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Using Hermeneutic Phenomenology to Investigate How Experienced Practitioners Learn to Communicate Clinical Reasoning

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This paper is primarily targeted at doctoral students and other researchers considering using hermeneutic phenomenology as a research strategy. We present interpretive paradigm research designed to investigate how experienced practitioners learn to communicate their clinical reasoning in professional practice. Twelve experienced physiotherapy practitioners participated in this research. Using hermeneutic phenomenology enabled access to a phenomenon that is often subconscious and provided a means of interpreting participants' experiences of personal learning journeys. Within the philosophy underpinning hermeneutic phenomenology, researchers need to design a research strategy that flows directly from the research question and goals of the research project. This paper explores such a strategy. Key Words: Hermeneutic Phenomenology, Clinical Reasoning, Designing Research, and Professional Practice

Introduction

This paper explores the value of hermeneutic phenomenology as a credible and rigorous research approach to investigate learning of clinical reasoning and its communication in health professional practice. The research was part of Rola's doctoral research, with Joy as the principal supervisor. We have primarily targeted the paper at doctoral students and others considering hermeneutic phenomenology as a research strategy. In this paper we present the design of a research approach that encompasses a research paradigm and its philosophical assumptions and framework, the methodology, and the strategies used to gather data and derive meaning from these data. This is underpinned by criteria chosen to ensure quality in interpretive research; rigor (Lincoln & Guba, 2000) and credibility (Denzin & Lincoln, 2000; Koch & Harrington, 1998). In addition, attention is given to the ethical conduct of the research. Research findings are presented to enable readers to contextualize the research approach and to understand the connection between research design and outcome.

The Research Phenomenon and Questions

The researchers explored how experienced physiotherapists learn to communicate their reasoning within the complex context of health care settings in Sydney, Australia. The purpose was to uncover the practice and professional craft knowledge embedded in practitioners' practices, related to communication of clinical reasoning with patients and novice physiotherapists. In addition, the researchers sought to interpret participants' learning journeys and experiences. We have used the term "learning journey" to refer to the participants' learning experiences and the events, people, and situations that impacted on participants' learning of clinical reasoning and its communication. Clinical reasoning was defined in this research as the thinking and decision making associated with clinical practice (based on Higgs & Jones, 2000). Communicating reasoning includes explaining, articulating, or teaching the actual decisions and the thinking leading to the decisions (this includes decisions negotiated with the patient).

Clinical reasoning is a complex phenomenon. This complexity is related to reasoning processes within individuals that are both cognitive and interactive processes; are predominantly unobservable; at times automatic and subconscious; and always multifaceted and context-dependent (Higgs & Jones, 2000). Communication of clinical reasoning, while it is much more observable, is also embedded and enmeshed in practice, multifaceted, and is context-dependent. Learning in practice is situated and mostly implicit (Billett, 1996). Therefore, investigating the phenomenon of learning to communicate clinical reasoning required the participants to raise their level of awareness of their reasoning, their learning, *and* their communication, hence sub-questions related to each of these areas were explored.

The principal question of this research was: How do experienced physiotherapists learn to communicate clinical reasoning with patients and with novice physiotherapists? This question contains multiple embedded and overlapping phenomena, which required explicit attention in order to understand and interpret the main research phenomenon as a whole. Therefore, we investigated the following research sub-questions:

1. How do experienced physiotherapists understand and perform clinical reasoning?
2. How do experienced physiotherapists communicate their reasoning?
3. How do experienced physiotherapists learn to reason?

Research Paradigm

The goal of this research was to understand a human phenomenon and practitioners' experiences of this phenomenon (learning to perform and communicate reasoning, a particular responsibility and capability of health professionals). This goal fits with the philosophy, strategies, and intentions of the interpretive research paradigm. The interpretive research paradigm is based on the epistemology[1] of idealism (in idealism, knowledge is viewed as a social construction) and encompasses a number of research approaches, which have a central goal of seeking to interpret the social world (Higgs, 2001). The investigative approaches of Dilthey (1833-1911) and Weber (1864-1920)

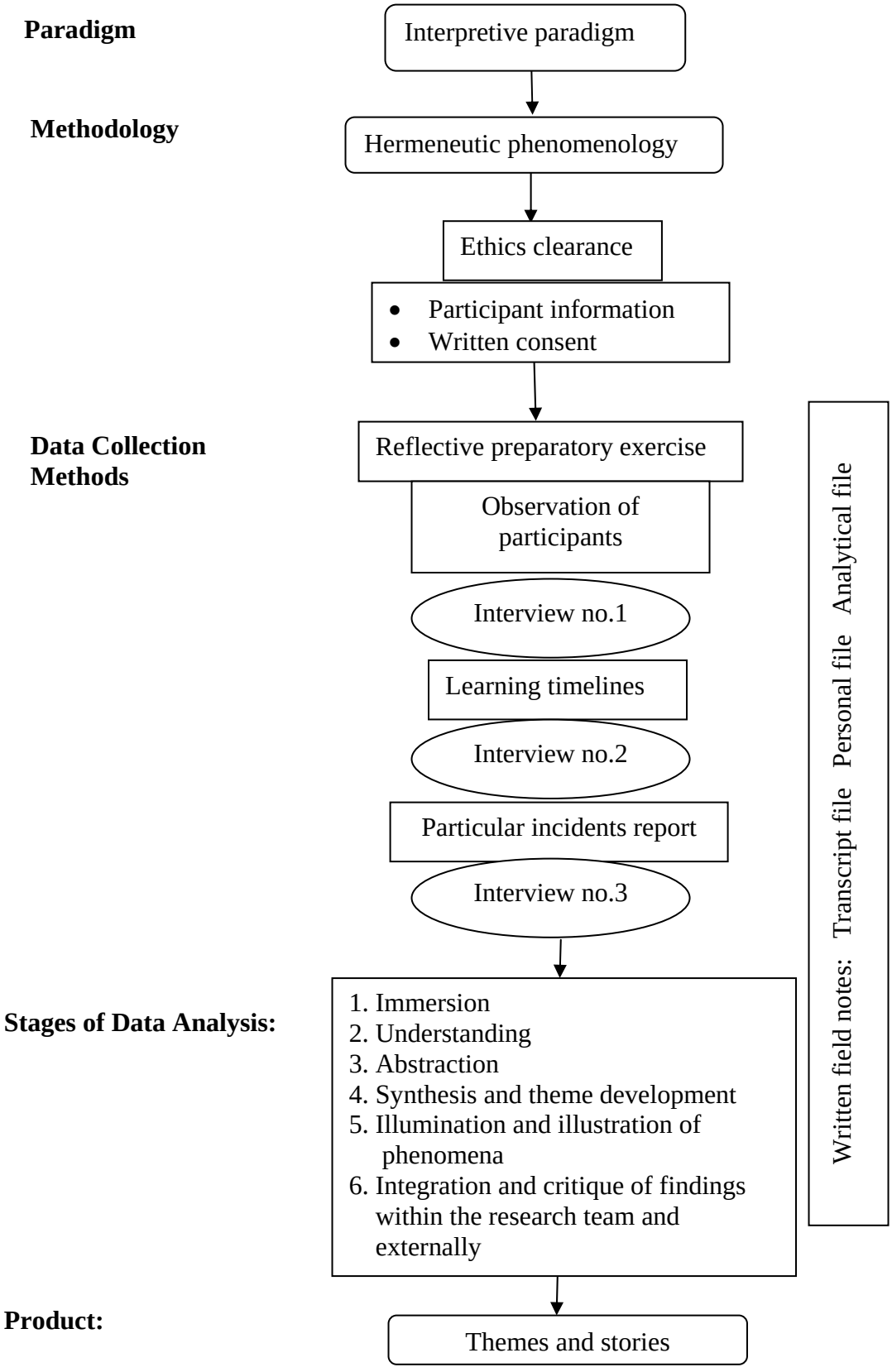
[1] Epistemology is defined as "the philosophy and theory of knowledge, which seeks to define it, distinguish its principal varieties, identify its sources, and establish its limits" (Bullock & Trombley, 2000, p. 279).

