

Understanding Medical Education

EVIDENCE, THEORY AND PRACTICE

Second edition

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26 Qualitative research in medical education: Methodologies and methods

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KEY MESSAGES

- Qualitative research explores social, relational and experiential phenomena in their natural settings.
- Qualitative research methods can contribute to theory building and to the study of complex social issues in medical education.
- Qualitative research encompasses multiple research methodologies, including case study, grounded theory, phenomenology, hermeneutics, narrative inquiry and action research.
- Qualitative data collection methods and qualitative analysis strategies must be selected for their suitability to a particular research question and methodology.
- Principles of rigour, specific to qualitative research, have been developed and can be used as a framework on which to build a qualitative research study or in the appraisal of its quality.

Paradigms and purposes of qualitative research

What is qualitative research in medical education?

Qualitative researchers study social, relational and experiential phenomena in their natural settings. For questions about group interactions, social processes or human experience, a qualitative approach is appropriate. *How* and *what* questions are particularly suited for exploration through qualitative research (see Box 26.1).

The term 'qualitative research' encompasses a broad range of philosophical and theoretical traditions, methodologies and methods, which the following sections will take up in detail. Common to all qualitative approaches are some basic principles. Qualitative research explores the object of study within its natural environment, by observing and interacting with the people and places experiencing the phenomenon. Qualitative research seeks to understand and represent complexity, to offer a richly textured account of social or human phenomena. Also, qualitative research attends carefully to the role of context, to produce situated accounts that are anchored in space and time. As a consequence of these principles, the goal of qualitative research is the careful understanding of instances. It does not make claims to generalisability; rather, it values contextualised understanding and theory building. Qualitative research is frequently used to understand subjective experiences and perspectives; it can also be used to understand empirical networks or sequences of

activity, with potential to explicate tacit or hidden elements of such activity.

Origins of qualitative research in medical education

Qualitative research comes to medical education from the social sciences and humanities, from disciplines such as anthropology, sociology, education and history. At various points, each of these disciplines used medical education as a site for research shaped by their own disciplinary questions and theories. Now, medical education researchers use tools from these disciplines to explore questions arising in the domain of medical education.

According to Harris,(1) the importation of methods from these disciplines into medical education began in the 1980s amid calls for more prescriptive theory building to complement the dominant paradigm of controlled experiments. Interestingly, these calls persist as reviews of the medical education research field continue to identify a need for increased theory building and qualitative strategies of inquiry to grapple with complex social questions.(2,3)

Qualitative research paradigms

Discussions of qualitative research often begin with discussions of research paradigms. As Denzin and Lincoln(4) explain, paradigms are basic sets of beliefs that guide action; Harris describes them as 'cognitive road maps, taken-for-granted assumptions within communities of scholars'(1) that orient researchers towards meaning and the research endeavour. Paradigms encompass ontology

BOX 26.1 Examples of qualitative research questions

- What is the nature and impact of social group interaction?
- How are decisions made in problem-based learning groups?
- How do team members learn from each other when they confront new situations?
- What do people think about an experience?
- How do medical students respond to professional dilemmas?
- How do paediatric residents approach 'difficult' patients?
- How does a social process work?
- How do international medical students acquire a sense of professional identity as residents in a Canadian programme?
- How do clinical teachers balance the duties of education and clinical care?

and epistemology. Ontology refers to the study of being and nature of existence and is linked to epistemology, which refers to the theory of knowledge. Ontology can be thought of as questions of 'what is' and epistemology as questions of 'what it means to know'.(5) For example, the ontology most commonly associated with medical research is realism, which assumes one true reality exists. Realism implies an epistemology of objectivism, which asserts that we can accurately and directly attain knowledge of the one true reality through perception. The most congruent paradigm for a realist-objectivist position, then, would be positivism, which attempts to empirically measure reality and asserts that it can, or more commonly today, post-positivism.(5)

Post-positivism, a common paradigm in medical education research, shares with positivism the belief that there is an objective reality that can be discovered if the correct research procedures are in place. What distinguishes post-positivism from positivism is the acknowledgement that complex human behaviour is shaped by individual motivations and cultural environments, and research must represent these complexities rather than elide them in search of a contextual 'essence' or truth. Irby's account of how clinical teachers make decisions about what to prioritise in their round exchanges with students represents the post-positivist paradigm in his search for the essence of teachers' decision-making while paying attention to the contextual and individual features that shape this process.(6)

Constructivism, another common paradigm in medical education research, departs from post-positivism in its acceptance of reality and meaning as relative, produced through the interaction between researcher and researched. Research in the constructivism paradigm acknowledges the subjectivity of the researcher, producing accounts of a social phenomenon that reflect the researcher's interaction with the phenomenon. Lingard's accounts of tension, collaboration and socialisation within operating room teams

provide an example of this approach, as she views team communication through her training as a rhetorician and blends this perspective with those of study participants and 'insider informants' engaged in the collaborative analysis process.(7-10)

Also becoming apparent in medical education research is work within the critical inquiry paradigm, which is identifiable by its goal of revealing power dynamics in studied phenomena and fostering empowerment through the careful description and analysis of these dynamics. Albert's account of tensions within the medical education research community uses critical theorist Bourdieu's theoretical notion of field to explore the configuration of power relations in this research community.(11)

Two less frequently discussed elements of paradigm worth mentioning are axiology and rhetorical structure.(12,13) Axiology refers to the place or role of values, and rhetorical structure to the use of language in 'writing up' the research. For example, a study drawing on feminist theory might be written in the first person and include explication of the researcher's own experience and position relative to the research, including explication of biases. In contrast, a study informed by a post-positivist paradigm may adopt language that is more in line with the objectivist scientific tradition, such as third person narration and passive voice.

Although contrasting examples are useful to highlight the nuances of each paradigm, the researcher's paradigm does not inflexibly dictate one's methodological choice. A thoughtful consideration of research question and paradigmatic position will guide the qualitative researcher in selecting the most appropriate methodology for inquiry. The best methodological approach for a particular study depends on the research question, the nature of the research setting and the objective of the research. These factors also determine what the best methods are. The selection of a well-aligned and well-justified paradigmatic position, methodological approach and methods relative to the research question is a primary marker of methodological rigour in qualitative research. This notion of 'best fit' is a more philosophically appropriate marker of quality and rigour in qualitative medical education research than a ranking based on a bio-medical hierarchy of evidence.(14)

For a more detailed discussion of research frameworks and paradigms, see Chapter 24.

