

# Ready for a paradigm shift? Part 1: Introducing the philosophy of qualitative research

Nicola J. Petty, Oliver P. Thomson, Graham Stew

**Keywords:**

Qualitative research Philosophy of knowledge Manual therapy

**a b s t r a c t**

The manual therapy professions have almost exclusively focused on the use of quantitative research to help inform their practices. This paper argues that a greater use of qualitative research will help develop a more robust and comprehensive knowledge base in manual therapy. The types of knowledge used in practice and generated from the two research paradigms are explored. It is hoped that an understanding of the philosophical and theoretical underpinnings of qualitative research may encourage more manual therapists to value and use this approach to help further inform their practice; for some, this may involve a paradigm shift in thinking.

**1. Introduction**

Manual therapy researchers have, for a number of years, favoured quantitative research, which has generated a great deal of useful knowledge for our practice and professional standing. We have identified mechanisms that help explain the therapeutic effects of our treatment modalities as well as determined the effectiveness of a range of therapies and management strategies. While this knowledge has made a significant contribution to our understanding of manual therapy, the exclusive use of quantitative approaches has resulted in a narrow understanding of our practice. Very little use has been made of qualitative research approaches that generate a different sort of knowledge and is complimentary to quantitative approaches. We carried out an audit of published research in this journal, since its inception in 1995; the results are summarized in Fig. 1. In the last 16 years to December 2011, Manual Therapy has published 475 original articles and only ten of these (2.1%) used a qualitative research approach. An editorial exploring the value of qualitative research for manual therapists was published in 2005 (Grant, 2005) and the first research paper was published in February 2007. Across other manual therapy journals, qualitative research is also under-represented (Gibson and Martin, 2003; Johnson and Waterfield, 2004) and a number of researchers have highlighted the importance of including qualitative research findings into their professions' body of knowledge (Jensen, 1989; Greenfield et al., 2007; Adams et al., 2008; Thomson et al., 2011).

We believe qualitative research will help develop a more robust and comprehensive knowledge base in manual therapy. This paper sets out our argument by first exploring the types of knowledge used in clinical practice and that derived from quantitative and qualitative research. It then examines the philosophical underpinnings of these two different research approaches. The second paper in this series will continue this exploration by outlining the various methodologies and methods used in qualitative research. The two papers provide an introduction to qualitative research; the reader is directed to further literature for more in depth understanding. Our intention is not to belittle or criticise quantitative research in any way, we firmly believe in the value and necessity of this approach. Rather, we want to provide the rationale for qualitative research and counter the common criticism levelled at this approach of being 'soft' and 'unscientific'. Understanding its philosophical and theoretical underpinnings may help to alleviate this attitude and encourage more manual therapists to value and use this approach to help inform their practice; for some, this may require a paradigm shift in thinking. Since all research seeks to generate new knowledge, it is fundamental to explore what we mean by knowledge. For the purposes of this paper we will focus on knowledge that is used in clinical practice, however the issues could equally be referred to others areas of practice such as education or management.

**2. Knowledge used in clinical practice**

There are a wide variety of types of knowledge (Table 1) that may be of relevance to our practice. We may recognise some as being more important than others. For instance our knowledge of

\* Corresponding author. Tel.: þ44 01273 641806; fax: þ44 01273 643944. E-mail addresses: N.J.Petty@brighton.ac.uk, n.j.petty@me.com (N.J. Petty).

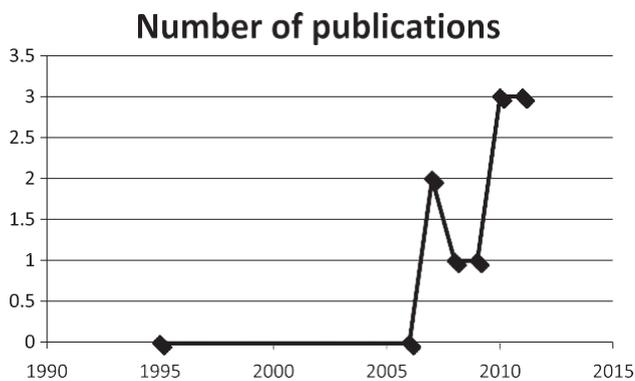


Fig. 1. Frequency of qualitative research publications in Manual Therapy.

Table 2  
Conceptions of clinical practice (Schon, 1987; Fish, 1998; Fish and Coles, 1998).

	Technical rationality	Professional artistry
Application of	Value-free skills and theoretical and research knowledge	Principles and context specific judgements through improvisation, invention and testing
Goal	Solve, in a simple mechanistic way, predictable clinical problems	Construct and solve complex, uncertain and unpredictable problems
Knowledge and skills	Separate and distinguishable from clinical practice	Embedded within, inseparable and indistinguishable from clinical practice

types of knowledge we recognise and value in our practice will be influenced by the way in which we view, or conceive, our own model of practice. Conceptions of clinical practice may be considered along a continuum from technical rationality to professional artistry (Schon, 1987; Eraut, 1994; Fish, 1998; Fish and Coles, 1998) and are summarised in Table 2.