focused on interpretive understanding (or *Verstehen*), to access the meanings of participants' experiences as opposed to explaining or predicting their behavior, which is the goal of empirico-analytical paradigm (or quantitative) research (Smith, 1983). According to the interpretive paradigm, meanings are constructed by human beings in unique ways, depending on their context and personal frames of reference as they engage with the world they are interpreting (Crotty, 1998). This is the notion of multiple constructed realties (Crotty, 1996). In this type of research, findings emerge from the interactions between the researcher and the participants as the research progresses (Creswell, 1998). Therefore, subjectivity is valued; there is acknowledgement that humans are incapable of total objectivity because they are situated in a reality constructed by subjective experiences. Further, the research is value-bound by the nature of the questions being asked, the values held by the researcher, and the ways findings are generated and interpreted.

In choosing a particular paradigm, certain assumptions and perspectives are accepted. Clinical reasoning and communication are cognitive and interactive processes that are frequently tacit and subconscious and occur in context. These phenomena cannot maintain their essential and embedded features if reduced or measured as in quantitative research. Both clinical reasoning and communication are complex phenomena involving multiple strategies, purposes, and interpretations; there are no perfect approaches to reasoning or communication. In addition, both processes are contextually bound (i.e., in terms of persons involved, the social and health situation, the actual setting); what is useful, relevant, and meaningful *depends* on the situation. Attempting to isolate or measure reasoning and communication in clinical practice as specific, a-contextual processes ignores the complexity, reality, and consequences of these activities in practice.

In addition, learning journeys in the clinical or work environment are situated and implicit (Billet, 1996). The interpretive paradigm was viewed as the most suitable for this research because of its potential to generate new understandings of complex multidimensional human phenomena, such as those investigated in this research (learning, communication, and reasoning). Specifically, practical knowledge was sought, which is embedded in the world of meanings and of human interactions. It was therefore appropriate to investigate this phenomenon within the interpretive paradigm. Figure 1 presents an overview of the research approach and the various decision points and actions taken in conducting this research.

Figure 1. *Overview of the research approach adopted in this research.*



Research Methodology

Hermeneutic phenomenology was chosen as a suitable methodology for this research, informed by the work of Max van Manen (1997). Hermeneutic phenomenology is attentive to the philosophies underpinning both hermeneutics and phenomenology (van Manen). It is a "research methodology aimed at producing rich textual descriptions of the experiencing of selected phenomena in the lifeworld of individuals that are able to connect with the experience of all of us collectively" (Smith, 1997, p. 80). From identification of the experience of phenomena, a deeper understanding of the meaning of that experience is sought (Smith, 1997). This occurs through increasingly deeper and layered reflection by the use of rich descriptive language.

The research methodology chosen depends on the research questions and the philosophical perspectives from which the questions are to be investigated (Shepard, Jensen, Schmoll, Hack, & Gwyer, 1993). Research devised to understand the nature of the phenomenon of learning, to communicate clinical reasoning from the experiences and interpretations of physiotherapists, in clinical practice, lends itself to phenomenological research. Phenomenology is concerned with lived experience, and is thus ideal for investigating personal learning journeys. However, the main focus of phenomenology is with pre-reflective experiences and feelings (the essence of a phenomenon), and a key aspect of this research was exploring physiotherapists' experiences of their learning journeys of communicating reasoning. The use of hermeneutic phenomenology enabled the exploration of participants' experiences with further abstraction and interpretation by the researchers based on researchers' theoretical and personal knowledge. Hermeneutics adds the interpretive element to explicate meanings and assumptions in the participants' texts that participants themselves may have difficulty in articulating, for example, tacit practice knowledge (Crotty, 1998). Communication and language are intertwined and hermeneutics offers a way of understanding such human experiences captured through language and in context (van Manen, 1997).

The Participants

The goal of hermeneutic phenomenological research is to develop a rich or dense description of the phenomenon being investigated in a particular context (van Manen, 1997). A purposeful selection method was chosen, as recommended by several authors for this type of research, in order to select information-rich cases for detailed study (Denzin & Lincoln, 2000; Patton, 2002); these were participants who could illuminate the phenomenon of learning to communicate clinical reasoning. This method of sampling is consistent with interpretive paradigm research (Llewellyn, Sullivan, & Minichiello, 1999).

Experienced physiotherapists were chosen to be the participants in this research because we anticipated that they would have greater breadth of experience in communicating with patients and, potentially, greater insight into learning to communicate through the teaching of students and novice physiotherapists. The criteria for selecting participants were: physiotherapists registered in New South Wales (NSW)

(Australia)[2] who were working in at least one of three clinical areas (cardiopulmonary, musculoskeletal or neurological physiotherapy), with a minimum of 5 years of clinical experience in physiotherapy, and a minimum of 2 years of supervision experience of undergraduates and/or new graduates in their clinical area. It was determined that 12 participants (four in each clinical area) would allow for in-depth data collection with repeated interviews, and would provide the possibility for *saturation* to be achieved (that is, to reach a point in data collection and analysis where no new ideas were arising). The achievement of saturation was subsequently checked and reached during data analysis.