Relationship between qualitative and quantitative research

Historically, in medical education, the relationship between qualitative and quantitative research has tended to be represented as a dichotomy. A situation that probably arises from strong paradigmatic differences between researchers working within these two approaches. Experimentalists have tended to espouse a positivist belief system, thus the intent to control variables in order to see the essence of a phenomenon, and the use of statistical analyses to reveal and represent knowledge. By contrast, qualitative researchers in medical education have been more likely to adopt post-positivist, constructivist and critical world views.

There has been a gradual recognition that such polarisation is distorting and unhelpful and scholars have consistently urged the medical education community to reconsider this position; from Irby's invited address in 1990 [cited by Harris(1)] to Norman's editorial in 1998,(15) to Lingard's in 2006(16) and to O'Sullivan and Irby's plea to reframe faculty development research in 2011.(17) These calls emphasise the generative potential of considering qualitative and quantitative research depending on 'best fit' with purpose. Certain kinds of research questions are suited to certain paradigms, certain methodologies and methods,(18) and a dichotomous or hierarchical view may be severely limiting.

Together, the components of a research paradigm should be congruent with the methodology. So, one's ontology informs one's epistemology, which together shape one's paradigm, which guides their selection of methodology, which guides their use of particular methods. Methodology and methods are described next.

As in quantitative research, in qualitative research there is a distinction and synergistic relationship between methodology and method. Methodology refers to the theory of how inquiry should proceed, including assumptions, principles and procedures governing the use of particular methods.(19) Methods are the specific investigative tools or procedures used to gather and analyse data.(19)

Qualitative research methodologies

Qualitative research encompasses an eclectic group of research methodologies, which are linked by their common aim to explore social processes through interpretation or representation of qualitative data. These methodologies, or 'systems of inquiry', are, according to Denzin and Lincoln,(4) 'a bundle of skills, assumptions, and practices' that the researcher employs to generate and address their research questions. The various qualitative methodologies stem from different philosophical and/or theoretical perspectives, with resultant implications for the research process. Although there can be a significant overlap between them, and some qualitative methodologists may creatively and effectively employ combinations of methodologies, the following section provides a brief overview of seven major qualitative research approaches (summarised in Box 26.2), with examples of their contribution to medical education research.

Ethnography

The tradition of ethnography originates in the field of anthropology, in which a researcher would travel to study an 'exotic' tribe.(20,21) Current-day ethnography often rejects the traditional notion of a privileged researcher, and ethnographic studies are now more likely to occur in local subcultures (such as a medical school or an operating room) than in far-flung locations. However, ethnographic studies carry on the practice of long-term engagement in a study setting, and the collection, through observation and conversational interviews, of data that are analysed to understand the meaning inherent in the everyday activities of a particu-

BOX 26.2 Seven qualitative research approaches

- Ethnography
- Grounded theory
- Case study
- Phenomenology
- Hermeneutics
- Narrative research
- Action research

lar social group.(22) There are a number of classic ethnographies in the domain of medical education, including Becker's *The Boys in White*,(23) a study of the nature of student culture in medical school, and Bosk's *Forgive and Remember*,(24) a study of the treatment of medical error in postgraduate surgical education. An example of a variant, critical approach to ethnography within medical education research is Mykhalovskiy's investigation of the social organisation of evidence-based medicine using institutional ethnography.(25)

Grounded theory

Grounded theory research explores social phenomena through the development of theoretical explanations that are 'grounded' in (i.e. derived from) the practical experience of study participants.(26) Grounded theory was developed by two sociologists, Glaser and Strauss, in the 1960s, to provide a systematic approach to the analysis of qualitative data that would live up to the standards of 'rigour' imposed by the quantitative paradigm and that would focus on theory generation rather than theory testing.(26) Since its inception, three main methodological schools of grounded theory have gained popularity:(27,28) a post-positivist or classicist approach,(26) pragmatist(29) and constructivist.(30) Key elements that are common across all 'schools' of grounded theory include:

- *iterative* study design (cycles of simultaneous data collection and analysis, in which the results of the ongoing data analysis inform the subsequent data collection)
- *purposeful or theoretical* sampling (purposeful selection of data sources for their ability to provide data that would confirm, challenge or expand an emerging theory)
- *constant comparison* approach to data analysis (through which incidents or issues of interest in the data are compared against other examples for similarities and differences)(31–33)
- *theoretical saturation or sufficiency* – the end point of data collection for a particular study, which occurs when no new codes or concepts are found in newly collected data; sufficiency has been proposed as the more appropriate term by some grounded theorists, particularly constructivists, who assert that saturation must be declared cautiously.(30,34)

In the domain of medical education research, Ginsburg has used grounded theory to develop a behavioural theory

of professionalism.(35–40) Watling has used grounded theory to theorise feedback in medical education.(41)

Case study

Case study research involves an in-depth analysis of a 'bounded system' (a programme, an event, an activity, a process, a group, etc.).(42) The case study can have intrinsic value or can be used as a means of gaining understanding of a larger process.(43) Case study research has roots in sociological tradition as well as in the medical case report.(42) One hallmark of case study methods is triangulation, which is the use of multiple data collection tools or data sources to gain rich insight into the study phenomenon from multiple perspectives (*see* Principles of rigour, below). An example of a qualitative case study in medical education is Perley's study of a group of primary care physicians to explore their use of the 'curbside consultation' with colleagues as a continuing education tool.(44)

Phenomenology

Phenomenology arose early in the 20th century from philosophical reflections on consciousness and perception. Phenomenological research aims to understand the essence of a social phenomenon from the perspective of those who have experienced it.(45) Phenomenology with a descriptive intent involves the 'bracketing' (or putting aside) of the researcher's own preconceptions and perspectives in order to understand the 'lived experience' of the research participants.(45) Phenomenological studies often involve an in-depth exploration of the experiences of a relatively small number of individuals. Bearman has used phenomenology to explore the experiences of medical students during interactions with virtual patients.(46)