Technical rationality would consider clinical practice as the application of value-free skills and theoretical and research knowledge

how to do something (practical knowledge) gained through our experience (experiential knowledge) and learnt from others or from textbooks (propositional knowledge) may be immediately apparent. We may also recognise ethical and moral knowledge in our practice as we act in the best interests of the patient; however, the use of aesthetic and artistic knowledge may be less obvious. The

(and clinical guidelines) to solve, in a linear mechanistic way, predictable clinical problems (Fish and Coles, 1998). An example of this is the drive for standardisation of patients with low back pain (NHS Quality Improvement Scotland, 2008). With this view, knowledge and skills are considered to be separate and distinguishable from clinical practice (Fish, 1998); this enables practice to be broken down into a set of competencies with a competency framework reflecting practice (Chartered Society of Physiotherapy, 2007; Skills for Health, 2007). Technical rationality has been described as the 'high, hard ground' of practice (Schon, 1983, p. 42) and views knowledge as unproblematic and objective, and problems well defined. The curriculum for pre-registration courses in physiotherapy are often heavily influenced by technical-rational approaches.

Professional artistry on the other hand, would consider clinical practice as the application of principles and context specific judgements through improvisation, invention and testing, to construct and solve complex, uncertain and unpredictable problems (Schon, 1987; Fish, 1998; Fish and Coles, 1998). Critical evaluation and reflection on and during practice are part of what it means to be an

Table 1  
Types of knowledge.

Aesthetic	Emotional	Intuitive	Process
Artistic	Espoused theories	Knowing in practice	Professional craft
Assumptions	Ethical	Moral	Propositional
Attitudes	Expectations	Personal	Situational
Beliefs	Experiential	Practical	Tacit
Emancipatory	Heuristic	Presentational	Theories-in-use
Embodied	Impressions	Procedural	Values

Ryle, 1949/2000; Polanyi, 1966/2009; Argyris and Schon, 1974; Benner, 1984; Kolb, 1984; Eisner, 1985; Dreyfus and Dreyfus, 1986; Schon, 1987; Shepard et al., 1990; Brown and McIntyre, 1993; Eraut, 1994; Morgan, 1994; Benner et al., 1996; Heron, 1996; Fish, 1998; Reason, 1998; Higgs and Titchen, 2000; Beeston and Higgs, 2001; Billett, 2001; Higgs and Andresen, 2001; Titchen and Ersser, 2001a; White, 2001

'artist in practice' (Fish, 1998). Knowledge and skill are considered to be embedded within, inseparable and indistinguishable from clinical practice (Fish, 1998) and thus cannot be broken down into a set of competencies. Professional artistry reflects Schon's (1983, p. 42) practice topography of a 'swampy lowland' where knowledge is socially constructed, negotiated and value laden, where problems are ill-defined and cannot be solved using technical rationality.

While the way we view our practice will fundamentally shape the way we work and develop as practitioners, there has been little research into how manual therapists conceive their practice. What evidence there is in recent years suggests a professional artistry view. A conceptual model of clinical expertise that emphasised collaborative patient-centred practice and the application of interventions for complex problems (Jensen et al., 1999) suggests manual therapists viewed practice as professional artistry; this is also suggested by an Australian study of 'expert' manual therapists (Edwards et al., 2004). In this research, Edwards also highlighted the relationship between different types of knowledge used in practice and a broad range of clinical reasoning approaches employed by the physiotherapists. In addition, therapists completing Masters level study in manual therapy became more patient-centred, creatively adapting to individual patients (Stathopoulos and Harrison, 2003; Rushton and Lindsay, 2010; Petty et al., 2011a,b) also suggested a professional artistry view of practice. This emerging evidence of professional artistry is perhaps unsurprising given the widespread acknowledgement of the biopsychosocial model (Engel, 1977) and Mature Organism Model (Gifford, 1998) that highlight the social, psychological and behavioural dimensions of health and disability; they emphasise the need for manual therapists to understand the patient's unique experience (Jones et al., 2002). One major aim of clinical reasoning is that practitioners take 'wise' action; that is, they take the 'best judged action in a specific context' (Higgs and Jones, 2008, p. 4). Given the complexity surrounding patients' problems, this is likely to involve a diverse mix of knowledge types such as that suggested in Table 3.

We suggest that contemporary manual therapy, that embraces a biopsychosocial approach, needs to use a variety of different types of knowledge to underpin practice. Enhancing manual therapy practice would require building this eclectic knowledge base; that

Table 3  
Clinical decision-making and knowledge.

Practical knowledge (how to)
Moral and ethical knowledge
Intuitive knowledge
Professional judgement and wisdom
Anatomical, biomechanical, physiology, pathology etc Tacit knowledge
Situational knowledge
Research knowledge
Knowledge from experience
Attitudes, values and beliefs

is all aspects of our practice knowledge (all types of knowledge used in practice, not just technical rational) need to be explicated, critically reviewed and developed. This has also been argued by others (Richardson, 1993; Malterud, 2001; Titchen and Ersler, 2001b; Higgs et al., 2004). A major way to develop and create this new knowledge is, of course, through research.

