	
Behaviour, Doing	3, 1, 2	1, 2, 1	3, 1, 2	2, 1	1, 1, 1
Listening, Hearing	3		4, 2, 2	1	
Learning	1		2, 2	2, 1	
Organisation		1, 1, 1		1	
Rote learning, training	1		1	1	
Quality notes	1		1		
Doing this correctly	1, 1, 1				
Recall, brainstorming, studying	1				
Repetition of clinical tasks		1, 1			
Asking questions			1	1	
Moral conduct				1	1
Avoidance		1			
Display frustration		1			
Positive or negative actions		1			
Helping people, patients, staff			1		
Professional skills, conduct				1	
Speaking					1
Reacting					1

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Domain linked to: / Specific Concepts by domain linked from	Thinking/ Knowing	Emotions/ Feelings	Actions/ Artefacts	Attitudes/ Values	Beliefs
Attitudes/Values					
Empathy	1	2, 2, 1	1, 1, 1	1	
Integrity	1	1, 1, 2		1	1
Enthusiasm	1		2, 1, 1	1, 1	
Passion, interest, motivation		1	1	2	1
Responsibility, sense of duty			2, 1	1, 2	
Honesty, realness				1, 1	1, 1, 1
Sense of duty, expectations			1	1, 1	
Good attitude to life				1, 1, 1	
Bias		1	1	1	
Moral values, principles	1	1			1
Positive or negative attitudes		1		1	
Mindfulness		1	1		
Respect				1, 1	
Unlikely to change		1, 1			
Diligence			1	1	
Proactive attitude to learning			2		
State of alertness		1			
Resilience					1
Beliefs					
Truth	1, 1		2, 1, 1		1, 1
Belief in something/ worldview		1, 1, 1			1
Other-view/reality/paradigm		1		1	1, 1
Hope		1	1, 1, 1		
Injustice the worst thing					1, 1, 1
Soul self	1, 1		1		1
High dream					1, 1, 1
Reality	1				1
Self-view, self-knowledge				2	
Not very creative	1				
Job gives me fulfilment		1			
Self-esteem		1			
Visible self			1		
Health practice beliefs			1		
OK to get frustrated				1	
Self-perceived reality					1
Other concepts					
Relationships	2, 2	1, 2, 2		1	1
Experience		2, 1	1	2	1, 1
Teachers/lecturers		1	1, 1		1
Identity					2, 2
Patients	1	1, 1	1		
Emergency, traumatic events	1	1			1
Approaching exams		1	1	1	
Job satisfaction, aspirations		1		1	1
Direct experiential wisdom	1				1
Power imbalance	1, 1				
Change, circumstances, context		1, 1			
Students		1			1
Quality of clinical learning			1	1	
Culture				1	1
Leap in learning, learning style			1		
Support			1		
Meeting place				1	
Lack of clinical practice				1	
Manipulation					1

Table 12: Number of Participants Using Specific Concepts in Maps 1, 2 & 3

Data Analysis Findings

While Table 11 shows that most participants made links to and from each domain in each of the maps, fewer participants made links to thinking/knowing, actions/artefacts and beliefs in the third map. When compared with the total numbers of propositions (Table 10), this indicates that some participants made many more links from beliefs and to thinking/knowing while others made very few links from attitudes/values. This is borne out by the large numbers of specific concepts used by only one or two participants in Table 12.

To assess the lack of balance due to some participants contributing larger numbers of propositions to the data set than others, the distribution of frequency of propositions by individual participants amongst the different domains is provided in Table 13. This shows that the individual participants contributing the most propositions to each domain varied and are distributed quite evenly between the two disciplines (Claire, Jane and Marble Rose from Occupational Therapy and the others from Medicine).

Domain	Five most frequent participants
Thinking/knowing	Sarah-Jane, Marble Rose, Mary, Shelly, Leah
Emotions/feelings	Liz, Marble Rose, Taro M, Claire, Mary
Actions/artefacts	Marble Rose, Taro M, Sarah-Jane, Liz, Mary
Attitudes/values	Sarah-Jane, Claire, Marble Rose, Shelly, Liz
Beliefs	Marble Rose, Sarah-Jane, Jane, Adele, Claire
Other concepts	Jane, Taro M, Sarah-Jane, Liz, Mary

Table 13: Five Most Frequent Proposition Contributors by Domain

Proposition word frequencies

The total frequencies of specific words in all propositions were able to be determined using NVivo 10® word frequency analysis. Tables 14 on the following page shows all words used more than 20 times, excluding participants' names and words that are part of the five domain names. A number of these most frequently used words also appear in Table 12 which shows their use in relation to specific domains.

Data Analysis Findings

Word/s	Frequency
Self	83
clinical	82
Knowledge	81
influence, influenced, influences	77
affect/s, affected	73
lead/s, leading	71
professional, professionalism	60
Can	56
change/s, changed, learn, learning	53
reflect/s, reflected, reflecting, reflection/ive	51
Observing	45
I, I'm	44
cause/s	42
Understanding	41
Good	36
stress, stressed	35
My	34
quality, decision/s	33
view/s	30
increase/s, increased	29
link, linked	28
give/s,	27
Empathy	24
listening, result/s, may	23
confidence, towards	22
include, including, reality, relationships	21

Table 14: Proposition Word Frequencies

Table 15 on the following page shows the distribution by domain of words used more than 10 times in propositions excluding domain names and words used by only one participant. Tables 14 and 15 indicate that the use of words related to "self" is common, and particularly so in propositions including emotions/feelings or attitudes/values. An example of this use in a proposition would be:

Beliefs ⎯⎯⎯→ Self-View ⎯⎯⎯→ Attitudes (Adele 2)

Somewhat predictably the word "clinical" is used frequently across all the domains except beliefs, "knowledge" is used almost entirely in connection with thinking/knowing and "professionalism" is predominant in the attitudes/values list. Examples of this are:

Thinking about ⎯⎯→ knowledge ⎯⎯⎯→ linked to a clinical case ⎯⎯→improves

⎯⎯⎯→ memory (Taro M 1)

Professionalism ⎯⎯→ ensures a sense of duty towards ⎯⎯→ Patients (Liz 3)

Data Analysis Findings

Domain	Word/s	Frequency
Thinking/knowing	knowledge	54
	reflecting, reflection, reflective	30
	understanding	27
	clinical	20
	linked	16
	decision, decisions	15
	changed, changes	13
	lead, leads	12
	good	11
Emotions/feelings	stress, stressed	26
	can	19
	cause, causes, change, changes, I, I'm	16
	influence, influenced, influences	16
	confidence, fear	15
	affect, affected, affects	14
	increase, increased, increases	14
	clinical	12
Actions/artefacts	observing	38
	behaviour, behaviours	19
	learning	17
	listening	16
	leads	14
	affect, affects	12
	clinical	11
Attitudes/values	professional, professionalism	32
	influence, influenced, influences	19
	affected, affects, I, I'm	15
	integrity	13
	honesty, responsibilities, clinical	12
	empathy	11
Beliefs	self	48
	view, views	29
	lead, leading, leads	22
	influence, influenced, influences	18
	self esteem	17
	identity	14
	other, soul	13
	knowledge	12
	truth	11
Other concepts	clinical	28
	learn, learning	21
	affect, affects	14
	relationship, relationships	13
	experience, experiences, quality	12

Table 15: Proposition Word Frequencies by Domain

Perhaps less expected is the more frequent use of "leads" or "leading" in connection with beliefs than with thinking/knowing, although this aligns with the more frequent propositions from beliefs to other domains (Table 9). The use of the words "change", "increase" and "influence" in connection with emotions/feelings and the predominance of connections to rather than from this domain suggest that the effects of other domains on emotions/feelings are a significant aspect of clinical learning. Of note also is the more frequent use of words to

describe concepts in the thinking/knowing, actions/artefacts and beliefs domains compared with the predominance of linking words in the emotions/feelings domain. This aligns with increased connections to and from emotions/feelings, but also with the range of links made from specific concepts in the thinking/knowing and actions/artefacts domains (Table 12).

Finally, the frequency of use of the specific domain names was determined using NVivo 10®. This is presented in Table 16, again highlighting the predominance of emotions/feelings.

Domain name used	Frequency
feel, feeling, feelings	207
attitude, attitudes	182
think, thinking	168
Beliefs	158
Actions	151
Artefacts	136
emotion, emotions	114
Values	81
know, knowing	56

Table 16: Domain Name Use Frequency in Propositions

Proposition linking words

Following on from the tables above, consideration was given to the nature of the words used to link concepts within the propositions. This involved classifying these words as either causal or associative. The use of the term causal implies that one concept in the proposition produces a specific effect on the other or is the result of such an effect. The term associative implies that there is a relationship between the first and second concepts but the effect is either non-specific or non-directional. Using this classification, Table 17 on the following page shows the number of causal and associative linking words used by the participants.

Data Analysis Findings

Participant / Causal Links	Adele	Anna	Claire	Jane	Leah	Liz	Marble Rose	Mary	Sarah Jane	Shelly	Taro M
After… comes											3
Alters								2	1		2
Can block		1									
Causes					6	3		2	1		4
Changes		2			7			3		2	8
Consolidates									2		
Creates						2		4			
Determines										2	2
Driven by								1			
Due to											2
Ensures						2					
Follows								1			
Generates											1
Gives/gives rise to					1	2			3		
Improves/enhances									2		3
Increases		3						1			2
Induces								1			2
Inspires								1			
Instils											2
Is response to			2								
Leads to		1				1		6	19		
Motivates									2		
Prevents											2
Prompts						3					
Reduces						2					
Renews					1						
Results in/of		1							3		2
Revises					1						
1-way arrow				3							
Associative links											
Affects		2	1			2		7	16	10	4
Associative phrase	18		42	19		11	57	5	8		
Can be/give/make		1				4		8	11		
Connected to						1			1		
Helps						2			2		
Impacts on					1						
Includes									4		
Influences		5	1		5	7		8	8	12	2
Intimately linked to										6	
Involves									1		
Is based on			1						1		
Is different from									2		
Links/ed to	1			1		2	1	1		3	1
Manifests as									3		
Opens eyes to								1			
Provides						2					3
Reflects	2	3			1	6		3			
Relates to								3	1		
Shapes		2								6	1
Is tied to								1			
Underlies		1									
2-way arrow or line				7						2	
Totals Causal	0	8	2	3	16	15	0	22	33	4	35
Totals Associative	21	14	45	27	7	37	58	37	58	39	11

Table 17: Causal and Associative Linking Word Frequencies by Participant

Data Analysis Findings

Table 17 indicates that Leah and Taro M made predominantly causal connections, while most of the other participants made mainly associative links e.g. Adele, Claire and Marble Rose. An example of this can be seen in similar propositions of Leah and Marble Rose:

Thinking/Knowing ———→ revises ———→ Emotions/Feelings (Leah 1)

Thinking/Knowing ———→ uncertain ———→ Emotions/Feelings (Marble Rose 1)

Two participants, Mary and Sarah-Jane, used a more even mixture of both types of linking word. This relates to the type of map from which the propositions were taken; causal linking words were more commonly used in maps including chains (e.g. Leah 1 and 3, Taro M 1 and 3, Liz 1) while associative words were more common in maps including networks e.g. Shelly and Marble Rose. Using the causal and associative word classifications, the following table shows the total number of causal and associative links within and between different domains.

Domain linked to:	Thinking/ Knowing		Emotions/ Feelings		Actions/ Artefact		Attitudes/ Values		Beliefs		Other Concepts		Total links from:	
Domain linked from:	**C**	**A**	**C**	**A**	**C**	**A**	**C**	**A**	**C**	**A**	**C**	**A**	**C**	**A**
Thinking/Knowing	8	15	7	5	1	3	8	7	4	1	1	7	29	38
Emotions/Feelings	6	8	6	20	1	8	0	12	0	5	2	4	15	57
Actions/Artefacts	7	7	7	12	1	13	1	8	1	4	2	5	19	49
Attitudes/Values	1	8	2	10	1	13	4	13	0	5	3	4	11	53
Beliefs	3	9	2	17	0	3	3	9	4	13	8	13	20	64
Other Concepts	3	4	3	5	2	1	2	5	0	3	0	13	10	31
Total links to:	28	51	27	69	6	41	18	54	9	31	16	46	104	292

Table 18: Causal and Associative Linking Word Frequencies by Domain

This table demonstrates that there are almost three times the number of associative links compared with causal links. This reflects the overall differences between participants seen in Table 17. An example of this would be Claire's predominant use of associative phrases such as "If I believe something to be so it affects the way I feel", to link Beliefs and Emotions, which can be compared with Sarah-Jane who suggested that "positive self-esteem leads to" "positive feelings". Causal links were more commonly used to connect other domains *to* and *from* Thinking/knowing and less commonly used to connect *to* Actions/artefacts or *from* Attitudes/values. Associative links were used predominantly when linking *to* and *from* emotions/feelings and beliefs.

These findings appear to contradict the word frequency finding of many causal words such as causes, changes and leads amongst the most frequently used in propositions including emotions/feelings and beliefs (Table 15). This can be accounted for since the word

frequencies counts do not consider the direction of the links, most of which are *to* rather than *from* emotions/feelings, nor the differences in the use of particular words by individuals. Additionally, the words found most frequently in the beliefs domain are not linking words. Overall these findings indicate that participants generally made more associative links to and from domains, but causal linking was more frequent with Thinking/knowing and found more often in particular participant's maps, especially those including chains.

Differences between participant groups

Even with the small participant numbers, some comparison of coding and proposition patterns was possible using matched pairs of participants with similar numbers of propositions from each of the two disciplines. Discrepancies were noted between the raw numbers of propositions and coding frequencies analysed using NVivo 10®, as shown in Table 19.

Participant	Actual number of propositions made	Average frequency as % of total coding
Sarah-Jane	85	31.12
Mary	59	8.70
Marble Rose	58	7.23
Liz	52	8.35
Claire	45	4.95
Shelly	43	6.68
Jane	35	5.28
Taro M	35	17.38
Leah	23	3.15
Adele	21	3.70
Anna	21	3.06

Table 19: Proposition Frequencies Compared with Coding Percentages

These occurred because some participants used the same propositions in sequential maps. To adjust for this some coding frequency analyses were replaced with manual counts of proposition numbers in order to compare the two disciplinary groups.

The following tables show comparisons of the number of propositional links made within and between domains by participants from the two disciplines using the manually counted propositions. Given the small number of participants, Occupational Therapy (n=3) and Medicine (n=8), these comparisons can only indicate difference. The shaded cells show the links in which the ratio of Medicine to Occupational Therapy is greater than or less than the expected 8:3.

Data Analysis Findings

Propositions	Medicine	Occupational Therapy
From Thinking Knowing	63	27
To Thinking Knowing	61	29
From Emotions Feelings	57	29
To Emotions Feelings	88	47
From Actions Artefacts	75	26
To Actions Artefacts	62	17
From Attitudes Values	55	19
To Attitudes Values	70	20
From Beliefs	63	46
To Beliefs	41	28

Table 20: Number of Propositions by Domain by Discipline

To counteract over-representation by participants who produced more propositions in the Medicine group, matched participant analyses compare coding of the three Occupational Therapy participants (Marble Rose, Claire and Jane) with that of three Medicine participants with similar numbers of propositions (Mary, Shelly and Taro M). This matching took into consideration the fact that Jane and Taro M had similar numbers of propositions in the other concepts category. Table 21 shows the total numbers of propositions to and from domains for each pair.

Participant	Total propositions from domains	Total propositions to domains
Marble Rose	57	63
Mary	58	58
Claire	45	48
Shelly	46	46
Jane	30	31
Taro M	32	35

Table 21: Number of Propositions for Matched Pairs

Table 22 on the next page includes the total numbers of domain specific propositions for the matched pairs. The same shading is used as in Table 20, with which it can be compared.

Data Analysis Findings

Propositions	Medicine	Occupational Therapy
From Thinking Knowing	26	21
To Thinking Knowing	30	25
From Emotions Feelings	28	24
To Emotions Feelings	26	35
From Actions Artefacts	26	21
To Actions Artefacts	33	23
From Attitudes Values	20	18
To Attitudes Values	27	17
From Beliefs	22	37
To Beliefs	16	22

Table 22: Number of Propositions by Domain for Matched Pairs

In Table 20 there are more Medicine participant propositions to Actions/Artefacts and to Attitudes/Values from other domains than would be expected with an 8:3 ratio, while there are more Occupational Therapy participant propositions from other domains to Thinking/Knowing and to and from Emotions/Feelings and Beliefs than would be expected with a 3:8 ratio. In the matched pair tables, the ratios might be expected to be 1:1 if there are similar frequencies of linking between domains by participants in both disciplines. Table 22 suggests that some differences between the two groups persist. There are more propositions from Beliefs and to Emotions/feelings for the Occupational Therapy participants and more propositions linking other domains to Actions/artefacts and to Attitudes/values for the Medicine participants. This suggests differences between participants from the two disciplines in the perceived importance and direction of some inter-domain connections.

Domain name word	Frequency Medicine	Frequency Occupational Therapy
feelings	35	21
actions	34	15
artefacts	34	13
thinking	33	19
attitude, attitudes	32	13
beliefs	29	16
emotions	28	13
Values	23	7
Knowing	22	4

Table 23: Domain Name Use Frequencies for Matched Pairs

Table 23 compares the frequencies of use of domain name words by participants in the matched pairs from the two disciplines. It shows that use of domain name words is more evenly spread amongst the Medicine group, even allowing for the greater frequencies in total, and some differences in the most frequently mentioned domain names are evident. These differences generally align with the differences in the frequencies of propositions within, to and from domains noted in the previous tables, but they also show that "knowing" and "values" are words more commonly used amongst the Medicine group. As well as these differences in the

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use of domain names, differences in the frequency of all words used within the propositions between the matched pairs were also found. As shown in Table 24, linking words account for all five of the Medicine group's most frequently used words, while words for concepts, especially related to self, are most frequent for the Occupational Therapy group.

Discipline	Five most frequently used words (frequency)
Medicine	Influences (22), affects (16), changes (12), linked (10), can (8)
Occupational Therapy	I (16), self (9), my (8), doing (6), soul (6), students (6)

Table 24: Five Most Frequently Used Words for Matched Pairs

This concludes the analysis of the proposition text. The following section documents the findings from analysis of the annotations, a much larger body of text.

Annotation analysis

This section includes the result of several different analyses of the annotations, including frequency analyses of the number of annotations made, the words used in them and comparisons between the two participant groups. The results of the analysis of the annotation content conclude this section.

Annotation frequency analyses

The following tables show the total number of annotations attached to the propositions linking the different domains for each of maps 1, 2 and 3, and the number of participants who included annotations to specific links in each of the three maps.

Key for Tables 25 and 26

Map 1 Black (total 11 maps); Map 2 Red (total 9 maps); Map 3 Blue (total 9 maps)

Links To: From:	Thinking/ Knowing	Emotions/ Feelings	Actions/ Artefacts	Attitudes/ Values	Beliefs	Other concepts	Total annotations to links from
Thinking/ Knowing	5, 3, 5	6, 3, 2	3, 1, 1	5, 6, 4	3, 2, 0	1, 4, 1	23, 19, 13
Emotions/ Feelings	5, 4, 3	7, 7, 8	7, 7, 5	4, 5, 3	1, 1, 0	2, 4, 3	26, 28, 22
Actions/ Artefacts	8, 3, 4	3, 5, 1	1, 2, 0	7, 8, 2	1, 0, 0	4, 1, 4	24, 19, 11
Attitudes/ Values	2, 4, 2	2, 1, 5	6, 5, 5	2, 2, 1	2, 3, 1	5, 4, 0	19, 19, 14
Beliefs	4, 2, 5	4, 4, 5	1, 0, 2	4, 3, 4	2, 4, 2	4, 1, 1	19, 14, 19
Other concepts	2, 0, 0	0, 0, 0	0, 0, 0	0, 0, 2	0, 0, 1	10, 7, 3	12, 7, 6
Total annotations to links to	26,16,19	22,20,21	18,15,13	22,24,16	9,10,4	26,21,12	123,106, 85

Table 25: Number of Annotations Attached to Propositions by Domain

Table 25 shows that there was a general decline in the number of annotations between the first and third maps, even accounting for the smaller number of second and third maps collected. Despite the decline, annotations to links to and from emotions/feeling and from beliefs were more sustained across the mapping period.

Links To/ From	Thinking/ Knowing	Emotions/ Feelings	Actions/ Artefacts	Attitudes/ Values	Beliefs	Other concepts
Thinking/ Knowing	3, 2, 5	5, 3, 2	2, 1, 1	5, 6, 4	3, 2, 0	1, 3, 2
Emotions/ Feelings	4, 3, 3	3, 4, 5	4, 3, 3	4, 4, 3	1, 1, 0	2, 3, 3
Actions/ Artefacts	4, 3, 3	3, 3, 1	1, 2, 0	5, 6, 2	1, 0, 0	2, 1, 3
Attitudes/ Values	1, 4, 2	1, 1, 4	3, 4, 5	2, 2, 1	2, 3, 1	2, 2, 0
Beliefs	3, 2, 4	2, 4, 5	1, 0, 2	3, 3, 4	2, 3, 2	3, 1, 1
Other concepts	1, 0, 0	0, 1, 0	0, 0, 0	3, 0, 1	1, 2, 1	1, 2, 2

Table 26: Number of Participants Annotating Links between Domains

The results of the analysis of the number of individual participants' maps including annotations to links seen in Table 26 shows a similar pattern, with more participants annotating links to Attitudes/values in the first two maps and more participants annotating links to Emotions/feelings, to Thinking/knowing and from Beliefs in the third map.

The following two tables show the overall frequencies of annotation for individual participants, and a comparison between disciplines of the number of annotations made using the same matched pairs as above.

Participant	Number of annotations
Claire	41
Liz	38
Sarah-Jane	38
Shelly	33
Jane	30
Mary	30
Leah	25
Taro	25
Anna	19
Marble Rose	19
Adele	18

Table 27: Number of Annotations by Participant

The frequency of annotations in Table 27 shows a different distribution amongst the participants from the frequency of propositions in Table 19, although those who made fewer propositions tended to annotate more of them than those who produced more propositions.

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Key to Table 28

Black = Medicine, Red = Occupational Therapy

Links To: From:	Thinking/ Knowing	Emotions/ Feelings	Actions/ Artefacts	Attitudes/ Values	Beliefs	Other concepts	Total annotations to links from
Thinking/ Knowing	4, 2	5, 0	1, 1	8, 2	4, 0	1, 3	23, 8
Emotions/ Feelings	5, 2	9, 6	3, 10	3, 4	0, 0	3, 4	23, 26
Actions/ Artefacts	3, 3	1, 0	1, 0	7, 4	0, 0	0, 2	12, 9
Attitudes/ Values	2, 4	3, 3	7, 3	1, 0	1, 3	2, 0	16, 13
Beliefs	4, 6	2, 4	1, 0	4, 3	0, 5	2, 0	13, 18
Total annotations to links to	18, 17	20, 13	13, 14	23, 13	5, 8	8, 9	87, 74

Table 28: Number of Annotations by Matched Pairs of Participants

Matched pairs analysis confirms that annotations to links to and from Emotions/feelings are most common but there are differences between the Medicine and Occupational Therapy participants in the distribution of annotations.

Overall, these analyses suggest that across the whole group of participants more annotations were likely to be made to links to and from Emotions/feelings, but that more individual participants made annotations to links to Attitudes/values. These findings may reflect the ease with which participants were able to recall specific situations in which these connections were identified and therefore the significance of learning that affects these domains, or the impact of experiences in prompting connections or changes to them. They may also reflect the ease with which the connections between particular domains are integrated, suggesting perhaps that Emotions/feelings are more easily linked to situations involving the other domains of learning and Attitudes/values more often perceived as an outcome of situations producing learning in other domains rather than as an initiator.

While the matched pairs analysis confirmed the frequency of annotations overall, Occupational Therapy participants made more annotations to links to and from Beliefs, while Medicine participants made more annotations to links from Thinking/knowing and to Emotions/feelings or Attitudes/values. This correlates with differences between the two

disciplinary groups in the number of propositions made between the different domains. These differences may relate to how participants from the two disciplines perceive the influence of their experiences on connections between domains, but also the degree to which the domains are integrated. Thinking/knowing may be seen to be a more important initiator of situational influence on other domains by Medicine participants, while Emotions/feelings and Attitudes/values are more of a response or outcome in these situations. For Occupational Therapy participants' situated experiences were more often linked to influences both on and from their beliefs.

Word frequencies in annotations

Tables 29 and 30 on the following page show the most frequently used words (used more than twenty times by at least two participants) and the most frequently used domain name words found in the annotations as analysed using NVivo 10®. When compared with words used most often in the propositions (Tables 14 and 16), the domain names were used similarly often, as were words like clinical and knowledge. Again, feelings were of significance to the participants. Many other words such as patients, clients, work, students and supervisors were used frequently in the annotations but not in the propositions. The high frequency of the word "learn" is to be expected since the focus question for the maps specifically asked about clinical learning.

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Word/s	Frequency
learn, learned, learning	113
patient/s, patients'	98
clinic/s, clinical, clinically	74
Good	64
influence/s, influenced	62
work/s, worked, working, time/s	58
experience/s	55
student/s	52
knowledge, knowledgeable	51
get/s, getting	48
supervisor/s	42
change/s, changed, changing, example/s	41
like, likely, liking, one/s, one's	39
situation/s	38
consult, consultant/s, consultation, affect/ed/ing/s	36
reflect/ed/ing/s, reflection, reflective	36
help/s, helped, helping, people, peoples'	36
placement/s, self	35
day/s, take/s, taking, professional/ism/s	34
client/s, thing/s	32
positive, positively, positivity, doctor/s	31
observant, observation/s, observe/d/r, observing	31
ask/s, asked, asking, make/s, making	30
run, towards, want/s, wanted, wanting	30
need/s, needed, really, tried, try, trying	29
person, personal, personalities, personality	29
way/s, often	28
question/s, questioning	27
relationship/s, something	26
Always	25
also, teach, teaching, year/s	24
shape/s, shaped, confidence, confident, may	23
come/s, coming, lead/s, made, well, wellness	22
stress, stressed, stressful	22
give/s, giving, health, team, pressure, pressured	21

Table 29: Most Frequently Used Words for Annotations

Word/s	Frequency
feel, feeling, feelings, feels, felt	161
think, thinking	96
attitude, attitudes	85
belief, beliefs	53
know, knowing	33
value, valued, values	30
thought, thoughts	24
action, actions	22
believe, believed	21
emotion, emotional, emotionally, emotions	19

Table 30: Most Frequently Used Domain Name Words for Annotations

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Since these word frequency analyses involved much larger amounts of text than the propositions, words of less than three letters were excluded. This meant that words indicating the degree of personal involvement with experiences such as I, me and my, were not included in the word frequency tables; therefore, as an adjunct to the analysis of the annotations and as an indicator of personal engagement with the annotated experiences, words identifying who the experience actually or theoretically happened to were also analysed using NVivo 10®. These words, which included personal pronouns and possessives, were divided into six categories ordered from most to least subjective to indicate the degree of personal ownership of the experience. The six categories were: subjective first person (I, me, my) e.g. "I found that I reacted to …"; subjective second person (you, your) e.g. "You find yourself thinking…"; subjective first person plural referring to students (we, us, our) e.g. "We are taught to…"; subjective first person plural referring to any group of health professionals, discipline or team (we, us, our) e.g. "As occupational therapists we are expected to…"; objective third person specific referring to people identified with, usually as ideals (the student, the doctor, a person) e.g. "The doctor who wants to appear professional…"; objective third person non-specific (he/she, his/her, they, their) e.g. "Their attitudes in this situation reflect…". Table 31 shows how these words were used by the different participants.

Words Participant	I, me, my	You, your, yourself	We, us, our (as students)	We, us, our (as health professionals)	The doctor, the OT, a person	He, she, they, his, her, their
Adele	40	34	2	1	4	3
Anna	10	28	0	0	3	2
Claire	242	6	1	0	5	3
Jane	215	3	66	0	3	0
Leah	127	0	0	0	0	1
Liz	162	32	9	10	2	0
Marble Rose	18	2	0	19	4	0
Mary	44	0	0	3	0	7
Sarah-Jane	31	20	3	12	8	4
Shelly	118	13	7	0	2	0
Taro M	8	4	4	0	1	3

Table 31: Participants' Use of More and Less Subjective Personal Pronouns

This table shows noticeable differences between participants in the use of these words, suggesting that Claire, Jane, Leah, Liz and Shelly have engaged much more subjectively as individuals with their experiences than other participants. Marble Rose appears to have related her experiences equally to a subjective professional identity and to a personal one. Sarah-Jane, Adele, Mary, Anna and Taro M show equal or more frequent use of second and third person pronouns compared with their use of I, me and my, suggesting a degree of distancing from some experiences. The annotations of some of the Medicine participants frequently

reported either hypothetical experiences or what the participant imagined others in the situation thought, felt or believed. Three of these participants included annotations that did not identify an experience but were instead statements of opinion or belief, suggesting that the connection made was theoretical or that their own experiences were distanced from it.

This concludes the numerical pattern analysis of the annotations. In the final subsection of this chapter, the results of the analysis of the annotations are described.

Annotation analysis

The participants' mapped propositions are responses to a focus question about connections they perceive to exist between the domains of clinical learning. In their annotations participants were asked to describe specific clinical learning situations that illustrated these propositions. As noted in the methodology and methods chapters, this allowed the participants to explain and contextualise the propositions and add personally relevant text about their learning and reflection on it. As a single document of around thirty pages the annotation set was dense rather than long. While many of the 20-40 annotations made by each participant were single sentences, about a third were longer, particularly those recalling difficult or complex situations. After multiple readings it became clear that two different things were documented in the annotations; a description of the experience including where, who and what was involved, and an interpretation reflecting on why this situation related to the proposition between domains or concepts. On this basis it is appropriate to treat the data as two distinct sets; the first containing the types of experiences or contexts, and the second the critical elements of experiences related to the propositions between domains and concepts. It was easy to separately identify these within the annotations and hopefully the examples used to illustrate the two sets make this apparent.

As described in the methodology and method sections, these findings are presented as diagrams. This gives the visual impression of sets containing all the different types of participant experience and the critical elements related to connections between domains. Textual and numerical aspects of the annotations are represented in a single interpretation. In Figures 16 and 17 the title is the name of the whole set and each circle represents a category within it. The size and overlaps of the circles approximate how often a category was represented and how often categories were found in annotations together. This provides a scale of measurement that assists clarification of meaning (Tufte, 2006). The overlapping relationships between different types and elements of experiences reflect a systems theory integrated approach to the part-whole nature of the phenomenon of clinical learning (Bateson 1979/2002).

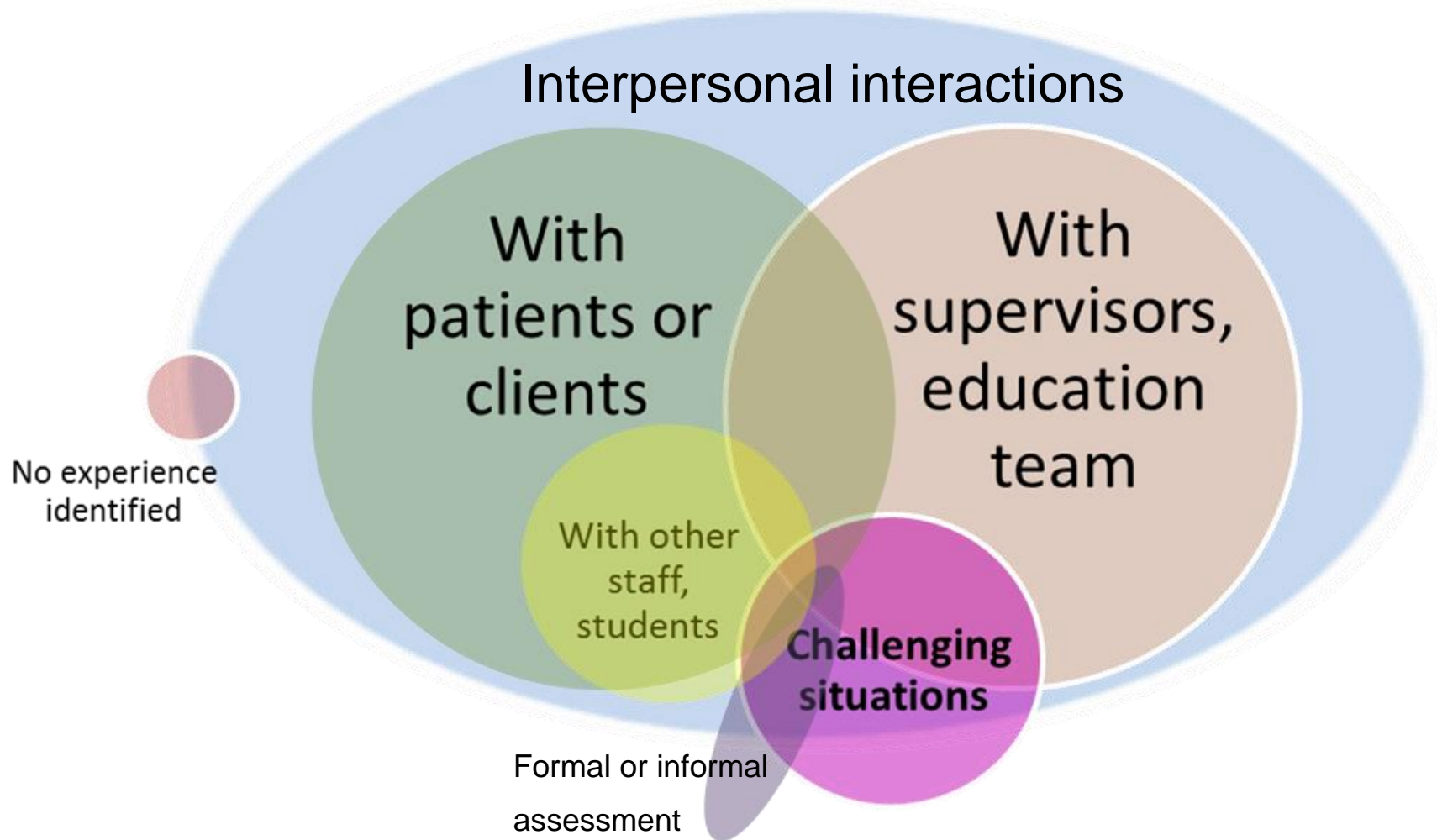Interpersonal interactions

With patients or clients

With supervisors, education team

No experience identified

With other staff, students

Challenging situations

Formal or informal assessment

Figure 16: The Who, What and Where of Clinical Learning

Data Analysis Findings

Set 1: types of experience

Interpersonal interactions, the "who" of clinical learning, were mentioned in almost all of the annotations, making it the single largest type of experience. Figure 16 shows quite clearly that in illustrating connections between domains with clinical learning experiences, interpersonal interactions with patients or clients and with supervisors and other members of the clinical education team such as consultants or registrars, were the predominant contextual categories. The overlapping and foreground/background relationships of the circles represents the observation that even though each experience type was identifiably distinct and many of the participants' annotations suggested only one context, others indicated concurrent experience types.