Hermeneutics

The term hermeneutics historically refers to the interpretation of biblical texts. In the domain of qualitative research, hermeneutics uses the lived experience of participants as a means of understanding their political, historical and sociocultural contexts.(47) Hermeneutic analysis involves a cyclical process called the 'hermeneutic circle': movement back and forth between the consideration of the meaning of individual parts of a data set and the meaning of the whole text.(48) Addison has explored how medical residents cope with their training through a hermeneutic approach.(49)

Narrative research

Narrative research stems from the ancient practice of storytelling as a method of communicating, arranging and interpreting human experience. Narrative inquiry is a qualitative approach that 'solicits and analyzes personal accounts as stories',(50) using these stories as a means of understanding or making sense of a particular experience or situation. Narrative analysis seeks meaning in the content, structure, context and relational aspects of a story.(51) Narrative methods have been promoted as an educational tool for teaching empathy and communication skills to medical students,(52) but are also being used to address research questions in medical education. Ventres

has used narrative case reports of patient interviews conducted by residents to compare differences between patients' and physicians' perspectives.(53)

Action research

Action research has its roots in the social activism movements of the mid-20th century. Key principles of action research are the explicit aim of producing social change through the research process and the direct engagement of research participants in the research process.(54) Action research classically occurs through sequential cycles of planning a change, implementing the change while observing the process and reflecting on the consequences of the change.(55) Participants collaborate with researchers to construct the results of the research and implement social change. An action research approach was employed successfully in the design and implementation of a new general practice curriculum in Dundee, Scotland.(56)

Qualitative research methods

Qualitative research studies are carried out through a set of tools for data collection and analysis. In the following section, methods for data collection and approaches to data analysis will be reviewed separately. This separation of data collection from analysis is somewhat artificial in qualitative research for two reasons. First, many qualitative studies employ an iterative study design,(1) in which cycles of data collection and analysis occur simultaneously. In an iterative research process, preliminary analysis of data collected early in the study process affects decisions about how to go about the next phase of data collection by revealing questions that require clarification or new ideas that require further exploration in subsequent data collection and analysis cycles.(26) The second way in which data collection and analysis are linked in qualitative research practice is the way in which the choice of data collection methods necessarily informs the choice of the analytical approach and vice versa. For example, an exploration of the educational impact of the choice of language used during case presentations (*see* Discourse analysis section) requires access to audio-recorded data that can be transcribed for analysis. For the sake of clarity, in this chapter, data collection methods (including interviews, focus groups, observations and assembly of textual documents) and data analysis methods (including thematic analysis and discourse analysis) are considered separately.

General questions relating to ethics have been dealt with in Chapter 24, but particular ethical issues arise in the collection and analysis of qualitative data. These include both procedural ethics (how the research is conducted to protect research participants from harm) and situational ethics [how the researcher conducts himself or herself in what Guillemin and Gillam call 'ethically important moments'(57)]. Reflexivity is encouraged in qualitative research; it is a way to identify, articulate and consider the influences shaping research.(58) It is asserted as a sensitising concept researchers can use as they negotiate ethical



BOX 26.3 FOCUS ON: Ethical issues in qualitative research

Subjectivity of the researcher:

- Who are you in relation to your participants?
- What power dynamics are inherent in your relationship to your research subject and participants?
- How can these be managed appropriately to safeguard confidentiality and anonymity, and to avoid harm?

Emotionality of research participation:

- Will your research provoke powerful emotions in participants sharing their stories and experiences?
- How can you provide appropriate support and negotiate the evolving balance between harms and benefits in individual research interactions?

Minimal disclosure:

- Have you used minimal disclosure in your informed consent process (offering generic rather than specific study information to help minimise observer effect in field observations)? Such studies must include a mechanism for full disclosure when appropriate, and the ability to exclude data if participants decline participation following full disclosure.

tensions that may arise in their interactions with participants in the field (see Box 26.3).

Data collection methods

The various qualitative research methodologies have in common a set of data collection tools. Although certain qualitative approaches are classically associated with particular data collection or analysis methods (e.g. ethnography with participant observation or hermeneutics with document analysis), contemporary qualitative researchers commonly choose from the available methods the one(s) that is (are) best suited to address the research question at hand (see Box 26.4).(3)

Interviews

Individual interviews are probably the most familiar and the most often used form of data collection in qualitative medical education research.(1,59) Interviews provide access to participants' personal perspectives and relevant experiences on an unlimited number of topics.(60) The qualitative interview standard is the 'in-depth interview',(60) which provides a rich and detailed exploration of a research question and generally lasts between 45 minutes and a few hours.(61) Qualitative research interviews often follow a 'semi-structured' format.(59) The semi-structured interview is guided by a predetermined set of open-ended questions, but the researcher and participant are free to pursue additional relevant topics as they arise (see Box 26.5 for a sample interview script). Qualitative interviews are usually audiotaped and later transcribed to facilitate analysis, but



BOX 26.4 HOW TO: Choose a data collection tool

Consider a hypothetical research programme about professionalism in medical students. The following potential research questions are matched with an appropriate data collection tool.

- 1 How do medical students' characterise professional behaviour in themselves and other members of the interdisciplinary health-care teams?
In-depth interviews could provide a rich understanding of the students' conceptualisations of professional behaviour in multiple contexts, derived from detailed descriptions of relevant personal experience.
- 2 What are medical students' impressions of the professional behaviour of their clinical supervisors?
Focus groups could provide an affirming environment where the accounts of other students' similar experiences might promote disclosure of relevant anecdotes. Discussion between students could make evident the range of relevant experience.
- 3 Do patient-care discussions on medical teaching teams promote professionalism in novice physicians?
Observations of case presentations or teaching rounds could provide 'real-life' data that would permit analysis of the language used by medical students and their supervisors.
- 4 What messages about professionalism are being conveyed through the clinical evaluations of medical students?
Textual analysis of the narrative comments on clinical evaluation forms could provide insight into the types of behaviour that are being promoted through the evaluation process.

BOX 26.5 Sample semi-structured interview script

Research question: How do medical students characterise professional behaviour in themselves and other members of interdisciplinary health-care teams?