### 2.1. Generating knowledge through research

Research can be broadly categorised into quantitative and qualitative approaches; the approach used is largely determined by the research question. Quantitative research helps to explain phenomena by collecting numerical data. It tests hypotheses, controls variables, measures, identifies cause and effect, and through statistical analysis, aims to generalize findings to predict future events. A major strength of quantitative research is therefore to determine the efficacy and effectiveness of manual therapy interventions. While this is exemplified by the randomized controlled trial, even this methodology has limitations in relation to manual therapy research (Koes and Hoving, 1998; Koes, 2004; Littlewood, 2011; Milanese, 2011) and clearly cannot provide the whole range of evidence needed for clinical practice (Malterud, 2001; Moore and Petty, 2001).

Qualitative research helps to understand human experience and meaning within a given context using text rather than numbers, interpreting experience and meaning to generate understanding, and recognizing the role of the researcher in the construction of knowledge. A useful description of qualitative research is as follows:

*'Qualitative research begins with assumptions, a worldview, the possible use of a theoretical lens, and the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem. To study this problem, qualitative researchers use an emerging qualitative approach to inquiry, the collection of data in a natural setting sensitive to the people and places under study, and data analysis is inductive and establishes patterns or themes. The final written report or presentation includes the voices of participants, the reflexivity of the researcher, and a complex description and interpretation of the problem, and it extends the literature or signals a call for action.'* (Creswell, 2007, p. 37)

The purpose of this paper is to explore the underpinning philosophy behind qualitative research and to help do this, some comparisons will be made to quantitative research. It is possible that readers only familiar with quantitative research may actually be relatively unaware of their ontological and epistemological assumptions. They are so taken for granted that they are often not explicitly stated in research papers.

### 3. Philosophy underpinning qualitative research

Two very different paradigms, or theoretical frameworks, positivism/post-positivism and interpretivism commonly (but not always) underpin quantitative and qualitative research respectively and are summarised in Table 4. Before launching into each paradigm it may be useful to define terms. Ontology is used here to refer to the nature of reality. It is the claims or assumptions that

Table 4  
Comparison of assumptions underpinning post-positivism and interpretivism (Blaikie, 1993; Robson, 2011).

	Post-positivism	Interpretivism (also referred to as Constructivism or naturalistic)
Ontology	One objective reality. Social reality is ordered and these uniformities can be observed and explained. Deterministic view of social life such that social action and interaction are the product of external forces on social actors.	Multiple realities (perspectives). Reality is socially constructed. Reality is preinterpreted, intersubjective world of cultural objects, meanings and social institutions.
Epistemology	Only accepts what can be directly observed by the senses. Observation is theory neutral. Discover a reality that will be known imperfectly and probabilistically due to limitations of the researcher. Absolutist: objective knowledge possible through observation, uncontaminated by theory. Value-free knowledge.	Understand the multiple social constructions of meaning and knowledge. Requires insider status; researcher being immersed, to learn the local language, meanings and rules. Relativist: ultimate truths are impossible. Knowledge is value laden.
Knowledge	Objective knowledge (facts) can be gained from direct observation or experience, but is imperfect and fallible. Theories, hypotheses, background knowledge and values of the researcher influence what is observed.	Observation involves interpretation.
Purpose of research	Deductive reasoning strategies tests hypotheses. General laws and theories that explain and predict. Results can be generalized.	Inductive reasoning strategies to explore, describe, understand, explain, change, evaluate. Analysis of the frames of meanings of social actors obtained from everyday concepts, meanings and accounts; abstraction leads to explanation. Findings are specific to time and place.
Research question and hypotheses	Explicitly defined at the start of the study.	Broad research question that becomes refined during data analysis. Does not identify hypotheses.
Research instrument	Often uses external instruments that ideally are valid and reliable. Researcher may also act as observer.	The researcher.
Participants	Subjects are passive.	Participants actively involved in constructing the 'reality' with the researcher.
Relationship between researcher and participants	Detached and impersonal. Researcher to remain objective. Participants are subjects to be studied.	Involved, immersed in the participants world. Participants are actively contributing.
Data	Measure. Quantitative data (numbers) is derived from strict rules and procedures.	Interpret words (spoken or written) and meanings to gain understanding of phenomena. Use of thick description.
Variables	Controlled.	Not controlled.
Role of lay language	Reject lay language. Language describes objects in the world, therefore precision important.	Accepts lay language as the very medium of social life.
Credibility	Replication.	No attempt to replicate studies.
Natural versus social science	Possible to use assumptions and methods in natural sciences and social science.	Fundamental differences between natural sciences to social science requiring different procedures.

a particular approach makes about the nature of the reality under

investigation (Blaikie, 1993). Epistemology is used here to refer to the

ways in which it is possible to gain knowledge of this reality. It is the claims or assumptions about how that reality can be made known (Blaikie, 1993). An epistemology is a theory of knowledge of what can be known and what criteria it uses to justify it being knowledge.