Four of the participants were male, eight were female: This is comparable to the gender mix among physiotherapists registered in NSW in 2005 (NSW Physiotherapists' Registration Board, 2005). Participants' number of years working as physiotherapists ranged from 6 to 26 years, demonstrating a wide level of experience and varying stages of development of reasoning and teaching ability. The advantages of this range of experience are the richness in the depth of data obtained and the multiple perspectives illuminating the phenomena. In addition, participants were at varied stages in their career and life ambitions, with differing life experiences, motivations, and goals. This diversity lends richness to the data and is a valued aspect of interpretive paradigm research.

Data Collection Methods

Methods of data collection were observation, written reflective exercises, and repeated semi-structured interviews. Figure 1 above illustrates the sequence of these activities. These strategies were chosen because they are congruent with the philosophical framework of the research paradigm and methodology, and enabled access to participants' experiences.

Observation

A convenient date was arranged with each participant for Rola to observe them carrying out their normal work tasks for the majority of one day. Participants were asked to choose a day where they could be observed treating patients and interacting with students and/or new graduates, with no more than one staff or team meeting during the day and no specialist clinics (e.g., fracture clinic). This criterion was stipulated to maximize time spent with the participant observing interactions and actual practice with patients and students. During the observation, Rola acted as an observer and did not participate in any activities undertaken by the participant, and attempted to minimize inconvenience associated with her presence.

Observation was used to access the phenomenon of communicating clinical reasoning in context and to observe interactions and possible influencing factors. The importance of observation in addition to other data collection methods is that much of the thinking (or clinical reasoning) involved in clinical practice occurs at a rapid and subconscious level, particularly in experienced practitioners. Feedback or prompting on observed behaviors can serve to prompt recall and awareness of thinking, and enable practitioners to verbalize their reasoning, reflect upon it, and explain the rationale for it.

[2] The total number of physiotherapists registered in NSW in 2005 was 6,454 (NSW Physiotherapists' Registration Board, 2005).

This was utilized during the interviews when the researcher asked about observed encounters. Similarly, workplace learning is a largely subconscious phenomenon embedded in social interactions (Billett, 1996). Many experiences, observations, and connections are constantly being recorded during learning, for possible later reflection and learning. Observation was also used to gain an understanding of the work setting, to note other people interacting with the participants in the workplace, and to observe the extent to which participants used behavioral strategies (e.g., the use of touch and body position) and cultural tools in their work (e.g., jargon). These observations were used both to prompt reflections by the participants on their current and past learning journeys and experiences, and to provide points of reference for interpretation of findings.

Reflective Written Exercises

As part of the process of constructing the data sets or texts, participants were asked to complete three reflective exercises, which included a preparatory exercise, a learning timeline, and a particular incident report. Reflective exercises were used to assist participants in reflecting on their past learning experiences related to clinical reasoning and its communication. These exercises were utilized in combination with probing questions during interviews to encourage deeper exploration of participants' learning experiences.

The preparatory exercise consisted of open-ended questions that participants were asked to answer in writing. The questions focused on communication of clinical reasoning with novice physiotherapists because teaching would have been a more obvious/familiar context for consciously communicating their reasoning and for thinking about their reasoning (e.g., critiquing how and how well they reasoned). The aims of this exercise were threefold; first, to establish the participants' understanding of the research phenomena (learning to reason, communicating reasoning, and learning to communicate reasoning); second, to raise their awareness of these phenomena in their daily practice; and third, to identify areas for probing in the first interview.

In the second exercise, participants were asked to draw two learning timelines that described significant events, mentors, colleagues, friends, courses, and training, which they had experienced during their career, and which may have influenced their clinical reasoning and the communication of their reasoning. The timelines were used to raise participants' awareness of events that accelerated learning (or possibly led to a decline in learning) and to provide a focus for discussion for the second interview. In addition, the learning timelines provided a greater understanding of the sources of knowledge that participants drew upon in their daily practice.

In the third exercise, participants were asked to write a direct account of three personal experiences that resulted in a change in the way they explained their clinical reasoning to patients, novice physiotherapists, or other health professionals. The particular incidents that the participants described were directly oriented to the phenomenon of learning to communicate clinical reasoning and were used as a stimulus for dialogue in the third interview. Jensen, Gwyer, Shepard, and Hack (2000, p. 32) referred to such incidents as *clinical exemplars*, and used them to aid clinicians' recall of significant events in their professional growth and development. Critical incidents have also been used effectively to explore workplace experiences of new graduate

physiotherapists working in New Zealand, specifically their socialization experiences and the factors perceived to influence these experiences (Roe-Shaw & Higgs, 2003).

As noted by van Manen (1997), writing is inherently reflexive, making it more difficult for the writer to stay close to an experience as it was immediately lived. Writers tend to include explanations and interpretations with their description of the experience. Therefore, each written exercise was followed by an interview where the participants were encouraged to focus directly on the actual experience and describe it in detail (noting that hermeneutics assumes that all experiences are always already interpreted simply through choice of language).

Interviews

In hermeneutic phenomenology the interview serves very specific purposes. First, it is used as a means for exploring and gathering of narratives (or stories) of lived experiences. Second, it is a vehicle by which to develop a conversational relationship with the participant about the meaning of an experience. This may be achieved through reflection with the participant on the topic at hand (van Manen, 1997). Interviews also allow participants to share their stories in their own words.

There are various ways of conducting research interviews, including structured, semi-structured, and unstructured interviews (Minichiello, Madison, Hays, Courtney, & St. John, 1999). A semi-structured interview format was chosen in this research to provide the advantages of both structured and unstructured interviews. Semi-structured interviews provide greater breadth or richness in data compared with structured interviews, and allow participants freedom to respond to questions and probes, and to narrate their experiences without being tied down to specific answers (Morse & Field, 1995). A further advantage over unstructured interviews is the ability to compare across interviews because some of the questions are standard (Minichiello et al., 1999). See Appendix A for a list of the key questions asked during the interviews.

Field Notes

Three types of field notes were recorded during the research process, as described by Minichiello, Aroni, Timewell, and Alexander (1995); the transcript file, personal file, and analytical file. The transcript file contained raw data from the interviews. The personal file contained a detailed chronological account of the participants and their settings, other people present (e.g., staff, clients, and their family), and reflective notes on the research experience and methodological issues. The information contained in the personal file enabled reconstruction of conversations in context rather than simply relying on a-contextual verbal recording; this strategy was suggested by Minichiello et al. (1995). Specifically, any observable evidence of participants' reasoning and strategies, that they used to communicate their reasoning to clients and novice physiotherapists, were recorded. The analytical file contained a detailed (critical) examination of the ideas that emerged in relation to the research questions as the research progressed. It also contained reflections and insights related to the research that influenced its direction. It was a means of prompting and recording reflexive inquiry by the researchers. For example, Rola

frequently recorded her emerging ideas and questions in the analytical file and brought these ideas to supervisory meetings for discussion with Joy.