There was overlap of all three types of interaction used to illustrate the connections made in the propositions. For example, in Figure 16, the "Interpersonal Interactions with other staff and students" circle overlaps with all the other interpersonal interaction circles since this type of experience was most often noted in conjunction with interactions with either a person from the education team or patients or both. An example of an annotation that illustrates this would be:

> When I was taking a history the other day in front of a consultant and peers for a tutorial, I felt that my nervousness affected my ability to come up with the next question, and the next question. (Shelly 3)

On its own the proposition this was attached to, "Feelings – affect – Thinking", reveals very little about the exact nature of how feelings affect thinking for this participant, nor does it indicate that the feelings generated relate to both educators and other students. Diagrammatic expression of the overlaps helps to visualise the importance of such details. Annotations like this also reveal differences in participant awareness of the overlaps of the types of experience; in this particular annotation it would be very easy to almost miss the fact that the participant was also interacting with a patient who is mentioned only indirectly.

The other categories tend to describe "what" the situation included, while the physical "where" was often only a general indication or indirectly mentioned. Figure 16 shows that most of the "Challenging situations", which included any situation identified by the participant as stressful or thought-provoking, overlapped with an explicit or implied interpersonal interaction, especially "with supervisors or the education team". Such situations were often viewed positively by the participants, as documented by Adele. In her first map the proposition "Actions/artefacts – reflecting – Emotions/feelings" is annotated with:

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> I witnessed a situation where a patient had a cardiac arrest on the operating table. On reflection of this incident with the registrar, this really helped me to tune into the emotions that I was feeling. (Adele 1)

Overlapping interactions between "Challenging situations" and interactions "with clients or patients" or "with other staff or students" were less frequently mentioned but did occur. An example of this is found in Marble Rose's first map where she annotated the proposition "Emotions/feelings – pressure – integrity" with:

> When put under stressful situations, it is sometimes easy to make decisions based on ones' feelings and emotions. An OT working in an acute physical ward, given less than 30mins to make a decision and an intervention for a client who is about to be discharged. (Marble Rose 1)

The "No Experience" circle overlaps with "Interpersonal Interactions" because even annotations that were impersonal, indirect or did not describe a specific context often included the notion of interaction with patients, clients or the education team. An example of this is the annotation of the proposition "Thinking/knowing – changes – Attitudes/values" with:

> Increased knowledge about a certain topic for example health inequalities between ethnic groups in NZ will affect your attitudes when interacting with these patients and writing up case studies/assignments requiring personal reflection. (Anna 1)

While the "No Experience" category applied to a small percentage of most participants' annotations, three participants' annotations were categorised in this way much more frequently: Adele (40%), Sarah-Jane (24%) and Taro M (36%). Additionally, some of the remaining annotations of these three participants were quite non-specific, suggesting a less personal level of engagement. This is supported by these participants' more frequent use of less subjective personal pronouns (Table 31).

The "Formal or informal assessment" type of experience, which included any situation in which the participant was aware of being assessed, was often, although not always, a "Challenging situation". The annotation of Shelly noted on the previous page is an example of how informal assessment in an interpersonal context also constituted a "Challenging situation". All but one of the eight medicine participants included annotations in which formal assessment was identified as the type of experience, and four of these participants had three or more such annotations. Only one occupational therapy participant's annotations described formal assessment situations and, as with the medicine participants, these were attached to propositions linking thinking or actions with emotions and pressure. Annotations about formal

assessment rarely included an interpersonal interaction or specific challenging situation, while informal assessment experiences almost always overlapped with one or both of these.

One participant, Taro M, based his rather brief final map entirely on the formal assessment experience and included only two annotations, one of which was attached to a chain-style proposition "Approaching exams – change – Attitudes – towards – study – such as – order of topics". The annotation read "Depending on schedule of exams, size and difficulty of each topic, do easy topics on bad days", suggesting that the pending final year exams were an all-consuming pre-occupation that altered his attitudes and actions on a daily basis.

Perhaps predictably, the most detailed annotations included overlapping categories of experience of an interpersonal, challenging nature which illustrated propositions about relationships in the clinical learning environment. In categorising participants' experiences and testing the categories against the text it became very clear that there were some participants who were consistently very aware of these contextual overlaps while others were not. This awareness is illustrated by the following annotation about an experience linked to a proposition about thinking:

> I thought all the time, it was very exhausting. I had to not only come to terms with the clinical learning, I was constantly thinking about how to manage the clinical relationships with other staff members as each person had different expectations of students and you had to work out what each one thought in order to get on with them i.e. some would give you a lot of help and others saw you as not worth bothering with due to the student status. I felt I had to think all the time not only about the learning with clients but how to manage the student role with different people. (Jane 3)

In summary then, the set of categories or types of experience illustrates the primary significance for the participants of interpersonal interactions in the clinical environment, both as contexts for learning and as backgrounds to other sometimes simultaneously important contexts such as formal and informal assessment. The effect of this will become apparent in the next section.

Set 2: Critical elements of experiences

In seeking to identify distinct critical elements of the experiences in the annotations, I began by thinking of them as perceptions of what was most important to the participants about the types of experiences described in the first set. The propositions were crucial since each annotation was an attempt to illustrate a particular connection between two concepts and/or domains, and so it is perhaps fitting that five of the critical elements reflect processes

specifically related to one of the five domains: thinking/knowing, emotions/feelings, actions/artefacts, attitudes/values and beliefs. The sixth critical element emerged from the predominance of the interpersonal interaction experience category and the significance of relationships. The six critical elements are, in order of prevalence: Changing beliefs, values and attitudes; Building or negotiating relationships; Experiencing or transforming emotions; Altering actions or outcomes; Cementing or challenging theory or knowledge; Exposing or disrupting identity or sense of self. Figure 17 shows these critical elements of experience. The title "(Re)forming identity" and the three types of becoming are interpretations of the integrated meaning of all the critical elements.

As in Figure 16, the size of the circles and text reflect how often each critical element was represented in the annotations, and the positions and overlapping of the circles indicate variable awareness by the participants of more than one of the elements simultaneously. The two smaller circles should be viewed as sitting behind, not inside the larger ones, and as overlapping them, but not each other.
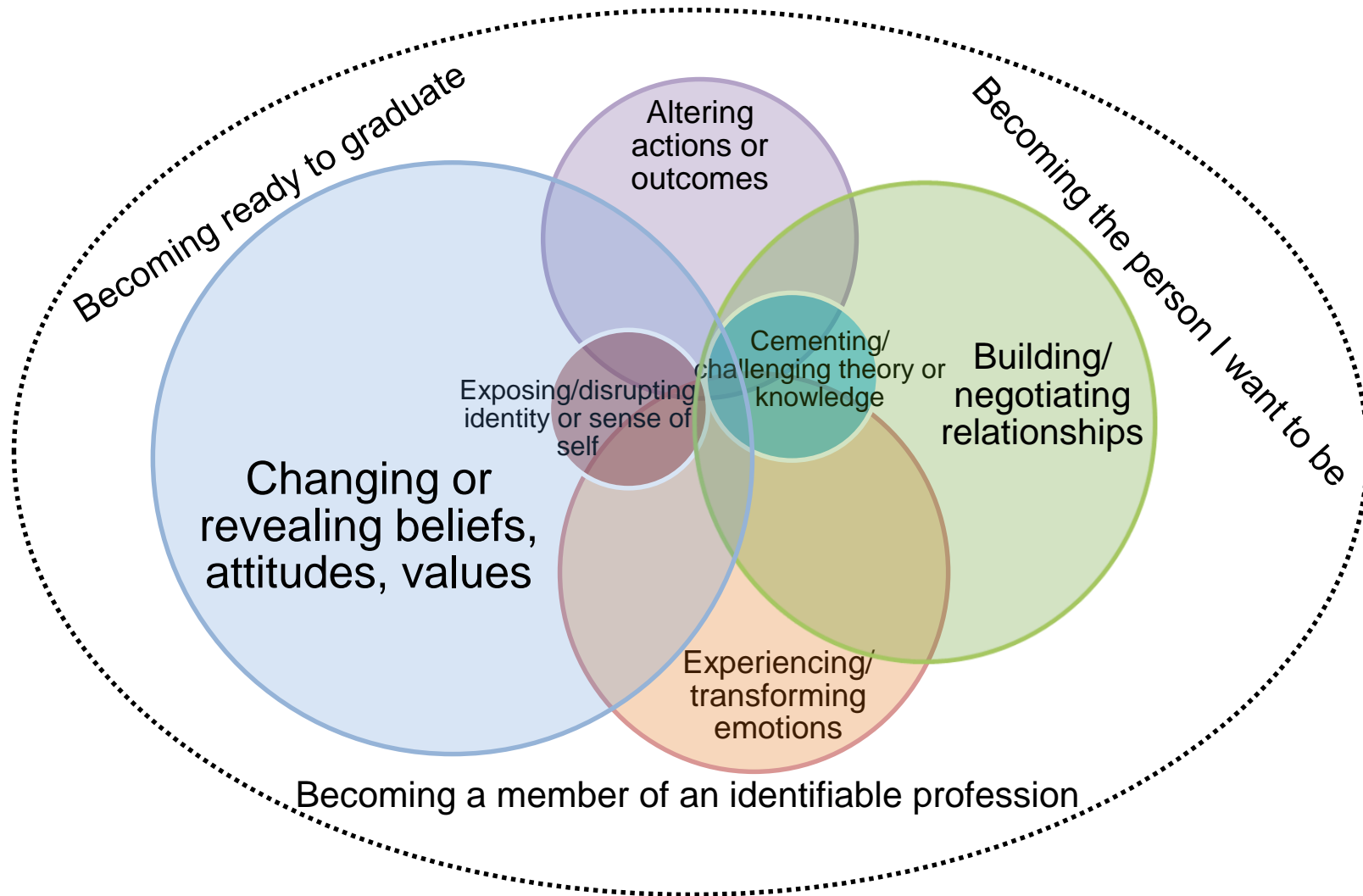
Figure 17: (Re)forming Identity

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The critical elements of the participants' perceptions of their proposition-related experiences were identified by seeking as few ways as possible to include all the material within the annotations. Preliminary critical element descriptions were revised to ensure that at least one could be identified in every annotation, and final categories were confirmed in collaborative discussion with my supervisors. Together we arrived at the title for the whole set and an improved name for one of the elements. An example of each critical element and an annotation that illustrates it follows:

Changing or revealing beliefs, attitudes, values: this critical element describes situations in which the participant was aware of either a change in, or the presence of, a new or pre-existing belief, value or attitude. This was the most frequently identifiable critical element, being recognised in 168 of the 316 annotations. An example of this is:

> I realised there was some degree of stigmatism within me when I had an HIV patient seen in clinic. (Shelly 3)

Building or negotiating relationships: annotations in which this critical element was identified include explicit or indirect reference to the need to build, negotiate, manage or maintain relationships with patients, clients, families, supervisors, members of the education team, staff members such as nurses, teachers or social workers, or other students. This element was recognised in 119 annotations and an example is:

> In group meetings I will behave in a politically correct way if my actions will affect my marks. (Claire 1)

Experiencing or transforming emotions: this critical element was identified as either the experiencing of specific feelings or the transformation of emotions or feelings as a result of the situation. Identified in 96 annotations, an example of this is:

> Turning up at ward round and being ignored and not acknowledged by the clinical team makes you feel small and insignificant as a student, and causes negative emotions and decreases self-esteem. (Anna 1)

Altering actions or outcomes: This critical element was the interpretation given to annotations in which participants noted actions, outcomes or both as the result of the situation described. Often associated with propositions linking Actions/artefacts with Emotions/feelings or Attitudes/values, this critical element was identified in 78 annotations and an example is:

> When a patient has an agenda or need, you help the patient out, they are happy and you feel good by doing a positive action. e.g. explaining how the heart works to an MI/ACS patient who has no idea and is very interested to learn. (Sarah-Jane 2)

Cementing or challenging theory or knowledge: Annotations including this critical element described the confirming, reinforcement, challenging or changing of existing knowledge or theory. There were 53 annotations in which this element was recognisable and an example is:

> Knowing about both cases changed my initial theory that this young boy would definitely survive, to this young boy has a 90% survival. (Mary 3)

Exposing or disrupting identity or sense of self: Some annotations appeared to be primarily about the participant's sense of identity or self and how this was exposed or disrupted by a particular situation. This element was found in 47 annotations and an example is:

> When a supervisor's attitude towards me is condescending or unwelcoming then this shapes my belief that I may not be welcome or that I am an annoyance. (Anna 1)

As these annotations demonstrate, each of the critical elements alone can completely describe some participant's perceptions of some of their clinical learning experiences, and this was how the final set of critical elements was arrived at. This was especially so for "Cementing and challenging theory or knowledge" which, for some participants, was the only critical element identified in experiences they recorded to illustrate propositions to and from the thinking/knowing domain. At the same time, as the diagram and extracts demonstrate, the boundaries between the critical elements are close. Claire's annotation about building relationships with the team suggests that this situation is also about attitudes and changes to actions, which were linked by the proposition this annotation was attached to. For most participants, there were some annotations of experiences in which two, three or even four critical elements could be identified. This provided evidence for a close, sometimes barely differentiated relationship between the critical elements, and for variability in the extent to which individual participants' annotations were characterised by more than one element.

Identification of more than one critical element in an annotation was explored further because it suggested that some participants' perceptions of their experiences were more integrated or holistic. Two critical elements were identified in 111 annotations; "Building or negotiating relationships" and "Changing or revealing beliefs, attitudes, values" was the most common combination. Other frequent combinations included "Altering actions or outcomes" or "Experiencing or transforming emotions". Table 32 shows all possible combinations of three critical elements and the associated participants. Duplicate combinations are greyed out. This

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table indicates that annotations in which three critical elements could be identified were not distributed evenly amongst participants. Taro M and Mary do not appear at all, and Anna, Adele, Leah, Marble Rose and Sarah-Jane feature less often than Claire, Jane, Liz and Shelly.

Elements identified in annotation	Cementing or challenging theory	Changing beliefs, attitudes, values	Exposing or disrupting identity or sense of self	Experiencing/ transforming emotions
Altering actions & Building relationships	Claire 1	Claire 14, Jane 2, Leah1, Liz 1, Shelly 1	Claire 1, Liz 1	Anna 1, Claire 9, Jane 2, Liz 1, Marble Rose 1, Shelly 2
Altering actions & Cementing/challenging theory		Adele 1	None	None
Altering actions & Changing beliefs, attitudes, values			Claire 2, Jane 1	Adele 2, Claire 10, Jane 3, Liz 1, Sarah-Jane 2
Altering actions & Exposing/disrupting identity				Claire 1, Jane 1
Building relationships & Cementing/challenging theory		Adele 1, Leah 1, Marble Rose 1	None	Jane 1, Shelly 1
Building relationships & Changing beliefs, attitudes, values			Claire 1, Jane 3, Liz 2, Shelly 1	Claire 8, Jane 5, Liz 1, Sarah-Jane 1
Building relationships & Exposing/disrupting identity				Anna 1, Claire 1, Jane 2
Cementing/challenging theory & Changing beliefs, attitudes, values			None	Adele 1, Marble Rose 3
Changing beliefs, attitudes, values & Exposing/disrupting identity				Claire 1, Jane 3, Liz 1

Table 32: Participant Annotations Including Three Critical Elements

Annotations in which three or more critical elements from different domains are identified appear to reflect more integrated processing of learning by some participants. Two examples of propositions with annotations including multiple critical elements follow:

Emotions/Feelings – influence your – Actions/Artefacts: My clinical experiences in (country) were full of contrasting emotions. It's a place of poverty, but also of hope. I learnt to pick the patients that I would try and intervene with carefully - for example, the young woman with terrible burns from an attempted suicide. I really wanted to do something to help her, but because I don't speak much (language), I was quite limited.

> I spoke to the consultant and tactfully asked about a psych referral for her. The next day more time was spent with her on ward round and she was referred to a psychiatrist. If I'd done that for every patient, my supervisors would've got sick of me criticising their methods of care. You have to check your emotions and choose your battles wisely. (Liz 2)

> Attitudes/Values – it's ok to get frustrated about things – frustration: You can't work with special needs children and not get frustrated e.g. I am working with a boy who has limited social skills and anger management issues and I believe that no matter how much I do with him at school, I know he has a dysfunctional home life which also influences his behaviour. As a result, I don't let the situation with his home environment frustrate me to the point that I would stop trying to help him. (Claire 3)

These demonstrate that integration of the critical elements of a learning experience produced depth of insight into thinking, actions and emotions, a sense of considerable personal and professional critical evaluation, and reflection about beliefs, values and attitudes. This may indicate the use of higher order capacities by some participants.

Integration of the *whole set* of critical elements is represented by the three statements of "Becoming", and summarised by the title of the diagram "(Re)forming Identity". When all the critical elements are considered together as an integrated process of ongoing change across the domains of thinking, feeling, acting, beliefs, values and attitudes against the background of relationships, they form the basis of becoming. This "Becoming" is an integrated being and doing (Barnett, 2009; 2011; Rees, 2010), but because the annotations are specific responses to a focus question by participants in specific clinical learning contexts, the becoming is also more specific. The annotations above each refer directly or indirectly to aspects of "Becoming the person I want to be", "Becoming a member of an identifiable profession" and "Becoming ready to graduate". These align with the frequent use of particular words such as "good" and "work" (see Table 29):

> Reflecting – influences – Professionalism: to be a good doctor you have to know your own weaknesses and strengths and in particular know what you need to work on e.g. I need to get better at making the patient feel like they are in good hands when I do an IV line. (Shelly 2)

In annotations including multiple critical elements, becoming was reflected in the forming and reforming of personal and professional identity through the daily clinical life of the participants. Created with matrix coding, Table 33 on the next page shows the cross relationships between the critical elements of becoming (Figure 17) and the contexts of clinical learning (Figure 16).

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Critical element	Altering actions or outcomes		Building or negotiating relationships		Cementing or challenging theory or knowledge		Changing or revealing beliefs, attitudes/values		Exposing or disrupting identity or sense of self		Experiencing/ transforming emotions		Totals		Total
Category of experience	Medicine	OT	Medicine	OT	Medicine	OT	Medicine	OT	Medicine	OT	Medicine	OT	Medicine	OT	
Challenging situations	3	5	3	8	1	3	14	10	5	5	15	9	41	40	81
Formal or informal assessment	6	4	4	1	7	0	10	3	1	0	12	2	40	10	50
Interacting with other staff, students	5	7	9	12	1	1	19	9	6	4	4	5	44	38	82
Interacting with patients, clients	12	15	13	19	14	6	35	18	3	2	13	12	90	72	162
Interacting with supervisors, team	12	8	33	16	7	5	27	13	11	7	13	6	103	55	158
No experience identified	1	0	0	1	5	3	9	1	2	1	4	1	21	7	28
Totals	39	39	62	57	35	18	114	54	28	19	61	35	339	222	561
Overall total	78		119		53		168		47		96				

Table 33: Numbers of Annotations Including Critical Elements by Types of Experience

Key to shading for Table 33:

Pink squares: 4 most common combinations and 3 largest totals for Medicine

Green squares: 4 most common combinations and 3 largest totals for Occupational Therapy

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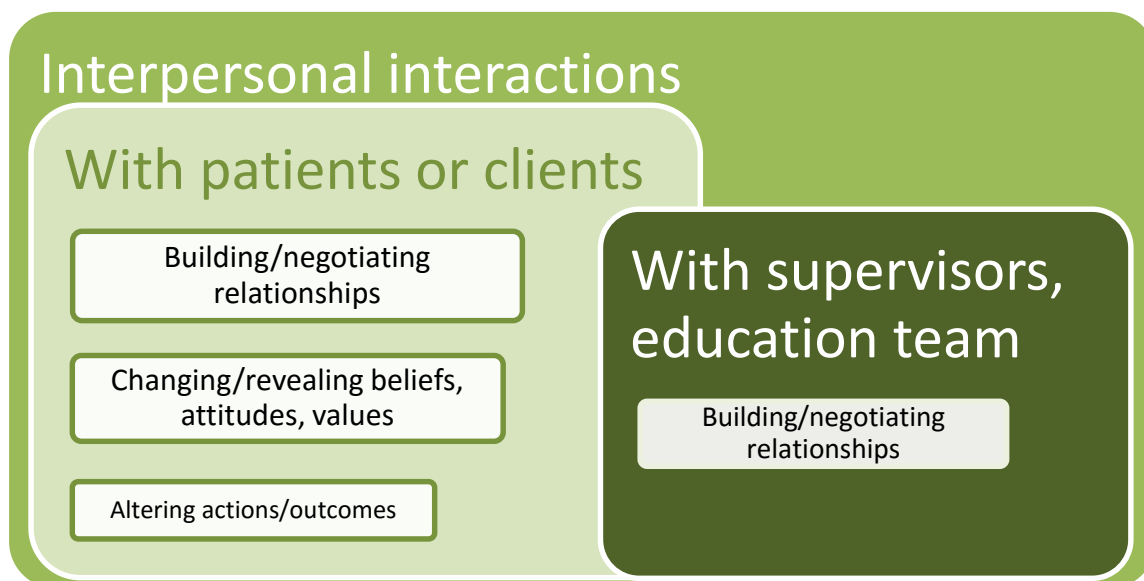
Integration of experiences and critical elements

While the division of findings into two sets makes interpretation easier, the participants' perceptions of their experiences were not recorded in this way, but as single texts. Examining the relationship between the types of experience and the critical elements across the whole set of annotations provides a way to reintegrate them and see differences between Medicine and Occupational Therapy participants. Overall, the cross relationships in Table 33 show that the most frequent combinations are "Interaction with patients or clients" and "Changing or revealing beliefs, attitudes, values" (53 occurrences) and "Interaction with supervisors, education team" and "Building or negotiating relationships" (49 occurrences).

The most frequently occurring combinations and the three highest totals for critical elements and types of experience for each disciplinary group suggest that there are similarities and differences. Occupational Therapy participant annotations were more likely to include the critical element of "Altering actions or outcomes" especially when interacting with patients or clients, which ties in with their use of the word "doing" in propositions (Table 24). Table 33 supports the strong link between the critical element "Changing beliefs, attitudes, values" and all interpersonal interactions for the Medicine participants but only those with patients or clients for the Occupational Therapy participants. This confirms the findings for matched pairs in Table 21 which records more propositions to Attitudes/values amongst the Medicine participants. Table 21 also shows that propositions to Actions/artefacts were more common for matched pairs of Medicine participants while propositions to emotions were more common for Occupational Therapy participants. Table 33 suggests the opposite for altering actions and experiencing emotions in the annotations. This highlights the difference between perceptions generated from experiences and the perhaps idealised conceptualisations found in the propositions.

Figure 18 on the next page shows the information found in Table 33 in an integrated visual way that highlights the importance of the types of experience and the critical elements for participants from each of the two disciplines. In the figure, the same colours have been used as in Table 33, and the size of the text boxes represents the numbers in the tables, thus giving an impression of the most important experiences and elements for each discipline.

Occupational therapy participants

Interpersonal interactions

With patients or clients

Building/negotiating relationships

Changing/revealing beliefs, attitudes, values

Altering actions/outcomes

With supervisors, education team

Building/negotiating relationships

Medicine participants

Interpersonal interactions

With supervisors, education team

Building/negotiating relationships

Changing/revealing beliefs, attitudes, values

With patients

Changing or revealing beliefs, attitudes, values

With other staff, students
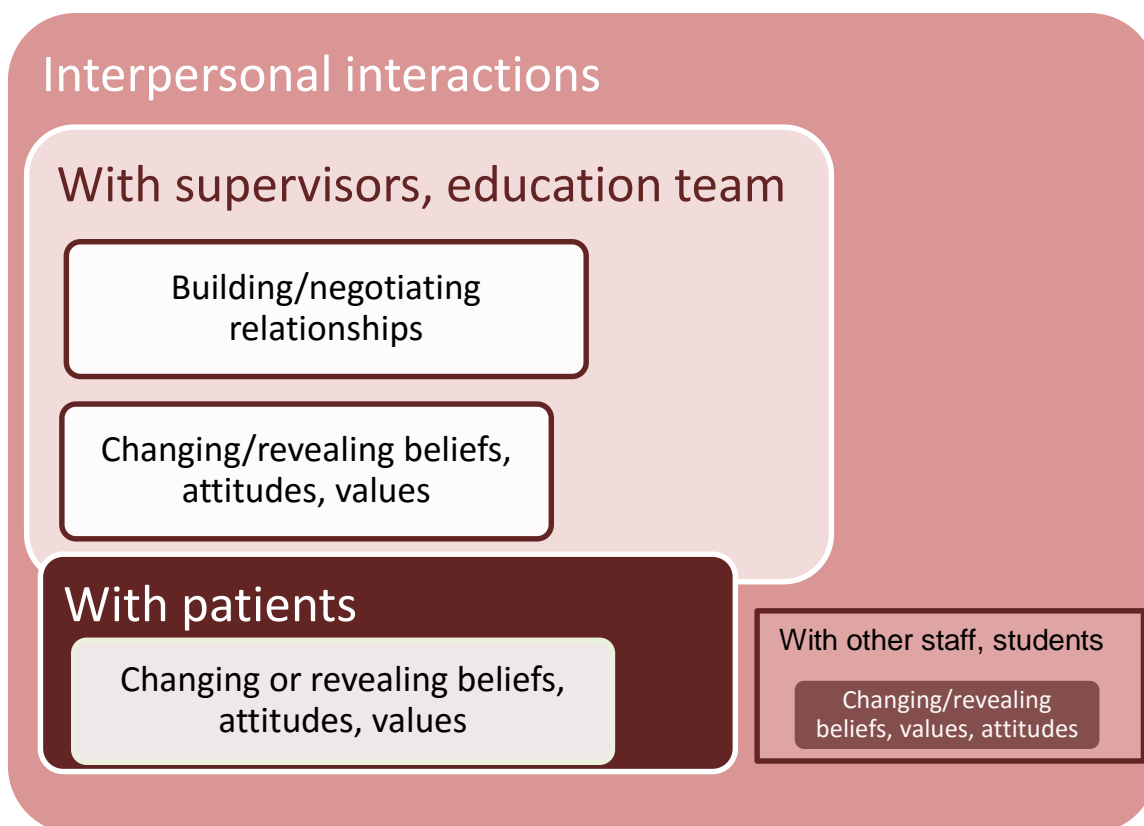
Changing/revealing beliefs, values, attitudes

Figure 18: Most Frequent Experiences and Critical Elements by Discipline

Data Analysis Findings

In this form it is easier to see that for the Occupational Therapy participants, interpersonal interactions with patients were of primary importance. "Building or negotiating relationships" was critical in these interactions and in those with their supervisors and the education team. "Changing beliefs, attitudes, values" was also an important element of their clinical learning. For the Medicine participants, interactions with supervisors and the education team were of primary importance, especially as the context for "Building or negotiating relationships". "Changing beliefs, attitudes, values" was overwhelmingly the most readily identifiable critical element, present across a wider range of interpersonal interactions including those with patients, other staff and students.

Figure 18 illustrates the overall integration of clinical learning contexts and critical elements in a holistic expression of what the connections between domains in clinical learning mean for each discipline; the particular emphases on relationships, beliefs, attitudes and values differ but "The Who, What and Where of Clinical Learning" is inseparable from the "How" process of identity formation and reformation. This whole integrated experience of clinical learning includes all the human and non-human contextual elements, the relationships within it and the internal and external processes that make it a multi-faceted, dynamic, complex, experience. Such a description is similar to Esbjörn-Hargens' (2010) description of integral pluralism as a who, what, and how enacted relationship that explains ontologically complex phenomena. Figures 16, 17 and 18 suggest that clinical learning is experienced as this kind of dynamic pluralistic relationship as a result of individual and disciplinary difference in awareness of the integration of domains and contexts.

Participant evaluations of modified concept mapping

This section concludes the findings from the study. It reports on nine participants' evaluations of the study completed at the conclusion of mapping. The number of participants is small, making statistical analysis inappropriate, but the evaluations do give some indication of the ease of use, convenience and learning utility of the modified mapping tool. The evaluation form included four questions and the individual responses to each are presented as raw data, which is then evaluated.

Question 1: Evaluation of ease of use on scale of 1 (difficult) to 5 (easy)

Responses:

Claire: 4. I don't really like using mind maps and as a rule never used them during my studies however managed to grasp the concept much more easily with an electronic version and found the software very easy to work with.

Jane: 2. I chose 2-somewhat difficult to use- as although some features were easy to apply e.g. the annotation boxes, the lines with arrows on were harder to figure out. I also forgot between C-maps how to use the tools and found that frustrating as it was not easy to access the information again and I just wanted it to be clear and easy.

Leah: 4. I was confused initially about how to use the mapping tool but when reading the instructions it was easy to use.

Liz: 2. I can see the value in the mind-mapping tool, but for me it wasn't that intuitive to use.

Marble Rose: 4. No comments

Mary: 4. It was a bit tricky figuring it out initially.

Sarah-Jane: 5. It becomes easy to use after getting used to all the controls. And using it was pretty self-explanatory, so did not need to read any instruction manual etc.

Shelly: 1. It was difficult to use because it took so long to come up with boxes etc. that it was difficult to do the next part of linking these ideas which meant that often you lost your train of thought and that is not how I feel a brainstorm of just dumping down your ideas should be like. And the difficulty meant that I was less likely to think about the links etc. properly.

Taro M: 4. Mostly intuitive, once learned the basics then it was very easy.

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Evaluation

Ease of use of the modified tool appears to have varied, with many participants initially experiencing difficulty but most reporting subsequent ease of use. Jane, Liz and Shelly noted a negative effect of these difficulties on the degree to which they felt able to express themselves. This suggests that familiarisation is important so that using the tool does not interfere with the process of making connections. Comments made by Claire, Liz and Shelly suggest that their perception was that the modified mapping was a form of mind-mapping, which would be associated with particular interpretations of use. This may have restricted participants' interpretations of how the modified tool was intended to be used or what the focus question was asking them to do.

Question 2: Evaluation of convenience of use on scale of 1 (inconvenient) to 5 (convenient)

Responses:

Claire: 5. The more I used the tool the easier it became and I was able to construct a map from the convenience of my own home whenever the mood took me and make editing changes as I went along.

Jane: 2. I chose 2 again. Mainly because the annotation boxes were so small and made it difficult to edit and read what I was writing. Also although I was aware there were lots of features I could have used i.e. different thickness of lines and colours, I only bothered to do that once as always felt they took me too long. I was never sure what was important, the way I configured my map (which to be honest I did not alter much on the 3rd effort, I just changed the annotation boxes) or what I wrote in the boxes.

Leah: 5. I found it very convenient to use three times as it was easy to use with practice.

Liz: 4. Once I'd got my head round how to use it, it was fairly straightforward to produce a map each time. However, I never really felt that my views and experiences were accurately represented using the tool and I would have preferred to write three essays.

Marble Rose: 4. No comments

Mary: 5. It's got a lot easier after the first time.

Sarah-Jane: 5. It is convenient to use because I always had access to a computer. There is no lag, which makes work very efficient.

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Shelly: 2. It did get easier as you went on but I would have preferred doing a linking activity by hand on a large piece of paper. It was very difficult the first time, quite difficult the second time and then the third time was fairly easy.

Taro M: 4. Repeated use did not really improve ease of use, already max efficiency after first time. Not 5 because some aspects of design could be made smoother.

Evaluation

While most participants found the tool quite convenient to use, Jane and Shelly did not, and Shelly and Liz both mentioned that they would have preferred other forms of mapping or writing. This suggests that convenience does not compensate for a lack of engagement with the modified mapping which may be perceived as a particular type of unappealing learning tool. All three of these participants wrote numerous or extensive annotations supporting this self-evaluation of a preference for other modes of communication. Although the mapping process appeared to become easier, this did not translate into more complex or higher scoring second or third maps suggesting that ease of use will not necessarily improve engagement with the process. This may be a result of other factors pressuring participants to complete maps quickly, or of familiarity with the tool creating a normalised way of using it. Several comments suggest that while relatively easy to use, the tool has some restrictive elements, particularly the annotation boxes and the limited personalisation.

Question 3: Evaluation of learning in each domain (thinking/knowing, beliefs, emotions/feelings, attitudes/values, actions/artefacts) using concept mapping on a scale of 1 (definitely unhelpful) to 5 (definitely helpful)

Responses:

Domain Participant	Thinking/ knowing	Emotions/ feelings	Actions/ artefacts	Attitudes/ values	Beliefs
Claire	5	5	5	5	5
Jane	5			5	5
Leah	4	4	3	4	3
Liz	3	4	3	4	3
Marble Rose	4	4	4	4	5
Mary	4	4	4	5	5
Sarah-Jane	4	4	3	4	4
Shelley	3	4	3	4	4
Taro M	4	3	3	3	3

Table 34: Evaluation of Learning with Concept Mapping by Domain

Data Analysis Findings

Evaluation

While most participants found the tool somewhat or definitely helpful for learning in at least one area, the responses were generally less positive for the Actions/artefacts domain and more positive for the Attitudes/values and Emotions/feelings domains. This may be related to a focus on these aspects by the participants or their programs, or to the degree of integration of the different areas of learning, or to greater awareness of some areas at the expense of others. The Occupational Therapy participants (Claire, Jane and Marble Rose) generally rated the usefulness of the tool for learning higher than the Medicine participants, particularly in the Beliefs domain. This may reflect individual or disciplinary contextual and learning and teaching differences.

Question 4: Comments on value or otherwise of the concept-mapping tool as an aid to learning, and ideas for improvements.

Claire: Over the period of the study I realised I wanted to add more to the annotations boxes as it became easier for me to explain what I was thinking. I am not sure whether that was because my clinical reasoning skills were improving or I was becoming more familiar with the C-map concept but the activity certainly became more pleasurable and I learned more about myself during the latter stages of the study.

Jane: The mapping clarified for me that I do not want to work within DHBs which was a major realisation and breakthrough. This was because it (mapping) gave me an opportunity to examine what happened to me during my clinical placements with regards to the learning I achieved and how the supervision process impacted on that. It took until the 3rd map to realise fully that my values and beliefs just do not fit within that system and I am grateful to the maps as think I may still be struggling to fit in there if I had not done this. The only improvement I can think of is to have the key to symbols come up on the same page as the map so I could refer to it easily all the time.

Leah: Doing the study map has made me think about how I evaluate my clinical placements and what actually influences my actions and what I really believe and how this interacts with my experiences. It was also helpful to have subject titles to work with as I am a person who finds it hard to come up with these myself!

Liz: Although concept-mapping didn't really work for me, I did find it a useful tool for forcing me to review my clinical teaching and learning and critically appraise its quality, along with my attitudes. The review process helped me identify areas where, as a learner, I could better my

performance in future. It also helped me put some of the challenges that we face as medical students into perspective.

Marble Rose: No comments

Mary: I think it is a valuable tool. I do mind maps for studying as I am a visual learner so concept maps seemed to me like an advancement on from mind maps. I like doing them too. They would be difficult to use in terms of drug names etc. of which there is a lot but good for clinical based work.

Sarah-Jane: C-map is a good tool for mind-mapping, makes mind-mapping very easy. Mind-mapping may help stimulate reflection in terms of those who do not habitually reflect, help these people connect different ideas and get a better understand of the inter-relationships between these concepts. However (personal opinion), less benefit is gained for those who already habitually reflect and have clear insight, as the concepts and principles are already clear in their minds.