### 3.1. Positivism/post-positivism

This paradigm (also known as the scientific method or empirical science) developed during the enlightenment in the eighteenth century when rational thought and reason replaced religion and faith to explain phenomena. It assumes a stable reality that can be measured and observed in a rigorous and systematic way to develop objective knowledge (facts). Ontologically, it assumes a single objective reality. Social reality is considered a complex result of causal relations between events, with the cause of human behaviour external to the individual. Knowledge of this reality (epistemology) is through observation; whatever can be observed is thought to be real, whether in the natural or social world. Human beings are observed, measured and tested and will, according to positivist thought, behave according to certain generalisable laws (Bruce et al., 2008). The observer brings their own experiences and knowledge to the research and it is vital they separate this from the study, thus remaining objective. Science aims to gain predictive and explanatory knowledge of the external world by developing universal laws that express regular relationships of phenomena discovered through systematic observation and experiment (Keat and Urry, 1975, p. 4). Credibility will be enhanced through replication studies. This worldview or paradigm underpins much of quantitative research and some qualitative research. The second of this two-part paper, discusses how qualitative methodologies can be applied from either a positivist or interpretivist position. A deductive reasoning strategy is used whereby a theory (or hypothesis) is tested through scientific observational methods and measurement.

### 3.2. Interpretivism

This paradigm is where

*'social reality is regarded as the product of processes by which social actors together negotiate the meanings for actions and situations; it is a complex of socially constructed meanings. Human experience involves a process of interpretation rather than sensory, material apprehension of the external physical world and human behaviour depends on how individuals interpret the conditions in which they find themselves. Social reality is not some 'thing' that may be interpreted in different ways, it is those interpretations.'* (Blaikie, 1993, p. 96).

Interpretivism assumes that people seek understanding of the world in which they live. Meaning is not automatically present in objects or social situations, it has to be constructed, created by individuals (Dyson and Brown, 2006). Individuals develop their own subjective meanings of their experiences; meanings are varied and multiple (Creswell, 2009). Ontologically, reality is socially constructed. Because of this assumption, the social world cannot be researched in the same way as the natural world. Knowledge of this reality (epistemology) involves understanding the multiple views of people in a particular situation. The research question is kept broad to capture this variation and the study evolves as it proceeds. The researcher moves to and fro (iterative) between data collection and data analysis, chasing leads and reasoning inductively from the data, progressively focussing on issues from the data. The research

process is thus flexible (Robson, 2011). The meanings held by individuals are often formed through interaction with others and within particular cultures and this broad view is often explored. Writing up research will involve quoting words from different participants to present different voices and reflect different perspectives. Researchers acknowledge that their own experiences and subjectivity influence their interpretation and this becomes part of the research process, referred to as reflexivity. The values and biases the researcher brings to the study are made explicit within the write up to enable the reader to contextualise the study. Making sense of the meanings held by individuals leads to patterns of meaning, or a theory. Knowledge generated from the research will have been co-constructed by the participants and researcher and will bear the mark of this process such that the knowledge cannot be assumed to be generalized but may be transferrable to other situations. The writing style is narrative, informal, may use the first person pronoun 'I' and may refer to words such as 'meaning', 'discover' and 'understanding' (Creswell, 2007). These assumptions and procedures underpin qualitative research. Inductive and abductive reasoning strategies are used. The researcher inductively builds patterns, themes and categories from the data, to increasing levels of abstraction. Abduction involves generating new ideas and hypotheses to help explain phenomena within the data (Blaikie, 1993). The reasoning strategies lead to a detailed description of the phenomenon of interest or a theory.

A case example, the use of which was inspired by a paper by Carter and Little (2007), serves to further highlight the relevance of these paradigms in carrying out a research study.

#### Case example

Imagine a therapist named Chris wanting to study the exercise habits of keyboard workers as part of a degree and has two supervisors, Professor P and Professor I.

Prof I thinks Chris will need to engage with keyboard workers to carry out this research. Prof I believes that Chris will be jointly creating knowledge about exercise habits in collaboration with his participants. The knowledge constructed will be different from the knowledge that would be constructed with different participants in a different time and place. Chris will be actively creating the knowledge and so needs to continually reflect on his influence during the research process and be transparent in the write up of his subjectivity. Chris needs to keep memos during data collection to provide a further source of data during analysis. Prof I believes Chris cannot directly access and measure the beliefs, attitudes and motivations, but rather will explore the issues and problems raised by participants. He advises Chris to be natural and interact freely and comfortably with participants. Any inconsistencies of participant data need to be further explored to understand the different contexts and meanings that led to this. Chris might triangulate multiple sources of data to produce more data. Transcriptions may be returned to the participants to gain more data by asking them to add written reflections on the transcript. Data analysis will start as soon as the first data is collected and will continue throughout data collection. Peers may also analyse the data alongside Chris, to gain greater perspective of the data.

Prof P thinks very differently. Chris needs to understand the exercise habits of keyboard workers in order to generalize the results. Prof P believes Chris can directly access the beliefs, attitudes and motivations of keyboard workers. He needs to get inside the participants heads and report accurately on this. Chris should avoid subjectivity and

transparency, rather questions should be asked in a detached and depersonalized manner to ensure he obtains the participants' real thoughts. He needs to be as invisible, detached and unobtrusive as possible. Chris needs to pick up inconsistencies or errors in the participants views and return the transcriptions to check for accuracy. Chris' views need to be set-aside during the interviews so that he does not influence the findings. Prof P believes the study should be able to be replicated elsewhere with similar results. Chris should use multiple observers to verify his own observations and if possible triangulate several different sources of data to increase accuracy of the data. All the data should first be collected and then analysis should be done, ideally using a predefined and repeatable method. It will be an advantage to ask peers to also analyse parts of the data to ensure there is agreement in the coding process. Prof P considers a follow up survey would then test the generalisability of the results.