The Role of the Researcher in Data Collection

During this research, Rola, as the principal data collector, was both a researcher and a member of the same profession as her participants. Being, thus, an insider gave her several advantages. It helped to facilitate trust and confidence in the researcher-participant relationship and allowed her to establish rapport with the participants early in the data gathering process, providing access into their clinical world and thoughts. Specific jargon may be a code that is hard for non-members to understand (Fontana & Frey, 2000). Rola was already fluent in the language the participants spoke, which provided greater access to their world without the need to constantly ask for clarification. However, this may be a disadvantage if researchers ascribe meanings to certain words or jargon, behaviors, and decisions, with which participants differ (Minichiello et al., 1995). Being aware of this disadvantage, Rola attempted to maintain what van Manen (1997) referred to as *hermeneutic alertness*, which occurs in situations where researchers step back to reflect on the meanings of situations rather than accepting their pre-conceptions and interpretations at face value. Thus, reflexivity was viewed as an important dimension in designing and implementing this research. Throughout the research, opportunities for thoughtful analysis of the research experience, and the relationship between the researchers, participants, and the research (e.g., research questions, methods) were built into the research process and are explicated in this account.

Ethical Conduct of the Research

Ethical approval for this research was obtained from the University of Sydney Human Research Ethics Committee and from relevant ethics committees at each hospital site from which data were collected. Ethical considerations raised by this research were concerned with obtaining informed consent and maintaining participant confidentiality. Informed consent is defined as "the voluntary and revocable agreement of a competent individual to participate in a therapeutic or research procedure, based on an adequate understanding of its nature, purpose, and implications" (Sim, 1986, p. 584). Informed consent may be broken down into four constituent elements: disclosure (providing adequate information), comprehension (understanding of information), competence (ability of participants to make a rational decision), and voluntariness (no coercion) (Sim, 1998).

All participants were provided with information sheets detailing the aims of the research and the research process. These information sheets were provided to the participants either directly or via the physiotherapy managers. All participants were given the opportunity to ask questions about the research, and were aware that they could withdraw from this research at any time without negative consequences. Written consent was obtained from each volunteer prior to commencement of data collection. There were no existing power relations between the researchers and the participants that could be perceived as coercion.

A verbal explanation and information statements were also provided to all patients, students, and novice physiotherapists with whom the participants interacted during the observation phase of this research. Written consent was obtained from these "secondary" participants before commencement of data collection activities. Patients were excluded if they declined or were unable to give consent (e.g., if unconscious, under the influence of heavy medication, or with insufficient grasp of the English language). An attempt was made to obtain written consent from all the patients; however, this was not possible on a few occasions, such as in some patients in the high dependency unit, who had multiple cannula sites and lines in the dominant hand and forearm. In these cases verbal consent was audio recorded, while a witness was present (usually the treating physiotherapist), and was documented in the field notes.

Maintaining participants' confidentiality is often a major ethical concern of interpretive research because of the personal nature of the research and the type of questions the participants are asked. Confidentiality was maintained through the use of pseudonyms in the research reporting and by changing specific contextual details that could have revealed the identity of the participant.

Data Analysis Methods

In keeping with the methodology adopted in this research, data analysis methods were developed from phenomenological and hermeneutic principles and from guidelines in the literature about systematic, useful ways of interpreting research data. Therefore, the methods we used were specific to this research, but also drew on the experience and knowledge of experts in the field of interpretive research. There were six stages in the analysis (see Table 2). Throughout all stages of the data analysis there was ongoing interpretation of the research text and the phenomenon of learning to communicate clinical reasoning. In addition, we continually tested our pre-research assumptions about the phenomena by comparing and contrasting these assumptions with the findings in the research text. In this way, we were able to address any prejudices developed from the literature and personal experience. By constantly cross-checking our interpretations with the original transcripts we sought to maintain closeness (or faithfulness) to the participants' constructs, grounding interpretations in the data. This strategy to maintain authenticity was suggested by Lincoln and Guba (2000). Dialogue between the authors of this paper about emerging findings served to further check the faithfulness or authenticity to the data.

Table 2

Stages of Data Analysis Developed for this Research

STAGE	TASKS COMPLETED
1. Immersion	▪ Organizing the data-set into texts ▪ Iterative reading of texts ▪ Preliminary interpretation of texts to facilitate coding

2. Understanding	▪ Identifying first order (participant) constructs ▪ Coding of data using NVivo software
3. Abstraction	▪ Identifying second order (researcher) constructs ▪ Grouping second order constructs into sub-themes
4. Synthesis and theme development	▪ Grouping sub-themes into themes ▪ Further elaboration of themes ▪ Comparing themes across sub-discipline groups
5. Illumination and illustration of phenomena	▪ Linking the literature to the themes identified above ▪ Reconstructing interpretations into stories
6. Integration and critique	▪ Critique of the themes by the researchers and externally ▪ Reporting final interpretation of the research findings

Phenomenological Strategies

The aim of phenomenological data analysis is to "transform lived experience into a textual expression of its essence – in such a way that the effect of the text is at once a reflexive re-living and a reflective appropriation of something meaningful" (van Manen, 1997, p. 36). Text may be viewed as both the data and product of phenomenological research (Smith, 1997). The aim of researchers using phenomenology is to construct an animating, evocative description (text) of human actions, behaviours, intentions, and experiences as we meet them in the *lifeworld*. Phenomenological descriptions are rich and evocative, invoking in readers the *phenomenological nod* in recognition of a phenomenon so richly described that they too may have experienced (van Manen, p. 27). The product of phenomenological research should be simple and straightforward, such that readers who have experienced the phenomenon may analyse their own reality with the identified themes (Swanson-Kauffman & Schonwald, 1988). Phenomenological themes may be understood as *structures of experience* and offer a thick description of phenomena (van Manen).