- 1 Could you give me an example of a time when you acted professionally? (*prompt for rich contextual details*) What is it about this behaviour that was professional? (*elicit further examples as appropriate, for this and all subsequent questions*)
- 2 Could you give me an example of a time when you acted unprofessionally? What is it about that behaviour that was unprofessional?
- 3 Could you give me examples of times when your medical student colleagues acted professionally or unprofessionally?
- 4 Could you give me examples of time when a nurse working with your team acted professionally?
Unprofessionally? (*repeat question for other members of the health-care team: therapists, social workers, staff physicians, etc.*)
- 5 What, in your understanding, are the important elements of professional behaviour for a medical student? For a nurse? For a physiotherapist? (*repeat for other relevant members of the health-care team*)

recent advances in analysis software allow analysis directly from a digital audio or video recording.

The main disadvantage of the interview method of data collection is the fact that the information provided is filtered through the memory of the participant and is influenced by the social context of the interview.(62) Interview researchers must be careful to avoid leading questions (consider, for example, the potential difference in responses to the questions 'What barriers to the mentorship process have you encountered?' and 'What have your experiences with the mentorship process been like?'). Researchers must also attend to the power dynamics of the interview. For example, candid opinions from medical students about their experiences during clerkship are unlikely in an interview conducted by the clerkship director.

Focus groups

Focus groups have recently become well known as a marketing research tool, but they have a long history in the domain of social sciences research. Focus groups are sessions involving 4–12 participants and a moderator or facilitator who guides the group discussion of a topic relevant to the research question.(63) Focus groups provide access to multiple stories and diverse experiences in an efficient manner. More importantly, focus groups provide a dynamic and interactive exchange that can stimulate exploration of contrary opinions, reflection on group norms and common practices and exposure of taken-for-granted values.(64) Like individual interviews, focus group discussions often follow a semi-structured format and are audio-recorded and transcribed for analysis. The focus group moderator also records notes on group dynamics and interactions.

Researchers using focus groups must consider whether their topic would benefit from exploration in the synergistic and dynamic focus group format (e.g. some deeply personal topics might be more safely or productively explored in an individual interview). Attending to power dynamics is also critical in focus group methodology: one influential, opinionated group member can monopolise the discussion.(63)

Focus groups have been useful in exploring medical education questions such as the ethical implications of providing medical education in public and private hospital settings.(65)

Observation

Observation of study participants as they go about their regular activities can provide powerful insights into social processes. Researchers conducting observations have access to data on what participants do and not just on what they recall or say they do.(66) Qualitative researchers conducting observations make records called 'field notes' (see Box 26.6 for an illustrative example), which can be structured to capture details such as the content of conversations, the context of discussions, the participants and intended audience for relevant comments and the non-verbal nuances that accompany these interchanges.(67) Observations are sometimes accompanied by audio recording of 'naturalistic' conversations, which are later transcribed for analysis.

BOX 26.6 Sample field note

Research question: Do patient-care discussions on medical teaching teams promote professionalism in novice physicians?

Reflective notes*	Observation notes*
	Morning rounds, 31 Jan, ward 5C nursing station Present: AP, MS1, JR, SR, CN
MS2 is flustered, out of breath	MS2 arrives 5 minutes after rounds have started
AP – good natured sarcasm	AP: Nice of you to join us! (laughter)
MS2 doesn't appear upset by the comment	MS2: Sorry, I ran into the asthmatic's mom in the hall – she wanted to know about the chest x-ray
Note respect for patient through use of name rather than diagnosis	AP: You mean J's mum . . . MS2: Right AP: Did you tell her? MS2: Yeah, that it was clear. AP: Thanks . . .

*Two-column format is often used to facilitate recording of observation notes (containing details of the observed events) and reflective notes (containing the researcher's comments about the context and process of the observation, as well as emerging analytical ideas).

Abbreviations used to distinguish participants without identifying personal information: AP = attending physician, MS = medical student, JR = junior resident, SR = senior resident, CN = charge nurse

Observational researchers must deal with 'observer effect', which is the fact that the presence of the observer has an impact on the behaviours of study participants. There are a number of ways to deal with observer effect.(66) Some researchers will spend long periods of time in the field to allow participants to become accustomed to their presence. Others will not reveal the specific focus of their observations to prevent participants from altering specific behaviours (e.g. a researcher might obtain consent to observe all clinical teaching in an intensive care unit without revealing to participants that the research question related specifically to the teaching of technical skills).(68) Still, others will take care to document evidence of the impact of their presence and then reflect on and write about the significance of this impact on their results.

Another consideration in observational research is the likelihood that relevant data will be obtained. Observations are a useful tool for gathering data about common events and activities, but they are inefficient when the event in question is uncommon or difficult to predict. For example, observations of teaching clinics would be an inefficient way to collect data about failing students if only one or two students fail their clinical rotations each year.

Observational research has a long tradition in medical education. Observational researchers in medical education,

as in other fields, must decide to what degree they will participate in the activities around them. The term 'non-participant observation' has been used to signify an observer who remains uninvolved in the activities of their study participants, taking the role of a passive observer. Stern used non-participant observation of internal medicine teaching teams to investigate the hidden ethics curriculum being taught on the wards.(69) Observational research in the ethnographic tradition takes the form of 'participant observation', in which the researcher becomes fully engaged in the daily activities of the study participants: Sinclair, a sociologist from London, enrolled in medical school and completed a medical degree as he conducted his ethnographic research.(70)

Assembly of textual documents

In the domain of medical education, a myriad of documents is used and created on a daily basis, many of which can yield important insights into educational processes. Sources of text for analysis include course curricula, assignments and examinations, student and faculty evaluations, clinical notes and policy documents. More recently, texts from websites, email correspondence and even digital images and video have been included in qualitative analyses.(71) Analysis of pre-existing documents can be a quick and inexpensive data collection method, and because they were created for purposes other than research, the content of these data is not influenced by the research process.(72) Assembly of textual documents, however, does not allow the researcher to take full advantage of the powerful qualitative process of iterative inquiry (see above), in which ongoing analysis informs the data collection process because the data collection occurs one step prior to the analysis. However, analysis of one type of collected document may point to another as potentially useful for the research.

Perhaps the most common use of textual documents for qualitative analysis in medical education is the analysis of documents produced as course assignments by students. For example, Olney analysed written 'experience summaries' created by medical student participants in a community service project to explore learning outcomes.(73)

Data analysis methods

Qualitative data analysis is the process of making sense of a qualitative data set. As previously emphasised, qualitative data analysis does not often mean sifting through hundreds of pages of text in one sitting, but is rather an ongoing process of reading, reflecting on and questioning the meaning of the data as they are collected. Qualitative data analysis can be conducted individually or as part of a research team that analyses as a group or meets to compare and discuss results of individual analytical work.