From the case example, it can be seen that each professor holds very different epistemological views. There is internal consistency in their views of what they consider will create trustworthy knowledge, but they are not compatible with each other. The student's own view of what counts as knowledge will help decide which direction to take. How he also manages the divergent views of his professors is thankfully another story for another paper! What this case highlights is that the epistemological position adopted by the researcher, directly influences methodology and methods used. The relationship between epistemology, methodology, methods and knowledge creation is explained in Fig. 2.

A summary of the ten qualitative research studies published in Manual Therapy is provided in Table 5. Typically, the articles have not made explicit the ontological and epistemological assumptions of the study, however hints appear from the way in which they have conducted the study. For example, Smart and Doody (2007) and Sweeney and Doody (2010) have followed case study as described by Yin (1994, 2003), who comes from a positivist position. This stance is further borne out by the controls put in place to: view the videotapes in a set order and with the same pauses for each participant; during analysis pre-determined codes are used and intra- and inter-coder reliability are tested. This sits in contrast to

Petty et al. (2011a), who used a case study approach within an interpretivist paradigm whereby the interview guide changed with subsequent interviews and no attempt was made to determine reliability. Echoes of post-positivism are suggested in the study by Strutt et al. (2008) who measured the frequency of codes within the data and ensured thorough checking of data analysis across the research team. While this was an interpretive phenomenological study suggesting an interpretivist approach, the use of a questionnaire survey suggests trading large numbers of participants for deep understanding of individuals' experience. Four studies (Barker et al., 2007; Fenety et al., 2009; Pool et al., 2010; Sokunbi et al., 2010) do not provide the paradigm within which their study sits, they also do not explain what methodology they used perhaps choosing a generic approach (Lichtman, 2006); two of the studies (Barker et al., 2007; Fenety et al., 2009) document the use of the constant comparative method of data analysis suggesting a grounded theory approach. While Perry et al. (2011) conduct a study within interpretivism, the statement that 'all themes and categories being successfully identified' (p. 286) suggests a possible move towards post-positivism. Carlesso et al. (2011) while not mentioning the paradigm, appear to have operated within interpretivism.

The value of making explicit the paradigm within which the researchers conducted a study is that it enables the reader to use the appropriate criteria with which to judge the merits of the research. If a study sits within post-positivism for example, then that immediately guides the reader to critically evaluate the study in terms of the strict rules and procedures necessary to create objective knowledge. For example, the reliability and validity of measuring instruments and control of variables would be vital. On the other hand a study sitting within interpretivism would, for example, expect the researcher to follow an iterative process in relation to data collection and analysis, and take a critically reflective and reflexive stance. While quantitative studies carry out statistical testing and arrive at generalizations, qualitative studies would provide thick description, conveying the different perspectives of the research participants (and researcher). Findings would remain specific to the context in which data was collected, and may be transferrable to another similar setting. Thus the knowledge claims of qualitative research are entirely different to that of quantitative and it is perhaps overlooking this that leads to the accusation that qualitative research is 'soft' and 'unscientific'.

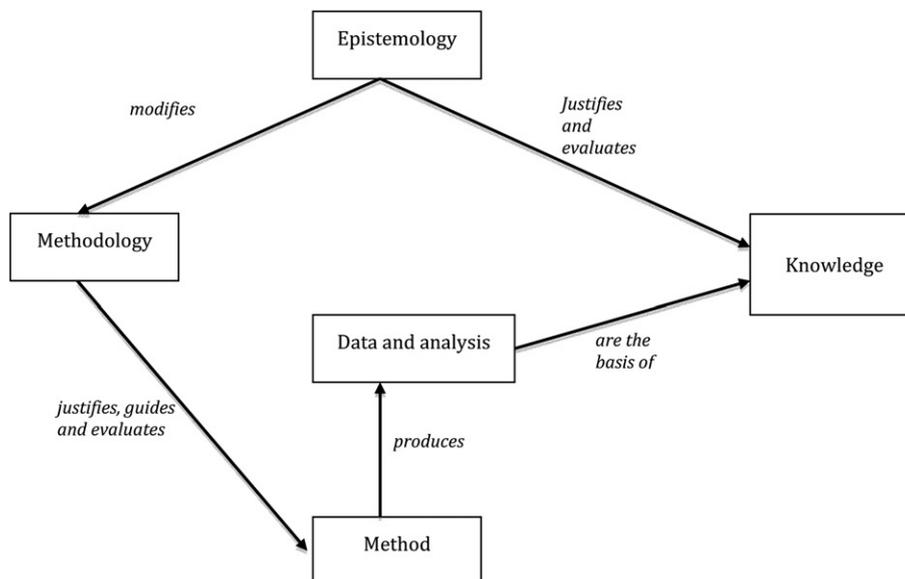


Fig. 2. Relationship between epistemology, methodology and methods to create knowledge (Carter and Little, 2007).

Table 5  
Summary of qualitative original articles published in Manual Therapy since 1995.