Shelly: I think it would be nice if we did it on paper and then could mail it to you in the post. I think that it was difficult using the computer system so much that it really affected the links between concepts and even when you thought of a different idea it was difficult to move/shift around.

Taro M: I would like to explain that I checked no effect for 4 categories above because I have already undergone similar mental evaluation processes in the past (not in any official capacity). I believe concept mapping may be more useful to someone who has not been exposed to such things before. I think it would be a great tool to track mental development in senior high school students and undergraduate university students as they undergo self-discovery and reach mental maturity. In those age groups it would stimulate more self-reflection and if it was monitored over several years it would produce marked results.

Evaluation

These comments suggest that modified mapping was of some or significant value for most of the participants. The participants who found the mapping valuable (Claire, Jane, Leah, Liz, Mary) reported using it to assess their clinical learning and identified personal engagement with the process as affecting them significantly. Of the participants who found the process less valuable, Shelly noted that the restrictions of the tool interfered with the process of making connections; despite this she consistently produced quite well integrated maps and annotations. Sarah-Jane and Taro M implied that they already engaged in mental processes that they perceived to be the same and therefore did not find the modified mapping valuable.

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Data Analysis Findings

It is interesting to speculate whether those who found the modified mapping more valuable were more perceptive of what it afforded or less restricted by previous experiences with mapping or perceptions of what clinical learning is about, and whether this relates to personal, experiential or disciplinary differences. Comparing these comments with the findings from the maps, depth of integration between domains and a view of learning as a process of personal change appears to correlate with finding the mapping valuable, while more superficial, impersonal views of learning correlate with less value attributed to the process.

What this study cannot answer is the extent to which modified mapping created depth of engagement with integrated learning or made existing depth visible. From the evaluations and analysis, it appears that modified mapping encouraged depth of engagement and critical evaluation of experience for some participants even if the tool was not easy to use or would not be their preferred method. Evaluations of the usefulness of the mapping suggest that motivation and personal insight may be the most important factors in this engagement; a lack of perceived value may be related less to the affordances or otherwise of the tool used than to the personal capacity or willingness to connect epistemological challenges to ontological ones.

Using Learning Style Survey testing, Kostovich et al. (2007) concluded that learning style was not a significant factor in aptitude for traditional concept mapping and that in fact there appeared to be some benefit when students were forced to use a tool that did not align with their preferred styles. The evaluations from my study provide some support for these findings although summatively assessed scored maps of knowledge are very different from self-assessments of integrated learning. It appears likely that neither mapping aptitude nor learning style preferences alone is sufficient to determine engagement with the modified mapping process.

Conclusion

The evaluations from my study align with the findings of Pudelko et al. (2012) who note that in the majority of recent concept mapping studies with healthcare profession students, most did not like concept mapping, although many still found it effective as a learning tool. The most important factor in this dislike was the time-consuming nature of concept-mapping rather than any inherent learning style preferences. Students working in the clinical learning environment are often time-poor; the workload of required clinical hours and assessments, personal issues and travel all contribute to student perceptions of stressful or less than ideal placement experiences (Hamshire, Willgoss, & Wibberly, 2013). Over half of those interviewed by

Data Analysis Findings

Hamshire et al. (2013) felt they had insufficient time with their mentor or leader, irrespective of whether the relationship had been a positive and negative influence on their experience.

Modified concept-mapping may be an effective tool for the self-assessment of integrated learning and its relationship to beliefs, values and attitudes in the clinical learning environment; however, unless more systemic problems around the allocation of adequate clinical learning time to less measurable aspects of the curriculum such as mentoring relationships and self-evaluation are addressed, such tools are unlikely to be well-received. The time-rich nature of engagement with modified concept mapping may assist personal change and growth, but this is unlikely to endear itself to either students or educators when the blunt end of the clinical year is a raft of competency-based theoretical and practical assessments.

Chapter Seven: Discussion Part One

Introduction

The discussion of the findings spans three chapters which cover: a discussion of Figures 16, 17 and 18 and what they suggest about integrated clinical learning and access to clinical wisdom; a theoretical model of access to clinical wisdom; and a discussion of modified concept mapping as a data gathering tool.

In this first chapter the three diagrams are discussed through the lens of the theoretical approaches informing them to suggest that integration of the domains of clinical learning may be linked to accessing clinical wisdom. The contexts and critical elements of Figures 16, 17 and 18 represent the analysis and interpretation of the patterns and relationships between all the textual elements of the maps. These diagrams summarise my interpretation of the participants' varying awareness of integration in clinical learning experiences. In conjunction with the structural analysis of the maps as diagrams, a more integrated visual-verbal interpretation of the participants' ways of experiencing clinical learning is gained. This provides a fuller, more synergistic picture of the being and becoming aspects of clinical learning as experienced by the participants. This thesis claims that person-centred clinical education needs to fully integrate the minds, characters, bodies and souls of clients/patients, practitioners, educators and students and the systems they are embedded in. Integration of some elements is already recognised as central to effective practice and associated with clinical wisdom and professional becoming (Barnett, 2009; Bishop & Rees, 2007; Coulehan, 2005; Marcum, 2009; Peabody, 1930), but this is incomplete.

This chapter argues that clinical education aimed at increasing access to clinical wisdom must go beyond fostering personal and professional growth in each learning domain to focus on the development of integrated becoming and a coherent personal, professional and graduating student identity. This reflects the researcher's position on the nature of whole-person being and becoming and will require educators who understand the processes of embodied identity formation and how dialogue, interpersonal interaction and institutional processes shape these (Monrouxe, 2010). They will also need to engage in fully person-centred critical inquiry into disciplinary and personal values and beliefs and their own patterns of being and becoming as teacher-learners, modelling an integrated approach as a guide through the unpredictable challenges of clinical practice (Donetto, 2012; Ursel & Aquino-Russell, 2010). This integration will need to span clinical teaching, learning and assessment.

Discussion Part One

In the second discussion chapter, the study findings are used to support a theoretical model of soul-mediated access to clinical wisdom based on integration of the domains of learning and a theory-based view of soul function. As outlined in the researcher's position and literature review sections, this thesis takes a theistic, realist systems-theory informed view of clinical wisdom as a complex external resource, and an integrative dualist view of the soul as part of a soul-mind-body unity, experienced as a seamless physical and non-physical inner self or "me" (Goetz & Taliaferro, 2011). From the researcher's perspective (informed by systems theory, embodied phenomenological and integrative dualist thinking) all interactions between and within the complex systems of clinical learning, including all learning contexts and whole-persons, are unique, interdependent and dynamic. This means that nothing is repeatable or predictable, so individual systems must have internal integrating and self-regulating functions to make interdependent existence possible (Bateson, 1972/2000; Capra, 2007). This is the proposed function of the soul which is underpinned by the theorising of clinical wisdom as an external accessible entity and the soul as a functional mediator of this access.

As noted in the introduction to this thesis, the intended aim of the study was to use longitudinal reflexive self-ethnographic self-assessment to gather students' perceptions of connections and perhaps gain insight into ontological and epistemological beliefs and values and whether and how clinical wisdom is accessed. The third and final discussion chapter considers the internal validity of modified concept mapping and its fitness, trustworthiness and limitations as a data gathering tool for achieving this aim. This chapter now returns to its discussion of the three diagrams, smaller versions of which appear on pages 158 and 188 to assist the reader.

Re(forming) identity in the who, what and where of clinical learning

Figure 17 provides a pattern- and relationship-based demonstration of how the participants' body-mind-soul awarenesses of the becoming and critical elements of clinical learning are integrated into a single interconnected whole. Similarly, the patterns and relationships of the contextual who, what and where of clinical learning that shapes this becoming and the participants' perceptions of it are represented in Figure 16. For these participants, clinical learning was not about isolated incidents where specific skills, knowledge or attitudes were learned, but about an inter-related network of contexts and relationships within which they progressed toward a personally coherent view of themselves as practising graduates in their profession. Figure 17 refers to this as "Re(forming) Identity" because the participants were variably engaged with the individualised becoming of self as a person, student and future occupational therapist or doctor. The six critical elements of this process are each important alone but the findings indicate that greater awareness of becoming and evidence of clinical wisdom were associated with integration of these elements, which only some participants

demonstrated. This section examines each of these elements and its integration with others through the integrative dualist, embodied phenomenological, systems theory interpretive lens of the diagrams and what each suggests about access to clinical wisdom and clinical education.

Changing or revealing beliefs, attitudes, values

Values, beliefs and attitudes are central to one's view of the world and of self (Bebeau & Monson, 2012; Taylor, 1989) so it is not surprising that revelation of and change to them was the most frequently identified critical element of the participants' experiences. That the changing of beliefs, values and attitudes is an embodied, integrative, whole-person process is supported by the finding that "Changing or revealing beliefs, attitudes, values" was the element most frequently integrated with another overall. This occurred most often with "Experiencing or transforming emotions", especially when three or more elements were present (Tables 22, 32, 33). This integration and the pattern of consistent association with all interpersonal interactions (Figure 16, Table 33) suggests that change to beliefs, values and attitudes occurs in situated, collaborative, transformative learning of the kind that encourages the development of meta-capacities like moral judgement and clinical wisdom (Balakrishnan & Claiborne, 2012; Daniels, 2008; Illeris, 2014).

The body-mind-soul of the clinical student is a dynamic complex system moving in and out of different learning-context systems that affect relationships and challenge identity, being and becoming. Figure 17 indicates that this becoming does not happen in a moral and ethical vacuum, but rather through epistemological and ontological doubt and the reconstruction of what is believed and valued (Barnett, 2011). Students nearing graduation are striving to integrate perceived professional and graduate epistemological beliefs, values and attitudes with those held personally to become the person, practitioner and graduate they wish to be. Whether one conceives of self (as I do) as an integrated body-mind-soul or not, unique lenses of beliefs and values determine what is important enough to individual students to meaningfully connect learning with a personal life and sense of purpose (Goetz & Taliaferro, 2011; Mason, 2007). This is reflected most visibly in attitudes.

Attitudes

Attitudes were mentioned more often and more frequently perceived to affect other domains than values, especially for the Medicine participants (Tables 15 & 29). Pre-existing attitudes were more likely to be revealed than changed, especially when connected to emotions. Claire noted that "the stronger my feelings the less likely I am to change my attitude". Another participant gave this example:

Discussion Part One

> Emotion/feelings – reflected – attitudes/values: My emotion of being angry at the mother for giving her baby too much panadol reflected my attitude that I felt the mother should have known better then to overdose her baby on panadol. (Mary 2)

This suggests that the process of personal becoming begins with values and attitudes directing emotional responses, which conflicts with the proposal that strongly held attitudes or values are reshaped by emotional responses (Buissink-Smith et al., 2011).

The attitudes mentioned most were professionalism, integrity, responsibility and empathy (Tables 10, 14, 29). In "Becoming a member of an identifiable profession", the participants consistently integrated changes to attitudes with actions. Propositions connecting "observing" and "professionalism" were frequent (Table 12) and reflected in the integration of "Changing or revealing attitudes" with "Altering actions or outcomes":

> Actions/artefacts – observing – attitudes: Observing doctors working in reality has shaped my attitude towards my clinical practice and they often show me what professionalism and integrity is and how I can practice this. This was displayed in one case where I observed a doctor explaining and apologising to a patient for a mistake that they had made. (Adele 2)

> Attitudes/values – professionalism, responsibilities – actions/artefacts: An attitude of professionalism and responsibility shapes actions. For example the professional doctor that values his/her responsibility towards their patients will make an effort to keep up to date with new information and guidelines. (Adele 2)

For Adele, the integration of personal and professional becoming is through reciprocal change in attitudes and actions involving personal values, yet the literature often conceptualises attitudes of professionalism as only associated with visible conduct. "Demonstrate" is commonly used in clinical learning outcomes related to professional attitudes, creating tacit but powerful expectations that they will be judged from action and produced not from values but knowledge. This may be traced to paradigms of assessment based on Millers (1990) pyramid in which action, performance and competence demonstrate knowledge in action. According to the participants, professional attitudes include integrity, honesty, responsibility, compassion and morality. Behaviour may allow some judgement of these characteristics, but as Anna insightfully noticed it does not always reliably reflect attitudes:

> Sometimes as a student you feel like burden on the clinical time, especially when they are extremely busy, however their attitudes are often a reflection of their stress and not annoyance at you being present as a student. (Anna 1)

Discussion Part One

Discourses of professionalism shape students' expectations of what is acceptable behaviour:

> It would be unprofessional of me to give away my true feelings in front of a child or their teacher with my facial expressions e.g. when I was with a child today I was becoming frustrated and annoyed with him when he would not cooperate during the session but I remained calm and made sure my expression didn't change and as a result he did not get the reaction he was looking for, began to modify his behaviour and the session was able to be completed with a satisfactory outcome. (Claire 3)

For Claire, "Becoming a member of an identifiable profession" involves demonstrating professionalism through appropriate behaviour. This framing of attributes as individual and collective behaviour-based standards reflects a shift in the social contract of professional clinical practice from a moral and ethical base of trust-based relationships to one of expertise and control (Hilton and Southgate, 2007). Students know that these standards are entry criteria for becoming a member of the profession, but with little influence or input they frequently learn how to behave as required without engaging with the situated, social and bodily aspects of practice essential to an embodied phenomenological view (Dall'Alba, 2009a; Merleau-Ponty, 1964/1968). When under pressure, detachment, "survival" actions and disengagement have been noted in both students and experienced healthcare professionals (Haque & Waytz, 2012; Hilton & Southgate, 2007; Uhrenfeldt & Hall, 2007). Observation may change attitudes and actions, but this does not imply a change in the values or beliefs that provide the required motivation for permanent change (Artino et al., 2010). This highlights the problem of assessing attitudes from actions without evaluating values and beliefs, and the importance of not assuming that attitudes relate permanently to either.

The demonstration 'paradigm' is also evident in graduate attributes such as scholarship, global citizenship and lifelong learning described as the ability "…to apply their knowledge …solve consequential problems …communicate their knowledge, contribute to society …" (Barrie, 2012, p. 86). While no-one would dispute the value of these abilities, they are not character traits or peculiar to the development of particular values or attitudes, and clinical curricula focused on developing such abilities run the risk of producing capability without culpability (Coulehan, 2005). The researcher's embodied, integrative dualist, person-centred view of clinical education aligns with others who recognise the contribution of the body and soul to attitudes and actions through tacit procedural knowledge and personal values (Miles & Mezzich, 2011; Krathwohl, 2002). By encouraging students to use intuition and pattern recognition knowledge to tap into tacit insights (Epstein & Hundert, 2002), awareness of the bidirectional relationship between "Changing attitudes" and "Altering actions" might be

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developed in more "causal" thinkers. For educators, this will require a significant shift away from suspicion of intuition as part of clinical decision-making (Braude, 2009).

Clinical learning introduces students to some stark differences between ideal and real relationships which can affect developing professional attitudes towards patients and clients:

> Attitudes/values – honesty – beliefs: Being on placement in a mental health setting, I discovered that honesty could ruin rapport between a clinician and a client. When dealing with clients who are battling alcohol and drugs, the clients lack honesty when it comes to medications, some will stop taking medication and still not disclose this to a clinician. (Marble-Rose 3)

De-contextualised pre-clinical learning may prepare students poorly for challenging interpersonal interactions (Dall'Alba, 2009a). These impact on attitudes and beliefs and can negatively affect students' self-efficacy, reducing the skill levels of even competent students (Bandura et al., 2003). This may generate attitudes of reluctance in seeking feedback or volunteering in challenging practice situations, which may impact particularly on medical students who have strong desires to appear competent in all situations (MacLeod, 2011; Ross et al., 2011). This was noted in some Medicine study participants' annotations, for example Adele (p. 160) and Leah (p. 159).

In basing the assessment of attitudes and values on measurable outcomes, behaviours and complex artefacts such as portfolios (Frank et al., 2010; Leigh et al., 2007), competency educational frameworks create a "high stakes" performance-focused clinical learning environment. Despite this, as noted in the literature review, educators are uneasy about the ability of such measures to adequately identify the student who is competent but has less than desirable attitudes, and about how well reflective assessments match what students actually subscribe to (Coulehan, 2005; Macfarlane & Gourlay, 2009). While tutors and assessors of criterion-based assessments of attitudes feel ambivalent about awarding grades, students struggle to accept feedback (Andonian, 2013) or are unimpressed with a process they describe as "…just a load of satisfactory" (Rees & Shepherd, 2005, p. 37).

The key to addressing student avoidance and educator disenchantment may be in adopting a systematic formative approach to the development of attitudes as part of becoming and whole-person change (Barnett, 2011; Jarvis, 2012). In assisting clinical students to integrate "Becoming the person I want to be" and "Becoming a member of an identifiable profession", a systems theory approach would focus on recognition of differences between personal and professional attitudes in ideal and real experiences to improve the recognition of patterns of behaviour and awareness of attitudes (Bateson, 1972/2000). Early and ongoing engagement

with difficult clients and situations could provide a whole-person-centred context for this (Andonian, 2013). A climate of trust and absolute acceptance of vulnerability and uncertainty are essential for attitude change; becoming familiar and comfortable with interpersonal tension, multiple perspectives and error is part of the reality of juggling survival, security and flourishing in clinical practice (Little et al., 2012).

In support of the need for an integrative formative approach, a significant feature of the integration of "Changing attitudes" was the strongly unidirectional impact of thinking and knowing on attitudes, as illustrated here:

> Thinking/knowing – changed my – attitudes/values: My thoughts were that the baby would be saved if we transplanted the liver. So my attitude was very optimistic.
> (Mary 2)

Propositions and annotations *from* thinking/knowing *to* attitudes/values were almost double those in the opposite direction (Table 10) and made by twice as many participants (Tables 11, 24, 25, 27). Words related to knowledge and thinking/knowing were common in annotations about attitudes, especially for the Medicine group (Tables 29, 30), suggesting that participants perceived thinking as playing an important role in "Changing or revealing attitudes". Both "Cementing or challenging theory or knowledge" and "Changing or revealing beliefs, attitudes, values", were frequently identified in interactions with patients or clients (Table 33). Some participants felt theoretical concepts affected attitudes to patients:

> Thinking/knowing – changes – attitudes/values: Increased knowledge about a certain topic for example health inequalities between ethnic groups in NZ will affect your attitudes when interacting with these patients and writing up case studies/assignments requiring personal reflection. (Anna 1)

Despite this, experiential knowledge impacted attitudes most in clinical learning:

> Thinking – causes – attitudes: Knowing about situations and people and thinking through these can change my attitude about the situation or person. For example, on my obstetrics run there was a situation where a baby did not breathe properly after birth and needed resuscitation. It reinforced my need to think through possible situations so my attitude is always that something could happen and I need to be prepared for it so I can act properly and promptly. (Leah 3)

These annotations suggest that theory or knowledge are perceived to be relatively stable compared with more variable and situation-specific thinking and attitudes. The ability to integrate thinking with attitudes requires the existence of an internal conceptual linking

framework or epistemology (Bebeau & Monson, 2012). Marcum (2009) adds that intellectual courage, honesty, curiosity, perceptual acuity and cognitive skills are needed to create an ethical epistemology. Such sophisticated moral and ethical reasoning beyond practice rules and norms is said to develop only with deliberate ethics and morality teaching (Penny & You, 2011; Sample, 2010).

While a few participants in the study did identify attitudes they perceived to be ethical for personal reasons suggesting the presence of a conceptual framework linking thinking and attitudes, a systems theory embodied integrative pedagogy consistent with the researcher's position would go further. Thinking translates knowledge into practice by mediating between theory and embodied emotions, attitudes, values and beliefs; therefore, an adequate theory of knowledge must include the affective, psychomotor, moral and social knowledges of practice (Henry, 2006). Polanyi (1974) asserts that most of this knowledge is tacit, subjective and personalised. Its strength lies in its links to beliefs, values and attitudes which direct thinking and behaviour to build practice knowledge in a way that is superior to logical reasoning (Bebeau & Monson, 2012). To stimulate integration of these knowledge systems through tacit and conscious processes, clinical experiences must expose students to different practitioner, patient and client attitudes, values and beliefs so that the fundamental processes linking them are detected (Bateson, 1979/2002). This view is supported by the study since "Changing attitudes" was so often identified in contexts of interpersonal perceptual learning, especially observation:

> Role modelling good staff members: e.g. a mid-wife very responsible and respectful to the patients and family. Makes the student feel, I too would want to be like them. (Sarah-Jane 3)

Clinical education is replete with attitude exposure opportunities for students, but as the participants indicated, underlying values direct whether or not attitude change happens or persists.

Values

A stepwise internalisation of higher education values driven by affective responses to observed values has been theorised from Krathwohl et al.'s (1964) hierarchy of affective outcomes; receive, respond, value, organise values, internalise (Buissink-Smith et al., 2011). By contrast, other research suggests that connections between emotions and values form early in life and clinical students frequently attribute their professional values development to upbringing and prior influences outside the learning environment (Baernstein et al., 2009;

Seidel et al., 2007). The study findings support this view in that participants' values were often intertwined with beliefs as more stable entities that were revealed rather than changed:

> Values, beliefs – provide foundation for resilience – preventing – overload: Overwhelming situations, breakdown, inability to function. (Taro M 1)

While the integration of "Changing beliefs, values and attitudes" with "Experiencing or transforming emotions" (Table 32) indicates that some participants linked affective responses to change, this applied almost exclusively to attitudes. Frequent connections between attitudes/values and beliefs (Table 9) and the integration of changes to them with "Experiencing or transforming emotions (Table 32) rather suggest that value changes are internally motivated and related to managing emotions through attitudes and thinking based on the student's own professional aspirations (Seidel et al., 2007; Woodman et al., 2002). Figure 17 (page 158) illustrates this integration of personal and professional becoming, expressed in this annotation:

> Aspirations – positively influence – attitudes/values: Every day I try to get a little bit closer to being the kind of doctor I'd want to be. If I didn't have clear career aspirations and good role models and mentors, I'm not sure I'd be quite as conscientious as I am. (Liz 2)

The continuous process of becoming is marked by ambiguous transitions from aspiring to actual professional that include questioning the actions and values of others, especially role models (Dall'Alba, 2009b), yet the interaction between students' internally held values and those they are exposed to or expected to adopt is not well researched. This probably relates to the reticence of higher education to be involved in teaching values, despite evidence that student moral formation is lacking and linked to phronesis (Kinghorn, 2010; Sample, 2010). Not to tackle the morality of the various human systems within clinical education with students is to risk that they will assimilate hidden and tacit values uncritically, as suggested by MacLeod's (2011) and Donetto's (2012) depictions of almost token adoption of humility, empathy or benevolence. Tacit values may be hidden by more obvious and acceptable ones:

> Conscience and moral values – if these are followed it leads to – contentment: e.g. a patient completely not relevant to you in terms of legal care (not part of your team etc.), needs help of some sort, e.g. needs some tissues, a helping hand along the way always feels good. (Sarah-Jane 3)

Here an appropriate compassionate response obscures how tacit clinical environment values shape the caring discourse - why would a patient "belong" to a team when he/she needs a

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box of tissues? From a systems theory perspective, all values have moral and social components that reflect the epistemological-ontological uncertainty of the systems generating them (Savin-Baden & Howell, 2010). Since no-one becomes a professional and remains immune to tacit workplace influences (Illeris, 2014), integrated clinical education should include exploration of the values of its intersecting systems and structures. Ideally educators, clients and students would critically explore this together in a Zone of Collaborative Development that would increase individual self-reflection and changes to moral values (Balakrishnan & Claiborne, 2012). Prior scaffolding of the learning of person-centred moral reasoning focused on relationships of trust and dialogical decision-making may assist this (McCance, 2008; Miles & Mezzich, 2011; Sample, 2010).

"Changes to values" was often integrated with "Building or negotiating relationships" and "Altering actions or outcomes" (Table 32), highlighting the significance of interpersonal interaction in values development. As noted by Baernstein et al. (2009) students can be quite critical of what they perceive to be unacceptable values held by their educators and fellow students:

> Learning occurred through observation of how to do things well or left me thinking I wouldn't do or have said that. I don't know if in a learning situation that the teachers/supervisors realise how we judge them, watch them and analyse what they do or don't do. It's funny because that's what they think their role is with us but in effect we apply critical thinking to everything they do and this helps inform our own learning. (Jane 3)

A number of annotations confirmed clinical students' sensitivity to educators' ambivalent attitudes or behaviours even when they did not necessarily discern the morals and values behind these or lacked insight into their own (Bebeau & Monson, 2012; Mattick & Knight, 2007). While questioning the values and attitudes around them, clinical students are at once open and resistant to particular ways of being and doing (Dall'Alba, 2009b). To foster integration of experience-based personal values with competency-based professional values, clinical education must help students recognise the different origins, implications and relationships between different sets of values within trusting, safe learning relationships (Harland & Pickering, 2011; Miles & Mezzich, 2011). This could encourage clinical wisdom development, although to effectively integrate values requires understanding the epistemological and ontological beliefs that support them (Barnett, 2009; McKie et al., 2012).

Discussion Part One

Beliefs

The most notable finding from analysis of the propositions was that propositions *from* beliefs to other domains were the most frequent overall, while those *to* beliefs were the least (Table 10). This strongly suggests that the participants considered beliefs to have an important and quite stable influence on other domains, as illustrated here:

> Values, Beliefs – provide – foundation for resilience to – strong stimuli: e.g. emotional or thought provoking encounters (Taro M 1).

Despite the fact that emotions are often regarded as irrational and beliefs as rational, in this study the two domains were closely linked in the cluster analyses of proposition words used and in grouping by discipline (Figures 14, 15). Frequent use of the words "fear", "shocked" and "self-esteem" in propositions linking beliefs to emotions (Table 12) is supported by the prevalent integration of the critical elements "Changing or revealing beliefs" and "Experiencing or transforming emotions".

Some effect of thinking/knowing on beliefs was noted for the Medicine group, but connections to emotions were much more frequent, suggesting greater experiential awareness of ontological beliefs (Tables 8, 9, 10, 24, 25, 27). Thinking about and testing ontological beliefs is at the heart of developing successful practitioner-patient relationships, although even with in-depth reflection threats to ontological beliefs may remain unresolved (Gadamer, 1996; Henry, 2006). For the participants, ontological doubt usually arose in connection with "Exposing or disrupting identity or sense of self" and is discussed in that section.

Awareness of predominantly epistemological beliefs was found in the integration of "Changing or revealing beliefs" and "Experiencing or transforming emotions" with "Cementing or challenging theory or knowledge" (Table 32) by a few participants:

> Beliefs – shocked – thinking/knowing: I always got shocked when family members give you a different perspective from the one you get given by the client. For example it was quite devastating to learn that a client I had seen in the afternoon and told me they were doing well and managing but later to be admitted in hospital after a suicide attempt. (Marble-Rose 3)

Dissonance between what Marble Rose had believed to be accurate or reliable sources of clinical knowledge generated intense emotions and doubt that challenged foundational beliefs. For participants, integration of "Changing or revealing beliefs" with "Challenging theory or knowledge" while "Experiencing emotions" often signalled a difficult aspect of "Becoming ready to graduate".

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Discussion Part One

This study aimed to assess awareness of epistemological and ontological beliefs, and even though "Cementing or challenging theory or knowledge" was integrated less often with "Changes to beliefs" than other critical elements (Figure 17, Table 32), the annotations of particular participants indicated in-depth thinking around beliefs. While beliefs about the nature of being tended to be associated with personal values, and beliefs about knowing with actions, relatively few annotations referred exclusively to either alone. This supports an integral pluralist systems theory and person-centred view of complex learning and practice in which ontology and epistemology are completely intertwined, more closely reflecting the reality of the phenomenon than single or even multiple object ontologies and epistemologies (Bateson & Bateson, 2005; Esbjörn-Hargens, 2010; Shapiro, 2008).

One set of annotations did appear to be mainly about epistemological beliefs. "Cementing or challenging theory or knowledge" was identified in most of Mary's annotations attached to propositions connecting thinking/knowing and beliefs. Annotations from her first two maps suggested that theoretical knowing was central to her view of practice reality (see p. 174); however, in her final map, she recorded a "Challenging theory or knowledge" and "Challenging beliefs" experience. The clinical situations of two patients with testicular cancer produced a shift to a more complex understanding of theory and more ambivalence about her epistemological beliefs:

> Beliefs – create – reality: I believed that having surgery was 90% curative because of the statistics for testicular cancer and the 10% that didn't get cured were a total rarity when in actual fact that 10% are very real and have a poor outcome. (Mary 3)

> Attitudes/values can influence emotions/feelings: My own values influence my beliefs. For example, maybe the 50yr old man was very happy despite the recurrence. My values of living being the most important thing may not even have been his values. Me having those values made me empathetic towards this patient yet he may have been quite happy. (Mary 3)

This encounter appears to be an epiphany in which beliefs about knowing have come sharply into focus and changed through emotional engagement in a situation (Mason, 2007). For Mary, belief in the value of statistical knowledge made sense when probability expectations were met, but her belief in the importance of living was irreconcilable with the reality of the man who is not cured. In striving to make sense of this and, perhaps to maintain the stability of her own beliefs, she concludes that her values may be different from the patient's.

Clinical learning experiences such as these are critical to developing self-efficacy and new learning strategies (Artino et al., 2010), but also to "Becoming ready to graduate". Through

epistemological belief changes, new ways of knowing impact on ontological ways of being, disposition and character (Barnett, 2009), for better or worse. Exposure to conflict reveals the underlying epistemological and ontological uncertainty of practice which produces doubt and questioning of values and beliefs (Savin-Baden & Howell, 2011). While exploring doubt through reasoning can build emotional competence (Kingston, 2008), rationalising one's values and beliefs may produce dishonesty and even barriers to progress (Poole et al., 2012). A major implication for clinical education is that students should be well-supported with opportunities to honestly process and discuss epistemological and ontological doubt. This is also essential for learning to care (Clouder, 2005).

While Barnett (2011) claims that faith in the system and hope for the future are needed for processing doubt, the participants' predominant integration of "Changes to beliefs" with "Building relationships" (Table 32) suggests that someone to trust is most important. Some participants also offered this to others:

> Beliefs – affects – actions/artefacts: I gave the patient's mum whom I was talking to extra time for me to just listen to her point of view because she seemed like she just wanted someone to tell her strong view points about her child who was always ignored as "having something wrong" by her teachers. (Shelly 3)

Most care-givers, patients and clients desire but seldom experience unconditional and emotionally supportive time and effort to understand their beliefs and perspectives (Shapiro, 2008; Taylor, 1989). In integrating "Changing beliefs, values, attitudes", "Building relationships" and "Altering actions or outcomes", Shelly's beliefs in the value of all the people in the clinical picture are expressed in her attitude and actions. This integration demonstrates how "Becoming the person I want to be" was at least as important to these participants as "Becoming a member of an identifiable profession" or "Becoming ready to graduate". In time-pressured, task-orientated clinical settings students may get the message that such interactions are a luxury or beyond what is necessary, but even apparently peripheral person-centred interactions have been shown to take no more time and to improve care and decision-making (Edmondson et al., 2009; Ursel & Aquino-Russell, 2010). The integration in this annotation also suggests that clinical wisdom may be accessed when personal beliefs are allowed to guide actions that have no immediately obvious beneficial outcome other than building a relationship.

While "Changing beliefs, attitudes, values" was an important critical element of clinical learning, when identified alone it was not associated with examples of the proposed access to clinical wisdom. Integration with other elements was needed, in particular with "Building or negotiating relationships".

Discussion Part One

Building or negotiating relationships

As the second most frequently identified critical element of becoming, "Building or negotiating relationships" signals the significance of interpersonal interactions as context (Figure 16). "Building or negotiating relationships" was also most frequently integrated with more than one other critical element (Table 32, Figure 17), suggesting that from the theoretical perspective of this thesis it may play a role in access to clinical wisdom. While interactions with other students and staff did feature, participants were most aware of "Building or negotiating relationships" with patients or clients, and with supervisors or the education team (Figures 16, 18, Table 33). Role models, of whom much was expected and whose attitudes and actions were carefully observed, featured throughout.

Higher education students are expected to go beyond imitation to analyse the complexities of what they see and assimilate valuable aspects into their own personal practice philosophies (Burwood, 2006; Sakellariou & Pollard, 2013). In clinical settings emotional, attitudinal and cognitive role modelling is intertwined, so students are constantly becoming through synthesis of their personal values and beliefs with others' ways of knowing, being and practicing professionally (Bebeau & Monson, 2012; Dall'Alba 2009b). The frequent integration of "Building or negotiating relationships" with role models with "Altering actions or outcomes" and "Changing beliefs, attitudes, values" (Table 32) suggests that this was happening for the participants. Nonetheless, like students studied in the literature, in self-assessing their professional attitudes they compared themselves against expected and modelled attitudes mainly on the basis of behaviour (Bishop & Rees, 2007; Bonsaksen et al., 2013). An issue with this, aside from the questionable accuracy of students' interpretations of educators' behaviour and the lack of correlation between behaviour and moral virtue (Coulehan, 2005), is whether clinical education has become a form of behavioural conditioning (Donetto et al., 2012). This would be unlikely to produce clinical wisdom even as phronesis, since clinical wisdom is acknowledged to include more than behavioural modification (Edmondson et al., 2009; McKie et al., 2012).

Epstein and Hundert (2002) believe peers or patients are ideally placed to judge attitudes and values; however, students are harsh judges of each other and patients' judgements of students' attitudes are variably aligned with self- and educator-rating (Baernstein et al., 2009). From a systems theory whole-person perspective, role modelling is a reciprocal relationship of becoming for students and educators. Figures 16 and 17 indicate that building this relationship is of central importance to the participants; therefore, to increase reciprocity and integration of learning which may lead to access to clinical wisdom, role models need to make their own attitudes, values, beliefs, being and becoming explicit. This will mean addressing

systems-related barriers such as time constraints, and the lack of accountability and specific debriefing strategies for students who experience negative role modelling (Baernstein et al., 2009).

In integrating "Building or negotiating relationships" with "Changing or revealing beliefs, attitudes, values" participants frequently indicated that adopting modelled values and attitudes required that they fit within their existing frameworks of professional beliefs and values (Bebeau & Monson, 2012). It has been suggested that the current student is more likely to lack this framework because of increased self-interest, a sense of entitlement and less maturity in social and moral reasoning (Bebeau & Monson, 2012). Clinical learning environments aggravate this deficit when they uphold utopian views of the elimination of error and discourage questioning of practice values and attitudes. Often, students and staff alike are expected to be inherently virtuous, dedicated and selfless despite heavy physical and mental demands (Bishop & Rees, 2007). These factors can create discouragement and emotional threats for students (Poole et al., 2012), or worse still cynicism and the adoption of an intrinsically disengaged professional persona (Coulehan, 2005). In an ideal curriculum, students would feel free to safely and honestly speak up about the mismatches and ethical dilemmas they face whenever values, attitudes, emotions and actions clash or the inner self is conflicted (Carel, 2011; Malpas, 2011). This would help develop and strengthen these internal frameworks and provide opportunities for educators to be more explicit about their own.