Although the different qualitative approaches involve somewhat different analytical procedures, there are some basic processes that are common to most qualitative analyses. The most common of these is coding. Coding is a process of sorting or organising the data into categories representing similar trends.(26)

The first step in the coding process is the selection of the unit of analysis. For example, analysis of medical student

interviews about professionalism might involve coding for the settings in which professional lapses occurred, or for types of professional behaviour or for specific words or phrases used by participants to describe unprofessional acts. Coding for more than one of these different units of analysis might occur over time. As the data are being sorted into categories or codes, names or labels are created for the codes that describe the essence of the category, and memos or reflective notes are written to document the process of the analysis and record reflections and analytical ideas as they arise. Qualitative software can be used as a data management tool to keep track of the coding process as it proceeds, but the cognitive work of categorising data, identifying trends and interpreting meaning is still done by the researcher(s).

The specific approaches to data analysis in qualitative research are wide ranging. They are illustrated below in broad clusters of approaches to thematic analysis and approaches to discourse analysis.

Thematic analysis

The most commonly used qualitative analysis approach in the domain of medical education is the organisation of data according to topics, ideas or concepts, often called themes. Variations of thematic analysis are used in many of the qualitative approaches, and a number of different systems of thematic analysis have been developed [e.g. content analysis(74) and constant comparative analysis].(26,32) The basic process of thematic analysis is to identify instances in the data set that are similar in concept. As further related examples are identified, a progressively rich understanding of the concept is developed, and as other important concepts are identified in the data, the relationships between concepts or themes are explored. The set of themes can then be used for description, theory development or interpretation (see Interpretation, below). Thematic analysis has been used to explore many complex issues in medical education, e.g. Burack's study of the process of medical students' decision-making on specialty choice.(75)

It is important to note that the manner and extent to which thematic analysis is closely tied to the data or abstracted beyond depends on the methodological approach. For example, in constructivist grounded theory, initial codes are at the level of very concrete and representative of the data. As coding progresses, codes should become progressively more conceptual and abstract, with multiple initial codes being clustered or categorised together to form a broader conceptual code or theme, which will eventually be incorporated into the developed theoretical model.(30) Contrastingly, in a post-positivist action research project, the development of theory is not imperative, but rather the grass-roots adoption of practices that will result in positive change in a local context. Themes may thus be useful at the level of description and identification of practical challenges and creative solutions.(76)

Discourse analysis

Discourse analysis is an approach to qualitative research that analyses data at the level of language. Discourse is a term meaning 'socially situated language'.(77) The aim of

discourse analysis is to make explicit what is normally taken for granted about language use or to show what talking accomplishes in a particular social context. Discourse analysis is an umbrella term that references a number of different approaches to the analysis of socially situated language use. Some discourse analysts, often in the domains of linguistics or conversation analysis, work to understand the complex mechanisms and structures of social language. Others, in fields like sociolinguistics or critical discourse analysis, use talk as a source of evidence about social processes. In critical discourse analysis, a central concern is the explication of power relations, with analysis focusing on identification of that which is constructed as 'truth' within a particular discourse and how those truths, from a socio-historical perspective, came to be.(78) Discourse analysis has an extensive history in the study of physician–patient communication,(79) but has been more recently applied to the domain of medical education. Hekelman *et al.* conducted a discourse analysis to investigate the changes in language use in the teaching encounters of a physician–teacher who was enrolled in a peer-coaching programme intended to improve clinical teaching skills.(80,81)

Interpretation and writing

The final stage of qualitative analysis is the process of interpretation, or finding the pivotal meaning in a data set. Without interpretive work, qualitative research produces merely a catalogue of ideas or themes. Important as those ideas may be, qualitative studies that do not take the next step of exploring the meaning at an interpretive level have not fully exploited the power of qualitative research.

There are different approaches to interpretation in qualitative research. In some qualitative approaches, the production of a thick, rich description of a social phenomenon is the goal of the research process (e.g. phenomenology). In other approaches, the development of a novel theoretical explanation of a social process is the aim (e.g. grounded theory). In still other qualitative approaches, the meaning of a data set is considered through the lens of pre-existing theory, such as feminist, rhetorical or Marxist theory.

The process of 'writing up' has been posited as an important tool in the toolkit of methods that qualitative researchers employ.(82) In a constructivist paradigm, writing can be considered a part of the interpretive inquiry process at the stage of coding, when memos are written by researchers to document the analytical process and associated reflective thinking as it unfolds. These memos, iteratively refined, may ultimately lead to the published written form of the qualitative work, and the act of memo writing is thus an intrinsic part of the interpretive inquiry process.(83)

Principles of rigour

Qualitative researchers both within and outside the domain of medical education have sought to articulate criteria for judging the quality of a qualitative report. Journals have published papers with checklists,(84–87) and qualitative leaders have offered overarching concepts such as 'trust-

worthiness',(88) 'utility'(89,90) and authenticity.(91) Position papers on the state of medical educational research assert a need for education and attention to rigour in qualitative research.(92,93)

Specific methodologies will often develop and suggest their own methodology-specific quality criteria. For example, in constructivist grounded theory, Charmaz(83) asserts four main criteria for rigour for her constructivist approach to grounded theory: credibility, originality, resonance, and usefulness. In phenomenology, a hallmark quality criterion is termed the 'phenomenological nod', which refers to the resonance of the research findings with the reader's own experience, such that the reader might nod his/her head in recognition.(94)

While there is growing debate about the politics of such criteria and their feasibility given the vast spectrum of activity housed within the term qualitative research,(95) this debate will not be taken up here. Rather, this section outlines and illustrates, using positive examples, some basic principles of rigour to assist the newcomer in their appreciation of 'quality' in qualitative research. These principles are drawn from an extensive literature outlining guidelines for excellence in qualitative research. They can serve either as a framework for critical appraisal of qualitative research studies in the literature or as a starting point for considering how to design a qualitative project (see Box 26.7).