No.	Authors	Research area	Methodology	No. of participants	Method	Qualitative data	Data analysis	Findings
1	Smart and Doody (2007) Ireland	The clinical reasoning of pain by experienced musculoskeletal physiotherapists	Multiple case study design (Yin, 1994)	7	Participants viewed 3 videotapes (in same order with same pre-determined pauses)	Semi-structured interviews; Participant profiles; Fieldnotes.	Pre-determined codes from the literature; Themes and categories; Kappa coefficient used to test Inter and intra coder reliability.	Clinical reasoning was multidimensional
2	Barker et al. (2007) UK	Views of members of the public regarding a low back pain media campaign	Not stated	68	8 Pieces of media material prompted discussion	Focus groups.	Constant comparative method; Categories and subcategories; Two independent analysts agreed findings.	Generally viewed positively particularly if promoted by the National Health Service
3	Strutt et al. (2008) UK	Patients perceptions of treatment in a UK osteopathic training centre	Interpretive phenomenological approach	181	Open text questionnaire survey	Six questions asking for free text answers.	Constant comparative method; Content analysis to determine frequency of codes; Two independent analysts agreed findings; Group discussion of 3 researchers.	Provided patient feedback for organization and service delivery
4	Fenety et al. (2009) Canada	The informed consent practices of physiotherapists in the treatment of low back pain	Not stated	44	3 Researchers; Standardised structured questions	Focus groups.	Constant comparison Codes, themes.	Identified how consent is obtained and created typology of different modes of consent
5	Pool et al. (2010) Netherlands	Value of qualitative methods to develop a neck pain questionnaires	Not stated	13	Interviews carried out at persons home to enhance reliability	Three step test interview (TSTI).	Not stated.	Identified a previously validated questionnaire to have difficulties for those completing
6	Sokunbi et al. (2010) UK	Experiences of individuals with LBP during and after a spinal stabilization exercise programme e a pilot study	Not stated	9	Prompts used	Focus groups; Participant profiles.	Thematic content analysis; 3 Researchers agreed themes and categories; Findings.	Individuals gained confidence, self help strategies and better control over their LBP
7	Sweeney and Doody (2010) Ireland	Clinical reasoning of musculoskeletal physiotherapists in assessment of vertebrobasilar insufficiency	Multiple case study design (Yin, 2003) Interpretative epistemology Phenomenology	12	Participants read 2 patient vignettes (with 4 pre-determined pauses)	Semi-structured interviews; Participant profiles; Field notes.	Comparative cross case analysis; Codes and themes; Regular debriefing with a peer; Tested intra- and inter-coder reliability.	Identified reasoning process used by MSK therapists; mostly used subjective
8	Perry et al. (2011) UK	The impact of Masters education in manual and manipulative therapy	Atheoretical pragmatic qualitative approach; Interpretivism	7	Open ended questions	Focus group; Participant profiles; Field notes.	Thematic content analysis; Themes and categories; Two researchers agreed findings; Finally tested by independent assessor.	Created a model to explain development of their knowledge
9	Petty et al. (2011b) UK	Development of expertise following a musculoskeletal Masters course	Theory seeking case study (Bassegy, 1999) Naturalistic enquiry	11	Open ended questions	Semi-structured interviews; Participant profiles; Observational memory.	Dimensional analysis; Constant comparative method of analysis.	Conceptual model of expertise development
10	Carlesso et al., 2011) Canada	How patients define an adverse event in manual therapy (physiotherapy, osteopathy and chiropractic)	Exploratory qualitative descriptive approach	13	Open ended questions	Semi-structured interviews; Participant profiles.	Thematic content analysis; Open coding, themes and subthemes; Two researchers agreed findings.	Different perceptions to therapists

#### 4. Summary and conclusion

While researchers have made a substantial contribution to the knowledge base of manual therapy, the complimentary use of qualitative approaches would further enhance our understanding of ourselves as practitioners, and our practice with patients. Quantitative and qualitative research has very different theoretical and philosophical assumptions and the paradigms of positivist/ post-positivist and interpretivist paradigms have been explored. It is hoped this understanding will encourage more manual therapists to appreciate how qualitative research may inform their practice, and how researchers may use this approach to further explore manual therapy. The link between philosophy, methodology and methods will be explored in the next paper.