For the participants, "Experiencing or transforming emotions", "Building or negotiating relationships" with supervisors, the education team, patients or clients and "Changing beliefs, attitudes, values" were strongly integrated (Figure 17, Table 32). The interpersonal emotional environment of clinical learning, especially the extent to which students feel affirmed, accepted, known and cared about, profoundly influences motivation and outcomes (O'Callaghan, 2013; Taylor, 2011). The following examples demonstrate the positive and negative impact of interpersonal emotional connections with educators on attitudes:

> Positive emotions/feelings – may include – excitement: e.g. looking forward to going to the hospital upon waking every morning, because of the team you are with. As the team consultant inspires you and you look forward to being in their presence, e.g. the consultant has ethical conduct and positive attitudes, introduces all team members on the ward round, remembers everyone's names. (Sarah-Jane 3)

> Feelings – affects – attitudes: I experienced some self-doubt the other day when I felt very overwhelmed and felt like I was grilled by consultants. I think this affected my

> integrity and element of professionalism- what is expected from me as a medical student and what will be expected of me as a doctor. (Shelly 3)

Educators recognise personal emotional connections with students as effective in changing attitudes, especially through passion for their subject, but they also believe that students enter university with tacit values and views that may not be amenable to reflection or influence (Grootenboer, 2010). Enhancement of this influence through mentorship and supervision has been researched extensively, but the emotional context of these relationships as a critical part of transformative clinical learning is seldom discussed (O'Callaghan, 2013). Despite this, students consistently look to role models and teachers to help them with the development of personal strategies to manage emotional issues (Andonian, 2013; Borgstrom et al., 2010). This is a vital aspect of negotiating tensions between "Becoming the person I want to be" and "Becoming a member of an identifiable profession". All but one of the participants connected the thinking/knowing, actions/artefacts, attitudes/values and beliefs of role models with emotions/feelings, suggesting awareness of the need for congruence in role models' relationships as confirmation for their own evolving emotional strategies:

> The main consultant's view was that the baby with the CHARGE syndrome should be treated. I realised the consultant's values were influenced by the bond she had with the baby. (Mary 1)

The participants also indicated that good and bad emotions experienced in "Building or negotiating relationships" with clinical supervisors affected their learning and becoming:

> A good relationship with clinical supervisors – creates – emotions/feelings: Academic confidence is gained because they praise you when your knowledge is of a good standard… (Liz 3)

> Relationships – intimately linked – emotions: I built a good relationship with my registrars in general surgery and this meant that I could get a lot more out of the run including enthusiasm and as a result it was my favourite run. (Shelly 1)

The learning potential of clinical role modelling is as much about these emotional responses in "Building or negotiating relationships" as about expert knowledge, teaching and guidance. While university academics believe in the importance of emotional connections for effective role-modelling (Grootenboer, 2010), unprofessional behaviour and poor role-modelling are unfortunately not uncommon (Byszewski et al., 2012). In the New Zealand medical education context this has been noted to create emotionally troubling ethical dilemmas and ambiguity for students, although this does stimulate reflection on their own actions and attitudes (Malpas,

2011). Expectations that students exhibit qualities that are not necessarily modelled to them are hypocritical, especially since students feel powerless to criticise or change this. In clinical learning, the meaning and value of professional attributes are legitimised through immersion in the disciplinary culture with more capable others (Daniels, 2008; Lave & Wenger, 1991). If that culture is not open to self-examination and feedback from students it will continue to create student emotional experiences that range from inspiration and excitement to depression and disillusionment.

A clinical student's self-awareness and ability to integrate "Building or negotiating relationships" with educators with "Experiencing or transforming emotions", "Altering actions or outcomes" and "Changing attitudes" can increase self-directed learning as illustrated here:

> Ambivalence of clinical teachers – leads to more – Observing and – can give increased interactions with – patients: Last month I experienced the frustration of having minimal meaningful interaction with the clinical team I was allocated to, for the first time. Almost every time I asked to help with something, do something, look something up, I was told no. All I did was watch someone else write notes - hardly stimulating for my learning! and: Seems paradoxical, but when your teachers aren't that interested in teaching you, you tend to spend more time with patients and their families, as you scour the wards for decent case histories to take and examinations to perform. Proving that every dark cloud has a silver lining! (Liz 3)

Despite a negative emotional response, a desire to learn and resilient attitude led to actions creating learning opportunities. This can be compared with another participant's integration of the same elements while attempting to negotiate a supervisory relationship:

> Experiences – two way arrow – feelings: …because of that supervisor my initial feelings of excitement, wanting to do well and anticipating learning changed to feelings of despair, hopelessness and dread of going into the workplace. This greatly affected my ability to learn and absorb information. (Jane 2)

Fortunately, a resilient attitude and strong self-beliefs facilitated integration with "Transforming emotions":

> Feelings: I have one special clear feeling and that is- no matter how bad my supervisor/placement experience was I did not let her get to me at all. I kept my inner self safe and did not blame myself for the bad experience. I was able to be clear that the setting and supervisor were why it was not working and this helped me stay there

for the whole 10 weeks. I refused to let the experience undermine my sense of self. (Jane 3)

The study findings suggest that not all students will be able to integrate their experiences of relationship building well.

Those who do have often reflected on the situation later and taken the initiative themselves:

Thinking – changes my – Beliefs: Often a situation can happen so quickly that it is not until I think about it afterwards that I realised I had a certain attitude that is changed when I think about what happened. For example in my obstetrics placement I helped deliver a baby who needed resuscitation. My belief during the situation was that I was doing something wrong. But when the midwives and doctors explained what had happened and I had time to think about it, I realised there was nothing I did wrong and this changed my belief about the situation. (Leah 2)

From a systems theory perspective, productive integration and coherent becoming should be fostered by such frequent, structured opportunities for reflection on the connections between domains in collaboration with an educator or supervisor. Collaborative situated reflection would support clinical wisdom development and the identification of patterns indicating individual or curricular systems weaknesses (Maani & Cavana, 2007). This would enhance students' experiences of "Building or negotiating relationships" with the education team and help less self-aware students become better integrators of their learning. In recognising the reciprocity of role modelling relationships, an integrated whole-person-centred approach to clinical education would also mean that emotional self-awareness was encouraged in both students and role models, as O'Callaghan (2013) suggests.

"Building or negotiating relationships" with patients was represented similarly by the participants but with a stronger focus on "Becoming ready to graduate". Since the exact meaning and complexity of clinical practice cannot be adequately taught, learning the 'rules' gives only a superficial grasp (Burwood, 2006). When "negotiating relationships with patients or clients" who did not fit the expected, some participants' demonstrated their increasing readiness to graduate through complex integrations of critical elements linking theory, attitudes and values:

I was taught to use CMOP-E for clinical practice. It starts with enter/initiate. My clients were in an acute mental health clinic and often unable to talk coherently therefore I was unable to fill in the learning outcomes of enter/ initiate as the underlying assumptions of the CMOP-E model are that we talk to our clients and gather

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information. Why teach me and other students in mental health a model we could not use? Luckily I found Daniel Suttons work on people like mine and was able to draw on his concepts. Goes back to one size fits all - not! (Jane 1)

Other students will need explicit training in integrating the critical elements in such situations. If this is omitted, they may be left feeling confused, unfairly responsible or emotional stressed, which can lead to distorted self-assessment (Baernstein et al., 2009; Sitzmann et al., 2010).

Negotiating relationships with clients also often involved "Experiencing or transforming emotions". Despite predominantly negative emotions such as fear and pressure in the propositions, the annotations recorded a more balanced range of attitude-changing and emotional experiences. Dunlap (2012) stresses that emotions are not simply responses but biological tools that help people assess situations, become motivated, and move towards action or others. This suggests that students need to be able to integrate "Experiencing or transforming emotions" and "Altering actions or outcomes" in "Building or negotiating relationships with patients or clients". Appropriate action was recognised by some participants as a professional responsibility associated with the emotional aspects of relationships with patients or clients, but integration depended on effort and awareness:

> Feelings – leads to – negative feelings: If I do something that hurts others, I won't feel good myself either e.g. if I hurt the patient while taking blood off them, then I will feel bad that I have hurt them. That is why a strong sense of good judgement means that the patient won't go through any unnecessary procedures or investigations.
> (Sarah-Jane 2)

> I have been told I usually display how I'm feeling with facial expressions so I am trying to have a poker face when I am at work, e.g. the other day I was putting shoes on for a patient and it was not that easy and so I ended up grimacing while I was doing it but when I put them on again for him this morning I made sure I didn't give any indication of how hard it was with my body language so he wouldn't be able to tell if I was having any trouble. (Claire 2)

Through a person-centred worldview lens, these participants' responses to their own and others' emotions indicate integration of bodily, affective and cognitive elements producing conscious decisions and effort to modify behaviour and manage emotions. They suggest that an embodied phenomenological approach to practice needs a complementary systems theory integrative dualist emphasis on imagining the other at the level of the inner self while also self-observing (Bateson, 1991; Taylor, 1989).

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Another important aspect of "Building relationships with patients or clients" was that this was the most noticeable interaction for "Cementing or challenging theory" (Table 33). This motivated the participants to engage with people, knowledge and wider issues (Sakellariou & Pollard, 2013) as illustrated here:

> Knowledge – changes – Feelings: Thinking about a patient's circumstances (the patient had just been told they had cancer and didn't have long to live) changed my feelings about the case from one of interest to one where a real person and their family was involved. (Leah 1)

> The patients I learn the most from are often the ones which have somehow made me feel more emotion than usual. I saw a little boy last week with a Meckel diverticulum. He had a difficult home life and I really felt for him as he recovered from this major operation with so little support. I read about his condition and reflected on the challenges and journey he has had to face. As a result, I know much more about his disease than I otherwise would have. (Liz 1)

These examples demonstrate how participants also frequently integrated "Experiencing or transforming emotions" during experiences of mismatches between abstract conceptual knowledge and its application to patients. Differences between knowing and being sometimes created tension between "Becoming the person I want to be" and "Becoming ready to graduate", especially when students were uncertain as to what was acceptable. A whole-person-centred, systems theory driven view of clinical education would suggest that these tensions are inevitable and profitable for dynamic processes that are constantly finding new equilibria (Bateson, 1972/2000). Embracing and exploring these tensions collaboratively as they arise is likely to improve students' confidence in their relationships with patients and supervisors (Monrouxe, 2011), encouraging integration and perhaps clinical wisdom access.

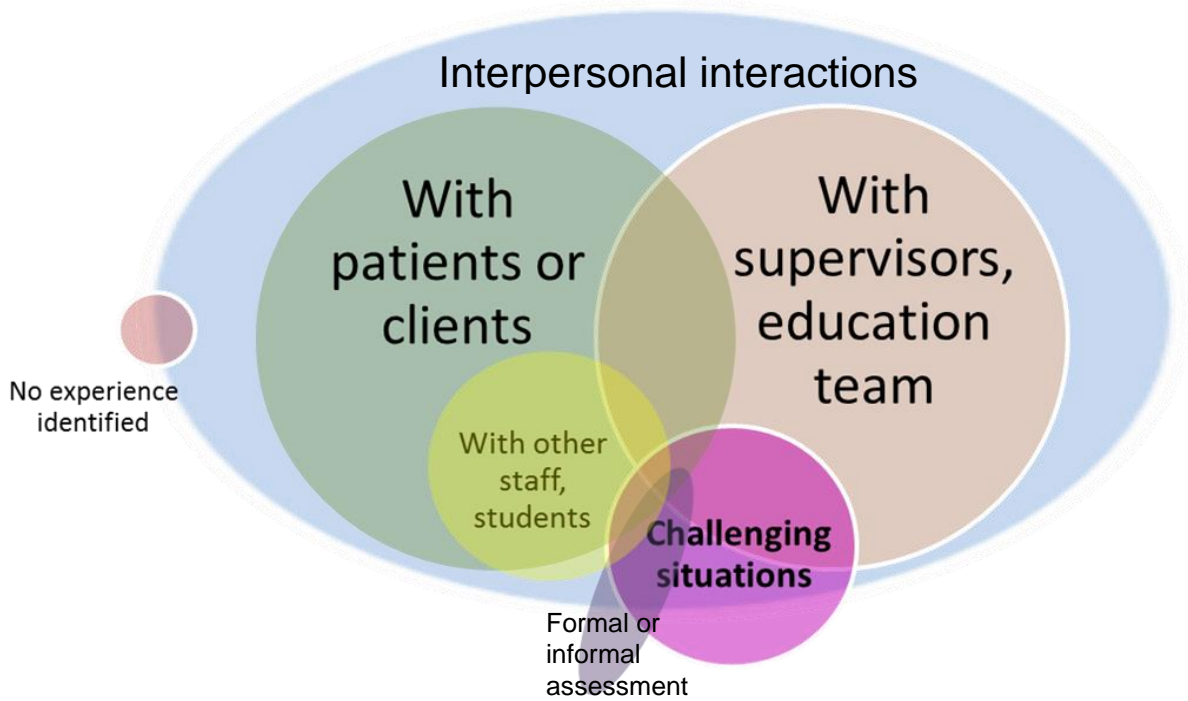On the following page small versions of Figures 16 and 17 are reproduced as a refresher for the reader.

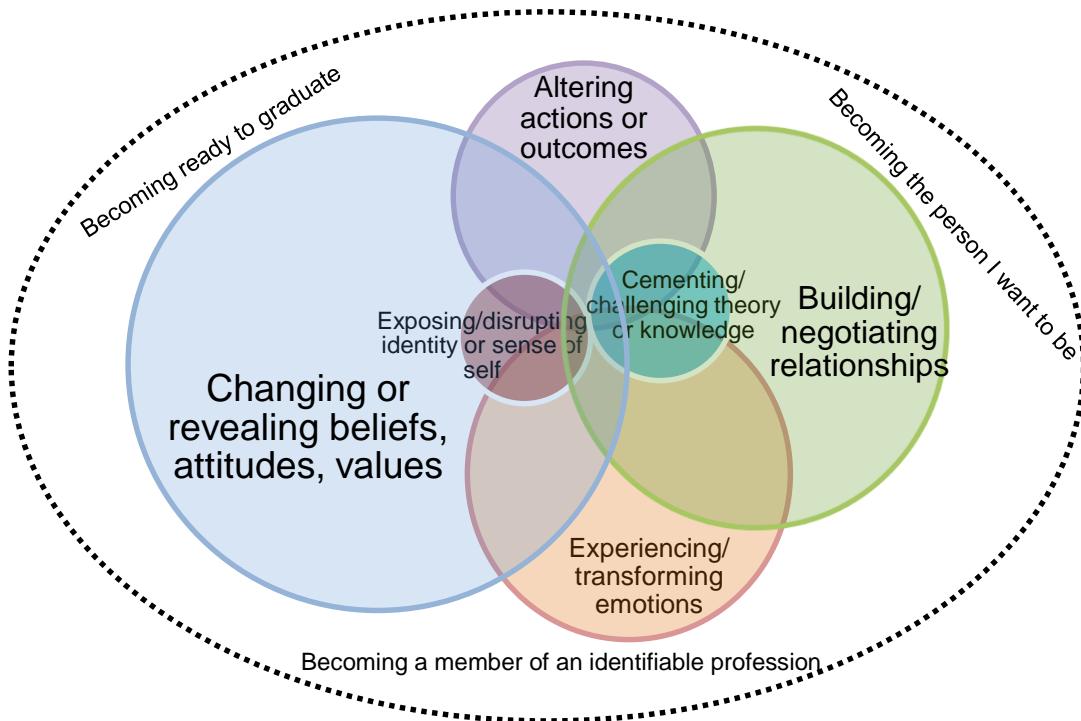**Figure 16: The Who, What and Where of Clinical Learning**

Figure 17: (Re)forming Identity

Discussion Part One

Experiencing or transforming emotions

The frequent identification of "Experiencing and transforming emotions" and integration of it with other elements suggests that affective components of complex experiences, especially interpersonal interactions and challenging situations, create conditions in which clinical wisdom could be accessed (Tables 32, 33). Viewed through an embodied phenomenological lens, there was a prevalent sense that emotions were unavoidable, externally generated and needing to be transformed or managed, rather than that they were deliberate choices or reasoned outcomes. An example was given by Mary who took part in the retrieval of an accident victim's liver and the transplanting of it to a baby whose mother had given her too much paracetamol:

> I had so many mixed emotions - anger, sadness and excitement because my values and beliefs were that the mother was silly to have given too much panadol, and it was sad that the 26yr-old had died. (Mary 2)

"Experiencing emotions" sometimes involved strong affective responses that conflicted with participant's expectations of what "Becoming a member of an identifiable profession" would mean:

> Emotions of fear and sadness were felt when working with a child in the oncology ward at X with my supervisor. I was sad for the child and family. My role as an OT is to encourage, to encourage individuals to participate in meaningful occupations, sadly with this child we're preparing for end of life. (Marble Rose 2)

The strong emotional reactions that medical students have to illness, disease and death can reinforce their sense of patients' "otherness" and produce withdrawal and detachment which undermine empathy (Shapiro, 2008). MacLeod's (2011) study of medical students and educators suggests that competence, sureness and confidence are more strongly promoted than emotionally invested attitudes like caring. In support of this, a number of the Medicine participants in the study made causal links between actions, thinking/knowing and emotions (Table 18) and the associated "Experiencing emotions" annotations often concerned the creation or disruption of confidence:

> If I feel better about my work I am able to be more efficient. When I feel good about what I am doing and how I am doing it I get onto things more quickly. (Leah 3)

This discourse of confidence was closely associated with "Becoming a member of an identifiable profession" as an aspect of "(Re)forming Identity":

> Feelings – confidence – actions/artefacts: Confidence in your skills and knowledge is important to be able to learn how to be an effective doctor. Often in order to get an opportunity to practice you have to have some confidence in your abilities. (Adele 2)

Emotional discomfort can be a valuable part of insight but may create undesirable views of the cause as a problem to be fixed when associated with loss of confidence, self-doubt and a desire to conform to a professional identity (Kingston, 2008; MacLeod, 2011). This may further alienate patients and reinforce student fear of engaging with emotionally invested caring.

Clinical students receive mixed messages about the appropriateness or otherwise of emotional engagement (Borgstrom et al., 2010) and unresolved emotions from challenging events can impact negatively on confidence and learning:

> Feelings – can be negative feelings – such as – confusion: e.g. if no one explains to you what is going on during or after (as in debriefing) a clinical event, it may lead to the student feeling confused, lost and disoriented, and may also lead to feelings of isolation. (Sarah-Jane 3)

What is needed in such situations is a whole-person integrated approach that encourages student engagement with strong emotions at "…the edge between intimacy and detachment…" (Shapiro, 2008, para. 37) and that addresses the impact of "Experiencing emotions" on other domains of learning.

For some participants the integration of "Becoming the person I want to be" and "Becoming a member of an identifiable profession" produced emotional boundary conflicts similar to those reported by Borgstrom and colleagues (2010). One noted that: "a clinical case – causes – attachment – due to – feelings" (Taro M 1). "Stress" "empathy" and "fear" were mentioned frequently in association with a range of interpersonal experiences (Tables 14, 15, 33) that were usually not discussed with educators. One implication of this is that educators need to be better prepared to help students learn to manage their emotional boundaries and open to dialogue about this need (O'Callaghan, 2013). Andonian's (2013) observations of correlations between occupational therapy students' emotional capacities and the efficacy of their relationships and intervention skills with clients suggest that attention to emotions through a more integrated approach may also help educators improve students' communication and relationship skills. The study findings support this to some extent in that specific words used to describe feelings of confidence, pressure and stress (Table 12) were most commonly linked to actions relevant to clinical relationship skills such as observing and listening.

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Neumann et al. (2011) conclude that personal experiences, personality and the distressing situations that healthcare students find themselves confronted with significantly affect their ability to demonstrate emotional capacities such as empathy. They postulate that perception of emotion may be suppressed as a result of pervasive technological advances overloading clinical students with information. This could be exacerbated by rational cognitive problem-solving approaches in medicine and occupational therapy that encourage attention to this plethora of information and discourage emotional elements (Delany et al., 2013; Mulnix, 2012; Witt Mitchell, 2013). The participants' annotations suggest that the relationship between "Experiencing or transforming emotions", "Cementing or challenging theory or knowledge" and "Altering actions or outcomes" is more variable and complex than this. In the emergency situation recorded by Adele (p. 119) delayed rational reflection was used to deal with actions she had observed and the resulting emotions. Other participants felt they needed to suppress emotions or act in spite of them:

> Emotions/Feeling – My actions are not always in response to how I'm feeling – Actions/Artefacts: …at times I have to ignore how I'm feeling and just get on with the job because I will only have to do it later and it is not fair to whoever is waiting for my contribution e.g. I was feeling rather stressed because I was the only OT at work one afternoon last week however I still managed to complete my workload and write up all the notes before I went home for the day. (Claire 2)

Participants were also aware that the integration of "Experiencing emotions", "Challenging knowledge" and "Altering actions" could be misread by others. Leah gave this example:

> Feelings – impact on – Actions/Artefacts: When I'm feeling nervous or have a lack of confidence in an area I'm less likely to talk and will become very quiet. This resulted in one situation last year where a consultant said that at the end of a run he found that I did have a personality as he thought I had been far too quiet during the run and only started joining in discussions at the end of the run (as I was a little more confident then). (Leah 1)

Many of these situations involved anxiety related to perceived expectations participants felt ill-equipped to fulfil. In integrating "Becoming a member of an identifiable profession" with "Becoming ready to graduate" the predominance of "stress" and "fear" in many propositions and annotations (Tables 14 & 28) is consistent with what other near-graduation clinical students feel (MacLeod, 2011; Woodman et al., 2002). In integrating "Transforming emotions" with "Altering actions" to resolve "Challenges to theory or knowledge", some participants were able to reflect on and evaluate their own and others' emotions and actions rather than only their knowledge. Such evaluative reflection can lead to greater self-awareness and

professional behaviours and attitudes (Bonsaksen et al., 2013; O'Callaghan, 2013), but this transformation depends very much on the emotional support received in clinical placement settings (Hodge et al., 2011).

For the study participants, clinical situations where "Experiencing or transforming emotions" and "Altering actions or outcomes" were difficult to integrate made them aware of their lack of preparation. Many felt they must negotiate these things for themselves:

> In emergency situations you often won't know how you will feel and react until you are actually in the situation and doing it. I think that with experience you will come to know your reactions towards things like dying and resuscitation etc. (Adele 2)

Others felt they should suppress or manage emotions to reflect what was appropriate in "Becoming ready to graduate" or "Becoming a member of an identifiable profession". Haque and Waytz (2012) suggest that the emotional capacity for attributes like empathy is reduced by dehumanising effects of the healthcare environment such as de-individuation, loss of agency and otherness. These effects are doubled for clinical students; they are part of the de-individualised body of healthcare workers but also of students, have limited or no power to make decisions and are often reminded of their peripheral participant status within the community of practice. This provides strong incentives for students to suppress emotions and regulate actions.

Interpersonal interactions with patients or clients and with supervisors and the team were the primary contexts in which "Experiencing or transforming emotions" and "Altering actions or outcomes" were integrated (Table 33, Figures 16, 17), yet clinical education often encourages their separation. Deficiency or suppression of connections from emotions/feelings to actions may result in tacit patterns that are difficult to reverse, less accessible to reflection and produce even poorer subsequent performance (Woodman et al., 2002). In the competency-based educational environment, authentic assessment often means performance-based examinations such as objective structured clinical examinations (OSCEs). Even in the formative use of such assessments, students report loss of personal control and reactive responses (Cazzell & Rodriguez, 2011) suggesting poor preparation for the affective challenges of performance-based assessment. This was reflected in the integration of "Changing attitudes" and "Experiencing or transforming emotions" in "Formal and informal assessment" contexts, as illustrated here:

> Feelings – influence – attitudes: My feelings affect my attitude towards placements. Again, with exams near, I feel nervous about exams and this influences my attitude towards the placement I am doing, an attitude of apathy towards the placement as all

> I want to do is study. This concerns me as I would have had a better attitude if the placement was earlier in the year. (Leah 2)

Artino et al. (2010) have commented on the connection between clinical student's perceptions of assessment task value, emotions generated, and the learning strategies they subsequently adopt that modify actions and attitudes. Cazzell and Rodriguez's (2011) study indicates that students find performance-based assessment situations emotionally fraught because of perceived task value and a lack of immediate constructive feedback. In my study, there was frequently an undercurrent of emotional risk-taking in the participants' clinical learning situations with regard to feedback, again reflecting the high value students placed on relationships with educators and on assessment, formal or informal. This sometimes produced counter-productive strategies:

> Emotions/feelings – confidence, doubt – thinking/knowing: Emotions such as doubt can influence clinical learning. For example doubt of clinical knowledge can lead a student to not offer suggestions or take the lead in interviewing a patient by themselves thus missing out on a valuable learning opportunity. (Adele 2)

An integrated systems theory approach would suggest that informal and formal assessment are interdependent parts of the clinical education system. Since they shape as well as accredit the becoming person and professional, they should include opportunities for students to be givers as well as receivers of feedback. Otherwise, students are likely to adopt strategic approaches rather than engage in a genuine dialogue of mutual whole-person becoming with their educators. The study confirms that formal and informal assessments generate emotional responses, suggesting that students need opportunities to give feedback on the contexts creating this. When students' emotions as learners are suppressed or discouraged, strategic adoption of avoidance and disengagement from learning are especially likely (O'Callaghan, 2013).

For embodiment phenomenologists, the body is the somatically experienced self, a necessary vehicle and transmitter of affective labour and skills such as communication and service (Blackman, 2008). Shared repertoires of bodily expression such as gestures act as mediators of social exchanges in which the taking of moral and affective stances creates practices (Goodwin, 2007). Emotion is thus centrally placed in interpersonal relationships mediated by the body, especially the face (Blackman, 2008). While our primary perceptual and intercorporeal relationships as emotionally expressive bodies may reveal emotions involuntarily, with practice this can be controlled cognitively to create an opposite impression from what is felt (Yakhlef, 2010), as Claire found with facial expression (p. 156). Sometimes,

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in "Experiencing or transforming emotions" awareness of the perceptual nature of actions and doing was heightened:

> Trial by fire – causes – fear – encourages – state of alertness – improves – training, experience: Keeping us on our toes, always ready for unexpected situations, being observant and fast at predicting changes. (Taro M 1)

This suggests some potential benefit in being challenged emotionally, although as another participant noted there is a fine line between some and too much emotional challenge:

> Feelings – pressure – Actions/Artefacts: Just before my clinical exams I often feel pressured. This pressure may be good or bad for learning - a small amount is fine to motivate you in what you do however too much can often backfire and lead to your actions being non-productive. (Adele 2)

The integration of "Becoming the person I want to be" and "Becoming ready to graduate" depends on linking "transforming emotions" with motivation to produce effective clinical learning. Correlations have been found between medical students' capability beliefs, achievement emotions and summative achievement outcomes (Artino et al., 2010). These correlations are established and reinforced during pre-clinical and classroom learning. The participants' maps suggest the same connections, which is significant because clinical practice situations cannot be predicted or controlled by the student. When there is no perceived avenue of support, achievement may depend entirely on the student's motivation and emotional competence:

> Beliefs –inextricably linked to – emotions/feelings: My soul as a human being is probably the biggest influence on the emotions I feel in a clinical context. For example, last week I witnessed a young woman break down in tears during a consultation because she felt that the clinician did not understand her. As a human, I needed to help and comfort her, as a medical student, I was forced to leave this to the doctor, as in this specific context it would have been highly inappropriate for me to step in. I have thought about her every day since, and wondered how she is. (Liz 1)

As indicated in this annotation and by Leah (p. 161), the nature of the connections between emotions, actions and attitudes is not necessarily evident to an observer of the student's actions. In both cases the students chose a form of emotional withdrawal from the people in the situation in order to maintain motivation or self-integrity. An observer might misconstrue this as disengagement from learning, whereas in both cases personally significant learning was taking place.

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These examples also highlight the difficulty in producing externally approved, measurable standards as representatives of essentially tacit internal qualities (Grootenboer, 2010). The interpersonal discomfort associated with critiquing internal qualities makes it easier to assess them as a set of behaviours but as the annotations show, this can lead to a complete misreading of students' underlying attributes and attitudes. From a systems theory embodied integrative perspective, emotional development and attributes are best assessed within a whole-person situated relationship, which may explain the resurgence of the apprenticeship model (Sheehan et al., 2010). Affect has a unifying function in all social encounters (Dunlap, 2012), so it must be recognised and capitalised on rather than suppressed or ignored. Re-integration of physical care-giving to increase emotional engagement (Clouder, 2005), greater use of narrative to encourage a more compassionate professionalism (Coulehan, 2005; Kuczewski, 2007), training in emotional awareness to improve the use and accuracy of intuition (Sinclair et al., 2010) and collaborative moral learning to increase emotional sensitivity and support (Balakrishnan & Claiborne, 2012) may all assist with this.

As Figures 16 and 17 illustrate, my perspectives on the findings suggest that teaching students effective strategies for dealing with the affective consequences of the challenging learning environment of clinical practice is vital for the integration of "Transforming emotions" with other critical elements and for integrated "Becoming". Together, students and educators should: explore differences between the role of emotions in intuitive and rational responses; address significant mismatches between values, beliefs, emotions and ingrained learning responses; and develop emotionally congruent relationships and learning strategies. Wider and more open discussion of the conflicting discourses of competence and caring and of systemic contextual issues that exacerbate emotional incongruence is also needed (MacLeod, 2011; O'Callaghan, 2013). It is vital that students are not left feeling that the only option in emotional conflict is to disengage from it:

> I always had feelings of withdrawal in a situation where there is a conflict of interest, between the health officials and the family. (Marble-Rose 2)

Overall, Figure 17 suggests that the lack of integration of emotions/feelings and actions in clinical learning is not the result of lack of awareness of connections. Rather, it appears to be a product of the clinical learning environment and a lack of specific strategies to help students manage their emotions and work with them to produce transformation of practice (Hodge et al., 2011). Since the experiences related to "Experiencing and transforming emotions" were spread quite evenly across the different categories of experience (Table 33), learning to recognise and document situations that consistently produce or require emotional transformation early in the curriculum would be beneficial. The participants appeared to be

able to identify and manage in certain situations such as informal assessment but were much less confident when the context involved formal assessment or external influences (see Marble Rose's comments on discharge decisions, p. 119).

As the participant examples in this section illustrate, "Experiencing emotions" was often integrated with "Exposing or disrupting identity or sense of self" when there was conflict between "Becoming the person I want to be" and "Becoming a member of an identifiable profession". Resolution of the emotional elements in these situations was left to the student or did not occur. From a systems theory embodied integrative perspective this implies that there are significant body-mind-soul interactions yet to be integrated in clinical education before clinical students' personal transformation links their thoughts, affects and inner selves to the total situated life of "Becoming the person I want to be, a member of an identifiable profession and a student ready to graduate" (Bateson, 1991; Jarvis, 2012; Taylor, 1989).

Altering actions or outcomes

The critical element "Altering actions and outcomes" emerged as one of the most frequently identified for the Occupational Therapy group in interactions with clients, and was also frequently integrated with the other critical elements by both disciplines (Figures 17, 18, Tables 32, 33). Actions/artefacts propositions most often included "observing", "listening", "behaviour", "learning" and "doing" (Tables 11, 14, 24), while "learning", "working" or "work" were used more in annotations (Table 29). Of primary interest for this thesis, "Altering actions or outcomes" all but ignored the embodied nature of actions and physical performance which were predominantly conceptualised and recorded without reference to the participants' bodies or physicality. A number of participants were aware that they still needed to practice physical clinical skills, but this related mainly to building confidence in "Becoming ready to graduate":

> Actions/Artefacts – constant repetition of clinical tasks gives – competence and confidence: (country) gave me a really good opportunity to do simple clinical tasks (such as taking blood pressure, listening to the heart and lungs and suturing) time and time again. There's nothing like repetition to improve your skills and give you confidence. (Liz 2)

This also quite typically illustrates how clinical students from a number of disciplines would describe the learning of skills and practice, thus reflecting the discourse of competence.

The paucity of bodily awareness in these experiences appears to support Dreyfus' (2007) claim that becoming unaware of bodily aspects of repeated practices is essential for developing expertise; however, from a systems theory embodied phenomenological

integrative dualist perspective this is an inadequate view of person-centred clinical practice. Embodied phenomenology recognises the importance of spontaneous bodily responses to environmental cues in situated interpersonal learning (Yakhlef, 2010) so in clinical practice a lack of bodily awareness is likely to impede integration of learning with the who, what and where of context. Ignoring perceptual and intuitive input reduces awareness of the inter-relatedness of all material and immaterial systems and of mutual body-soul-mindedness and vulnerability, which may increase distancing and othering (Hays, 2010; Shapiro, 2008; Thomas Moore, 2010). As Figure 17 suggests, in integrating "Altering actions and outcomes" with other elements the participants already recognised bodily action as part of becoming and "(Re)forming identity", so clinical education including more attention to bodily awareness and body-soul-mind unity is likely to increase this integration.

The participants' lack of bodily awareness is a reflection of social, academic and educational influences. Barnacle (2009) states that embodiment is a biological non-cognitive connection between mind and body with no epistemological status as a way of knowing. Students are less aware of primary sensory experiences and their impact on practice because intellectual development is favoured over whole-person development and postmodernism privileges linguistically, visually or technologically mediated experience (Jarvis, 2012). Shahjahan (2005) adds that non-cognitive ways of knowing are actively resisted by the Western academy, perpetuating a mind-body separation. This is exacerbated when clinical learning treats the body as an epistemological context rather than integral to knowing, and when clinical skills are seen as measurable, acquired and deployed external objects (Dall'Alba & Barnacle, 2005).

Paradoxically, current Western clinical education and practice do focus intently on the body in two areas, firstly in the conceptualisation of illness as bodily disruption of normal sensations, perceptions and functions. Participants in the study were aware of the bodies of others as directly relevant to their learning despite not noticing parallels with their own. This may be due to technology-driven views of the sick body (Neumann et al., 2011), emotional protection mechanisms such as distancing (Shapiro, 2008) or a general lack of comfort with physical touch in clinical education (Clouder, 2005). Powerful tacit disciplinary norms may encourage students to view the body as merely the flesh that houses the mind or as subservient to the inner self (Carel, 2011). In addition, while much attention is paid in recent patient-centred practice literature to the embodied nature of patients and clients, little if any is paid to that of the practitioner (Marnocha, 2009), which from my perspective excludes a whole human system within the client-practitioner interaction.

A second area of bodily focus in clinical practice is the use of the body for physical skills, for example surgery (Willis et al., 2012). Few studies investigate embodied clinical practices and

those that do, for example Goodwin's (2007) study of surgical theatre teams, focus on the social enactment of actions associated with particular role-specific tasks rather than the body. The presentation of the clinician's body as the trained, performing vehicle of practice with appropriately managed physical responses reinforces the discourse of competence and minimises the experience of shared embodiment and frailty (Shahjahan, 2005; Shapiro, 2008). A lack of representation by the participants of their own or others' bodily presence or responses and a focus on competent action and outcomes in the critical elements of "(Re)forming identity" align with this discourse (Figure 17) which is also unfortunately associated with unbalanced and negative student attitudes toward their own bodies (Ross et al., 2011).