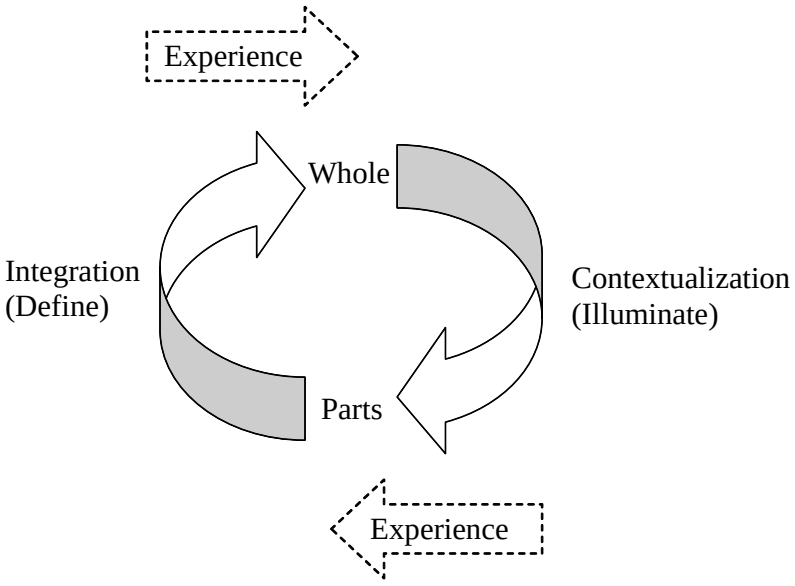
In this research, a systematic method of thematic data analysis was adopted, as informed by Titchen and colleagues' work (Edwards & Titchen, 2003; Titchen, 2000; Titchen & McIntyre, 1993). This method allowed for systematic identification of participants' interpretations and constructs (first order constructs), which were then layered with the researchers' own understandings, interpretations, and constructs (second order).

Hermeneutic Strategies

The hermeneutic circle and dialogue of question and answer were two key strategies drawn from the hermeneutic literature that were incorporated in this research. The hermeneutic circle is a metaphor for understanding and interpretation, which is viewed as a movement between parts (data) and whole (evolving understanding of the

phenomenon), each giving meaning to the other such that understanding is circular and iterative (see Figure 2). Therefore, the researcher remains open to questions that emerge from studying the phenomenon and allows the text to speak; the answer is then to be found in the text. In this context, the text is a creation by the researcher from data collected from participants. Understanding emerges in the process of dialogue between the researcher and the text of the research. The act of interpretation itself represents a gradual convergence of insight on the part of the researcher and the text (Bontekoe, 1996).

Figure 2. *The basic form of the hermeneutic circle (Bontekoe, 1996, p. 4).*



Stage one: Immersion – Organizing the texts

Texts were constructed for each participant from the interview transcripts, field notes, and written exercises. These texts were collated into the three disciplinary subgroups. Rola read and re-read all written texts (interview transcripts, written exercises, and field notes) for each participant to become very familiar with the text set. She also listened repeatedly to the audio recording of the interviews along with the relevant field notes. This process is often referred to as *immersion* (in the data) (van Manen, 1997) and involves engaging with the meaning of the texts, where the aim is to get a "sense" or preliminary interpretation of the texts, which then facilitates coding. Field notes written during the observation and interaction with the participants were used to facilitate the re-creation of the context in which reasoning and its communication occurred, which was an important part of text interpretation. Joy, as the doctoral research supervisor, read segments of the transcripts, written exercises, and field notes to become familiar with the texts and to enable dialogue between the researchers during supervision sessions about the emergent coding frameworks. Dialogue between the researchers served as a vehicle for reflection on emerging ideas and to help develop and expand these ideas. Such dialogue is valuable for providing insight, considering alternative interpretations and contradictions, and thoroughness in interrogating the data (Barbour, 2001). Emerging

thoughts were documented in the form of memos linked to the relevant section of the text in NVivo.

Stage two: Understanding – Identifying first order constructs

First order constructs refer to participants' ideas expressed in their own words or phrases, which capture the precise detail of what the person is saying (Titchen & McIntyre, 1993). These constructs were related to the research questions linked to clinical reasoning, communication of clinical reasoning, learning to reason, and learning to communicate reasoning. First order constructs were identified first for all participants in the cardiopulmonary subgroup, and were then used to code for the remaining participants, with a constant process of checking for appropriateness and completeness of these constructs. The texts were coded (using NVivo software) to identify these constructs. During this stage, Joy, in her supervisory capacity, provided feedback and questioned the relevance of the constructs, identifying overlap and/or connections between the first order constructs.

The researcher's understanding of the participants' first order constructs was checked at each stage with the participants by feeding back to the participants ideas raised in previous phases (see Figure 1) and by probing questions during interviews. This form of iterative member checking provided a progressively richer and deeper understanding of the participants' experiences and learning journeys, and was a central aspect of producing findings from the interactions between the researcher and the participants as the research progressed.

Stage three: Abstraction – Identifying second order constructs and grouping to create themes and sub-themes

Second order constructs were then generated using the researchers' theoretical and personal knowledge; these were abstractions of the first order constructs. A computer file was created for each second order construct and all relevant extracts from the transcripts, written exercises, and comments from the analytical log were copied into that file using the first order construct as a label. If a second order construct was very similar to an existing one, then all the data were copied into the existing file. Interpretation of each interview transcript was used to form a picture of that participant's data as a whole, which then informed understanding of each transcript such that a richer, deeper understanding of the phenomena evolved. In the same way, a composite data-set for each subgroup was formulated that was used to understand each participant's data and to seek any similarities between the subgroups. Thus, at the end of stage three all relevant text material was grouped under each relevant construct for each subgroup, in order to answer the principal research question and sub-questions.

Stage four: Synthesis and theme development

Themes were developed from the results of stages one to three of the analysis. The second order construct files were grouped together into a smaller number of broad themes both across and within the three subgroups. In this stage, themes and sub-themes

were further elaborated and their relationship clarified by reading and re-reading all the data. This stage involved continuously moving backwards and forwards between the literature, the research texts and the earlier analysis, moving from parts to whole following a process informed by the hermeneutic circle. From this process the interpretation of the research phenomenon of learning to communicate clinical reasoning evolved. This in-depth interpretation helped identify meanings that the participants could not articulate, considering the complexity and tacit nature of the phenomenon being investigated. "In determining the universal or essential quality of a theme our concern is to discover aspects or qualities that make a phenomenon what it is and without which the phenomenon could not be what it is" (van Manen, 1997, p. 107).

Themes and sub-themes were presented at the University of Sydney Health Education Conference to gain feedback on the fit and credibility of themes and sub-themes, and transferability of the findings to the settings of the practitioners and educators who attended this conference (Ajjawi, Higgs, & Hunt, 2005). The value of presenting the research findings at the conference was in the ensuing feedback and discussions about the research topic that helped to refine or further develop the presentation of the research themes. Most importantly, it was an opportunity for the researchers to reflect on their emerging interpretations in the process of writing and articulating the research process and content. These conference discussions provided supplementary feedback to the participants' input and reflections. It challenged the emerging interpretations through broader lenses and encouraged refinement of explanations and arguments. Finlay (2003, p. 108) argued that reflexivity in a research sense is the "process of continually reflecting upon our interpretations of both our experience and the phenomena being studied so as to move beyond the partiality of our previous understandings." In addition, consideration of the applicability of findings to other educators' contexts was important in highlighting the perceived value of research findings for future implementation by other practitioners, educators, and researchers.