#### References

- Adams J, Broom A, Jennaway M. Qualitative methods in chiropractic research: one framework for future inquiry. *Journal of Manipulative and Physiological Therapeutics* 2008;31(6):455e60.
- Argyris C, Schon DA. *Theory in practice, increasing professional effectiveness*. San Francisco: Jossey-Bass; 1974.
- Barker KL, Minns Lowe CJ, Reid M. The development and use of mass media interventions for health-care messages about back pain: what do members of the public think? *Manual Therapy* 2007;12:335e41.
- Bassey M. *Case study research in educational settings*. Maidenhead: Open University; 1999.
- Beeston S, Higgs J. Professional practice: artistry and connoisseurship. In: Higgs J, Titchen A, editors. *Practice knowledge and expertise in the health professions*. Oxford: Butterworth Heinemann; 2001. p. 108e17.
- Benner P. *From novice to expert, excellence and power in clinical nursing practice*. California: Addison-Wesley; 1984.
- Benner P, Tanner CA, Chesla CA. *Expertise in nursing practice: caring, clinical judgment, and ethics*. New York: Springer; 1996.
- Billett S. *Knowing in practice: re-conceptualising vocational expertise*. *Learning and Instruction* 2001;11:431e52.
- Blaikie N. *Approaches to social enquiry*. Cambridge: Polity; 1993.
- Brown S, McIntyre D. *Making sense of teaching*. Buckingham: Open University; 1993.
- Bruce N, Pope D, Stanistreet D. *Quantitative methods for health research, a practical interactive guide to epidemiology and statistics*. Chichester: Wiley; 2008.
- Carlesso LC, Cairney J, Dolovich L, Hoogenes J. Defining adverse events in manual therapy: an exploratory qualitative analysis of the patient perspective. *Manual Therapy* 2011;16(5):440e6.
- Carter SM, Little M. Justifying knowledge, justifying method, taking action: epistemologies, methodologies, and methods in qualitative research. *Qualitative Health Research* 2007;17(10):1316e28.
- Chartered Society of Physiotherapy. *Competence-based career framework for allied health professionals (AHPs) report to identify physiotherapy-specific competences and gaps*. London: Chartered Society of Physiotherapy; 2007.
- Creswell JW. *Qualitative inquiry and research design; choosing among five approaches*. Thousand Oaks: Sage; 2007.
- Creswell JW. *Research design. Qualitative, quantitative, and mixed methods approaches*. Los Angeles: Sage; 2009.
- Dreyfus HL, Dreyfus SE. *Mind over machine: the power of human intuition and expertise in the era of the computer*. New York: Free; 1986.
- Dyson S, Brown B. *Social theory and applied health research*. Maidenhead: Open University; 2006.
- Edwards I, Jones M, Carr J, Braunack-Mayer A, Jensen GM. Clinical reasoning strategies in physical therapy. *Physical Therapy* 2004;84(4):312e30.
- Eisner EW. *The art of educational evaluation, a personal view*. London: Falmer; 1985.
- Engel GL. The need for a new medical model: a challenge for biomedicine. *Science* 1977;196(4286):129e36.
- Eraut M. *Developing professional knowledge and competence*. London: Routledge Falmer; 1994.
- Fenety A, Harman K, Hoens A, Bassett R. Informed consent practices of physiotherapists in the treatment of low back pain. *Manual Therapy* 2009;14:654e60.
- Fish D. *Appreciating practice in the caring professions*. Oxford: Butterworth-Heinemann; 1998.
- Fish D, Coles C. *Developing professional judgement in health care*. Oxford: Butterworth-Heinemann; 1998.
- Gibson BE, Martin DK. *Qualitative research and evidence-based physiotherapy practice*. *Physiotherapy* 2003;89(6):350e8.
- Gifford LS. The mature organism model. In: Gifford LS, editor. *Topical issues in pain 1. Whiplash e science and management. Fear-avoidance beliefs and behaviour*. Falmouth: CNS Press; 1998.
- Grant A. The use of qualitative research methodologies within musculoskeletal physiotherapy practice. *Manual Therapy* 2005;10:1e3.
- Greenfield BH, Greene B, Johanson MA. The use of qualitative research techniques in orthopedic and sports physical therapy: moving toward postpositivism. *Physical Therapy in Sport* 2007;8(1):44e54.
- Heron J. *Co-operative inquiry, research into the human condition*. London: Sage; 1996.
- Higgs J, Andresen L. The knower, the knowing and the known: threads in the woven tapestry of knowledge. In: Higgs J, Titchen A, editors. *Practice knowledge and expertise*. Oxford: Butterworth Heinemann; 2001. p. 10e21.
- Higgs J, Jones M. *Clinical reasoning in the health professions*. 3rd ed. Amsterdam: Butterworth-Heinemann; 2008.
- Higgs J, Richardson B, Dahlgren MA. *Developing practice knowledge for health professions*. Edinburgh: Butterworth Heinemann; 2004.
- Higgs J, Titchen A. Knowledge and reasoning. In: Higgs J, Jones M, editors. *Clinical reasoning in the health professions*. 2nd ed. Oxford: Butterworth Heinemann; 2000. p. 23e32.
- Jensen GM. *Qualitative methods in physical therapy research: a form of disciplined inquiry*. *Physical Therapy* 1989;69(6):492e500.
- Jensen GM, Gwyer J, Hack LM, Shepard KF. *Expertise in physical therapy practice*. Boston: Butterworth Heinemann; 1999.
- Johnson R, Waterfield J. Making words count: the value of qualitative research. *Physiotherapy Research International* 2004;9(3):121e31.
- Jones M, Edwards I, Gifford L. Conceptual models for implementing biopsychosocial theory in clinical practice. *Manual Therapy* 2002;7(1):2e9.