The delineation of appropriate physical contact boundaries is another area in which the body is attended to in clinical learning, yet amongst the optional concept labels (Appendix 3) "touching" was the only term not used by any participant. This may reflect discomfort with touch or the subsuming of touch in action (for example, Claire's experience with a client's shoes, p. 156), or the delegation of non-specialised bodily contact to other lower status caregiving roles (Clouder, 2005). Physical contact with the world, our *modus operandi* as infants, becomes invisible against the adult *modus operandi* of language; however, movement is foundational to being and when disrupted, for example by a stroke, "higher" functions such as language, affect and social interaction are also disturbed (Sheets-Johnstone, 2009). The participants were aware of this with clients or patients:

> Thinking about how an aspect of a disease is affecting a person changes my attitude towards the disease. For example about how depression is a part of Parkinson's disease and not a reaction changed my attitude towards Parkinson's and what a difficult disease it is for the patient and their family. (Leah 2)

> When I am working with the children I tell them what I think they need to hear at the time e.g. today I told a client how well he was doing when he was cutting around some shapes on paper (even though he wasn't) because he has low self-esteem and my intervention is aimed at pointing out what he can do, not what he can't. (Claire 3)

Attention often centred on "higher" order capacities such as mental state and self-esteem rather than bodily disruption. Only when language was an issue did one participant become aware of the significance of the body:

> Observing – can be more important than – thinking/knowing: My overseas Selective in (country) was a great piece of training in observation. Because I couldn't understand much of the history, I was forced to observe the patient in order to come up with some

> sort or form of diagnosis. I think I'm much more aware of the subtleties of appearance, gait, facial expression etc. than I was previously. (Liz 2)

The word "forced" suggests that physical elements were not the preferred mode of operation, even though observation and examination were included. Using language to record bodily symptoms and signs changes physical experience into taxonomies and descriptions (Sheets-Johnstone, 2009). These factors may affect how clinical students integrate conceptual understandings of bodily function and movement within whole-person experience, even though for their patients or clients, the lived experience is often intensely body-focused. A systems theory, whole-person embodied phenomenological view is that sensory perception and subjective interpretation make experience meaningful and are relevant to personhood for patient and practitioner (Carel, 2011), so these elements need to be restored to students' practice experiences. Exploring the place of touch and shared bodily existence in physical caring may be an avenue for this (Clouder, 2005), since many participants mentioned caring actions when integrating "Altering actions or outcomes" with "Building relationships" with patients or clients (for example Sarah-Jane p. 146). For students who value caring this is also likely to increase the integration of "Becoming the person I want to be" with "Becoming a member of an identifiable profession".

Despite a lack of specific bodily awareness, the participants were very aware of how bodily actions demonstrated "Becoming ready to graduate" and affected other domains particularly thinking/knowing (Tables 8, 11, 12, 24, 25):

> Actions/artefacts – intimately linked – thinking: when I am in clinic, the less I do (i.e. the more I take an observer role) the less thinking I do. The more action/involvement I have the more thinking I do. (Shelly 3)

Nevertheless, the critical elements "Altering actions or outcomes" or "Cementing or challenging theory or knowledge" identifiable in annotations attached to these actions were seldom integrated. This aligns with a systems theory embodied understanding of the complementary nature of the intuitive and rational systems. Intuitive actions may prompt deliberative rational reflection, but this can only influence non-intuitive actions in which a person is thinking about his/her physical performance, for instance when learning new or difficult physical skills (Kahnemann, 2003). In the few documented examples of this, the focus was primarily on outcomes:

> Actions/artefacts – I don't know if I'm doing this correctly – thinking/knowing: I learned to ask for help from my supervisor and teaching staff when I doubted if what I was doing was working with the children or not e.g. I always discussed what I did with a

> child with their teacher at the end of the session because it was important that what I was doing was correct as the implications of me doing something incorrectly might have been far reaching and detrimental for the child in the long term. (Claire 3)

The desire for competency in "Becoming ready to graduate" creates intense self-awareness of appropriate actions, attitudes and their consequences (Dall'Alba, 2009a; MacLeod, 2011). Claire's concern was with the long term effect on the client and the "right" way to demonstrate physical skills. Practice-based learning includes training and modelling so that the learner can demonstrate bodily what he or she knows, but these bodily practices are shaped and regulated by the professional group (Yakhlef, 2010). Students depend on supervisors and teachers to transfer the tacit physical aspects of expertise so that "Cementing or challenging knowledge or theory" and "Altering actions or outcomes" can come together in bodily "Becoming a member of an identifiable profession". As noted previously, many educators may struggle to identify or express bodily and intuitive elements and may need training in this themselves (Nyatanga & de Vocht, 2008).

A few participants were able to integrate "Altering actions and outcomes" with "Cementing or challenging theory or knowledge" and "Experiencing or transforming emotions" using observation, intuition and rational analysis:

> Observing –can be more important than – thinking/knowing: There was a time last year when I was with the on-call general surgical Fellow. We walked into the OR after an emergency call. The patient had been given a general anaesthetic, but could not be intubated or ventilated. I watched what the Fellow did as he stood back and took stock of the situation, rather than diving in, and I tried to do likewise. There was a lot of panic. I was the least well-trained/educated to do anything to help but through observation, I saw that the patient was not being ventilated - the anaesthetist was holding the mask, but nobody was squeezing the bag. Observation enabled me to take an appropriate course of action and bag the patient, even though I had little knowledge of team roles in that scenario. (Liz 1)

As a role model, the Fellow suggested a way of acting based on both rational and intuitive thinking in a situation where some appropriate but ineffective action was already underway. Although the proposition suggests that the action of observing can be more important than thinking or knowing, what is described is not observation as a passive sensory experience. Practiced perceptual observation, in which embodied rational thinking and intuition give meaning to existing actions (Kahnemann, 2003; Marcum, 2009) was demonstrated by the Fellow and the participant. Liz observed the emotional mood and took a more effective course

of action on the basis of bodily physical and theoretical knowledge about bagging, even though she did not recognise this.

This demonstrates how conceptual links between action and thinking may be different from the embodied integration of multiple critical elements in practice and why a systems theory approach to clinical education would suggest making these differences more explicit. The meaning of "observation" in the annotation above is complex, indicating integration of other critical but unmentioned elements such as emotions, attitudes and a sense of self. This is typical of the use of the system of tacit bodily knowledge and intuition which unites peripheral understandings of a situation with the explicit focal knowledge of cognitive attention to improve understanding (Braude, 2009). By integrating "Altering actions or outcomes", "Cementing knowledge" and "Transforming emotions" Liz was able to judge the utility and acceptability of action and participate legitimately in the interpersonal practice environment (Lave & Wenger, 1991; Yakhlef, 2010). In doing so she was enacting Figure 17, "(Re)forming identity" and integrating "Becoming ready to graduate" with "Becoming a member of an identifiable profession".

In this example and in Claire's (p. 184), the who of "Interpersonal interaction with supervisors or the education team" is integrated with the what of "Challenging situations". The integration of multiple critical elements in "(Re)forming Identity" and the personal engagement reflected in the use of personal pronouns (Table 31) suggest access to clinical wisdom may have given the participants insight. My position is that all such access is partial and specific; in each scenario there are systems that are not integrated, for instance the patients to whom only indirect references were made, and all elements will be different in the next moment. Deliberate distancing is not implied in either case, but it may be encouraged by the normalised way of conceptualising and writing about clinical learning situations which emphasises objectivity and does not include identification with others' bodies or personhood (Brown et al., 2010; Haque & Waytz, 2012). Preference for rational, evidence-based thinking and concentration on actions rather than bodies in action may each contribute to this way of communicating (Braude, 2009; Myers, 2010). Since participants who consistently produced less integrated annotations wrote more objectively and mainly in the second person or about a third person (Table 31), an integrative systems theory approach to clinical education would encourage concurrent use of the complementary subjective and objective systems of being and knowing (Barnacle, 2009; Bateson, 1991).

The limited reference to links between physical performance and knowledge in "Altering actions or outcomes" was surprising given the participants' focus on "Becoming ready to graduate" from competency-based programs. In their model of novice to expert performance

progression Dreyfus and Dreyfus (2005) base the transition on development of a goal-based capacity to see and use alternatives to the rules. Kinchin and Cabot (2010) link linear chains of procedural knowledge that develop competence with non-linear networks of knowledge and understanding. Both models include tacit knowledge as the link between performance and theory. The apparent lack of participant awareness of these links suggests that clinical teachers need to articulate them explicitly in their feedback to students (Delany et al., 2013). This was recognised by some participants:

> Quality of feedback/teaching from clinical teachers – affects – quality of notes: e.g. consultant going through teaching of clinical signs and the reasons for it. Even if it can be found in a textbook, the teaching from the consultant was much better in terms of help for remembering and clinical learning. (Sarah-Jane 1)

Since most expertise models focus on skills performance without including bodily knowledge, an integrative dualist embodied systems approach to clinical education would suggest valuing and making all elements of being and doing explicit in student-educator dialogue, removing some of the mystery around expertise and making professional becoming a more collaborative endeavour (Bonsaken et al., 2013; Dall'Alba, 2009a; Daniels, 2008). For some participants, integration of performance and theory as "Altering actions and outcomes" and "Cementing or challenging theory or knowledge" happened around practical artefacts such as clinical notes, prescriptions, referrals, reflections and portfolios. Perhaps because of the nature of her placements, Claire provided many examples:

> I made so many great resources during this placement that I found on the internet and even though they were not my original designs, I modified them to suit the individual children and used my creativity to source the materials for little or no cost e.g. I custom made a glove for a child to improve his writing grip from scrap fabric at my home instead of purchasing a commercial one for $11 from the provider. (Claire 3)

This annotation was attached to a proposition linking the psychomotor domain with beliefs, suggesting that thinking/knowing alone would not have produced this outcome without integration with "Changing or revealing beliefs, attitudes, values". Although propositions between actions/artefacts and beliefs were the least frequent, least annotated and made by few participants (Tables 8, 9, 10, 24, 25), "Changing beliefs, attitudes, values" and "Exposing or disrupting identity or sense of self" were frequently integrated with "Altering actions or outcomes" (Figure 17, Table 32). One reason for this may be that bodily responses produce unnoticed physiological, physical and mental effects that contribute not only to more holistic actions, but also to one's sense of self and purpose (Barnacle, 2009; Leathard & Cook, 2009; Shahjahan, 2005).

Discussion Part One

The study findings suggest that the integration of intuitive bodily knowledge and beliefs with actions is predominantly unconscious, yet bodily and thought processes are interlinked and have similar patterns of both orderly and chaotic organisation (Capra, 2007; Shahjahan, 2005). One of the key implications of this for integrative whole-person clinical education is that the body needs to be recognised as a goal-directed, "intelligent" subjective-objective self (Carel, 2011) and a genuine source of learning. Taking a more integrated approach to the progressive learning of skills and theory will help (Barrow et al., 2010) but fully integrative clinical learning would include drawing attention to bodily responses and how they affect actions and reflect professional and personal aspirations, goals and beliefs (Dall'Alba, 2009a). One way to encourage this may be through educators and students co-learning new skills and tools together (Bonsaksen et al., 2013).

A second implication would be that clinical education needs to reframe the place of physical contact and caring as part of the embodied system within which the "Reforming identity" of the becoming health professional is shaped. Refocusing attention on shared bodily existence and identifying physically with patients or clients is likely to counter distance and increase empathy (Clouder, 2005; Shapiro, 2008). Interprofessional practice-based learning situations may be ideal for this since the different disciplines understand and work with the body differently and have variable physical boundaries. One suitable vehicle could be whole patient caring where a team of students is responsible for delivering and co-ordinating a patient or client's full care over a longer time period.

A third implication is that the cognitive system needs to include bodily and intuitive "thinking" alongside rather than inferior to rational and critical thinking or reflection. Barnacle (2009) and Myers (2010) suggest spending time attending to the sense-making process of intuitive hunches and semi-formed ideas which precede deliberative thinking and action. This can produce greater awareness of alternatives and improved conceptualisation that is more likely to be emotionally attuned (Barnacle, 2009). Clinical educators adopting a whole-persons-within-systems approach to teaching psychomotor skills might be able to help learners identify tacit elements and adjust for pre-existing bodily dispositions towards movements (Blackman, 2008; Merleau-Ponty, 1948/2004). Observing, the participants' most-used word, is a whole-person learning opportunity rather than, as is often assumed, only about what is seen:

> Observing – leads to – learning: Clinical observation takes a significant proportion in terms of the clinical learning experiences. Seeing good consultants with good clinical and professional conduct leads to good role modelling. (Sarah-Jane 3)

Intuitive hunches and pre-reflective sensations give the overall sense or meaning that is drawn from whole-person observation and typifies the expert's assessment of a situation, as

illustrated by the Fellow on page 170. Students need permission and training in using these insights themselves.

A final implication is that both conceptual and experiential information-gathering is needed in self-assessments of psychomotor learning. The participants in the study were well aware of thinking-action mismatches but not of their origin in accurate but rationally inaccessible intuitive insights (Kahneman, 2003; Myers, 2010). Better integration of the cognitive and psychomotor domains in self-assessment would be likely with spiral curricula which emphasise integrating all elements incrementally and "thinking out loud" (Barrow et al., 2010; Mattick & Knight, 2007). A more systems-based embodied approach might include small groups of students and educators using rational and non-rational cognitive and psychomotor self-assessment to identify and articulate all the contextual and interpersonal elements that contribute to "Altering actions or outcomes".

Cementing or challenging theory or knowledge

The predominance of propositions and annotations associated with thinking/knowing, especially in connection to emotions/feelings (Tables 9, 10, 24, 25, 30) might lead one to expect "Cementing or challenging theory or knowledge" to be a frequently identified critical element. That it was the critical element *least* likely to be found in annotations that also included "Experiencing or transforming emotions" (Table 32), suggests differences between the conceptualisation of the relationship between emotions and thinking and knowing and how it is experienced. The following annotation illustrates this:

> Emotions/Feelings – created – doubt: When I was doing O and G a few months ago, a baby girl was born with CHARGE syndrome and the parents decided they didn't want her to be kept alive with medical intervention but rather left to die without treatment. I wasn't sure whether it was ethical as treatment was available and the girl could have lived with disabilities until at least 10 years old. I could understand that it would mean a lot of work for the parents and was a difficult situation. (Mary 1)

Although the proposition links emotions to thinking and doubt, the annotation does not include "Experiencing or transforming emotions" and the uncertainty is described in relation to ethics, knowledge and understanding. Doubt can be an expression of an emotion or a thought process and in this case it is the latter; hence, "Cementing or challenging theory or knowledge" is identifiable. A number of Mary's first map annotations were of this nature. For other participants, connections between thinking/knowing and emotions/feelings were principally about "Experiencing or transforming emotions", and not about ""Cementing or challenging theory or knowledge":

> Feelings – affect – thinking: If people are nice to us, e.g. a good consult to a patient/student, then we feel good, and so our thoughts of them when they come to mind are always good and respectful thoughts. (Sarah-Jane 2).

These examples demonstrate the value of the annotations in explaining exactly what was meant by the propositions, and in revealing the divergence in participants' ways of understanding concepts. Some propositions and annotations were more clearly about the mutual impact of "Cementing or challenging theory or knowledge" and "Experiencing or transforming emotions", especially in decision-making. Edmondson et al. (2009) base their claim that clinical decision-making includes emotions on the premise that emotions are not private but part of explainable rational social responses. The participants' experiences of clinical thinking often included explicable emotions but only when there was time for reflection and processing. As Figure 16 shows, the interpersonal interactive nature of clinical learning was uppermost in participants' awareness and "Challenging situations" did not allow this time, creating much more ambivalence about the place of emotions:

> Emotions/Feelings – can lead to – impulsiveness and "unrational" decisions purely based on emotion: for example when a patient goes into cardiac arrest, and if I don't know what to do, or if I get really emotional, it will affect my own thinking and ability to perform. (Sarah-Jane 2)

For Sarah-Jane, strong emotions interfere with rational thinking in an emergency. There is a general assumption that negative emotions make thinking or action less efficient, but this is not so for intuitive thinking, the use of which is affected by intensity of mood rather than whether it is positive or negative (Sinclair et al., 2010). Myers (2010), Kahneman (2003), and Nyatanga and de Vocht (2008) explain that emotional intuitive reasoning is misunderstood yet just as important as emotionally neutral rational thinking. Despite being considered inferior or even dangerous, the automaticity of intuition allows rapid efficient responses that are best left uninterrupted by rational thought in emergency or habitual practice situations (Dreyfus, 2006). One participant was aware of this:

> Repetition – advantageous in – emergency situations: Fast recall, mechanical due to repetition. (Taro M 1)

A systems theory integrative clinical education approach to counter-productive conflicts between emotions and thinking would be to develop students' explicit understanding of the different roles of perceptual, intuitive, emotional and deliberative rational thinking.

Discussion Part One

Many participants expressed the conviction or hope that they would develop the expert ability to navigate emotion-thinking conflicts since "Becoming a member of an identifiable profession" often involved integrating "Cementing or challenging theory or knowledge" and "Experiencing or transforming emotions" within the tacit rules of the profession:

> Thinking – knowledge – Feelings: I have been in situations where my knowledge and feelings have come into conflict. For example knowing that there may be more that we could do to keep a patient alive but empathising with the patient and their family in feeling that they would be better without invasive interventions for a low quality of life. (Adele 2)

Adele is equally aware of her emotional engagement with the patient's family and the need for rational decision-making based on the ethical rules of her profession. In intensely "Challenging situations", integration of "Cementing or challenging theory or knowledge" and "Experiencing or transforming emotions" included the specific "Who, What, and Where" of context as much more than simply neutral background. Systems theory highlights the equal significance of every contextual element (Maani & Cavana, 2007); without any one, the situation would not be the particular opportunity it is for "(Re)forming identity" and perhaps for accessing clinical wisdom.

Well-developed emotional capacity and self-awareness allow affective attributes to be expressed without emotions overriding thinking (Seidel et al., 2007). For many participants "Becoming the person I want to be" included being empathic and offering hope despite uncomfortable emotion-thinking conflicts. Integrated systems theory would suggest that eliminating these conflicts or taking a purely cognitive approach to decision-making is less productive than accepting tensions and human frailties and allowing the dynamic interpersonal systems of clinical learning to continually find new equilibria (Bateson, 1972/2000; Haque & Waytz, 2012; Shapiro, 2008). Clinical wisdom could be framed as an ontologically multiple entity arising from this, unique to each moment and combination of persons (Esbjörn-Hargens, 2010).

The integration of "Cementing or challenging theory or knowledge" and "Experiencing or transforming emotions" is affected by knowledge recall which depends on whether one's emotional state is similar to that when the knowledge was acquired and stored (Seidel et al., 2007). Clinical learning situations are very different from class settings and the emotional state of the student may not be the same in each. This may explain why several participants described situations in which knowledge recall was either enhanced or made difficult by their emotions. Two examples are given here:

> Trial by fire – being thrown head first into an unfamiliar situation and then forced to think fast and adapt to survive – results in – leap in learning: Exhilarating and boosts confidence if successful, will solidify experience into memory very efficiently compared to learning via more conventional methods e.g. reading books. (Taro M 1)

> Emotions/feelings – can block – thinking/knowing: being nervous, for example in an assessment situation or being asked a question in front of a group of people, can lead to not being able to recall the answer even if in a less stressful environment you would have had the appropriate knowledge. (Anna 1)

For Taro M and Anna, similar contexts of "Formal or informal assessment" in which knowledge recall, application and integration of "Experiencing or transforming emotions", "Altering actions or outcomes" and "Cementing theory or knowledge" was required produced different outcomes. Taro M's choice of words (also seen on page 164) suggests a significant challenge, but also that he experienced similar emotions in learning and application. By contrast, Anna may have experienced an unrecognised mismatch in emotional state producing the inability to recall the knowledge needed. This might suggest that students who are either constantly emotionally challenged or constantly emotionally disengaged have an advantage over those with more variable emotional states. More probably, students with greater affective awareness experience more emotional mismatches, but also have greater potential to switch between emotionally enhanced intuitive thinking and emotionally inhibited rational thinking (Sinclair et al., 2010). Again, a systems theory approach to clinical education suggests building affective capacity and the ability to recognise when different thinking modes are appropriate.

The frequency of causal links between thinking/knowing and other domains and use of the word "knowledge" (Tables 13, 14, 18) reflects the conceptualisation of clinical reasoning as thinking that "… conforms to a set of rules of rationality" (Mulnix, 2012, p. 467). This foregrounds rational activities such as planning, diagnosis, intervention or consultation with colleagues in which thinking has a specific role. In rational thinking, tacit aspects of expert thinking processes are made visible by breaking them down into a series of logical questions (Delany et al., 2013). This influence is reflected in this participant's annotation:

> Understanding – requires – thinking: Complete understanding and ability to break down and clearly explain all thought processes. As long as the basic laws are known it is possible to solve any problem by derivation of first principles, albeit slowly and often complex to follow. (Taro M 1)

The use of critical reasoning and its associated specialised language that characterises a professional group improves clinical decision-making and helps students feel they belong, but

it may exclude patients or clients and reduce empathy (Dall'Alba, 2009a; Haque & Waytz, 2012; MacLeod, 2011; Yarascavitch et al., 2009). The hierarchical linear models describing rational clinical decision-making processes (for example, Charlin et al., 2012) largely ignore the concurrent reciprocal relationships between thinking and other domains, yet many participants indicated awareness of this reciprocity in propositions such as: "Thinking – affects – feelings" (Shelly 3) and "Actions/artefacts – changes – Thinking/knowing" (Anna 1). Even causal thinking/knowing connections were not exclusively about rational thinking.

Clinical reasoning can also be conceptualised as critical thinking embedded in and responsive to the social, emotional and moral contexts of practice (Edmondson et al., 2009; Tim Moore, 2013). This more closely aligns with most participants' experiences and the thinking conflicts felt between "Becoming a member of an identifiable profession" and "Becoming the person I want to be":

> I thought I would be taught to think more for myself but so often our assessments gain a high mark only if we supply the correct answer containing the "right intervention" or best one towards it. I have struggled with this at times as our case studies are about people and surely there's more than one approach as we are also taught to be evidence based practitioners and be guided by our own clinical reasoning and judgement, as well as taking the client into consideration. (Jane 1)

These connections were often made through reflection which can also be conceptualised as either purely rational or more holistic. Rational reflection recruits critical thinking, epistemological evaluation and controlled thinking processes to produce appropriate information-gathering questions and logical deductions (Mulnix, 2012; Witt Mitchell, 2013). In clinical learning this can bring clarity to decision-making and aid in formulating future action plans, tackling epistemological error and solving ill-structured problems (Witt Mitchell, 2013). In class-based teamwork situations it may also enhance insights into intra- and inter-personal qualities and ways of working (Clark, 2009).

For a systems theorist this form of reflection is essential but incomplete since it "abstracts" the subconscious emotional and psychomotor processes influencing and contributing to rationalisation (Poole et al., 2012). In unpredictable dynamic interpersonal clinical learning, rational reflection alone may miss vital elements while purely intuitive body and emotion-based reflection may be self-absorbed (Andonian, 2013; Macfarlane & Gourlay, 2009). Integrated whole-person-within-whole-systems reflection would make space for rational and intuitive elements but also the re-evaluation of beliefs to encourage honesty, self-efficacy and the integration of "Becoming a member of an identifiable profession" and "Becoming the person I want to be" (Andonian, 2013; Poole et al., 2012). Jane's annotation illustrates this emerging

independence but also the tensions inherent in developing this while "Building relationships" with supervisors or the education team.

While "Cementing or challenging theory or knowledge" was identified relatively infrequently across all categories of experience it was most often found in combination with "Building or negotiating relationships" with patients or clients and "Changing or revealing beliefs, attitudes, values (Tables 32, 33). This indicates that most thinking in the clinical learning environment was only indirectly about theory or knowledge and usually related to attitudes, values or beliefs surfaced through interactions. Experiences connecting thinking and beliefs almost always included affective and/or psychomotor elements, as demonstrated by Leah's annotation on page 155, yet many models of personal epistemology reflect predominantly cognitive views of belief formation. Bendixen and Rule's (2004) model places affect externally to cognitive processes while Brownlee and Berthelson's "relational epistemology" (2008, p. 405) acknowledges the influence of interpersonal interaction on the knower but not affective psychomotor influences. A systems theory clinical learning approach to integrating "Cementing or challenging theory or knowledge" with "Changing beliefs" while "Building or negotiating relationships" would explore the reciprocal influences of all interacting elements in assisting the development of flexible personal and professional ontological-epistemological beliefs and better integration of the three "Becomings". This might be based on open student-educator dialogue, mutual interdependence and awareness of context, all of which promote access to complex systems such as clinical wisdom (Hays (2010).

One of the pragmatic problems with integrated thinking approaches is the inclusion of sufficient time in clinical encounters and debriefings for perceptual, tacit and intuitive insights to be surfaced and discussed. Clinical encounters are often goal-focused and parsimonious with time and conversation. Bogdan-Lovis et al. (2012) feel it unlikely that the time and effort for better encounters will ever be adequately compensated for financially unless the focus shifts to rewarding quality of life. Rationalists recognise the need for different types of cognition for different domains (Witt Mitchell, 2013), so shifting the focus of clinical education toward equal development and integrated use of perceptual, intuitive and critical thinking and reflection could significantly improve patient-practitioner relationships (Marcum, 2009). This would be expected to impact positively on quality of life.

In "Cementing or challenging theory or knowledge" it is inevitable that some decisions will need to be made with inadequate or conflicting information and uncertain outcomes. Values and beliefs are central to negotiating this aspect of expert practice, yet engagement with value and belief issues relevant to professional becoming tends to be left to individual students (Bebeau & Monson, 2012; Dall'Alba, 2009a). In making explicit the values in different clinical

learning environments, more research is needed into how clinical experts' values and beliefs help them negotiate situations of uncertainty or insufficient information. In an ideal curriculum, students would be part of discipline-specific and interprofessional teams as increasingly less peripheral participants, comparing how more capable others think, feel and act and what they value and believe (Dall'Alba, 2009b; Daniels, 2008; Lave & Wenger, 1991). While working towards this, it may be useful to identify aspects of successful, relevant, value-based learning approaches used in the past (Dewey, 1938/1997).

Exposing or disrupting identity or sense of self

As noted in preceding sections, the critical element "Exposing or disrupting identity or sense of self" was found in many annotations about beliefs and often integrated with "Experiencing or transforming emotions" (Table 32) as illustrated here:

> Emotions/feelings – reflect – beliefs: when I see patients treated in a way I don't agree with such as being talked to in a condescending manner or being cut off when trying to answer questions, this reflects my beliefs on how I think a patient should be treated by their doctor. (Anna 1)

This annotation indicates that when others' actions conflict with her beliefs, emotions are triggered that alert Anna to her sense of self as distinct from others. As Table 14 shows, of all optional words for the beliefs domain (Appendix 3), self was the most used overall in propositions. For many participants this did not go beyond recognition or comparison of self as distinct from others. For a few participants, there was more. While "Changing or revealing beliefs, attitudes, values", "Experiencing or transforming emotions" and "Altering actions or outcomes" was the most common combination of critical elements (Table 32), the less common integration of these with "Exposing or disrupting identity or sense of self" went deeper into the experiences of the inner self. An example of this is given by Liz on page 164. For an integrative dualist, these first-hand experiences of the body-mind-soul as a simultaneously persistent neuroscientific reality and unique immaterial sense of self and identity amongst others make this kind of integration the key to entities like clinical wisdom (Bateson, 1972/2000, 1991; Goetz & Taliaferro, 2011; Green, 2005). This section explores how participants experienced integration of the inner self with other critical elements.

A number of annotations concerned repeated or unresolved emotions in episodes of "Exposing or disrupting identity or sense of self". Childhood associations with emotional states and traits affect the formation of the self while in adulthood the expression and processing of emotions depend on self-awareness and personal growth (Seidel et al., 2007). Emotional self-awareness affects every area of clinical learning, especially the development of meta-

capacities such as judgement needed for successfully negotiating new situations (Bonsaksen et al., 2013; McKie et al., 2012; Rees & Shepherd, 2005). The unconscious, intuitive system quickly recognises important emotional elements of situations and prepares for what comes next, but like the conscious rational system this is built on learned associations and prone to the same ingrained errors (Myers, 2010; Seidel et al., 2007). A systems theory embodied approach would teach students to use intuitive and rational thinking to identify recurrent patterns in specific bodily, affective and cognitive responses when the inner self is exposed or threatened. Strategies to address these threats could be developed for each of the different contexts of Figure 16 and then applied to build self-awareness and self-efficacy (Cunliffe, 2009; Epstein & Hundert, 2002).

Even when not specifically addressed in an annotation, identity was so pervasive in the integrated critical elements that it became the title of the "(Re)forming Identity" diagram. Mutual acknowledgement of unique identity in interpersonal interactions fosters empathy and patient-centredness, countering detachment and power differentials and building the confidence that facilitates transformation of personal and professional identity (Donetto, 2012; Haque & Waytz, 2012; Monrouxe, 2010; Shapiro, 2008). For the participants who integrated "Exposing or disrupting identity or sense of self", beliefs about self were central to this identity, especially in "Becoming the person I want to be" and "Building relationships", which frequently required integration with "Experiencing emotions":

> Positive emotions/feelings – may include-feelings of self-worth and being valued: e.g. when a consultant listens to your opinions and respects them, takes it into consideration, whether they may be right or wrong. E.g. what antibiotics would you like to give? Cefuroxime... with _ dose. "Okay, let's give that". Or what test would you like to order? "CRP" Okay, lets order that. Of course, only when the suggestions are clinically sensible. Also, consultants taking their precious time to teach students also makes students feel really valued. (Sarah-Jane 3)

Most clinical students hold idealised beliefs about themselves, their profession and emotionally-invested attitudes like caring, but these can conflict sharply with practice realities (Clouder, 2005; Penny & You, 2011). In integrating "Becoming ready to graduate" with "Becoming the person I want to be" the participants sometimes struggled to engage emotionally with patients, clients and supervisors which led to self-doubt. The following examples demonstrates how this was experienced:

> Emotions/feelings – doubt – inner self: Doubting self and interventions used especially when working with the families who are caring for a child with cancer. (Marble-Rose 2)

> Doubt would normally creep in when working with a client who is difficult to engage. As a clinician I tend to doubt my approaches and question the interventions used. (Marble-Rose 3)

As an integrated dualist, I see the emotions inherent in ontological conflicts as central to the development of a personal ontology and to becoming, which Barnett (2011, p. 13) describes as "coming-into-active-doubt". Near-graduates who can identify with patients', clients' or families' difficulties or emotions, yet believe in their ability to learn to deal with this despite doubt are displaying emotional self-efficacy (Bandura et al., 2003). Integrative dualist clinical education suggests focusing on identifying and confirming student self-beliefs that support a coherent body-mind-soul self and becoming as a person and professional. Awareness of the integrated nature of being for self and others may also be fostered through wrestling with unsustainable ideals rather than using rules or professional conventions to palliate the emotions created by moral or ontological distress (Penny & You, 2011).

For both disciplinary groups, "Interpersonal interactions with supervisors or the education team" was the most common context for integrating "Exposing or disrupting identity or sense of self", "Changing beliefs, attitudes, values" and "Altering actions or outcomes":

> Actions/artefacts – influences – beliefs: watching a doctor act in a particular manner with a patient, for example on surgical ward round there is little time spent interacting with and explaining things to patients, this helps to shape my own personal beliefs about how I think patients should be treated and talked to. (Anna 1)

The use of personal pronouns here is characteristic of participants whose annotations included the element "Exposing or disrupting identity or sense of self" (Table 31). This can be compared with an annotation that lacks this element and personal pronouns:

> Values, beliefs – provide foundation for resilience – preventing – overload: Overwhelming situations, breakdown, inability to function. (Taro M 1)

Taro M suggests that beliefs are crucial in "Challenging situations" because they provide stability but this is related to function or doing rather than being. When participants felt their being and identity was threatened or exposed, doing was just a vehicle for maintaining a stable sense of self:

> Behaviour is governed by expectations. I had to behave differently from how I wanted in order to be a professional in my direct supervisor's eyes. This often felt like game playing. What was deemed professional by my supervisor was not deemed professional by other key workers and I had to negotiate my internal feelings in order

to behave a certain way so I would not get told off, aware that other professionals would not require that of me, often they would require the opposite. It was difficult behaving out of integrity with my own codes of conduct. (Jane 3)

Personal integrity was often referred to in conflicts between participants' own and others' beliefs, values and actions. Integrity is essentially the sense that one's inner values and the outward manifestation of these as attitudes and behaviour are congruent (Bateson, 1991; Kuczewski, 2007). It supports identity and sense of self and fits my integrative dualist view of being simultaneously inner-outer and material-immaterial. Participants recognised integrity as an important part of "Becoming a member of an identifiable profession" but also for "Becoming the person I want to be". Integrity is characterised by critical cognitive mediation which reduces the impact of actions on beliefs (Marcum, 2009). This is seen in Jane's example where "Exposing sense of self" is integrated with "Revealing beliefs" that actions do not change. Since integrity is an inner self experience, inaccurate beliefs may also be unaltered by actions, even actions that are expected or valued. This may explain the lack of correlation between self-assessed and objective measures of performance (Rees & Shepherd, 2005; Sitzmann et al., 2010) and the adherence of poorly performing students to less desirable learning strategies (Mattick & Knight, 2007).

Since integrity was noted in connection with all the other domains (Table 12), a systems theory-informed embodied whole-person approach would suggest that students' self-beliefs and identity are central to integrated body-mind-soul clinical learning rather than peripheral personal endeavours. While transformative learning models include self and identity (Illeris, 2014; Jarvis, 2012) they do not integrate this with bodily learning which, as previously noted, is the primary vehicle of the action and performance so profoundly affected by beliefs. Integration of all the elements of Figure 17 with bodily awareness around a coherent inner self may increase integrity across the range of interpersonal contexts in Figure 16.