Stage five: Illuminating and illustrating the phenomena

In this stage Rola examined the literature for links to the themes and sub-themes identified from the entire data set. She also looked for links between the main themes to support further theoretical development. Using the themes, sub-themes, and their interrelationships as a basis, she reconstructed the participants' learning journeys using their own words (or first order constructs) in order to illuminate the journey and highlight key findings from the data. Joy provided feedback on the quality of the stories. Participants' timelines and particular incident exercises were repeatedly examined during this stage to ensure that the constructed stories where faithful to participants' learning experiences.

Stage six: Integration – Testing and refining the themes

The final stage of data analysis involved critique by the researchers, through critical debate, of the seven themes, along with a final review of the literature for key developments that could impact on or increase our understanding of the phenomenon. In addition, the themes and an interpretation of learning to communicate clinical reasoning

were presented at the Association for Health Professional Education (ANZAME) Conference in July 2006 for comment (Ajjawi & Higgs, 2006). The ANZAME conference is attended by students and health professional educators, both clinical and academic, mainly from Australia and New Zealand. The presentation of the phenomenological findings from this research sought to check their verisimilitude (i.e., the fit of findings with others engendering a recognition of the familiarity or resonance of these findings with their own experiences). This was seen as a further critique of the findings and it aided Rola's examination of the themes with an audience other than the participants to test the clarity and meaningfulness of the findings. The researchers were also able to test the relevance of the findings in a community of researchers, academics, and health professionals who might use these findings in their teaching, research, or practice. Comments received were incorporated into the interpretation and subtle adjustments were made, where necessary.

Overview of Research Findings

Seven themes emerged that explicate how experienced physiotherapists learn to reason and to communicate clinical reasoning. Each theme is presented followed by a participant quote to demonstrate grounding in the data. A more detailed report of these findings can be found in Ajjawi (2006) and Ajjawi and Higgs (2007). In this paper the focus is on the methodology rather than the findings of the research.

Theme 1: Learning to reason and to communicate reasoning are situated, embedded, and enriched in practice

A key finding common to all the participants was that their learning of clinical reasoning and its communication occurred in context. Both phenomena were embedded in specific situations and in the context of practice, and could not be considered acontextual. Learning of such complex, socially constructed, and experienced phenomena occurred best in their real workplaces and professional interactions.

> Working in a place like this really challenges you because, being a large teaching hospital you're going to see it all, I think I'm lucky in that respect in that I have had a lot of different experiences and a lot of different hospitals, it's helped along the way and I think being exposed to some really difficult clinical situations really does help develop your clinical reasoning skills. (CP1 interview 2, paragraph 45)

Theme 2: Professional attributes and responsibilities are drivers of learning to reason and to communicate reasoning

Motivation to learn was associated with a desire to deliver better patient outcomes, better service delivery, and better student learning that stemmed from excitement, passion, and enjoyment of the clinical area in which each physiotherapist worked, balanced with the challenges of reasoning and communicating reasoning faced in daily practice.

> As you become more professional, more experienced, you start to take on more accountability for your decisions, so maybe it's something as simple as I'm developing a program for a person with XX (condition) and I realize now that actually what I'm doing, what I'm thinking will have an impact on their life expectancy … you start to professionally realize that actually you're accountable for your reasoning and if the patient gets better great, but they might get worse and it might be because of the way you've been reasoning, so that professional accountability comes in. (CP3 interview 2, paragraph 112)

Theme 3: Communities of practice support, foster, and frame the development of clinical reasoning and its communication

Learning to reason was most often reported as an activity that occurred in association with other people rather than in isolation. Participation with colleagues, peers, students, and patients, where the participants felt supported in challenging situations and shaped and guided in their learning, was a powerful way to learn to reason and communicate reasoning. Upon reflection, participants appreciated the significant contribution of role models, mentors, and peers to their learning of clinical reasoning. In this way communities of practice support and foster the development of clinical reasoning and its communication.

> I would learn a lot from my peers, particularly C* is a very good clinician and he is very generous in his teaching … so I would often ask him questions and watch what he is doing across the gym … sometimes I disagree with how he does things but it's nice to have interesting conversations questioning who is doing what and why. (N2 interview 2, paragraph 49)

Theme 4: The workplace culture is a major influence on learning to reason and to communicate reasoning

Culture consists of the matrix of stories, symbols, beliefs, attitudes, and patterns of behavior in which individuals exist and function (Coulehan, 2005). Working in a culture influences the learning of clinical reasoning and its communication. Culture is the medium through which people's understanding of work practices, their attitudes, and behavior (including critical thinking and decision making) are learned and shaped. This view of learning involves collaborative learning relationships based on dialogue and negotiation (Solomon, 1999). There is considerable overlap between workplace culture and communities of practice.

> Culture is the experience of likeness with the people around you whether it's history or attitude or approach or belief or all those kind of things, so I think we've got a group of people who have some amount of experience who want to keep trying to do it better, so that … has developed a

> situation where learning can occur. I guess there has to be the situation where learning is seen to be important or improving is seen to be valued, so I guess culture is also having similar values. It's a very blessed environment. (N2 interview 2, paragraph 211)

Theme 5: Experiential learning strategies are powerful tools for enhancing clinical reasoning and its communication

Guidance, observation, modeling, discussion, and feedback were found to be effective strategies for the development of clinical reasoning and communication abilities. These tools are frequently described in the socio-cultural educational literature on facilitating or promoting learning (e.g., pointing out salient cues, feedback, questioning) (Cope, Cuthbertson, & Stoddart, 2000; Sanders & Welk, 2005). These strategies are congruent with learning in communities of practice because of the emphasis on collaborative learning through social participation, dialogue, and negotiation. A common aspect of all these strategies is that they act as prompts to focus attention on particular aspects of clinical reasoning (including communication), thereby leading to critical examination of the new information or strategies against what is already known.

> The key [to learning] is watching other people who teach and seeing how they do it, and picking up from the things that they do well and modifying your own practice, so that's definitely ongoing. That's primarily through working with other staff, also seeing staff that don't do it well reinforces the way that I do things. (MS1 interview 3, paragraph 232)

Theme 6: Self-evaluation and reflection on practice are important strategies to monitor and critique reasoning and communication of reasoning

Self-evaluation and reflection were strategies used by physiotherapists to monitor and correct their reasoning and its communication. Professionals benefit from being aware of and observing how well they are interacting with others, and how well their communication, content, and style are received by other people; and from developing strategies to improve communication skills.