Sampling: Adequacy and appropriateness

Sampling in qualitative research is not just about 'how many' subjects to include in the study. Because qualitative research explores social and experiential phenomena, deciding whom to include and exclude is a critical step in the sampling logic. A social phenomenon often engages a wide variety of participants, and the researcher must justify



BOX 26.7 HOW TO: Achieve rigour in qualitative research

Adequacy and appropriateness of the sample:

- Are the right people/activities being sampled?
- Is the sample size likely to yield sufficient insight?
- Does disconfirming data need to be sought?
- Does theoretical or purposive sampling need to be conducted to further explore a developing or emerging concept or theme?

Quality of the data collected:

- Is the researcher's relationship to the participants/setting considered and explicated?
- Are interview and observation techniques likely to capture naturalistic data?

Clarity of the analysis process:

- Can the analysis be audited?
- Were member checking techniques or considerations of representation of participants appropriately considered?

their decisions about who best to observe/interview and who to leave out of their study boundaries. In some qualitative research methodologies, sampling refers not only to individuals but also to groups, concepts or documents.(83) In other qualitative research methodologies, e.g. in institutional ethnography, the term 'sampling' is a slight misnomer, because the goal of selecting participants or informants for the research is not to report on a particular population's perceptions and experiences, but rather to learn from the informants about the actualities, work processes, and social coordination of a particular phenomenon.(96) However, overall, qualitative research seeks to sample with the aim of achieving a robust exploration of the study questions.

The following questions can help in assessing the nature and extent of a study sample and evaluating its adequacy:

- Who?
 - Can this sample provide data that answer the research question?
 - Does the sample tap into all relevant participants in the research setting?
- Why?
 - The choice of subjects must be justified, particularly if it does not represent all potentially relevant groups.
- How much?
 - Sample size is not a matter of mere numbers: it is a matter of a thorough exploration of a culture or phenomenon. Often, such thoroughness is referred to as 'saturation', which means that data collection was considered complete when dominant themes/trends were recurrent and no new issues were arising from subsequent data collection. For instance, if after 10 interviews the researcher is not hearing anything new on the topic and recurrent themes are similar across interviews, saturation is said to have been reached, and data collection may be stopped using this rationale.

Sample estimations may be justified by reference to method-based estimates (e.g. in-depth interviews),(61) sampling strategy (e.g. theoretical, confirming/disconfirming, snowball)(97) or past research findings. Methods need to reflect sampling strategy (e.g. confirming/disconfirming sampling requires data analysis to proceed alongside data collection).

Box 26.8 illustrates a number of issues relating to sampling through an extended example. The nature of the sample is specified, and justification is provided for the types of participant sampled, which include various kinds of problem-based learning (PBL) tutors and students who may perceive conflict resolution from different perspectives. Sampling strategies are well articulated. There is no explicit reference to saturation, although reference to the dominant themes implies this. A range of perspectives in faculty and students appears to be explored, suggesting that triangulation is adequate.

Data collection: Authenticity and reflexivity

Because the qualitative researcher engages with their research participants in the collection of data, their role in the construction of meaning must be considered. As part of this, their relation to the participants, and the ways in

BOX 26.8 Example: Sampling

To explore how conflict resolution is achieved in problem-based learning (PBL) groups in medical school, we conducted both individual interviews and focus groups in the final month of the 1999–2000 academic year. Faculty interviews were conducted with 15 PBL tutors with at least 3 years' experience in the tutor role, to ensure an information-rich population. Purposeful sampling of faculty was employed, in order to include both non-clinical tutors ($n = 5$) and tutors from a variety of clinical disciplines, including medicine ($n = 4$), paediatrics ($n = 2$), psychiatry ($n = 1$) and surgery ($n = 3$). Students were sampled using two strategies: convenience sampling for the first six students interviewed, and then a confirming/disconfirming strategy in which interviewed students were asked to recommend potential participants who might: (a) have a similar experience/viewpoint to their own; and (b) have a divergent experience/viewpoint from their own. Using this sampling method, 11 additional students were recruited for voluntary participation. Following preliminary analysis of the interview transcripts, dominant themes were returned for discussion to three student focus groups comprised of both interview participants and new subjects.

which that relationship may shape the data that are being collected, requires careful thought both when deciding how to collect the data and when considering constraints on their interpretation. In educational settings, hierarchical relationships between researchers, who may be medical faculty members, and participants, who may be trainees, can have a distorting effect on the authenticity of the data collection. Participants in vulnerable positions may alter their observed behaviour or tailor their interview responses to safeguard themselves, to please the researcher or to advertise their membership in a group. Data collection processes must take such participant motives and actions into account, and researchers must both strategise to maximise the authenticity of their data and reflect on the ways in which the data are a construction of a research relationship in a hierarchical situation.

A common strategy used by qualitative researchers to maximise the quality of their data set is 'triangulation'. Triangulation is a term from cartography, which refers to the process of finding one's position on a map with reference to multiple other mapped positions. In a qualitative research study, the process of triangulation involves collecting data from multiple 'positions', so that the researcher can gain insight into the studied phenomenon from multiple perspectives, thus realising a more refined and comprehensive understanding by the end of the research. Triangulation requires the selection of the most relevant data sources and their integrated analysis, exploring how they confirm or disconfirm one another.

The following questions can help when considering the factors related to the quality of the data collected:

- Has the researcher considered his or her relation to the study setting and subjects?

- Are the interview script and processes non-leading?
How was the script developed?
Was it piloted?
Were questions appropriate to capture relevant insights?
- Has the Hawthorne effect been considered?
The Hawthorne, or observer, effect is seen when observed participants act differently from how they would act if the observer were not present.(98)
Were mechanisms to minimise the Hawthorne effect used, e.g. prolonged engagement in the field, time taken to establish trust and rapport, and observer comportment (e.g. dressing like an insider)?
Was there a process for recording/reflecting on the Hawthorne effect; e.g. field notes should record any references to observer presence, such as jokes made about being observed.
- Are data triangulated for maximal richness?
- Are complementary data sets collected?
- Are different forms of data/subject populations accessed?

Continuing our worked example, Box 26.9 illustrates how rigour is achieved in data collection. The relationship of the observers to participants has been considered, and steps have been taken to minimise the impact of the observer on the observed activities. Triangulation among methods (observations, interviews and case note analysis) and groups (students and faculty) will assist in creating a more in-depth portrait of this activity.