Participants who integrated "Exposing or disrupting identity or sense of self" with "Changing beliefs and attitudes" tended to use subjective personal pronouns to express the inner self and beliefs more often (Table 31). When integration included "Building relationships with supervisors or the education team" they were also aware of and sometimes disturbed by differences in attitudes, beliefs and identity. In "Becoming ready to graduate" a sense of autonomy, evidenced as retaining control over the way in which one's professional identity is shaped, is important (Dall'Alba, 2009a):

Beliefs – influence – attitudes: My belief influences my attitudes e.g. I believe and value autonomy and so my attitude in a recent case was that a patient had the right to choose

to have surgery or not (as long as they were well informed) even if the clinician thought they should. (Leah 2)

Developing an inner self-affirming morality is related to the value one places on the good of others and how well this is balanced with care for self (Bishop & Rees, 2007; Clouder, 2005). This is an important part of integrating the three "Becomings" and may explain why some participants resisted perceived impositions that did not make sense to their "(Re)forming identity" as a person, student or professional. Claire provides an example of this:

I am learning to play the political game in order to achieve the results I am striving for e.g. I wanted to give my patient built up cutlery to facilitate his eating but my supervisor wouldn't let me at the time and yet she gave it to him the next day anyway. I didn't say I knew he needed it even though that was what I thought because that would be petty and would make me appear unprofessional. (Claire 2)

The confluence between attitudes and the developing sense of self and autonomy needed in "Becoming ready to graduate" was also evident in participants' demonstrations of valuing other points of view and working with them, even if this required sacrifice:

When I am given a task in the hospital I try to go the extra mile for them and talk to the nurses if they have a problem with something or tell the team if they have an opinion to express. (Shelly 2)

Beliefs – self-conscious – decisions: I have at times found it difficult to separate my personal beliefs when working with clients who share the same beliefs. A family were refusing their child to have a SUFE because this was against their beliefs and they believed God will heal their daughter. It is important for health professionals to have a clear understanding and a background before making decisions. It is [more] important to engage families than imposing our own beliefs. (Marble-Rose 2)

These examples reflect a willingness to take responsibility for learning. The frequent use of the words self-esteem, soul, reality and identity by participants (Tables 11, 14) demonstrated awareness of the relationship between "(Re)forming Identity", beliefs and motivation to learn:

Beliefs – shape your – identity: your beliefs shape who you are and how you will react to certain situations such as dealing with difficult patients. (Anna 1)

Beliefs – experiences – soul self: I had a belief that I would enjoy clinical learning and that my life experience and learning would enhance my practice. The reality was I had

> a supervisor for the first 5 weeks where we were not well matched and I ended up losing any/all confidence and doubting I had any ability at all to practice as an OT. I lost all belief in myself and in my choice of occupation. (Jane 2)

> Beliefs – other-view – emotions/feelings: Beliefs about learning can shape how you feel about it. For example if I believe that certain subjects are more important for my future I will feel more motivated and persevere in learning about them. This was evident in how I viewed my experience on paediatrics as I found this to be an important rotation I felt more motivated to do well in it and learn more. (Adele 2)

These experiences reflect how clinical education has largely left negotiating between "Becoming the person I want to be" and the multiple "member of an identifiable profession" role models of identity and belief up to students. Through integration of "Exposing or disrupting identity or sense of self" and "Changing or revealing beliefs, attitudes, values" with other critical elements of the three "Becomings", the participants expressed their professional aspirations. Successful integrated learning should align with these (Dall'Alba, 2009a; Woodman et al., 2002) and make space for students to "try on" different identities (Ursel & Aquino-Russell, 2010). Students with personal views that sit uneasily within dominant discourses of practice may feel pressured to conform or compromise (MacLeod, 2011) which has value in some areas of clinical practice (safety for example), but tends to create tacit rules that are difficult to identify or question. Systems theory not only accepts difference but suggests that it is necessary for maximum opportunity for change (Bateson, 1979/2002); therefore, clinical educators and students need to regularly revisit and align their learning, beliefs and practice aspirations (Miles & Mezzich, 2011).

Motivation is recognised as a key driver of successful learning (Artino et al., 2010) and is usually attributed to beliefs about task value. The participants' integrations of "Exposing or disturbing identity" sometimes suggested that finding a future identity fit for all three "Becomings" was equally motivating:

> …I have loved my second placement in special schools and believe I may have found my niche. This makes me feel less bitter about my first awful placement because if it had gone well I may not have even agreed to go to the special school setting and would have missed out on such a valuable learning experience which may ultimately determine my career path for the next 20 years. (Claire 3)

Clinical educators choose clinical learning contexts for their perceived worth in meeting the learning outcomes of the program, but students who cannot overcome identity disruptions or scepticism about the future value of placements they do not like are disadvantaged in their

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learning. Jane's initial assessment of her experience on page 154 demonstrates this, and not all students would have the insight or perseverance she demonstrated to change this view later. As Figure 16 illustrates, context is critical for (Re)forming identity and influences all other aspects. The implications for an integrative coherent inner self approach to clinical education are that students need some choice and control over placement settings and frequent opportunities to review them in the light of their sense of self before healthy doubt becomes unhealthy disengagement.

The study findings suggest that participants do not separate self, affect and epistemological and ontological beliefs but see them as interconnected. Doubt straddled affect and cognition while motivation included attitudes, values and identity. From an embodied phenomenological perspective this is characteristic of our incomplete and interconnected experience of being (Merleau-Ponty, 1945/2002, 1948/2004) and the integration of epistemological and ontological elements. The lack of integration of "Exposing or disrupting identity or sense of self" with "Cementing or challenging theory or knowledge" by participants suggests that (Re)forming identity does not result from testing of the content of learning, but rather testing of associated beliefs, attitudes and values. Changes to epistemological beliefs require high self-efficacy (Bendixen & Rule, 2004) and changes to ontological beliefs require humility and constant self-assessment (Barnett, 2009). Substantial self-assessment, self-efficacy and probably humility were present in the smaller number of participants who were able to integrate "Exposing or disrupting identity or sense of self" with the other critical elements of their experiences. An embodied phenomenological systems theory approach to clinical education would be likely to increase awareness of human error and interrelatedness which may foster humility and self-assessment ability.

The smaller group of participants who recorded deeply affecting, ontologically challenging situations of "Exposing or disrupting identity or sense of self" sometimes used the word "soul" to describe their impact (see for example Liz, p. 164 and Jane, p. 195). These references to soul suggest the unique part of the inner self where clinical learning impacts on self-beliefs. The annotations suggest shaping of the soul through judgement of personal beliefs and awareness of alignment with virtuous values, in which the changed person *is* the outcome (Bishop & Rees, 2007; Jarvis, 2012). In linking the domains of practice-based learning to the inner self or soul, these participants have made visible the "inner ecology" (Bateson, 1991, p. 256) and immaterial-material links of an integrative dualist view of the lived soul-body (Goetz & Taliaferro, 2011).

In describing morally exemplary dentists, Bebeau and Monson (2012, p. 142) note that they possess an "internal compass" of internalised beliefs that allows them to maintain and develop

their values and identity. They create individual ways of being and becoming while remaining self-aware, self-critical and cognisant of external forces. Participants who described self-awareness and "(Re)forming identity" through challenges to their beliefs and sense of self appeared to be doing this too. This was encouraging but not universal and happened sometimes in spite of rather than because of clinical education experiences. The best way to nurture becoming is unknown but adopting the theoretical lens applied to this study and assisting clinical students to integrate their inner-outer, material-immaterial selves with learning across domains and contexts may foster transformative learning and mimic exemplary professionalism (Bebeau & Monson, 2012; Dall'Alba, 2009b; Illeris, 2014). Clinical students respond positively to excellent role modelling and mentoring (Bishop & Rees, 2007; Bonsaksen et al., 2013) and this possibly remains the most important element in shifting students' trajectories from doing and passing to being and becoming.

Disciplinary differences

The small numbers in the study meant that differences between Occupational Therapy and Medicine participants were indicative only, but Table 33 and Figure 18 (see next page) do illustrate some variability in how different contexts and critical elements were integrated. These patterns suggest that integrative clinical education needs to pay closer attention to some relationships and learning needs in each discipline.

When integrating "Building relationships", interpersonal interactions with the education team were most important for the Medicine participants while for the Occupational Therapy group, it was interpersonal interactions with clients (Table 33, Figure 18); however, since "Changing or revealing beliefs, attitudes, values" was often identified in interactions with patients for the Medicine group and "Building relationships" with supervisors was prominent for the Occupational Therapy group (Table 33), these differences should not be exaggerated.

Discussion Part One

Occupational therapy participants
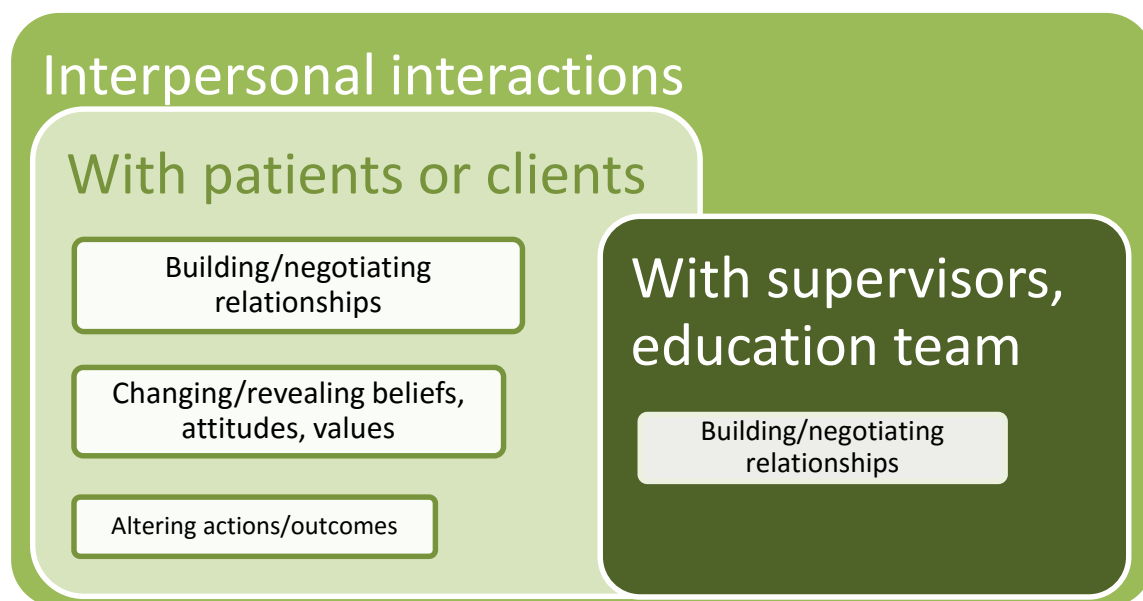
Medicine participants
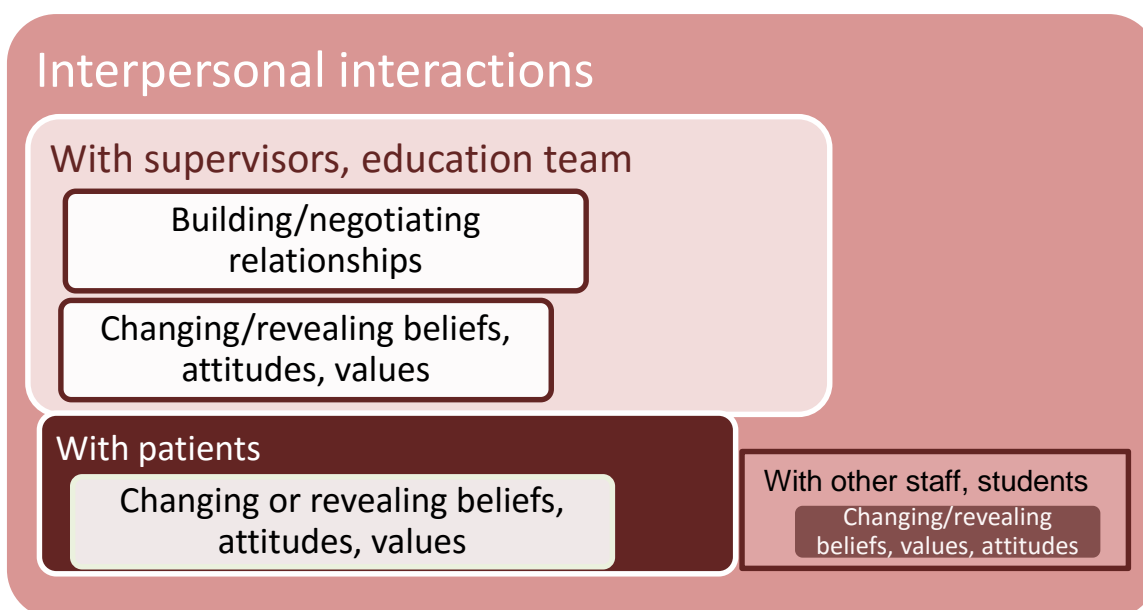
Figure 18: Most Frequent Experiences and Critical Elements by Discipline

An embodied phenomenological integrative dualist reading of the frequency and spread of integrations of "Altering actions or outcomes" and "Changing or revealing beliefs, attitudes, values" across participants from both disciplines confirms that, whether participants were fully aware of it or not, clinical learning was a whole-person body-mind-soul activity. The integration of these elements with "Building or negotiating relationships" or "Experiencing or transforming emotions" was more prevalent amongst the Occupational Therapy participants in interactions

with clients (Table 32, Figure 18). This difference may relate to the extended one-on-one time and daily life engagement the Occupational Therapy participants had with their clients and the disciplinary focus on building trust and rapport while helping clients reconfigure daily life (Bonsaksen et al., 2013). Balancing action and attitude in "Becoming a member of an identifiable profession" for these students meant building relationships centred around the client's concerns (McCance et al., 2008) as illustrated by Marble Rose:

> Actions/artefacts – listening – Professionalism: Being aware of oneself, experience, and acknowledged limits and scope of practice. An Occupational therapist conducting an initial interview with the client; listening actively is crucial as this could make or break the relationship with the client. (Marble Rose 1)

This indicates the value of using extended everyday caring as a way to improve integration of actions and attitudes for clinical students from all professions, a finding supported by studies involving nursing, occupational therapy and physiotherapy students (Clouder, 2005; Leathard & Cook, 2009; McKie et al., 2012; Ursel & Aquino-Russel, 2010).

"Cementing or challenging theory or knowledge" was only integrated with "Formal or informal assessment" by the Medicine participants who also integrated "Changing Beliefs, attitudes, values" more frequently (Tables 32, 33, Figure 18). This reflected strong awareness of appropriate attitudes and the perceived expectations of having relevant knowledge for assessment situations or diagnosis and treatment:

> I had to do [a presentation] and my attitude about doing it was quite negative. When I began to increase my knowledge about the topic I began to be very interested and my attitude changed. (Leah 1)

> You walk into the room quickly refresh in your mind what questions you need to ask, what to examine, likely causes, possible treatment and management plan. (Taro M 1)

These integrations and the many links to thinking/knowing in their propositions suggested the Medicine participants were more likely to be aware of integrating their attitudes through rational processes. The integration of thinking/knowing with "Changing beliefs, attitudes, values" and "Building or negotiating relationships" with role models in the education team reflects the emphasis on critical reasoning in medical practice (Edmondson et al., 2009). In the context of role model relationships, this integration also suggests conscious development of a well-defined perceived professional identity as future doctors (Bebeau & Monson, 2012; Monrouxe, 2010). Since ethical frameworks are based on critical reasoning, attitudes and values, there are also parallels with Malpas' (2011) findings of a strongly ethical dimension in

all medical students' perceptions of clinical interactions. These are strengths a systems theory integrative approach to clinical education could use to build self-efficacy and reflexivity for better integration of other domains (Cunliffe, 2009). Equally, students from other professions would benefit from having critical reflection and awareness of attitudes more strongly represented in integrated learning.

As noted in the data analysis, disciplinary groups exhibited some patterns in links between domains and words used within them. In matched pair analysis for example, links to the actions/artefacts domain and use of this domain name were more frequent amongst the Medicine group (Tables 22, 23). The more causal relationship between actions/artefacts and thinking/knowing (Table17) may indicate their heightened awareness of the direct effects of actions on thinking but also educational expectations that they will reflect on and change their actions through active experimentation (Clark, 2009). This may also relate to greater awareness of "right" actions for them in their interactions as part of a team and their perceptions of links from thinking/knowing to beliefs (Table 28).

Occupational Therapy participants were much more likely to use words related to self and doing, and to record the effect of emotions, especially on their actions and beliefs (Tables 22, 24, 28). This was correlated with the more widespread identification of "Altering actions or outcomes" across contexts for them, but particularly in relation to interactions with clients (Table 33). This probably reflects the practical nature of their involvement with the daily activities of clients and the emphasis on taking a wider socially engaged interest in clients' situations (Sakellariou & Pollard, 2012). Despite the small numbers, the three Occupational Therapy participants did tend to feature disproportionately more in the identification of "Exposing or disrupting identity or sense of self". While this may have been related to personal differences, the situations they recorded suggested that their placement experiences were often stressful:

> It is easy for me to reflect and see that how I have coped with whatever life has thrown at me in the past has been based on my attitude and beliefs and therefore at times I am able to foresee the outcome e.g. my placement at the moment is veryyyyyy challenging and I do not get on with my supervisor very well but I know I just have to work hard and prove myself and I'm sure it will turn out alright and be worth it in the end. (Claire 2)

Such encounters highlight the significance of adequate emotional support for clinical students who may have less self-belief than Claire and need to be able to explore practice dilemmas in collaborative safety (Penny & You, 2011).

Discussion Part One

Overall, Figure 18 strongly suggests that "Changing beliefs, attitudes values" while interacting with the education team is the central theme of "(Re)forming identity" in clinical learning for the Medicine group while "Building relationships" with supervisors and clients is central for the Occupational Therapy group. Given the factors noted in the preceding sections, this reflects the nature of the professions they are becoming members of, their clinical learning contexts and the way in which they are integrating "Becoming the person I want to be", "Becoming a member of an identifiable profession" and "Becoming ready to graduate". The points noted under each critical element suggest that while "Changing beliefs, attitudes values" and "Building relationships" are quite well integrated by both disciplines, there is room for improvement with the other elements. The researcher's systems theory embodied integrative perspective on this is that improving access to clinical wisdom would require paying equal attention to all elements.

Integration and map structure

The discussion thus far has explained how the three diagrams represent my interpretation of participants' variable awareness of integration of the contexts and critical elements of their experiences, and what this means for becoming and clinical education. These diagrams were generated from the participants' own interpretations of experience in annotation and proposition texts. It remains to consider their primarily perceptual interpretations found in the visual structures of the maps and what they suggest about integration, clinical education and clinical wisdom.

In the structural analysis, the positioning of the domains indicates participants' perceptions of domain integration and importance. For example, the placement of emotions/feelings in the upper more peripheral areas of maps suggests they were perceived to be part of the ideal world of new and known elements of clinical learning, exerting a disrupting rather than a unifying influence (van Leeuwen & Kress, 2011). This is consistent with the propositions which present them as outcome more often than agent. The frequent annotations of these connections, the most for any single domain (Table 25), and the identification of "Experiencing or transforming emotions" in annotations as sources of tension, confirm the structural analysis of this domain placement. Similarly, the more frequent placement of Actions/artefacts in the "known" half of maps suggests a more concrete conceptualisation of this domain, which is reflected in the particular words chosen when describing actions/artefacts (Table 12) and in the recognition of altered actions as a critical element of clinical learning.

Positioning patterns over time are also of interest. The spread and frequency of propositions between domains indicate that in most cases links were perceived to persist unchanged or to increase (Tables 9, 10, 11). Even if, as in Liz's case, evaluation of the use of the tool suggests little effect, the structural changes or lack of them suggest that participants had to learn to express and integrate conceptual and experiential processing of learning as domain integration. Structurally, the most consistent pattern over time was toward a network form (Table 2) that included connections within and to emotions/feelings, which were present in all three maps for all but one participant (Table 11). This aligns with the frequent integration of "Experiencing or transforming emotions" with other elements and all contexts (Figure 17, Tables 32, 33). There is also alignment between the most frequently identified critical element from the annotations, "Changing beliefs, attitudes, values" and the greater number of propositions associated with the attitudes/values and beliefs domains (Tables 11, 33). These findings suggest that the map structures reflect coherence and expanded meaning when the different modes of thinking conceptually and experientially about clinical learning are used together.

Discussion Part One

The key to increasing the value of repeated conceptual-experiential, integrative, embodied self-evaluative mapping as a clinical learning tool may be identifying and changing the drivers proposed in Figure 10. This C-map® of map structure (page 87) theorises that the different map structural features and depth of engagement were produced by the five pink drivers of map organisation; significance of context, domain and domain integration, concern with depicting processes versus relationships, and linear or non-linear thinking. The participants' propositions and annotations largely supported this, but the evaluations suggested additional impact from the perceived value of mapping for learning.

A systems theory approach to Figure 10 suggests that more linear modes of thinking and concern with depicting processes rather than relationships generates a more chain-like structure and less complexity. In matched pair analysis the Medicine group appeared more aware of processes and causal links (Table 24). Almost all of the more linear causal connections between concepts were found in propositions made by Medicine participants (Table 17), especially Leah and Taro M who used words such as "causes", "changes" and "improves" in each map to connect all domains. These participants' maps had more chain-like structures. Mary and Sarah-Jane also included causal connections in their more complex maps. Generally, the annotations of participants who used predominantly chain-like structures supported a more linear and less integrated way of depicting their experiences but this was not an absolute correlation. Many of Leah's annotations were highly integrated and often deeply reflective. Similarly, Liz's first map had a simple linear format with a number of more process-type connections, but these connections were often only conditionally causal. Her second and third maps were more complex and had more associative links, suggesting a shift from focusing on processes to focusing on relationships between domains.

Overall there is alignment, but also points of expansion and difference between map structure and content, as one might expect when attempting to capture and integrate relationship complexities and layers of meaning (Tufte, 2006). The critical element and context relationships in Figures 16, 17, and 18 share common connecting factors with the patterns of structure (Figure 10) and propositional linkages in the maps (Tables 10, 11) suggesting that there is a coherent relationship between narrative and visual map elements (Tufte, 2006). The combination of conceptual and logical expression and the collaborative input into the interpretation makes the study map/diagrams neither wholly visual nor verbal (Buckley & Waring, 2013) which has perhaps allowed the close links to the annotation content to create a synergistic rather than an ambiguous overall effect.

Summary

Clinical learning holds the identity of the becoming student, professional and person in its power. Monrouxe (2010) suggests that medical students construct their identities depending on whether they view different professional and personal identities as separate and simple, or more inclusive and complex. Perceptions of group membership, professional participation and becoming, and the context of interpersonal interaction are central to identity formation for students from all clinical disciplines (Bebeau & Monson, 2012; Bonsaksen et al., 2013; Dall'Alba, 2009a; Lave & Wenger, 1991; Monrouxe, 2010). Viewed through the researcher's theoretical lenses, the study findings support this; interpersonal interaction with patients or clients and with supervisors and the education team, the "who" and "what" of clinical learning, was the primary context of identity formation (Figure 16). The critical elements "Changing or revealing beliefs, attitudes, values" and "Building and negotiating relationships", dominate the intersecting aspects of "(Re)forming identity" and highlight the synergies and tensions between "Becoming a member of an identifiable profession", "Becoming ready to graduate" and "Becoming the person I want to be" (Figure 17). The degree to which these elements merge conceptually and experientially was expressed in participants' more or less integrated personal and professional senses of self. The use of subjective personal pronouns (Table 31) confirms Monrouxe's (2010) suggestion that students who internalise or "own" aspects of their identities are more likely to be able to use personal stories to illustrate this.

From a systems theory perspective, the implications for clinical learning can be summarised in one word: integrate. To do this effectively clinical education must embrace intuitive and rational thinking systems, restore the physical bodily and inner self systems to practice-based learning, and find better ways to support social systems of belief, attitude and values development. The predominant critical element "Building and negotiating relationships" with supervisors and the education team suggests that all the contextual clinical learning systems need to model self-awareness of identity and becoming as everyday aspects of whole-person clinical practice (Jarvis, 2012).

From an embodied phenomenological perspective, the absence of the body from identity formation was confirmed by the findings. To support whole-person integration, clinical education needs to pay more attention to the relationships between intuitive and rational processes, between bodily awareness, sense of self and being, and between physical bodies and relationships with others (Barnacle, 2009; Bateson, 1991; Dall'Alba & Barnacle, 2005; Leathard & Cook, 2009; Myers, 2010; Shahjahan, 2005).

Discussion Part One

From an integrative dualist perspective, the most significant implication of the findings is that educating for identity is a whole-person process (Jarvis, 2012) with inner self consequences. Integrated clinical learning must watch over what Bishop and Rees (2007, p. 397) call "…the state of the soul…" of all students and seek to avoid battering it.

> Soul self – visible self: I started writing in here and then deleted it all, about being invisible and having the wrong visible self. I deleted what I wrote as it is too personal and still the comments hurt from the midway about my visible external self being so wrong or inappropriate. I know they are taken out of context but that someone has the power to do that has left me with a large distrust of the system and I don't really trust saying my truth even here where I've tried to be honest. (Jane 2)

Every experience modifies the character and dispositions taken forward into future experiences (Dewey, 1938/1997); therefore, it is up to clinical educators to ensure that learning integrates body, mind and soul, providing enough control to maintain engagement and support future learning and professional becoming. With or without an integrative dualist view of body-mind-soul, the findings from this study suggest that students see the inner self or soul as part of this process, especially when integrating critical elements in a way that increases the likelihood of access to clinical wisdom.

Chapter Eight: Discussion Part Two

Clinical wisdom

Introduction

The findings from this study, particularly the map structures and the critical elements of "(Re)forming Identity" suggest that clinical learning is about changes in the affective, psychomotor, cognitive, beliefs, attitudes and values domains which lead to changes to identity and sense of self. This extends Åkerlind's (2008) model of conceptual expansion considerably since the "Becomings" include change or alteration, revelation, cementation, transformation, negotiation, disruption, challenge and exposure in all these areas (Figure 17). As a dynamic, collective and individual verb, "integrated learning" is more inclusive of all these elements and has the advantage of already existing in the literature around both general experience and practice contexts (Jarvis, 2012). In this section, evidence from the study findings for integrated learning and how this might relate to clinical wisdom is discussed. A proposed theory of clinical wisdom access and a role for the soul as the potential mediator of this based on the researcher's position is then presented.

Integrated learning and clinical wisdom

Integrated learning, as the findings from the study demonstrate, is about being and becoming. It is more than knowing what or how and more than simply experiencing and reflecting. While all participants were able to make connections between the affective, psychomotor, cognitive, belief, attitude and value aspects of practice, only some were aware when and how these elements were all linked together in particular circumstances. The premise of this thesis is that it is integration of this kind that is linked to clinical wisdom. In this section the findings are used to support this premise.

The integration of the two sets can be called holistic because it includes "The Who, What and Where of Clinical Learning" and the process of "(Re)forming Identity" which is the "how". This has parallels with Esbjörn-Hargens (2010) description of integral pluralism as a multiple who, what, how enacted relationship that explains ontologically complex phenomena like clinical wisdom. The clinical learning context includes all the non-human components of practice (the what and where), but it is the relationships (the who) and the way the participants feel, think and act according to their beliefs, attitudes and values (the how) that are most significant for identity development (Taylor, 1989). The critical elements identified from the participants'

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experiences, "Altering actions and outcomes", "Building or negotiating relationships", "Experiencing or transforming emotions", "Changing or revealing beliefs, attitudes, values", "Exposing or disrupting identity or sense of self" and "Cementing or challenging theory or knowledge", almost all concerned interpersonal contexts (Figure 16). Clinical wisdom, however it is conceived, is an interpersonal entity, apparent when clinicians are interacting with others, especially patients or clients. The "who" contexts of clinical wisdom and clinical learning are the same. Other contexts of clinical learning identified from the participants' annotations such as "Challenging situations" and "Formal or informal assessment" are similar to practice situations in which clinical wisdom is needed by virtue of their complexity, ambiguity, unfamiliarity or all three (Edmondson et al., 2009; Kinghorn, 2010; McKie et al., 2012). This suggests that clinical wisdom, like clinical learning, requires integration of a number of critical elements within the interpersonal context.

The descriptions of clinical wisdom in the literature correlate with most of the critical elements noted in this study but some have been overlooked because of the focus on identifying or investigating personal characteristics. For example, phronesis or practical know-how includes actions and the use of knowledge based on attitudes, values and sometimes beliefs (Kinghorn, 2010; Leathard & Cook, 2009), but it omits the body, emotions and identity. The depiction of clinical wisdom as a personal trait views identity, beliefs, values and attitudes as individual pre-disposing internal characteristics that facilitate the use of clinical wisdom for the "Who, What and Where" of the context (McKie et al., 2012). By contrast, the study findings support the view that the contextual and experiential elements from all the domains interact in clinical situations, and dynamic, unique combinations of these elements must be integrated in a given situation. This integration cannot be replicated exactly since it is unique to that moment, but personal traits may enhance awareness of these critical elements to increase the integration proposed to allow access to wisdom, which may in turn change personal traits.

Thus there is a fundamental difference between viewing clinical wisdom as an individually possessed character trait and viewing it through the researcher's theoretical lens as information, accessed through moment-by-moment dynamic interaction of all the human and non-human individual and collective factors inherent in a system (Hays, 2010). The information view explains both the elusive nature of clinical wisdom and why it can be transient, unexpected or even uncharacteristic of an individual or situation. If context or a relevant interacting element is not integrated, an interaction may not lead to clinical wisdom being accessed even if other elements are present.

Although many theories of clinical wisdom focus on cognitive aspects such as decision-making (for example Jenkins & Thomas, 2005), in the analysis of the participants' annotations

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"Cementing and challenging theory or knowledge" was less frequently integrated than other elements. Outcomes of clinical wisdom in the literature such as the ability to use tacit knowledge and intuition and the ability to balance needs, be self-reflexive and seek inner transformation (Cunliffe, 2009; Edmondson et al., 2009; Haggerty & Grace, 2008; Kinchin et al., 2008b; Kuczewski, 2007; Myers, 2010) are all represented in the critical elements of integrated learning, particularly in "transforming emotions", "revealing beliefs, attitudes, values", and "exposing or disrupting identity or sense of self". Rather than being character traits or dispositions, they can be interpreted as processes producing a context-dependent outcome, which may be integrated learning alone or learning plus access to clinical wisdom.

Background to theory development

The theory of clinical wisdom proposed here began with the work of Åkerlind (2008), who describes conceptual expansion as the increased understanding of a cognitive concept as a result of changes in the parts to whole relationship of the concept's various elements. These changes produce increased differentiation between conceptual elements, a fundamental premise in the theory of variation developed by Marton (2000) and Marton and Booth (1997). This theory suggests that as people interact with the world they reconstitute pre-existing "relevance structures" (Marton & Booth, 1997, p. 143) through simultaneously experienced variations in the critical aspects of a phenomenon (Pang, 2003). Variation theory extends this process to the ways variations of critical aspects of a phenomenon are experienced by learners (Pang, 2003).

Dahlin (2007) suggests that conceptions of experience generated from perceptual judgement are different from conceptions of understanding generated from rational or theoretical judgements. A suitable conceptualisation of clinical wisdom requires changes in cognitive *and* perceptual concepts, but also psychomotor and affective "concepts" that might change during experiential learning. The simultaneity of these changes during the deployment of previously acquired learning in complex situated clinical learning aligns with Roegier's (2007) descriptions of integrated pedagogy; therefore, integrated learning is proposed as the process that brings together all these elements and may lead to clinical wisdom.

Wisdom as an external resource

The theorisation of integrated learning and clinical wisdom proposed in this thesis began with systems theory depictions of wisdom (Hays, 2010) and the work of Bateson (1972/2000, 1979/2002, 1991), who distinguished between knowledge (what people interpret information to mean) and information (what is available to be interpreted). This led me to consider whether (in line with my theistic view) clinical wisdom might be a larger external resource of information.

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Conceived of as a personal attribute, clinical wisdom is an individual and human-specific knowledge-based capacity. Alternatively, clinical wisdom could be a pattern-based resource made up of all the elements of a situation, living and non-living, physical and meta-physical, and the temporally shifting relationships between them. From a phenomenological point of view, if all the elements were totally accessible, a situated being would be able to grasp each moment perfectly to think, feel and act appropriately; however, the human condition permits only partial access and varying degrees of connectedness to the living and non-living (Merleau-Ponty, 1945/2002). This constantly changing nature of unique situations more accurately describes the way clinical wisdom is experienced in practice.

Clinical wisdom fits the description of an ontologically, methodologically and epistemologically multiple object with intrinsic, recognisable features that are knowable by the senses, conceptualisation and indirect measurements (Esbjörn-Hargens, 2010). It is understood to be *some*thing distinct even if approached in different disciplinary ways. Because it bridges the ontological and the epistemological but is never definitively described or completely reached, it accommodates Platonic, philosophical and scientific paradigms (Gadamer, 1996; Jaspers 1971). Some understandings of clinical wisdom acknowledge cognitive and emotional connections, knowing and being as significant (for example Edmondson et al., 2009; McKie et al., 2012), but the switch from personal attributes and knowledge structures to multiple interacting elements is a fundamental shift from an internalised to an externalised locus. This shift allows clinical wisdom to be approached through different methodologies, ontologies and epistemologies that overlap. It is still a recognisable *some*thing, but also multiple.

Access to wisdom

In describing the distinction between dynamic interactive structures such as wisdom and the fixed structures of knowledge, Bateson (1979/2002) uses the analogy of territory (what exists) and map (the coding, classification and transformation used by people to describe and explain territory). In the proposed theory, wisdom is territory - an independent, external pre-existing body of dynamic information including fundamental truths about the origins and patterns of existence and relationships of everything known and unknown. This transcendent whole territory of wisdom also includes "meta-pattern" information (Bateson, 1979/2002) which explains integration, unquantifiable relationships and illogical experiences. Knowledge is the maps made of this territory by living and possibly non-living things; knitted together by a sacred unity between epistemology and ontology, these maps are parts of an indivisible whole that Bateson (1991) called "mind".

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Conceived of in this way, wisdom contains all the information about the nature and relationships of everything, having depth and expanse that is only intermittently and imperfectly accessible to human consciousness. This suggests that it also includes what is unknowable and eternal (Jung, 1925/1963). Like Hays' (2010) ecosystem, I see wisdom as dynamic, so it can be viewed and explored from an infinite number of perspectives by different living things to create unique maps. Interactions with the non-living and between living creatures are important opportunities to access wisdom and create new maps. These interactions include perception, which Merleau-Ponty (1964/1968) describes as always aware of, and grasping at, the transcendent whole but only ever apprehending the knowable. Access to wisdom would therefore involve discrimination of difference and patterns (Bateson, 1972/2000) but also doubt and uncertainty which are fundamentals to learning and person-centred relationships (Bendixen & Rule, 2004; Jarvis, 2012; Shapiro, 2008).

The power to doubt arises from imperfection and our ability to imagine nothingness, but because our free will exceeds the scope of our knowledge and self-knowledge, we are at risk of deception and poor choices (Descartes, 1641/1964). This raises the possibility of evil and of evil wisdom which Leibniz (as cited in Saw, 1954) described as essential for free will since it maximises possibility and existence. From my theoretical position, it is essential that the false, imperfect, evil or non-truth resides in wisdom for it to include all information. Wisdom needs no moral or ethical definition or content unless it is internalised. From Leibniz's theory one can conclude, as Jung (1925/1963) does, that wisdom contains the absolutely unknowable and nothingness, which is at the root of all fear and anxiety for human beings (Gadamer, 1996). This is pivotal for my person-centred view of clinical wisdom since death and illness represent the potential to experience both the unknowable and nothingness.

If clinical wisdom is conceived of as an internal attribute it becomes associated with convergent, specific and predictable human processes, values, behaviour and knowledge (Bateson, 1979/2002). By contrast, if clinical wisdom is an external body of information that all living things can access it may be linked to divergent, generic and unpredictable processes. Bateson (1979/2002) suggests that people tend to focus on quantity rather than pattern, mistakenly mapping dynamic unpredictable pattern-based systems such as perception onto discontinuous, predictable quantity-based structures such as images. To create reliable depictions of reality people unconsciously fill the gaps between patterns and structures (Bateson, 1979/2002). The error of mapping the continuous, unlimited dynamic pattern-based body of information of wisdom onto discontinuous, delimited quantity-based internal knowledge structures may explain why efforts in the clinical literature to pin wisdom down to particular kinds of knowledge or specific attributes have been unsuccessful.