- Keat R, Urry J. *Social theory as science*. London: Routledge and Kegan Paul; 1975.
- Koes BW. How to evaluate manual therapy: value and pitfalls of randomized clinical trials. *Manual Therapy* 2004;9:183e4.
- Koes BW, Hoving JL. The value of the randomized clinical trial in the field of physiotherapy. *Manual Therapy* 1998;3(4):179e86.
- Kolb DA. *Experiential learning*. Englewood Cliffs: Prentice-Hall; 1984.
- Lichtman M. *Qualitative research in education, a user's guide*. Thousand Oaks: Sage; 2006.
- Littlewood C. The RCT means nothing to me! *Manual Therapy* 2011;16(6):614e7.
- Malterud K. The art and science of clinical knowledge: evidence beyond measures and numbers. *The Lancet* 2001;358:397e400.
- Milanesi S. The use of RCTs in manual therapy e are we trying to fit a round peg into a square hole? *Manual Therapy* 2011;16:403e5.
- Moore A, Petty N. Evidence-based practice e getting a grip and finding a balance. *Manual Therapy* 2001;6(4):195e6.
- Morgan J. Learning to live with emotion. *Educational Philosophy and Theory* 1994; 26(2):67e81.
- NHS Quality Improvement Scotland. *An audit of physiotherapy management of patients with low back pain*. Retrieved 03.08.11 from, [http://www.healthcareimprovementscotland.org/previous\\_resources/audit\\_report/low\\_back\\_pain\\_-\\_physio\\_audit.aspx](http://www.healthcareimprovementscotland.org/previous_resources/audit_report/low_back_pain_-_physio_audit.aspx); 2008.
- Perry J, Green A, Harrison K. The impact of Masters education in manual and manipulative therapy and the 'knowledge acquisition model'. *Manual Therapy* 2011;16:285e90.
- Petty NJ, Scholes J, Ellis L. Masters level study: learning transitions towards clinical expertise in physiotherapy. *Physiotherapy* 2011a;97(3):218e25.
- Petty NJ, Scholes J, Ellis L. The impact of a musculoskeletal masters course: developing clinical expertise. *Manual Therapy* 2011b;16(6):590e5.
- Polanyi M. *The tacit dimension*. Chicago: The University of Chicago Press; 1966/2009.
- Pool JMM, Hiralal SR, Ostelo RWJG, van der Veer K. Added value of qualitative studies in the development of health related patient reported outcomes such as the pain coping and cognition list in patients with sub-acute neck pain. *Manual Therapy* 2010;15:43e7.
- Reason P. Co-operative inquiry as a discipline of professional practice. *Journal of Interprofessional Care* 1998;12(4):419e36.
- Richardson B. Practice, research and education e what is the link? *Physiotherapy* 1993;79(5):317e22.
- Robson C. *Real world research*. 3rd ed. Chichester: Wiley; 2011.
- Rushton A, Lindsay G. Defining the construct of masters level clinical practice in manipulative physiotherapy. *Manual Therapy* 2010;15(1):93e9.
- Ryle G. *The concept of mind*. London: Penguin; 1949/2000.
- Schon DA. *The reflective practitioner*. Aldershot: Ashgate; 1983.
- Schon DA. *Educating the reflective practitioner*. San Francisco: Jossey-Bass; 1987.
- Shepard KF, Jensen GM, Hislop HJ. Physical therapist curricula for the 1990s: educating the reflective practitioner. *Physical Therapy* 1990;70(9):566e77.
- Skills for Health. *A competence based career framework for allied health professionals (AHPs) project information bulletin 3*. Retrieved 08.08.11 from, <http://www.skillsforhealth.org.uk/page/competences/competences-projects-in-development/list/allied-health-professions>; 2007.
- Smart K, Doody C. The clinical reasoning of pain by experienced musculoskeletal physiotherapists. *Manual Therapy* 2007;12:40e9.
- Sokunbi O, Cross V, Watt P, Moore A. Experiences of individuals with chronic low back pain during and after their participation in a spinal stabilization exercise programme e a pilot qualitative study. *Manual Therapy* 2010;15:179e84.
- Stathopoulos I, Harrison K. Study at master's level by practising physiotherapists. *Physiotherapy* 2003;89(3):158e69.
- Strutt R, Shaw Q, Leach J. Patients' perceptions and satisfaction with treatment in a UK osteopathic training clinic. *Manual Therapy* 2008;13:456e67.
- Sweeney A, Doody C. The clinical reasoning of musculoskeletal physiotherapists in relation to the assessment of vertebrobasilar insufficiency: a qualitative study. *Manual Therapy* 2010;15:394e9.
- Thomson OP, Petty NJ, Ramage CM, Moore AP. Qualitative research: exploring the multiple perspectives of osteopathy. *International Journal of Osteopathic Medicine* 2011;14(3):116e24.

Titchen A, Ersser SJ. The nature of professional craft knowledge. In: Higgs J, Titchen A, editors. Practice knowledge and expertise in the health professions. Oxford: Butterworth Heinemann; 2001a. p. 35e41.

Titchen A, Ersser SJ. Explicating, creating and validating professional craft knowledge. In: Higgs J, Titchen A, editors. Practice knowledge and expertise in the health professions. Oxford: Butterworth Heinemann; 2001b. p. 48e56.

White K. Professional craft knowledge and ethical decision-making. In: Higgs J, Titchen A, editors. Practice knowledge and expertise in the health professions. Oxford: Butterworth Heinemann; 2001. p. 142e8.

Yin RK. Case study research. Design and methods. 2nd ed. Thousand Oaks: Sage; 1994.

Yin RK. Case study research. Design and methods. 3rd ed. Thousand Oaks: Sage; 2003.