> I had fourth year students … your communication improves as a result of it. It's probably a little bit after the student unit you reflect a little bit and work out how you can do things better or how you can … explain things better. (MS2 interview 2, paragraph 53)

Theme 7: Incidents or episodes that promote reflexivity stimulate and deepen learning of clinical reasoning and its communication

Mostly participants were not aware at the time that they were learning to reason and to communicate reasoning. However, certain events or episodes during their careers (e.g., teaching students, changing jobs, articulating reasoning, particular incidents, conducting research, and participating in this research) raised their awareness of their

clinical reasoning. These episodes of raised awareness almost always reflected periods of rapid development of clinical reasoning depicted in their timeline exercises. When participants were asked to reflect about these episodes during the data collection process they became more acutely aware of the learning that had occurred and were then able to talk in depth about their learning. Although the participants recognized that they were becoming more competent and efficient physiotherapists, they were not always explicitly aware of the improvement in their clinical reasoning and its communication.

> Rola: Did doing this timeline exercise tell you anything about how you learned to reason?
> CP1: I actually had never thought about it before, I think it [this research] really made me think about why my clinical reasoning has improved over the years and it's not just clinical practice that assists that – it's a whole lot of different things, good experiences, bad experiences, working with different groups of patients, working with different physios with different levels of abilities, ranging from very experienced to incredibly inexperienced/incompetent sometimes and also with students. The other thing that struck me is how having to teach other people really influences your clinical reasoning and also having done postgraduate [study] can affect that as well as having been involved in research where you've really got to look at the current research. (CP1 interview 2, paragraphs 190-192)

In keeping with the goal of phenomenological writing, to richly portray the phenomenon being researched, descriptions of the participants' learning journeys were presented in Rola's PhD thesis as stories that brought to life the experiences of the participants, as they learned to reason and communicate their reasoning. Here we present an extract from Melinda's story that includes episodes, experiences, and pathways that influenced her learning of clinical reasoning and its communication. The participant's first order constructs (that is, her own words and conceptualizations) are retained as much as possible in the story reconstruction. Participants' names have been replaced by pseudonyms and identifying features removed to maintain confidentiality. A key finding of this research is the reciprocal relationship between learning to reason and communicating reasoning, such that learning to reason leads to development of communication ability and communicating reasoning promotes learning to reason. Hence, participants' stories contained intertwined learning experiences about reasoning and about its communication: This is evident in Melissa's story below.

An Extract from Melinda's Story

> As a student I didn't feel that I had learned an awful lot about clinical reasoning, it was more learning techniques, and I remember feeling that I did things because I'd been told to do them rather than thinking about what I was actually doing and why I was doing it. When I graduated I worked for two years in a large teaching hospital and was fortunate enough to have huge amounts of teaching in all different areas. I felt that every single time I did a new rotation I was on a steep learning curve and thought a lot more about why I was doing things rather than just carrying

> out the techniques. We had a lot of formal teaching and a lot of case study type teaching. We had a mentoring system as well which I've set in place here (for my junior physios), where you go through particular patients with senior physiotherapists each week and we also get people to present case studies. As a new graduate although I was learning a lot more reasoning I wasn't really having to communicate it an awful lot, I was talking to patients and a little bit to my seniors and mentors but not huge amounts. I wasn't reasoning (much) therefore I wasn't communicating my reasoning. I just hoped that the patient didn't ask too many questions. Seniors asked me questions, which is why there is still some rise in my communication (at that time). Then I became the musculoskeletal senior for about 2 years and had students. And during that time I went on a lot of postgraduate courses (weekend and day courses); consolidating what I knew and expanding the number of tools in my belt so I didn't need to be as prescriptive. By having students and explaining what I was doing, I was also learning to think a lot more about my clinical reasoning. If you're trying to teach others to reason then it stands to reason that you've got to be able to reason yourself! My communication of clinical reasoning also went up during this period because I was doing more teaching and explaining.

Implications

Findings from this research have implications for the learning and teaching of clinical reasoning and its communication at the university and in the workplace during clinical education or fieldwork placements. For example, learning to communicate reasoning requires an explicit focus within the goals, learning activities, and assessment strategies included in university curricula that are seeking to help students learn to reason in context, communicate effectively, and critically self-evaluate. The role of mentors, peers, and role models is invaluable in creating learning environments that support and challenge health professionals to continue to develop capability in clinical reasoning and its communication throughout their chosen career paths. For example, role models provide novice physiotherapists with exemplary behavior in relation to communicating their reasoning. Novices can learn much from them in relation to the language, norms, and behaviors expected of them as communicators of their reasoning. Case conferences and patient handovers are key examples of this phenomenon in action. A deeper understanding of expert clinical reasoning and the process of learning to communicate it may be used to facilitate the journey from novice to experienced practitioner; clinical reasoning and its communication being hallmarks of professional practice. This knowledge may then be used in learning and teaching situations with undergraduate and novice physiotherapists. Learners would then be able to develop their own understanding of the clinical reasoning process, how to communicate their reasoning, and, importantly, how to better critique their own practice.

Ensuring Quality in Interpretive Research

Several authors have argued that the criteria used to ensure quality in interpretive research should be consistent with the philosophical and methodological assumptions on which the research is based (Koch, 1996; Koch & Harrington, 1998; Leininger, 1994). In support of this view, we chose the criteria of rigor and credibility as appropriate for this research.

Rigor

In qualitative research rigor and credibility go hand in hand. For the product of research to be credible the process must be rigorous. Ensuring quality in any research requires the rigorous use of systematic methods of data collection and analysis, transparency in documenting these methods, and consistency in operating within the philosophical assumptions and traditions of the research paradigm and approach (Lincoln & Guba, 2000). Several strategies have been identified in the literature as enhancing rigor in interpretive research, including congruence between the adopted paradigm and chosen methods, prolonged engagement with the participants and the phenomena, multiple methods of data collection, and auditable records.

To achieve these outcomes, data from each participant were collected over a period of 3–4 months, with at least four visits to each participant and seven items of data collection. Over this period Rola established rapport with the participants and gained their trust. This gave participants the comfort and freedom to discuss their views and learning experiences, increasing the rigor and trustworthiness of the research findings.

Multiple methods and sources of data collection provide multiple constructions of phenomena, thereby enhancing the depth and richness of the data and reducing systematic bias in the data (Denzin & Lincoln, 2000). In this research, data were collected using several written reflective exercises, observation, repeat interviews, and field notes. Physiotherapists from a range of practice specialties (cardiopulmonary, musculoskeletal and neurological) were recruited, offering different perspectives on the phenomenon of learning to communicate clinical reasoning. In addition, using multiple methods and sources of data may be seen as a way of encouraging reflexivity in the collection and analysis of the data or a sensitivity to the interaction between the researcher and the research (Mays & Pope, 2000). The use of the transcript, personal, and analytical files, as discussed above, assisted in achieving reflexivity, rigor, and transparency of the research process.