Socrates, Einstein, Augustine, Descartes, Jaspers and Jung have all indicated that where wisdom is concerned, doubt and acknowledgement of being out of one's depth about the deeper order of life is the only certainty. Each of these men exhibited access to the deep meanings and patterns of life but such access can equally appear unpredictably and in the most unlikely individuals, as when children access wisdom through syncretic sociability (Merleau-Ponty, 1960/1964). From my position, only a pattern-based systems view of wisdom can accommodate this.

Clinical wisdom as an external resource

Similarities between attributes of clinical wisdom presented in the literature and the proposed accessible information view of clinical wisdom are evident, but what is different is location and nature. As an external resource clinical wisdom would be beyond complete comprehension, independently existent and accessible only as information for the moment. Individuals' knowledge maps would modify future interactions with this resource, potentially increasing awareness of integrated critical elements in clinical situations. Repeated access to clinical wisdom would be expected to produce consistent whole-person and collective learning in practice contexts.

Emphasis in the clinical wisdom literature on metacognition, intuition, mindfulness and spirituality has led some to conclude that wisdom is an attribute of the scholarly, deeply empathetic and spiritually aware (Leathard & Cook, 2009). This view of clinical wisdom implies ontological elements of being which cannot be explained scientifically. The primary goal of science is to increase knowledge (Gadamer, 1996) but it cannot effectively tackle the nature of being because it is "…not amenable to unequivocal and unanimous statement" (Jaspers, 1971, p. 34), the very thing that science aims for. This perhaps explains why clinical wisdom has been framed as a capacity connected to thinking and knowing since these fit more comfortably within a scientific discourse (MacLeod, 2011).

If clinical wisdom were an accessible external resource it could accommodate ontological, scientific and other human paradigms as parts of a larger system, about which there are theoretically justifiable ways to think. Integral pluralism is based on the idea of an enacted relationship between ontological, methodological and epistemological pluralisms. This allows complex phenomena to exist somewhere between single and multiple objects and yet retain intrinsic, recognisable features that span different approaches to them (Esbjörn-Hargens, 2010). Climate change, for example, can be known directly by the senses, cognitively by abstract notions and indirectly by various measurements; it is "known" by different disciplinary specialists in different ways, and yet understood as *some*thing distinct from other things

(Esbjörn-Hargens, 2010). Similarly, there are likely to be multiple ways of knowing in clinical wisdom since wise clinical action can be described as maximum perceptual presence intertwined with moral capacity and acceptance of the deficiency of knowledge (Chan, 2005). Even without the enactment aspect of Chan's work, clinical wisdom appears as an ontological, epistemological and methodological pluralism accessed in many ways.

In summary, this thesis proposes that clinical wisdom is an external resource that includes all the information relevant to a particular moment in any clinical situation. This is accessed by the integration of context and all the unique, situated, interacting critical elements associated with the five domains. The logical question that follows is how this happens and, in this context, what this implies for clinical education. If wisdom was knowledge then it would be accessed using the mind, meta-cognition and intuition. If it spans other domains, accessing it will mean including affective, meta-physical and psychomotor or bodily individual capacities, and perhaps collective or environmental processes.

Support from the findings

Since the participants in the study were students, one might expect them to have accessed clinical wisdom less frequently than expert practitioners; however, an important aspect of the proposed theory of access to clinical wisdom is that each combination of elements and context is unique and constantly shifting. For this reason, access to clinical wisdom cannot be predicted even though it may be more likely in some situations than others. The significance of all contextual and human elements of interaction suggests that it may be any or all of the student, client or supervisor who accesses clinical wisdom in an interaction or not.

This theoretical view does not make identifying access to clinical wisdom in clinical learning easier. Outcomes such as empathy, personal transformation and increased depth of relationship are either subjective or cannot be adequately measured. In a clinical learning environment, the best evidence of clinical wisdom access by students would be from interpersonal outcomes such as patient or client satisfaction and constructive interactions (Haslam, 2007; Neumann et al., 2011). Internal changes such as increased emotional congruence (O'Callaghan, 2013), motivation (Artino et al., 2010), belief in person-centred care for others (Clouder, 2005), greater self-awareness and differentiation of the "Becomings" (Bonsaksen et al., 2013; Seidel et al., 2007) may produce or result from this access. The study findings suggest that the connection between internal and external change is not temporally linear or predictable. This fits with the theory of clinical wisdom access but does not help identify it.

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In support of the theory that wisdom access arises from integrated learning, two annotations from the same participant show where three or more elements indicate integration. The first suggests that clinical wisdom has not been accessed in the situation:

> …I am a relational learner - there has to be some buy-in from both teacher and student for me to learn. There was one attachment last year where staff didn't even bother to learn my name. I gave minimal effort in return and felt like I learnt very little. Whereas, the general surgeons here at X allow me to go to theatre with them every time I am free, including evenings and weekends and sometimes they teach me how to assist and operate. (Liz 2)

The second (Liz 2 on page 125-126) suggests it has. In both examples the context is "Interpersonal interaction with supervisors or the education team" and the critical elements "Building or negotiating relationships", "Changing or revealing beliefs, attitudes, values", "Altering actions and outcomes", and "Exposing or disrupting identity or sense of self" are identifiable. The second also includes "Experiencing or transforming emotions". Indicative of the absence or presence of access to clinical wisdom are the attitudes and motivation of the participant and positive outcomes for the others. In the first situation the participant has withdrawn from engaging with the "Who, What and Where" of context. Consequently, her attitudes, beliefs and sense of self have been revealed but not challenged or changed. The likely effect on becoming would be reinforcement of what already exists. In the second situation there is evidence of engagement, a challenge to values or beliefs and awareness of a sense of self. This has led to action in becoming the professional and the person she wants to be and positive outcomes for others. Viewed through the researcher's theoretical lens, these differences highlight the significance of the dynamic interaction between contextual and critical elements to create the integration at the heart of the proposed theory.

Other examples of similarly interpreted integration of different elements and apparent access to clinical wisdom can be seen in the annotations of Claire (pp. 126, 168), Leah (p. 155), Marble Rose (p. 184), Shelly (p. 150) and Adele (p. 176). The outcomes for the students, clients and others are different in every example which supports the theory by demonstrating the multiple and sometimes very specific ways in which the use of the "right" information at the "right" time is context and critical element specific. With students, these outcomes may not always be visible since changes to beliefs or values take time. The findings suggest that these outcomes of integrated learning emerge gradually as "Becoming the person, professional and graduate I want to be".

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A mediator of access to clinical wisdom

Bateson (1979/2002) presents the body as a physiological and physical self-regulatory system that detects, corrects and maintains. Mental processes are similarly self-organising, inseparable from the physical structures they take place in, and part of a single unified "mind" (Bateson & Bateson, 2005). While not identifying a definite regulator of these processes, the need for an interfacing agent between the mental and the material is noted (Bateson & Bateson, 2005). Similarly, Jung (1983) presents the balance of opposites in self-regulating systems as central to psychology. The strong resonance between Bateson and Jung suggests that both inner and outer worlds have the same fundamental pattern types based on similar origins and truths.

From my perspective, the regulator of mental and psychological processes needs to be a material-dependent and independent internal entity capable of producing patterns of being and doing. The soul is a potential candidate for this role and for mediating access to wisdom because it can be used to describe the hidden, inner self of which there is only limited self-awareness but which has a functional role in our interactions with the world and in shaping character and behaviour (Goetz & Taliaferro, 2011; Jung, 1933/1959; Merleau-Ponty, 1964/1968). This possibility is discussed in the next chapter.

Summary

This section has considered the possibility that while clinical wisdom is usually framed as certain human cognitive and meta-cognitive abilities and qualities associated particularly with rational capacities such as decision-making, this is not the only way to theorise it. Based on a theistic, realist worldview and interpretation of the study findings, it has been suggested that, clinical wisdom can be considered to be a multiple object and dynamic external resource of information about all the interacting systems contributing to a clinical situation, rather than an internal attribute. As a multiple yet identifiably distinct entity, clinical wisdom could be accessed differently by individuals. Integration of the contextual and critical elements represented in Figures 16 and 17 is proposed to be the key to this.

While investigations of external factors contributing to clinical wisdom have focused on teaching, curricula and the clinical setting (Delany et al., 2013; Edmondson et al., 2009; Penny & You, 2011), the internal processes of student being and becoming have received less attention. The study of clinical wisdom in this thesis took the idea of purely cognitive conceptual expansion (Åkerlind, 2008) and extended it to whole-person learning by asking the participants to focus on the connections between learning in all domains as experienced in practice. All participants were able to identify links between domains and some were able to

integrate critical elements and context, supporting the theorising of clinical wisdom as an accessible resource. The mediation of the internal processes of this integration is the focus of the next section.

The role of the soul

Introduction

It has been suggested in preceding chapters that clinical wisdom can be viewed as an external information resource accessed through internal integration of one's beliefs, values and attitudes with the multiple ways of knowing and learning, including cognitive, intuitive, affective and bodily. Earlier in the thesis I stated that from my systems theory, embodied phenomenological integrative dualist perspective, the soul or inner self may be viewed as an agent and co-ordinator of interaction with other human, non-human and immaterial systems. Integration is a process that fits within this role and since the soul as an inner self has been referred to by participants who appear to have achieved this integration, it is possible that the soul may mediate access to clinical wisdom. This section explores this possibility. Based on a review of literature on the soul, its place in clinical learning and the theories of Jung, a model for the function of the soul as integrator and mediator of access to clinical wisdom is presented.

The soul in the literature

From Plato until now, a number of different complex understandings of the soul and its relationship to individuals, others and the cosmos have been proposed. Recurring themes are: the problem of the irreducibly subjective nature of mind, spirit, and soul; the immortality or not of the soul; views of the soul or psyche and body as independent or inextricably intertwined with each other and the world (Bateson & Bateson, 2005; Descartes, 1641/1964; Jaspers, 1971; Jung, 1933/1959; Saw, 1954; Merleau-Ponty, 1964/1968; Guthrie, 1971). Fundamental tension exists between views of the soul as the origin of being (psyche) or the seat of thinking (nous), even though they cannot be separated or defined empirically (Gadamer, 1996/2000). This tension persists in the struggle of philosophy and science to integrate and give meaning to differing interpretations of the self and the ambiguous nature of being (Jaspers, 1954). Strong debate continues about the relationship between the soul and the body. Theories of brain-mind-body interactions based on advances in neuroscience promote the physicalist view while dualist views of a material body and immaterial soul are still widely supported (Green, 2005). As Gadamer (1996, p. 165) puts it, we remain "a profound enigma" to ourselves and others. Somehow all of these views of the soul must be respected and recognised as pieces

of an incomplete and unsolvable puzzle that is personal identity and transformation (Goetz & Taliaferro, 2011).

The soul in clinical learning

Poole et al. (2012) suggest that one's clinical practice is changed by reconstruction of an inner system of beliefs about oneself as a professional, while Kuczewski (2007) proposes that integrating values into practice unites heart, soul and mind to create transformational professional becoming. Clouder (2005) states that personal transformation of thought and action arise from troubling experiences that test self-awareness and emotional maturity, such as those experienced by Jane (pp. 154-155, 183). When such situations create moral epiphanies and exploration of deeply held values and beliefs, the soul is touched (Mason, 2007). Bishop and Rees (2007) see this transformation as practice and becoming together changing the state of the physician's soul, which they define as "…the sum of the intellectual, the emotional, the psychological, the will and the desires" (p. 397). While this definition is comprehensive, the soul is also embodied and the unifier of all internal experience, separating us from each other and to some extent from our own bodies (Gadamer, 1996). The shared thread in this literature is acknowledgement that the soul is central to (re)forming identity and the process of deep personal change.

Despite this, the clinical professionalism literature discussing integration of volitional, moral, emotional and ethical aspects of practice with beliefs, values, thinking, feeling and behaviour does not usually mention the soul. Dilemmas associated with balancing selflessness and self-care (Bishop & Rees, 2007; Clouder, 2005), logical problem-solving and values (Mason, 2007), perceptual, belief-based and conceptual intellectual virtues (Marcum, 2009) and evidence-based practice, personhood and fiscal responsibility (Bogdan-Lovis et al., 2012) suggest this integration requires addressing contradiction between internally held beliefs and experience. Psychologists call such contradictions "*script violations* or *script-inconsistent events*" (Poole et al., 2012, p. 3, [italics in original]). The study participants provided some good examples of this (see Leah and Marble Rose, p. 184). While resolution of such conflicts has been theorised using emotionally connected models of thinking (e.g. Poole et al., 2012), explicit strategies to explore values and create emotional congruence (e.g. O'Callaghan, 2013) and whole-person learning (e.g. Jarvis, 2012), these all imply an inner self. This thesis contends that the soul is this person and that despite an ambiguous and incompletely graspable nature, its function as integrator can be theorised and investigated (Hankinson, 2009).

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Philosophical framework

This section presents the philosophical framework for the proposed theoretical model for the function of the soul. The theories of Jung, developed from years of thinking deeply about his interactions with patients, are relevant to clinical wisdom. Additionally, his archetypal system and aspects of the unconscious life suggest underlying fundamental truths about the nature of being which fit the researcher's theistic, realist worldview and an integrative dualist view of the inner self (Goetz & Taliaferro, 2011). These theories underpin the proposed functional role of the soul as a mediator of access to clinical wisdom.

Ashwin (2012) stresses the importance of clearly stating the ontological and epistemological premises that are the frame of reference for theory. The first of three premises behind the proposed theory is that access to clinical wisdom is unrestricted but not automatic. Bateson (1972/2000) has described the learning organism as one that can look in the right places in the right order for the right sort of information. The "right" search patterns for accessing clinical wisdom require a unique capacity to integrate context and critical elements at individual, collective and systemic levels (Bateson, 1972/2000). For an integrative dualist this includes unity of material (structure), immaterial (soul or form) and vital (spirit). Meta-conceptual unities such as wisdom can only enter the living world through their qualities or attributes and not through cognitive concepts (Bateson, 1979/2002), so wisdom can only be accessed through meta-cognitive immaterial entities such as the soul. This premise underlies the model presented and the theory supporting it.

The second premise is that the inner self or essence of a person includes both soul and spirit. Dictionaries define soul (psyche) and spirit (pneumos) similarly or interchangeably as intellectual, moral and emotional powers or the vital or animating principle of living beings (Oxford English Dictionary, 2014), but the two words have different origins; spirit from the Latin spiritus, breath, and spirare, to breathe, and soul from the Old English sawal. This may explain why their use in psychology and religion differs (Thomas Moore, 2010). The psychological framing of the soul is discussed later, while the following verses from the Old Testament illustrate one religious view:

> …my soul thirsts for you… My soul will be satisfied… My soul clings to you…
> (Psalm 63:1, 5, 8, NIV)
> …renew a steadfast spirit within me… grant me a willing spirit, to sustain me.
> (Psalm 51: 10, 12, NIV)

This view portrays soul and spirit as one inner self but functionally different. The soul is the thinking, evaluating and doing inner self while the spirit is the emotionally responsive, intuitive

and volitional inner self. A corollary of this can be found in Plato's suggestion in The Laws that the soul is the causative agent behind goodness and beauty (Plato, 360 B.C./1970). Descartes (1641/1964) too depicts the soul providing the sober judgement needed to prevent plunges into error.

Through self-reflexive conscious and unconscious processes of responsiveness, intuition, volition and meta-cognition, the soul and spirit discern and evaluate the trustworthiness, significance and relevance to self of qualities and attributes, and integrate or exclude them from character, values and beliefs. There is no imperative for the qualities and attributes to be virtuous or socially acceptable, even though philosophers from Plato (Field, 1961) to Descartes (1641/1964) believed that the soul of man ultimately seeks a higher good. An integrated soul-spirit inner self can explain changes to doing and being but because the self changes constantly the direction of becoming is unpredictable (Spinelli, 2005). Bishop and Rees (2007) maintain that this becoming involves the soul of the clinician constantly negotiating the tensions between the needs of self and others. To depict this within a systems theory framework, the functional soul model needs to accommodate integration of changes to character, attitudes and beliefs within unpredictable internal and external systems.

A final philosophical premise concerns immateriality and immortality, which are part of a theistic worldview of the soul. Plato believed the soul to be self-activating, immortal and bound for heaven or Hades (Plato, 380 B.C./1974). There is no convincing scientific reference point from which to dispute this (Goetz & Taliaferro, 2011; Hankinson, 2009), but equally, it need not be discussed in theorising the function, rather than the nature, of the soul-spirit complementary unity. Despite this, I readily acknowledge that many theorists reject the existence of any sort of soul.

The soul as mediator of access to clinical wisdom

A mediator can be understood as whatever integrates, co-ordinates and controls aspects of being and doing such as cognition, behaviour and values to allow higher order capacities such as clinical wisdom to exist. In the literature, other human functions or entities such as the embodied intellect or "mind" are frequently espoused as mediators of clinical wisdom. I would suggest there are four main arguments against this:

a) Mediation is of a higher order than thinking and cognition.

As Bateson (1979/2002) explains, even as components of the meta-pattern of "mind", thought and cognition are of a lower order than meta-cognition. Meta-cognitive integration that includes the bodily and affective also requires non-cognitive skills such as "perceptual virtues… innate

skills, which can be developed through training" (Marcum, 2009, p. 255). The practiced use of such skills can result in the formation of beliefs, suggesting a meta-cognitive link between beliefs and the psychomotor (Marcum, 2009). Both volitional psychomotor activity and our unnoticed, pre-reflective bodily interaction with the world that is the background to our subjectivity influence integration of external experience with the inner self (Carel, 2011). Additionally, capacities like empathy that enact values reflect embodied, affective and cognitively integrated connection of general beliefs and attitudes with specific, difficult situations (Mason, 2007). Cognitive capacities alone cannot account for this.

b) Whatever facilitates wisdom or access to it must be able to negotiate systemic imperfection and error.

Access to clinical wisdom needs to be possible and to improve, despite repetitive patterns of imperfection and error in all human processes and learning (Bateson, 1979/2002; Shapiro, 2008). In clinical practice the need for wisdom to negotiate an imperfect world is evident daily, especially since mental and physical suffering raise meta-physical questions (Plato, 360B.C./1970). While metaphysical entities such as the soul or inner self are also imperfect, through meta-cognitive capacities they may work with error across cognitive, perceptual and affective systems to produce insights and improve responses (Bateson & Bateson, 2005).

c) Many situations have no predictable pattern of individual experience.

Bateson (1979/2002) refers to the persistent unpredictability of some interactions as trying to make sense of a class of experiences in which the individual cases have no pattern. Interpersonal interactions have unpredictable possibilities at every point, requiring immediate access to wisdom within a framework of longer term, gradual change to character, values, attitudes and beliefs. Only a responsive evaluation and integration of momentary interpersonal contextual patterns at a deeper level can produce the changes to attitudes, character, beliefs and values that make wisdom access more or less likely. Mason's (2007) notion of the irreversible changes produced in epiphanies suggests just such a process, as illustrated by Claire's thoughts about her future (p. 186).

d) The search for wisdom is connected to the pursuit of virtue, the greater good, eternity and the divine.

Plato (380 B.C./1974) first connected the love of wisdom, pursuit of the greater good, virtue, eternity, and divine kinship with the soul steering the embodied person toward goodness and the hope of eternal life in an interconnected universe (Field, 1961). According to Plato, embodied souls tainted with the inescapable fallibility of beliefs and opinions are incapable of

access to divine wisdom (Guthrie, 1971; Plato, 380 B.C./1974). It is the premise of this thesis that access to clinical wisdom is similarly imperfect and partial, but the pursuit of clinical virtue and greater good requires a steering soul to integrate cognitive, affective and psychomotor capacities with beliefs and values.

A model for the functional soul

The model of the functional soul that follows reflects my theistic, realist person-centred worldview and phenomenological, integrative dualist philosophy and is based on the work of the phenomenological psychologist Carl Jung. Phenomenological psychology examines lived human inter-relationship with the concrete world, seeking to clarify the essential what and how of phenomena from meanings given to them, and comparing the adequacy of individuals' subjective meanings with the more objective collective meaning (Spinelli, 2005). A systems theorist might argue that the entire set of meanings is subjective and the concrete world has its own meaning, but the collective set is more likely to reflect the latter. Phenomenological psychology also studies the interactions of observable behaviours with thoughts, emotions and beliefs (Spinelli, 2005), such as those described by the participants. The following model suggests how the soul might mediate such integration, which may lead to access to clinical wisdom. Implications of the model for clinical learning are discussed, followed by examples from the participants' data illustrating the model and its implications.
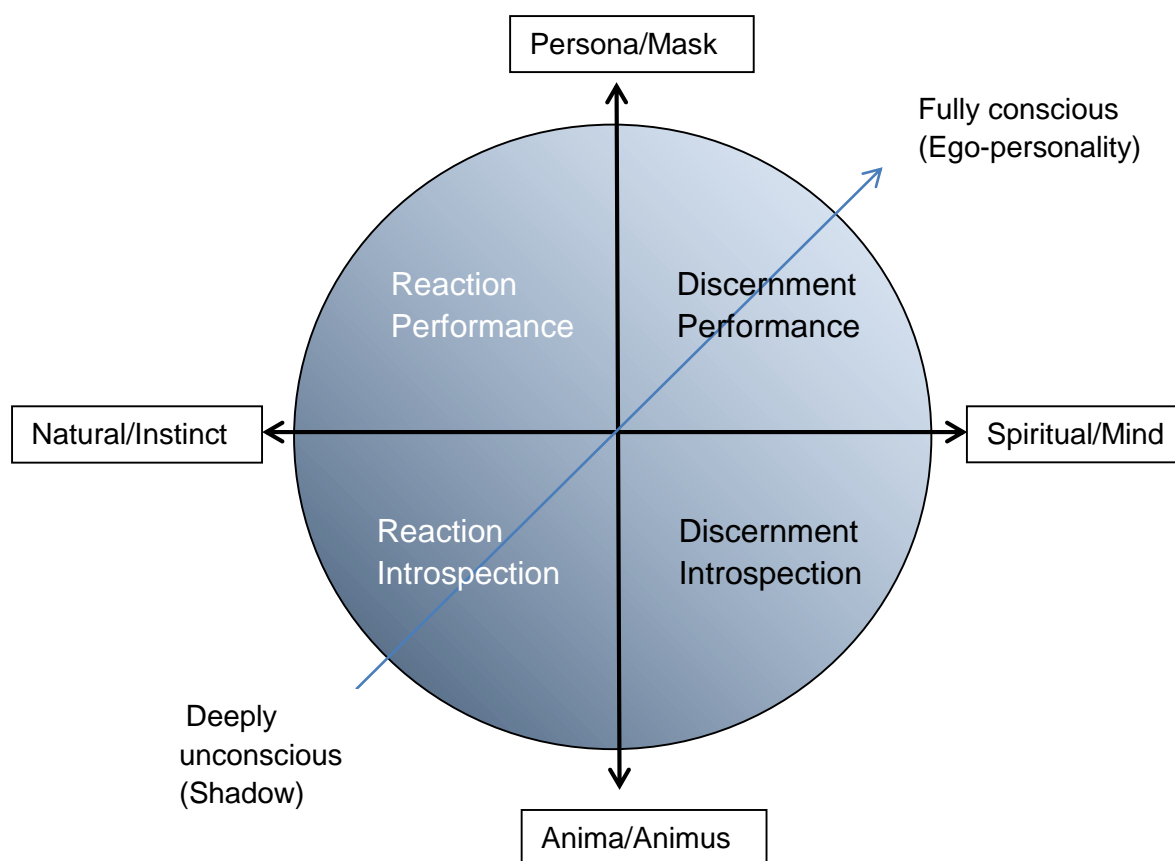
Figure 19: Model of Functional Soul

The vertical axis of the model (Figure 19) is based on the complementary archetypes of the soul or "personality"; the persona or mask of outer attitude turned toward society, and the anima/animus of inner attitude turned toward self (Jung, 1983). The horizontal axis separates the natural person functioning by instinct from the spiritual person functioning by mind and insight (Jung, 1928/1960). The diagonal axis of consciousness runs from the shadow archetype of the deeply unconscious to the ego-personality of the fully conscious (Jung, 1983).

These polarities do not imply a split self but rather a dynamic balance between our self-to-self, self-to-others and self-to-world relationships (Spinelli, 2005). The model is simplistic, but useful as a critical tool for investigating and representing the reality of chaotic multiple meanings (Jung 1946/1960, 1983). Bateson's (1979/2002) self-regulating biological, physical and meta-physical systems reflect Jung's (1983) underlying belief in polarities and the balance of opposites in self-regulating systems. This suggests that the inner and outer worlds of human existence have the same fundamental pattern types and therefore can be represented with similar models.

The provisional model includes four basic modes of soul function. Each quadrant contains two functions that reflect balance between polar opposites. "Reaction" refers to soul function that

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is primarily instinctual and unconscious and may be inner or outer self-focused. This includes bodily, affective and psychomotor responses to experience through pre-perception and instinctual attitudes or emotions that may be tacit or suppressed by over-attention to cognition (Henry, 2006). The soul function of "Introspection" is inner self-focused and variably conscious and instinctual. It involves perceptions and reactions based on bodily and affective knowledge and values, belief and character (Marcum, 2009). "Discernment" refers to soul function that is predominantly conscious and spiritual/minded, but variably inner or outer self-focused. This may include, intellectual, moral and ethical effort to overcome the instinctual (Jung, 1946/1960). "Performance" refers to soul function that is outer self-focused, predominantly conscious and variably spiritual/minded. This reflects cognitive and psychomotor attention to outward being and action in the world (Yakhlef, 2010). Soul function can be "plotted" at any point and would be expected to be an admixture of these four basic types. This fits the phenomenological view of embodied experience, perception and action, creating and changing the subjective sense of self and intention towards the world (Carel, 2011).

Implications for clinical learning

Reaction and discernment are terms that have been used to describe perceptual responses to experience and ways of seeing the world in the context of learning (Marton et al., 2004). Different types of learning require different balances of soul function to engage cognitive, perceptual, intuitive and instinctual resources and judgements, some of which will integrate these with beliefs values and attitudes. This may lead to access to clinical wisdom. For example, in situations where discernment and performance are the predominant modes of soul function, integration of the cognitive and psychomotor with attitudes might allow access to clinical wisdom. This could be insight into the wider place of a difficult practical skill which could lead to perseverance. In the same situation, soul function that is more reactive and performance based might facilitate integration of the psychomotor with intuition or affective responses leading to insight into causes of frustration. Situations like this involving the study participants can be found in the following section.

In the clinical learning environment, cultural or social expectations may accentuate or suppress various modes of function thus limiting or enhancing access to clinical wisdom. For example, integration with the affective domain may be inhibited if reaction and intuitive introspective responses to interpersonal encounters are suppressed, resulting in reduced empathy or emotional incongruence (Brown et al., 2010; O'Callaghan, 2013). Supressing reaction in practical assessments can produce anxiety and loss of control, adversely affecting performance and perceived relevance to real world practice (Cazzell & Rodriguez, 2011). When external performance is overemphasised or discernment is regarded as a purely rational

activity, reflective introspection and perceptual awareness may be discouraged or lost. This can produce health professionals and students who genuinely believe they are excellent and virtuous practitioners yet demonstrate behaviours that are completely at odds with this (Coulehan, 2005). It may also generate "automatic" behaviours and disappointing interactions (Uhrenfelt & Hall, 2007). Introspective function may also be suppressed in clinical education when a focus on knowledge, skill acquisition and professional ways of being encourages dehumanised views of patients as learning opportunities or "cases of" (Dall'Alba, 2009a).

In my view, we live as interdependent bodily people in the world (Merleau-Ponty 1945/2002), necessitating a dynamic balance of all four modes of soul function to integrate all the information needed for person-centred encounters. If the responsive and evaluative activity of the inner-self soul and spirit changes behaviour, thought and emotions, and in the longer term beliefs, values and character, these changes will affect soul function. This is similar to Bateson's (1972/2000) homeostatic feedback cycles. Positive and negative reinforcement of patterns of soul function from changes to values and beliefs might explain why access to wisdom in one setting or area of practice does not necessarily translate to other areas. Like Bateson's mechanical cycles, the proposed soul function includes the possibility of polar extremes and unbalanced states of the inner self. The model could be used to further explore how these develop in clinical learning and practice and how this affects access to wisdom.

Without personal transformation and integration, students are unlikely to cross important thresholds to connect deeply with their patients (Clouder, 2005). Such transformation must be a whole-person change, prompted by disjunction between the taken-for-granted world and experience (Jarvis, 2012). It is the contention of this thesis that the soul as a functional complex of the instinctual and spiritual, inner and outer, conscious and unconscious person mediates this process at the level of the inner self, enhancing or inhibiting integration and access to clinical wisdom.

Integrated learning and the role of the soul

Evidence for the functional role of the soul was sought from the participants' connections between the outer world elements of clinical experiences and their inner world beliefs, attitudes and values. It was hoped that contextual factors participants identified as contributing to these connections would be linked to the inhibition or facilitation of situated access to clinical wisdom. The findings do provide some support for the functional soul as the mediator of integration of thinking, emotions, attitudes, actions, values and beliefs that produces interpersonal insight, better clinical outcomes and personal transformation. Some examples of integration and proposed access to wisdom with beneficial outcomes have been identified

in the section on wisdom. It is the contention of this thesis that in these cases, the soul has acted as mediator of the holistic processes of being, doing and becoming through which personhood has been expressed and changed. While the term "soul" was used by only two participants, several others mentioned an inner self that aligns with the theoretical view of the soul presented in this thesis.

Evidence for the four basic modes of soul function can be found in the annotations of the participants. The instinctual and unconscious emotional responses and attitudes of "reaction" that are typical of bodily and affective responses to experience through pre-perception were noted in Taro M's "trial by fire" (pp. 164, 177) and Marble Rose's "shocked" (p. 148) responses to sudden or surprising events. Taro M notes that these responses can produce successful or unsuccessful actions, but that both can be productive if "reaction" is balanced by "discernment":

> Trial by fire- results in - failure: Inevitable and a necessary lesson in order for us to learn humility and the importance of team work/protocol. A powerful driving force in its own right. (Taro M 1)

As previously discussed, "discernment" refers to a deliberate conscious intellectual, moral and ethical effort to overcome "reaction" (Jung, 1946/1960). This is not identifiable in many annotations and is more typical of participants who recognised the need to manage emotions or attitudes, usually in relation to "Altering actions or outcomes":

> I am learning it is better to think before I speak and weigh up the consequences of my actions e.g. I was given the opportunity to do a MOCA assessment on a patient and I turned it down because I was anxious about getting it wrong but I ended up wishing I had done it as it looks like I may have missed the only chance for doing one that will come along during my placement. (Claire 2)

Examples are also found in Liz's annotations about "choosing battles" (p. 125-126) and not succumbing to peer influence, and in Claire's response to her supervisor's actions (p. 184). In many annotations there is a strong sense that emotional reaction is unprofessional. This and the pre-perceptual nature of reaction may explain why soul function in this quadrant is less frequently described.

"Introspection", the deliberate or intuitive knowledge, value, belief and character-based evaluation of perceptions and reactions (Marcum, 2009), is best seen in the annotations of Jane (pp. 147, 216) and Liz (p. 157). Leah (p. 155), Anna (p. 182) and Adele also provide examples of this:

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> Beliefs may influence your attitude towards yourself and thus shape your feelings. For example the first time I took a history from a patient I did not feel confident as I believed that I am a generally shy person. (Adele 1).

A characteristic outcome of this form of soul function is the use of information that is intuitively sensed or based on awareness of personal or interpersonal dynamics and underlying values and beliefs rather than stated or rationally derived.

"Performance", the deliberate cognitive and psychomotor attention to outward being and action is reflected in the critical elements of "Altering actions and outcomes" and "Building or negotiating relationships" and is a significant part of "Becoming a member of an identifiable profession". Examples of the performance mode of soul function are given by Shelly (pp. 118, 169) and by Sarah-Jane (p. 175) in particular:

> Helping people, patients and staff members: for example, if the team needs a job done, such as faxing a referral, helping the nurses out with something simple, although it is not directly "written" in our job description, it is good and feels good to help people out and work constructively. (Sarah-Jane 2)

As explained previously, from a realist, person-centred view, soul function would usually be expected to be a balance of these four elements as the subjective sense of self is shaped by embodied experience, perception and action (Carel, 2011); however, except when multiple critical elements indicate integration, the annotations mostly feature one dominant mode of function. This may be a result of clinical learning discourses of competence and confidence (MacLeod, 2011), that do not explicitly value outcomes of reaction or introspection such as heightened emotional awareness. Reaction and discernment are inherently perceptual responses to experience, and significant elements of learning (Marton et al., 2004). It is possible that these poles are poorly balanced in health professional students because of the tension between the unpredictability of reactions to situations and the need to appear professional at all times, which many participant annotations illustrate. This is possibly intensified by the high stakes associated with the final year of clinical learning and the power dynamics alluded to by Jane (p. 195). Soul function imbalances may explain why clinical wisdom is accessed infrequently, raising the question of whether increased awareness and attention to soul function balance would increase wisdom access. Further research may help to clarify this.

Access to clinical wisdom would be expected to require different balances of soul function to engage the cognitive, perceptual, intuitive and instinctual aspects of different types of learning. In the situation described by Liz on page 170, soul function modes of discernment and

performance appear to achieve the integration of cognitive, psychomotor and attitudinal elements producing access to clinical wisdom information that guides appropriate action. Other critical elements relevant to values, beliefs and identity are not integrated because the balance has not included introspective and reactive soul function. While viewed as less reliable, these modes are essential for whole-person processing of experience, and without them the scope of wisdom access will be less holistic. Later reflection using these modes could produce access to clinical wisdom relevant to beliefs, values or identity.

Examples from the annotations also illustrate the effects of suppression of modes of function resulting in the loss of emotional congruence (O'Callaghan, 2013). This is especially noticeable in participants' expressions of suppressed reactions to unsatisfactory interactions with supervisors, and when introspective soul function had no outlet. Additionally, the participants' awareness of near-graduation expectations and identity is reflected in the over-representation of the performance mode of function. This frequently swamped other modes, producing anxiety and loss of control (Cazzell & Rodriguez, 2011) and adversely affecting some participants' learning and confidence.

From a theistic integrated dualist perspective, a pattern of increasing access to clinical wisdom would be expected to affect inner-self soul and spirit responsiveness and evaluation to gradually change being and doing. While the study did not suggest noticeable differences in the participants' maps over time, some participants commented on changes to their self-view, which may indicate the inner change of becoming:

> As a 5th year student now with greater experiences and more knowledge I feel like this has influenced how I see myself and I have improved my ability to exhibit professionalism. (Shelly 1)

> This box stands for the beliefs and feeling I am left with at the end of clinical learning. I have learnt how to get up in the morning and commute to a daily job, I wasn't sure I had the stamina and yet came to sort of enjoy it although I wonder if working is really worth sacrificing quality of life. I learnt so much that can't be taught, not really what I expected. (Jane 3)

This section has presented a model for the function of the soul as an integrator of the different domains of learning with beliefs, values and attitudes based on the researcher's worldview and theoretical positioning. The model proposes four distinct modes of soul function that work together to produce whole-person inner change through the processing of experience. This, it is suggested, enables the soul to act as a mediator of access to clinical wisdom. While some of the study findings provide support for the four modes of function and for their integration

leading to access to clinical wisdom, the evidence could be interpreted differently and integration is only demonstrable in a few participants. Much more research is needed before anything definitive can be proposed.