BOX 26.9 Example: Data collection

Eleven students and 10 faculty participated in the observational phase. Students included five women and six men, while faculty included five women and five men. Faculty experience ranged from those within their first 5 years of appointment ($n = 4$) and those with 20+ years of teaching experience ($n = 4$). Nineteen oral case presentations and the teaching exchanges related to them were observed and audio-recorded by trained research assistants during morning rounds. Observers had no prior relationship with the study participants. All participants were observed at least once, with repeat observations purposefully distributed across the sample to maximise its range and richness. A pocket-sized digital recording system and clip-on microphone worn by the observer were used to record data, and written field notes were compiled. Attempts to minimise the Hawthorne effect included the unobtrusiveness of the recording equipment, the duration of the observation phase (4 months) and the observers' abilities (through similar dress, age and comportment) to blend into the team on rounds. The notes that students created as they prepared for their case presentations were also collected, anonymised and transcribed. Individual interviews were conducted with all students and faculty, using open-ended questions and asking participants to comment on two case presentation scenarios derived from the observational data.

Data analysis: Clarity and audit trails

Although a challenging task, given its iterative nature, the analysis process in qualitative research should be described such that there is little or no 'mystique' surrounding how the researchers went from a pile of transcripts to a list of conceptual or thematic categories. This is not to suggest that there is no 'art' to qualitative analysis; there is, of course, and it includes serendipitous, imaginative links, just as it may in the analysis of experimental data. However, on the whole, the steps involved in the analysis process can be made explicit, and they should be both in a published manuscript and in the researchers' own journals, which can form the basis of an 'audit trail' to review their analytical journey. Reflexivity may be a helpful tool in the elaboration of what may otherwise seem like 'conceptual leaps'.(99)
Questions to consider include the following:

- Is the analysis process well described?
Can you tell what was done, by whom and how?
Were insider experts used to verify coding samples?
- Were the following key aspects of analysis evident?
Is 'constant comparison' evident?
How were discrepancies resolved?
- Was an attempt made to engage participants or other stakeholders in reflecting on the results of the analysis?
Was 'member checking' or 'return of findings', processes that provide participants or other informants an opportunity to weigh in on findings and interpretations, conducted? How?
- Was a software program used?
Was its use appropriately described?

Box 26.10 and our worked example illustrate attempts to address these questions. The analytical process makes clear who conducted the analysis, the steps involved, the iterative process of data collection and analysis, the strategy in place for keeping an audit trail and the effort to engage participants in refining the analytical concepts.

As suggested earlier, some qualitative researchers would argue that the broad application of any of these proceduralist principles is a sub-optimal way of measuring quality. As Eakin argues, this approach can oversimplify and distort the complex and non-formulaic nature of qualitative inquiry. Instead, the notion of a paper's 'so what' factor – its ability to contribute to the understanding of a social phenomenon – is offered as the most important criterion.(100) Similarly, Sandelowski(90) has proposed a study's 'utility', its power to 'be of use' in the world, as another holistic principle for consideration when evaluating qualitative research. The utility of a study is related to how it is 'written up'. Charmaz(30) and Richardson(82) encourage researchers to attend closely to the aesthetics of the written product of qualitative research in order to maximise understanding and potential impact. These more holistic approaches build upon other principles, such as sampling and authenticity, while trying to avoid the pitfalls of a naïve, checklist approach to quality in qualitative research.

Role of theory

A final note regarding data analysis relates to theory. A beginner qualitative researcher should be aware that theory

BOX 26.10 Example: Data analysis

All interviews were audio-taped and fully transcribed. Initial themes were identified and developed by both authors in an iterative process of reading and re-reading transcripts. These initial themes were further explored, clarified and iteratively refined alongside ongoing data collection. Although *a priori* ideas existed in the form of literature review, research questions and the researchers' general familiarity with the topic, systematic attempts were made to be open to unexpected findings through searches for disconfirming examples, reflexive dialogue and reflexive memos. The development of themes and the framework for analysis were based on and driven by the original accounts and observations of the study's participants. Interviews and analyses, concurrently conducted, continued until no new themes emerged and data saturation was felt to be complete. The trustworthiness of the data was enhanced by the transparent process of analysis, the involvement of two independent researchers who read and compared ideas on the transcripts, and by searching for disconfirming evidence of the developing themes. An analytical journal was kept to record memos of ongoing analytical decisions, definitions of themes and researcher reflexivity. All interviewees were sent a copy of the primary analysis in order to elicit their comments on the representation of the data.

may play a differing role in the various stages of a qualitative study depending on the methodological approach. That is, depending on the underlying assumptions of a given paradigm and methodology, theory may be more or less involved from the initial phases of developing a research question and designing a study, to the final stages of analysing data and writing up findings. So, how does one know if theory has been appropriately employed? Generally, when assessing the rigour of a qualitative study with regard to the use (too much, or not enough?) of extant theory, the principle of 'best fit' applies again. Have the authors justified their approach in a cogent manner? If breaking from a methodological tradition or trend with regard to the use of theory, has the break been convincingly explained? If drawing from extant theory, have the authors reproduced more of the same, missing the opportunity to develop new knowledge? A sound understanding of the paradigmatic theories that underlie a chosen methodological approach is beneficial, and most qualitative researchers would argue, obligatory.(12,30) Debates about the role of theory relate to two main considerations: (i) the interpretation of data through a theoretical lens or frame and (ii) the production of theory through qualitative research.

On the one hand, qualitative research can effectively use theory to inform analysis and interpretation; when this is done well, the research ultimately moves beyond extant theories to produce new ways of thinking.(83) For example, in constructivist approaches to grounded theory, which of

course aim to produce theory, 'sensitising concepts' have been proposed to provide a theoretical lens for data analysis.(101) Grounded theory is often cited as an ideal methodology for process-based questions for which there is little extant theory. Forcing data into pre-conceived categories is strongly opposed by classicist grounded theorists, who suggest that constructivist approaches legitimate such forcing.(102) Yet, despite such resistance, a methodology is evolving to engage existing theory in the analysis process.(103) The use of 'sensitising concepts' in grounded theory may make way, if controversially, for grounded theorists to expand existing theory or make use of extant theory to understand similar processes in different contexts.