Credibility

Credibility refers to the vividness and faithfulness of the description to the phenomena (Koch & Harrington, 1998), or trustworthiness of the findings of the research (Denzin & Lincoln, 2000). Authenticity is demonstrated if researchers show a range of different realities in a fair and balanced manner (fairness) (Denzin & Lincoln, 1994). Using multiple methods and sources of data collection strengthens our claim for fair dealing in illuminating the phenomena using different perspectives. Multiple constructions and interpretations of events and experiences are consistent with the

philosophical underpinnings of the interpretive paradigm (Crotty, 1998). Ensuring that the voices of both the participants and the researcher are evident in the text also enhances authenticity (Lincoln & Guba, 2000). This was achieved by the use of rich description and, where possible, the use of participants' words to allow them to speak for themselves. Finally, transferability of the research findings to other settings has been proposed as an important indicator of quality in qualitative research (Hammersley, 1992). The researcher is responsible for describing the context sufficiently such that readers can judge for themselves the applicability of the research findings to their own contexts (Koch, 1996; Seale, 1999). (Such description is the subject of other publications. See Ajjawi, 2006.)

Limitations of this Research

There were several areas of exclusion or delimitation in this research. The first delimitation resulted from the deliberate focus of the project on experienced physiotherapists. Participants were able to shed light on the development of their reasoning and its communication from novice to experienced, both from their observation of novice physiotherapists and from reflecting on their own experiences. There would be value in future research specifically comparing novice and expert communication of clinical reasoning. Second, the therapist-patient (or therapist-novice) interaction is a dynamic one, in which the thoughts and behaviors of one communicator are constantly responding to and influencing those of the other. This study did not seek to interpret the role of the co-communicators (e.g., patient, peers) or their perceptions of the clinical reasoning communication process. To further understanding of the dynamics of communication, investigation of the impact of co-communicators' behaviors on the health professional and the perceived effectiveness of health professionals' communication would be of value. Third, our focus on the areas of cardiopulmonary, musculoskeletal, and neurological physiotherapy resulted in planned exclusion of physiotherapists working outside these areas (e.g., pediatric, mental health, and community physiotherapy). Communication of clinical reasoning is likely to be sufficiently different in these fields to warrant in-depth investigation in its own right.

Conclusion

This research was conducted in the interpretive paradigm using a hermeneutic phenomenological approach informed by the work of van Manen (1997). Multiple methods of data collection were used, including observation, repeat semi-structured interviews, and several written reflective exercises. All interviews were transcribed verbatim and these transcriptions, along with field notes, audio recording of the observation, and all written documents collected from the participants, comprised the texts that were used for data analysis. Data analysis was informed by Titchen and colleagues' thematic analysis model (Edwards & Titchen, 2003; Titchen, 2000; Titchen & McIntyre, 1993), and the hermeneutic circle. Rigor and credibility were the criteria used to ensure quality in this research.

Hermeneutic phenomenology proved to be an appropriate methodology to investigate learning to communicate clinical reasoning in professional practice. The focus that phenomenology provided on lived experience was congruent with the aim of

exploring participants' learning journeys. Hermeneutics allowed for an added layer of abstraction and interpretation through the lenses of the researchers to make meaning of the phenomenon in a way that is credible and maintains faithfulness to the participants and their interpretations. Using the interpretive paradigm enabled understanding of the research phenomenon in context from the experiences of the participants. In addition to adding to the body of knowledge concerned with learning to reason and to communicate reasoning, this research strategy, through its reflexive nature enabled the researchers to engage in their own learning journey towards a deeper understanding of the phenomenon being researched, the strategies adopted, and themselves as researchers.

Engaging with the participants during this research about their learning experiences in the workplace and career pathways, since graduation, has enabled Rola to reflect on her own experiences as a physiotherapist and clinical educator. She came to appreciate the value of the informal "chats" in the corridor, and the exchanging of patients' stories for developing a common language, and its influence on shaping thinking and decision-making. These episodes had previously gone unnoticed and unacknowledged as an important source for learning how to make decisions and how to articulate these decisions. Rola is currently working as a lecturer in health professional education, the framework for learning of clinical reasoning, and its communication that emerged from this research has application in her daily work and is being used as the foundation for a new unit of study titled "facilitating clinical reasoning."

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Appendix A

Principal Questions for Interviews

Interview #1 (following observation)	**Interview #2 (following timelines exercise)**	**Interview #3 (following particular incident)**
• Is there anything you would like to add or say about the preparatory reflective exercise? • When you're reasoning or talking about your reasoning what sorts of things do you think you do well? What do you think is important about doing it well? • Can you describe a situation where you had difficulty in explaining your decisions to a patient/student? Describe one incident- what happened? Why was it difficult? • What do you think is important when communicating clinical reasoning with patients/students? • What do you find difficult about communicating your reasoning?	• Why did you draw your clinical reasoning learning line in that shape? Height? Peaks and troughs? Slope? • Why did you draw your communication of clinical reasoning learning line in that shape? Height? Peaks and troughs? Slope? • What can you see happening after this? • Tell me about these people why have they or how have they influenced you? • What/who has most influenced you? How? Why? • How would you compare your reasoning to an expert? • What do you find difficult about communicating your reasoning? • What do you think most influenced how you learn to	• Is there anything you would like to add or say about the particular incidents exercise? • How much of your reasoning do you communicate with your patients? What sorts of things have influenced you so that you do it in this way? What sorts of things influenced your pattern of communication? • What do you think is the difference between communication of your reasoning with patients and with students? With students and new graduates? • Are there any metaphors/images/stories or examples that you use to teach students about reasoning and its communication? • One of the things that is important in learning how to communicate reasoning is what others think about your communication. What actions have you or do you take in terms of finding out how well your patients/students think you communicate. • What did the particular

• If I said "your goal is to help the students to reason critically" … what do you think about that? How would you go about that? • How important is it for your students to know how you are reasoning? • What do you think has changed in the way you explain your reasoning since you first started taking students/new grads?	communicate your reasoning? • Is the way you teach clinical reasoning similar to the way you were taught? • What did the timelines exercise tell you about how you learned to reason? And how you learned to communicate your reasoning?	incident exercise tell you about how you learned to reason … and how you learned to communicate your reasoning? • What did your involvement in this research tell you about how you learned to reason yourself? And how you learned to communicate your reasoning? • What do you think is the answer to my question? "How do physiotherapists learn to communicate clinical reasoning?"

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