Chapter Nine: Discussion Part Three

Introduction

This chapter examines the final two aims of the study: to investigate the potential of concept mapping as a more whole-person process by modifying it and using it longitudinally; and to generate findings that would give insight into how and when clinical wisdom is accessed.

Modified concept mapping

In the introduction, the development of modified concept mapping was described as arising from systems theory (Maani & Cavana, 2007), assimilation theory (Ausubel & Fitzgerald, 1961), embodied phenomenology (Merleau-Ponty, 1945/2002), integrative dualism (Goetz & Taliaferro, 2011), whole-person learning (Jarvis, 2012), and variation theory (Marton & Booth, 1997; Pang, 2003). Unwittingly, it was also influenced by theories of coherent diagrammatic expression (Tufte, 2006). The study modified Novak and Cañas' (2008) C-map® for use as a data gathering tool rather than as a learning tool. The modification sought to reduce hierarchical elements and include affective, psychomotor, belief, attitude and value related concepts. This reinstated aspects of Gowin's Knowledge V (Gowin & Alvarez, 2005) which balances thinking and doing and includes world views and values. Fuller use of the annotations feature allowed exploration of context, in an effort to improve internal validity of the maps (Pudelko et al., 2012; Srinivasan et al., 2008). Map scoring was based on Hay et al.'s (2008b) system which has reliability (Kassab & Hussain, 2010), with the addition of quality and relevance criteria for the annotations. Based on Kinchin and Cabot's (2010) demonstration of novice to expert progression in structure and complexity, the study included mapping three times over a period of eight months.

The study also explored the use of self-assessment which students perceive to be difficult and which educators claim is of dubious value due to fixed tacit beliefs, limited validity, questionable authenticity, and poor correlations with cognitive learning and assessed capabilities (Grootenboer, 2010; Macfarlane & Gourlay, 2009; Rees & Shepherd, 2005; Sitzmann et al., 2010; Struyven et al., 2005).

Participant evaluations

The most important conclusions associated with utility and value from a participant perspective have been discussed in the evaluation summary (pp. 135-137). Participants found ease of use

and convenience to be generally acceptable but there were issues with mapping pre-conceptions, C-map® limitations on expression, and preference for other forms. These issues need to be addressed, particularly because they were problematic for participants who engaged most. Possibilities include moving to a more freeform version of diagramming such as drawing, or a different program that includes audio, drawing, diagrams and text. Differences between participant estimations of the value of modified concept mapping for learning are very important since they correlate with variable comprehensiveness in self-evaluation and exploration of experience. Participants who felt they had experienced learning benefits appear to have engaged with modified concept mapping more, even if they did not particularly enjoy it. This suggests that it has potential as a whole-person learning tool if motivation is provided.

The evaluations confirmed previous findings (Kostovich et al., 2007; Pudelko et al., 2012; Torre et al., 2007), suggesting that modified concept mapping has the same limitations as traditional concept mapping. It is unlikely to produce any improvement in reliability as a summative self-assessment tool despite ease of use, convenience, or format acceptability to students. Since perception of learning value correlates with depth of engagement, differences in participant self-awareness and reflexive capacities may be the most significant factor. As these capacities are valued by employers but frequently deficient in graduates (Hart Research Associates, 2008) further modification of concept mapping as a learning tool to enhance and improve these capacities may be its biggest potential, especially if it reduces difficulties students have with self-evaluation (Rees & Shepherd, 2005). The problem of engaging less motivated, less self-aware students would remain, although this could be addressed through summative assessment of relevant integrated clinical case perspectives and meta-skills. This would preserve alignment with practice, creating the kind of self-assessment students respond positively to (Mattick & Knight, 2007; Struyven et al., 2005).

With the participants' views in mind, the following subsections discuss modified concept mapping internal validity as a data gathering tool and as a method for answering the focus question about integrated learning. Trustworthiness and limitations are also discussed.

Internal validity

From a researcher's point of view modified concept mapping has several advantages as a data gathering tool. The software is free, and it is easy to collect the participants' completed maps from anywhere; however, in qualitative research internal validity is about whether the data collection tool produces data that answers the research question and is sufficiently uniform to allow meaningful comparisons between participants (Sliverman, 2001). As integrated visual-verbal diagrams, modified concept maps demonstrate coherence between

the narratives and images that represent the unique and collective ways participants experience their practice worlds (Tufte, 2006; Wee et al., 2013). Their main advantage with regard to answering the research question is that, compared with purely text-based methods such as interviews, the participants' understanding of complex connections in everyday settings can be recorded as complementary visual and textual ethnographic data (Silverman, 2007). With regard to sufficient uniformity of the data, using the annotations to elaborate on the meaning of the conceptual connections may improve internal validity compared with traditional concept-mapping since the conceptual connections are being explained (Pudelko et al., 2012). In addition, collecting repeated maps allows comparison of structural changes indicating how perceptions of the clinical environment develop longitudinally; this may improve the interpretation of map score changes (Kassab & Hussain, 2010; Hay et al., 2008a; Hay et al., 2008b; Torre et al., 2007). These features of modified concept mapping suggest it has reasonable internal validity.

Evidence to support the internal validity of modified concept mapping is also present in the study findings. The conceptualisation of factors influencing map structure (Figure 10) is based on pattern similarities found within and among participants' maps (Figures 5-9). While basic concept mapping structural forms were preserved, the relationships between concepts were interrupted by the non-hierarchical form of modified mapping which made additional influences on map structure visible (Figure 10). This suggests internal validity of modified mapping as a data gathering tool with regard to producing sufficiently uniform data for meaningful interpretation. Similarly, the robust sets of inter-related categories of visual and textual elements produced from analysis of the maps and the annotations support the internal validity with regard to producing data that answers the focus question.

The focus question asked the participants to record perceived connections between the five domains and to provide specific examples of experiences related to them. Analysis of map structure, propositions, and annotations suggests this has been largely achieved, although some maps were less detailed and explanatory than others and some participants did not complete all three maps. This suggests reasonable internal validity for collecting data that answers the research question. Despite this, participant assertions of having developed different perspectives were not consistently reflected in map structure or scores over time, suggesting that the scoring system did not adequately detect changes. Differences between participant's scores directly reflected the quality of propositions and annotations as did correlations between annotation scores and integration of multiple critical elements for individual participants (Tables 8 & 32).

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Internal validity for answering the focus question is confirmed by participant depiction of significance and order in the use of concepts from all five domains, plus breadth of response to the focus question in the propositions. As a method of collecting data, the annotations are short texts when compared with interview transcripts, but the absence of extraneous material is advantageous for whole set reading (Marton & Booth, 1997) and the brevity of the richly detailed annotations about clinical learning does not appear to have compromised their narrative value (Polkinghorne, 1988). Analysis of these situated experiences produced two complementary, integrated sets (Figures 16 & 17) of contexts and critical elements that could be illustrated with examples. The categories of contexts and critical elements were relatively easy to identify and consistent amongst the participants (Figure 16), although many were described very briefly which did limit the interpretation of social and cultural influences. These two sets provide evidence of internal validity in answering the concept map focus question.

While the integration of contexts and critical elements addresses some of the concerns over the decontextualised nature of interpreting meaning in concept mapping (Haggis, 2003), there is potential for further improvement of the mapping process and interpretation which still involved the unavoidable element of an immersed researcher (Silverman, 2007). The annotations "personalised" the maps more than is usual with concept maps, enhancing the part-whole nature of the diagrams. This is crucial for investigating collectively experienced whole-person practice-based learning (Jarvis, 2012) but internal validity might be strengthened if this personalisation were extended to include the form in which the map was created.

Overall, the findings support the internal validity of modified concept mapping as a data gathering tool in clinical learning contexts suggesting that with further modification it may be useful in any practice-based setting where an embodied ethnographic record of experience is sought (Yakhlef, 2010). The structural, visual and textual elements of the data gathering tool allowed analyses demonstrating the relevance and meaning essential for internal qualitative validity (Silverman, 2001) while preserving the complementary nature of more qualitative and more quantitative approaches (Brewer & Hunter, 2006; Hesse-Biber, 2010; Ridenour & Newman, 2008).

Trustworthiness

As a method of collecting data about clinical learning, modified concept mapping was untested. Some trustworthiness has been suggested by the internal validity noted previously and some can be inferred from similarities to previous clinical education research using concept mapping (Hay & Kinchin, 2006).

Discussion Part Three

While very few full maps have been included in the thesis due to restrictions with the mapping program, propositions and annotations are well represented and Figures 16, 17 and 18 preserve the visual nature of the data. Narrative allows contextualisation and association with people and events (Polkinghorne, 1988), linking phenomenological and ethnographic research to our own experiences. This is especially important in clinical practice-based learning research where the interacting histories of practitioners and learners, practices and environment shape each other on a daily basis (Kemmis et al., 2012).

The use of transparent integrated quantitative and qualitative data gathering and analysis allowed methodological triangulation (Brewer & Hunter 2006; Silverman 2007) and overlap can be seen in the patterns and discrete elements of both types of data. The appropriateness of the choices of methodologies and methods and fitness for purpose of modified concept mapping has been justified with some provisos which indicate researcher reflexivity (Denzin, 2010; Silverman, 2001, 2007). The use of a modified scoring system which was created and applied only by the researcher has reduced the trustworthiness of this aspect of the data analysis. By contrast, the three supervisors' contributions to the annotation analysis led to modifications to the diagrams which shaped perspectives in the discussion and helped maintain reflexivity towards the data (Cousin, 2009). This collaboration was central to improving the integrity and interpretation of the many diagrams that have been data, process and outcome in this study (Buckley & Waring, 2013; Tufte, 2006).

Limitations

Limitations associated with the researcher's worldview and position mean the data collected could be interpreted differently from other positions. Of particular note, my theistic realist person-centred worldview has produced interpretations suggesting access to clinical wisdom and integration by the soul that could be explained in other ways using a different paradigm. Application of my systems theory theoretical perspectives could have resulted in detail being missed at the expense of a bigger picture focus. As a sole researcher bias in interpreting the data is inevitable, although collaborative checking may have reduced this somewhat.

The difficulty in recruiting participants for this study was unanticipated. Only two participants completed the pilot study and eight participants completed the first full study. While initial response to recruitment was good, very few volunteers were able to find the time in busy clinical schedules to complete the training and initial mapping phase, despite simplification of the process so participants could complete training and mapping at home. Resistance to concept mapping, which potential volunteers perceived as being similar to mind-mapping, was also unanticipated. One potential participant did subsequently complete the study after finding

the process was different. Potential participants in the second recruitment sessions were shown an anonymised map completed by a member of the first group. This produced a lot of interest but only a further three participants.

These difficulties confirm Pudelko et al.'s (2012) findings from a meta-analysis of concept mapping studies; many health professional students do not like mapping and those who do find it too time-consuming. These aspects have been considered in the discussion of the modified mapping evaluations, and may have discouraged students from volunteering for the study. Fortunately, there was an equally unanticipated degree of depth and detail in many of the maps, providing rich textual data to analyse, and since most participants completed two or three maps the set of twenty-nine maps was sufficient.

A related limitation concerns recruitment of participants for the study. While primarily chosen for reasons of comparability, previous experience with medical and occupational therapy students had suggested they would differ in terms of disciplinary philosophy, degree of involvement in clients'/patients' daily lives, and practice settings. This has potentially created researcher bias in participant selection and data analysis. It also excludes other health discipline perspectives on clinical learning, which limits application of the findings.

The limitations of the mapping tool on visual expression did reduce richness and spatial integration; some participants felt they could not change the structures quickly or easily enough to capture their stream of ideas. As a form of self-ethnography diagrams provide the opportunity for a more integrated expression of experience, but spatial flexibility is essential since the placement of items is significant (van Leeuwen & Kress, 2011). The C-Map® modification appeared insufficiently approachable for at least two participants (Mary and Marble Rose) who used the same template for their maps and did not alter structure despite being encouraged to do so. Both placed the five compulsory domains in the same positions in each map suggesting constrained spatial expression. These limitations reinforce the need to pursue a better format.

Timing of the mapping may have resulted in some "hurried" third maps and reduced scores. The structural complexity and content of map three was noticeably affected by proximity to exams for most participants in 2012, and while the final maps for 2013 participants were completed earlier, some participants still felt pressured by exams several months away. This emphasises the need for appropriate timing and mental space to accurately capture all perceived connections between elements and allow participants the opportunity to reflect deeply.

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In addition to the lack of internal validity noted for the modified concept map scoring system, trustworthiness of the scoring analysis has been reduced by subjective bias. The researcher scored the maps alone, which is an important limitation on the study findings. More rigorous assessment of the modified scoring would need to be conducted to confirm its usefulness and any score changes over time.

Finally, three participants commented via email that they would have preferred to create hand-drawn maps rather than use the computer tool. This supports the assertions of Pudelko et al., (2012) in relation to student preferences, and could reflect the limitations of the computer tool. It may also indicate a desire to interact with the process in a more direct hand-eye way. Mitchell (2013) reports that in collaborative university student spaces equipped with whiteboards and computers, students consistently use the whiteboards to draw, diagram and rework ideas before committing them to a computer-based format.

Buckley and Waring's work (2013) supports this, suggesting that hand-drawn diagrams and sketches have more value as preliminary theorising and conceptualisation tools. Future research into mapping and clinical learning could investigate whether hand-drawn maps are different from computer-generated versions and whether the two are synergistic or complementary. It would be valuable to investigate whether differences in the type of drawing and writing affect the degree of domain integration expressed. As Tufte (2006) notes, important differences between hand-drawn and computer-based drawings and diagrams are primarily a result of the creator's cognitive balance of analysis and reflection, both of which are needed to produce a succinct expressive diagram. Since modified concept mapping is a specific attempt to include both analytical and reflective elements, a more synthesised version allowing simultaneous freehand and computerised drawing and writing may allow better expression and improve the engagement of participants in self-assessment of learning.

Summary

Overall, the study suggests that modified concept mapping has some internal validity for the assessment of integrated learning across domains. Assessment of map structure and content were useful but further work is needed to clarify the value of modified scoring. Map structures and critical elements of experience identified in the annotations were able to be analysed as sets of interrelated categories of shared experience suggesting integration of the domains of clinical learning. According to Marton (2004), relationships between phenomenographically determined variations in students' conceptualisations of their experiences reflect different approaches to learning. Further investigation of integrated learning using mapping may improve understanding of these differences among clinical students.

Discussion Part Three

Modified concept mapping is a tool under development. While internal validity as a data gathering tool and potential value as a learning tool have been described, its use in self-assessment will need further study that attends to student motivation and self-awareness. Further development could include collecting hand drawn maps that quickly capture intuitively produced concepts and propositions during clinical learning, followed by computer-based diagrams and reflective annotations and online or face-to-face discussion. This could also be used with teams or groups to collaboratively explore unresolved or troublesome issues within the Zone of Collaborative Development (Balakrishnan & Claiborne, 2012), and to visualise the Zone of Proximal Development for individuals in the presence of more capable others (Daniels, 2008). From a research perspective, the use of modified concept mapping has been beneficial in generating a new diagrammatic way to express integrated findings.

Chapter Ten: Conclusions

The main aims of the study undertaken for this thesis were to assess whether participants' perceptions of connections between the domains of clinical learning and discernment of the critical elements of experiences associated with those connections indicated the development of access to clinical wisdom. The findings provide supporting evidence for two central ideas: the first, that through integrated whole-person learning the mind, body, affect, beliefs, values and attitudes of being, doing and becoming are revealed, changed and developed over time. The second is that this integration may allow access to clinical wisdom mediated by the functional soul. The occurrence of this in clinical learning is consistent with observations that the development of personal and professional identity is an ongoing process for the developing reflexive health professional (Andonian, 2013; Clouder, 2005; Dall'Alba, 2009a; Monrouxe, 2010; Purnell, 2009), and that clinical wisdom is a complex, meta-cognitive entity merging knowing and being, ontology and epistemology, and characterised by beneficial person-centred outcomes (Edmondson et al., 2009; Kinghorn, 2010; McKie et al., 2012; Miles & Mezzich, 2011). While elusive in nature, the functional soul as theorised can integrate all aspects of learning because it is the self-activating meta-working initiating part of the spirit/soul inner self embedded in the daily life of the body (Bateson & Bateson, 2005; Gadamer, 1996; Goetz & Taliaferro, 2011; Jung, 1946/1960, 1983; Moore, 2010; Plato, 380 B.C./1974). The main premise behind these ideas, based on the researcher's worldview and theoretical perspectives, is that whole-person learning and access to clinical wisdom are dynamic processes insufficiently captured by anything other than a fully integrated view of all aspects of being and becoming.

It is also proposed that clinical wisdom can be viewed as an accessible resource of unique situated information that is not a product of human understanding or mental activity. This reflects a theistic realist ontology and epistemology that is not centred on man as the origin of wisdom and is justified from systems theory, embodied phenomenology and integrative dualist philosophy. Built on the work of Plato, Bateson, Merleau-Ponty and Jung in particular, the theory attempts to explain the unpredictable and elusive nature of clinical wisdom as an instantly recognisable but never repeatable complex phenomenon.

Data from the study suggest that integrated learning as described above did happen amongst participants from Occupational Therapy and Medicine, producing personal, professional and graduate becoming and identity. Differences between the two disciplines, notably in the interpersonal interactions associated with particular critical elements of clinical learning (Figure 18), are likely to relate to the strongly team-based contexts of the Medicine participants

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and the individual supervision and more prolonged contact with clients of the Occupational Therapy participants' contexts. Despite this, difference was more noticeable between participants than discipline, suggesting that some individuals integrate their learning better than others. The findings point to a number of reasons for this which appear to relate to the linear or non-linear ways in which learners process information and the degree to which they engage personally with clinical situations. Some suggestions have been made as to what could be done to enhance the self-awareness and self-assessment capacities central to increased integration. Attention to the noticeable lack of awareness of bodily aspects of practice and its importance for the development of integrated attributes such as caring and empathy may also increase engagement.

Connections made between the five domains of learning have produced some important insights into particular areas of difficulty or neglect in clinical learning. The most significant implication is that integration is enhanced by constructive, focused and supportive reciprocal relationships with supervisors and inhibited by inflexible, impersonal or unsupportive relationships. While this finding is not new, the study highlights the effects both kinds of relationship can have on learning and identity formation and how individual differences in the sense of an inner self with particular beliefs and values is central to both. More attention in clinical education needs to be focused on developing this inner self and explicitly teaching students how to negotiate conflicts with personal beliefs and values.

The diagrams of "The Who, What and Where of Clinical Learning" and "(Re)forming Identity" have demonstrated how both context and content are of crucial significance in clinical learning, with far-reaching effects on learning. Practice shapes and is shaped by all the non-living and living elements within it, including students (Kemmis et al., 2012). One implication of this study is that context and content integration and identity formation cannot be left to just happen. Clinical education practice settings, personnel and interactions need to foster rather than inhibit these processes. More research into positive relationship and contextual influences such as those reported by Bonsaksen et al. (2013) for occupational therapy students is urgently needed. A second implication is that in supporting the three Becomings of (Re)forming Identity, equal attention needs to be given to the person the student wants to be and how this might be affirmed and harmonised with the expected professional and graduate identity rather than suppressed or ignored (MacLeod, 2011).

Finally, some comment needs to be made on modified concept mapping as a way to investigate the integration of the domains of learning. Despite problems with perceived utility and value, its potential as an integrated learning tool was recognised by some participants suggesting that further modification for learning purposes is warranted. The inclusion of

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drawing, images and other artefacts may improve modified concept mapping as a self-ethnographic learning or research tool. As a self-assessment, modified mapping is probably better suited to formative reflection than summative evaluation. The findings indicate that integration of learning is less dependent on the tool used than on self-awareness and engagement; therefore, finding ways to develop and enhance these in clinical students is more important than the vehicle used to demonstrate subsequent integration.

The use of a modified concept map in this study to identify the relationships between the drivers and influencers of map structure provided a visual interpretation of visual data. This may have relevance for individual or collaborative practice-based research into other holistic processes where visual data could be produced and analysed. Similarly, the diagrams represent relationships between contexts and the discernment of critical elements of experience. This is a new way to show the part-whole relationships between the researcher's interpretations of visual and textual data. In the analysis phase of the study for this thesis, diagrams were useful tools for collaborative analysis. They allowed integrated impressions of the data to be shared in a visual form which complemented the discussion of participant text.

The findings from the study confirm the assertions in the literature that clinical wisdom is difficult to define, detect and demonstrate; however, they also support the conceptualisation of access to clinical wisdom as a whole-person process of integrating contextual, cognitive, affective, psychomotor and attitudinal elements with beliefs and values to produce beneficial personal and interpersonal outcomes. This is a tentative working definition of access to clinical wisdom. Integration of learning and access to clinical wisdom are proposed to be mediated by a functional soul as part of the inner self soul-spirit complex, a position that aligns with an integral pluralist *some*thing view of wisdom (Esbjörn-Hargens, 2010) and an integrative dualist view of the soul (Goetz & Taliaferro, 2011).

Despite limitations noted earlier in the thesis and the mostly theoretical connections between integrated learning, access to clinical wisdom and the soul, the study suggests several areas of worthwhile further research. The development of better ways to enhance students' integrated learning using visual-textual tools like modified concept mapping and link this to effective assessment is an area I am especially interested in. Expanding understanding of clinical wisdom is another. Given the significance of "(Re)forming Identity" in the study, the relationship between personal and professional identity, soul function and access to clinical wisdom in experienced practitioners is worthy of investigation.

As part of an extended journey through the territory of clinical wisdom, this thesis is a short stop-over, but one that has helped to better define the geography and add more detail to the map. It is hoped that interest and insights have been generated that will lead to the formulation

of better theories yet. I would like to finish this thesis with a quote that expresses why clinical wisdom and the soul matter for healthcare professionals, and with two poems that are a grateful response to the participants; they have changed my developing concept of clinical wisdom and provided me with yet more questions! They also remind those of us who teach becoming health professionals of the importance of soul-mediated integration of our own beliefs and values.

> There is no escaping the sacredness of the body and the mysteriousness of illness. The doctor, try as he might, can't avoid the profundity of birth, illness and death – all within the purview of his work. The secularism of modern medicine may distract from these sacred values, but it can't entirely cover them up. So the doctor suffers the enormous gap between his exalted calling and the secular trappings of the modern profession… Still, a doctor could cultivate his own spiritual life in ways that give his work its needed verticality – its depth and transcendence.
> (Thomas Moore, 2010, p. 172)

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The student and the mentor
She was on guard of course;
The web of pain does that to you.
Still, his voice was calm and his manner not unkind -
Perhaps with him the coiled spring would not unwind
And show its twisted source,
Or cut his steady gaze in two.

She knew what he was not;
It somehow made him safe to trust.
He, brought no bright blade, psycho-speak or novel cure –
His quiet moves were like commands that seemed to lure
Their hope, and let the lot
Fall gently on the healing side.

She heard what his life said;
The weeks, the months, all came and went.
He, the pilot craft holding to the distant shore –
The waves of fear that swamped her thinking boat before
Now smaller in her head,
Obsession less and self-doubt spent.

She left his watch at last;
Poor thanks all she could then convey.
Time, released the spring but left memories on her heart -
She searched for what he saw and reached to take his part
Lest patients be looked past,
Or one small student swept away.

Conclusions

The researcher's questions
When I think of his fingers,
The work of some heaven,
The moon in his nails and the stars he might reach,
Why this memory that lingers
For sons of the living,
Their names on the daily outpourings of speech?

When I think of her features,
The bones made of ashes,
The beating of life and the chest's rise and fall,
Why this giving to creatures
Of joy that surpasses
The shouting of mountains that outlasts them all?

When I think of them learning,
The long search for meaning,
The words to be stored and the spells of the mind,
Why this thirst-driven yearning
And unending dreaming
Of hope-laden futures and high peaks to climb?

When I think of us giving,
The slow fires of loving,
The dross of rejection and diamonds of years,
Why these puzzles of living,
These ends ever-moving,
The ache-splattered paths with their verges of tears?

When I think on your glory,
The bursting of being,
The moon wrapped with stars in the vast cloak of space,
What is man and his story,
A man never seeing,
The son of a man that you still show him grace?

Appendices

Appendix 1: Participant Information sheet

Participant Information Sheet

20th June 2011:

Project title: Accessing clinical wisdom: mapping clinical students' experiences of integrated conceptual expansion.

Researcher Introduction

Dear invited participant,
My name is Sue McNaughton and I am a PhD student with the Faculty of Medical and Health Sciences at Auckland University. I am also a lecturer in the School of Interprofessional Health Studies at Auckland University of Technology (AUT). As a student of either Occupational Therapy or Medicine you are invited to take part in this study about integrated conceptual expansion, which is the changes in beliefs, thinking and behaviour that happen during the learning of knowledge, skills and attitudes in clinical practice. Your thoughts, feelings, perceptions, and experiences as you work with people in real-life situations could provide valuable insights into how clinical students access clinical wisdom, as you engage with the complex problems and daily tasks of becoming a qualified health professional. Participation in this project is entirely voluntary and you have the assurance of the Head of Department, Occupational Science and Therapy, AUT (for Occupational Therapy students) and the Dean of the Faculty of Medical and Health Sciences (for Medical students) thatyour participation or non-participation in this project will neither advantage nor disadvantage you.

What is the purpose of this research?

The purposes of the research are: to increase understanding about the nature of integrated learning across the cognitive, psychomotor and affective domains within clinical educational settings; to identify which particular clinical experiences participants recognis e as contributing to this learning; to relate what is found to the literature on clinical wisdom to better understand what it is and how it is accessed. It is anticipated that the findings of this research will be shared with clinical educators in both disciplines, and also published in academic journals and presented at conferences.

How was I identified and why am I being invited to participate in this research?

As a final year clinical student in either Occupational Therapy or Medicine, you are in a unique position to provide insight into the learning and changes to practice that happen in situated, clinically complex situations, both in healthcare institutions and in the community. It is these insights that this research hopes to capture.

What will happen in this research?

Appendices

This project aims to collect data about the nature of integrated clinical learning through the use of concept-mapping, a computer-based graphic tool that allows the recording of thoughts and ideas in a visual way. The focus question for the study is: "From my experiences, what are the relationships between thinking, feelings, behaviour, attitudes, values and beliefs in clinical learning?" For the study mapping will take place at the beginning of the year and be repeated in the middle of the year and again at the end. This should involve one to two hours per session (six hours total). As the mapping tool is computer-based, maps will be able to be produced at a location and time convenient to the participants. A short evaluation of the usefulness of the mapping process for learning will be part of the final mapping session.

What are the discomforts and risks?

In the institutions involved, the participants and clinical educators are known to each other, so there is a small possibility that information you provide could be recognised by other study participants or by educators. Even though all personal identification information will be removed from any data provided, and the data will not be able to be used in any way other than for the study, I cannot guarantee to keep your identity confidential. It is also possible that learning to use the mapping tool or using it to document clinical experiences could be associated with feelings of discomfort or anxiety.

How will these discomforts and risks be alleviated?

The risk of discomfort or breach of privacy will be minimis ed in the following ways:
Your participation is always optional and you have the choice to stop participating at any time. You will be able to access a copy of the maps created, and you will be able to withdraw any information you have contributed to the project.
You will be given a copy of previous maps created at each subsequent mapping to allow reflection and revision at each stage.
You have the right to leave the project and to withdraw any information you have provided, at any time before December 1st 2012 and without explanation.
Any personal identifying information you contribute will be confidential to the researcher. The researcher's PhD supervisors who may act as expert consultants will only view information with all personal details removed.
Participants in the study will be asked to keep confidential the identity of other participants. Conversations between participants outside the study cannot be controlled.
In the reporting of the findings, identifying features will be stripped from information you have provided and numerical data will be reported in aggregate form; therefore, it is more likely that your identity can be protected outside of AUT or the University of Auckland.
The purpose of the study is not to evaluate or judge performance in any way. This study requires trust and good faith practice amongst any staff who have been part of the clinical experiences you identify as contributing to your learning, and who may recognise participants from these in the published results. This is no different from the usual professional relationship between clinical educators and students.

What are the benefits?

Participation in self-evaluation activities has been shown to promote critical thinking and deep learning (Struyven, Dochy & Janssens, 2005). By participating in this project, you will have the opportunity to use concept mapping which has been demonstrated to benefit student learning (Hay et al., 2008; Kassab & Hussain, 2010; Torre et al., 2007), and which you will be able to use independently once the study finishes. The evaluation of the modified tool's usefulness and the findings from the study should benefit students in the wider field of clinical learning, and inform educators seeking to optimise clinical learning experiences.

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How will my privacy be protected?

All data you contribute will be anonymised as soon as possible, and will be kept in a secure location at all times and only accessed by the researcher. All data from the study will be destroyed six years after analysis by shredding and deletion.

What are the costs of participating in this research?

The primary cost for you is finding the time for the map creation sessions (1- 2 hours). Every effort will be made to minimise time costs and make the process as convenient as possible for busy clinical students. Participants will be given a $30 petrol voucher or phone credit for each completed map session to cover the cost of time.

What opportunity do I have to consider this invitation?

Your participation in this project is voluntary and you can withdraw from the study up until the completion of data collection (1st December, 2012). If you have any questions about this project, please feel free to contact the researcher, Sue McNaughton (contact details below). Please indicate if you will participate by April 6th 2012.

How do I agree to participate in this research?

If you would like to join this research, please email your name and postal address to the researcher at the email address below. A consent form and prepaid envelope will then be mailed to you. Read and sign the consent form, and return it to the researcher in the pre-paid envelope provided. A copy of the consent form is attached with this sheet for you to examine.

Will I receive feedback on the results of this research?

Yes. A copy of the findings will be made available to you on request.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the researcher, Sue McNaughton (see contact details below). You may also contact the researcher's supervisors or Head of Department (see contact details below).
Concerns regarding the ethics or conduct of the research: AUT participants should notify the Executive Secretary, AUTEC, Madeline Banda, madeline.banda@aut.ac.nz, 921 9999 ext 8044; Auckland University participants should contact The Chair, The University of Auckland Human Participants Ethics Committee, The University of Auckland, Office of the Vice Chancellor, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 extn. 83711.

AUTEC approval details
Approved by the Auckland University of Technology Ethics Committee on 11/10/2011
AUTEC Reference number 11/247
UAHPEC approval details
Approved by the University of Auckland Human Participants Ethics Committee on 07/09/2011.UAHPEC reference number 7432

Whom do I contact for further information about this research?

Researcher Contact Details: Sue McNaughton, Lecturer, School of Interprofessional Health Studies (AF409), Faculty of Health and Environmental Science, Auckland University of Technology. Email: smcnaugh@aut.ac.nz Telephone: 921 9999 ext 7107
Researcher's Supervisors Contact Details: Associate Professor Mark Barrow, Faculty of Medical and Health Sciences, University of Auckland, (505-101D). Email:

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m.barrow@auckland.ac.nz Telephone: 373-7599 Ext 84463; Dr Stanley Frielick, Director of The Centre for Learning and Teaching, Wellesley Campus, Auckland University of Technology. Email: stanley.frielick@aut.ac.nz Telephone: 921-9999 ext 9402.
Head of Department: Professor John Kolbe, Head of the Department of Medicine, University of Auckland, Grafton Campus. Email: j.kolbe@auckland.ac.nz Telephone 3737-599, Ext 86116

If you would like to participate in the study, please email the researcher with your name and postal address. When you receive the consent form, please read, sign, and return it in the pre-paid envelope provided. Many thanks for your support.

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Appendix 2: Participant consent form

Consent Form

(Participant consent for pilot or full study)

20th June 2011:

Project title: Accessing clinical wisdom: mapping clinical students' experiences of integrated conceptual expansion.

Researcher: Sue McNaughton

I confirm that I have read and understood the information provided about this research project in the Information Sheet dated 20th June 2011.

I have had an opportunity to consider the information, ask questions and to have them answered satisfactorily. I understand I may ask further questions at any time.

I understand that I will need to commit approximately six hours of my time to participate in this study.

I give permission for the concept maps and annotations created and recorded by me to be used as a source of data for this project.

I give permission for evaluations of the concept-mapping tool documented by me to be used as a source of data for this project.

I understand that only the researcher named above will be able to directly connect me with the information I have provided to the project. I also understand that, while every effort will be made to keep my identity confidential, this cannot be guaranteed.

I understand that results will be reported through published papers and conference presentations, including possible presentations to the clinical educators in the departments at both institutions involved in the study. In the reporting of findings, I understand that identifying features will be removed from the information I have provided.

I understand that any data I supply will be stored securely and accessed only by the researcher, and all data will be destroyed six years after analysis.

I understand that my participation in this project is entirely voluntary and that I can refuse to answer any particular questions. I am free to withdraw myself and any information that I have provided for this project at any time prior to completion of data collection (1st December 2012), without explanation. I understand that I have the assurance of the Head of Department, Occupational Science and Therapy, AUT (for Occupational Therapy students) and the Dean of the Faculty of Medical and Health Sciences (for Medical students) that I will be neither

advantaged nor disadvantaged in any way by either participating or withdrawing from the study.

If I withdraw, I understand that all relevant information including maps, annotations and evaluations or parts thereof, will be destroyed.

I agree to take part in this research project entitled "Accessing clinical wisdom: mapping clinical students' experiences of integrated conceptual expansion" under the conditions detailed in the information sheet dated 20th June 2011.

I agree to keep confidential the identity of other participants in this study.

I wish to receive a copy of the report from the research (please circle one):

Yes   No

I wish to receive a petrol voucher or phone credit as compensation for travel and time (please circle one):

Petrol Voucher   Phone Credit   Neither thank you

Participant's signature ....…………………………………… Date …………………

Participant's name …...........…………………………………………………………

Participant's Contact Details (if appropriate):

………………………………………………………………………………..

………………………………………………………………………………..

Approved by the Auckland University of Technology Ethics Committee on 11/10/2011 AUTEC Reference number 11/247 *and by the University of Auckland Human Participants Ethics Committee on* 07/09/2011 UAHPEC reference number 7432

Note: The Participant should retain a copy of this form.

Appendix 3: Concept labels

Concepts and Instructions for Their Use
Focus question: From my experiences, what are the relationships between thinking feelings, behaviour, attitudes, values and beliefs in clinical learning?

1. Concepts should come from the 5 underlined categories
2. Use ALL FIVE underlined concept labels plus other words from the lists below, or words chosen by you.
3. Annotations should be used to describe the clinical context/s that contributed to the links you have made.

Soul - inner self		**Character- projected self**		**Behaviour -visible self**
Beliefs	Feelings	Thinking	Attitudes	Actions/Artefacts (Artefacts = things created diagrams, models, notes

Optional labels:

Identity	Hope	Creativity	Empathy	Listening
Other-view	Confidence	Decisions	Honesty	Observing
Reality		Ideas	Integrity	Speaking
Self-view	Fear	Knowledge	Professionalism	Reflecting
Truth	Pressure	Theory	Responsibilities	Touching Writing Doing

Annotations: Give examples of clinical situations which have led to propositions linking concepts.
Context could include an incident, event or problem.
Where? When? Who was involved?
What made this incident significant for the proposition you are annotating?

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