On the other hand, some methodologies aim neither to use theory to guide analysis nor to produce theory as an outcome of the research. For example, descriptive phenomenology aims to remain true to a rich description of the 'essence' of the lived experience of a particular phenomenon,(94) and institutional ethnography aims to explicate the 'actualities' of every day work without imposing theory to explain this work, and without producing theory (but rather, enabling social change) from the explication.(96,104)

As an interdisciplinary field, medical education draws from myriad disciplines, which offer countless social theories that need not be completely re-invented. So, at times, drawing from extant theory can be the 'best fit' for a research purpose. Calls for more theory in medical education(3) implore the medical education research community to use rigorous theory-building approaches. At the same time, a value for theory does not hierarchise theory over description; such a hierarchy may create implicit pressure to claim theory when one has produced description, which in turn may undermine the rigour of some qualitative research.(105) Researchers need to be both thoughtful and transparent about their purposes and procedures with regard to theory building and theory use, in order to advance understanding of medical education through rigorous qualitative research.

Conclusions

Qualitative research has made important contributions to medical education research in the past few decades. This form of inquiry is situated within a particular set of paradigms and draws on recognisable approaches and methodological tools to build knowledge regarding the experiences and activities of teachers, trainees, patients and team members in medical education settings. Particular ethical issues must be considered in a qualitative project, as well as appropriate criteria for determining the most rigorous path for each individual study. Used properly, qualitative research promises to offer profound insights into the complex social and human aspects of how health professionals develop their identity, expertise and practice.

References

- 1 Harris I (2002) Qualitative methods. In: Norman G, van der Vleuten C and Newble D (eds) *International Handbook of Research in Medical Education*, pp. 45–95. Kluwer Academic Publishers, Dordrecht, The Netherlands.
- 2 Shea JA, Arnold L, Mann KV, Shea JA, Arnold L and Mann KV (2004) A RIME perspective on the quality and relevance of current and future medical education research. *Academic Medicine*. 79: 931–8.
- 3 Regehr G (2010) It's NOT rocket science: rethinking our metaphors for research in health professions education. *Medical Education*. 44: 31–9.
- 4 Denzin N and Lincoln Y (2000) Introduction: the discipline and practice of qualitative research. In: Denzin N and Lincoln Y (eds) *Handbook of Qualitative Research*, pp. 1–28. Sage Publications, Thousand Oaks, CA.
- 5 Crotty M (1998) *Foundations of Social Research: Meaning and Perspective in the Research Process*. Sage Publications, Thousand Oaks, CA.
- 6 Irby DM (1992) How attending physicians make instructional decisions when conducting teaching rounds. *Academic Medicine*. 67: 630–8.
- 7 Lingard L, Espin S, Whyte S et al. (2004) Communication failures in the operating room: an observational classification of recurrent types and effects. *Quality & Safety in Health Care*. 13: 330–4.
- 8 Lingard L, Garwood S and Poenaru D (2004) Tensions influencing operating room team function: does institutional context make a difference? *Medical Education*. 38: 691–9.
- 9 Lingard L, Espin S, Rubin B et al. (2005) Getting teams to talk: development and pilot implementation of a checklist to promote safer operating room communication. *Quality & Safety in Health Care*. 14: 340–6.
- 10 Lingard L, Reznick R, DeVito I and Espin S (2002) Forming professional identities on the health care team: discursive constructions of the 'other' in the operating room. *Medical Education*. 36: 728–34.
- 11 Albert M (2004) Understanding the debate on medical education research: a sociological perspective. *Academic Medicine*. 79: 948–54.
- 12 Ponterotto JG (2005) Qualitative research in counseling psychology: a primer on research paradigms and philosophy of science. *Journal of Counseling Psychology*. 52: 126–36.
- 13 Creswell JW and Plano Clark VL (2007) *Mixed Methods Research*. SAGE, Thousand Oaks, CA.
- 14 Morse J, Swanson JM and Kuzel AJ (2001) *The Nature of Qualitative Evidence*. Sage Publications, Inc, Thousand Oaks, CA.
- 15 Norman G (1998) Editorial. *Advances in Health Science Education*. 3: 77–80.
- 16 Lingard L (2007) Qualitative research in the RIME community: critical reflections and future directions. *Academic Medicine*. 82: S129–30.
- 17 O'Sullivan PS and Irby DM (2011) Reframing research on faculty development. [Research Support, Non-U.S. Gov't]. *Academic Medicine*. 86: 421–8.
- 18 Sandelowski M (2001) Real qualitative researchers do not count: the use of numbers in qualitative research. *Research in Nursing & Health*. 24: 230–40.
- 19 Schwandt TA (2007) *The Sage Dictionary of Qualitative Inquiry* (3e). Sage Publications, Thousand Oaks, CA.
- 20 LeCompte M and Schensul J (1999) *Designing and Conducting Ethnographic Research. An Ethnographers Toolkit*. Alta Mira Press, Lanham, MD.
- 21 Hammersley M and Atkinson P (1995) *What is Ethnography? Ethnography: Principles in Practice*. Routledge, London.
- 22 Atkinson P and Pugsley L (2005) Making sense of ethnography and medical education. *Medical Education*. 39: 228–34.
- 23 Becker H, Geer B, Hughs E and Strauss A (1961) *The Boys in White: Student Culture in Medical School*. University of Chicago Press, Chicago, IL.
- 24 Bosk CL (2003) *Forgive and Remember: Managing Medical Failure*. University of Chicago Press, Chicago, IL.
- 25 Mykhalovskiy E (2003) Evidence-based medicine: ambivalent reading and the clinical recontextualization of science. *Health*. 7: 331–52.
- 26 Glaser B and Strauss A (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine Pub Co., Chicago, IL.
- 27 Meston CN and Ng SL (2012) A grounded theory primer for audiology. *Seminars in Hearing*. 33: 135–46.
- 28 Watling C and Lingard L (2012) Grounded theory in medical education research: AMEE Guide No. 70. *Medical Teacher*. 34: 850–61.
- 29 Corbin J and Strauss A (2008) *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (3e). Sage Publications, Inc, Los Angeles, CA.
- 30 Charmaz K (2006) *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*. Sage Publications, Inc, London.
- 31 Corbin J and Strauss A (1990) Grounded theory research: procedures, canons, and evaluative criteria. *Qualitative Sociology*. 13: 3–21.
- 32 Strauss A and Corbin J (1998) *Basics of Qualitative Research*. Sage Publications, Thousand Oaks, CA.
- 33 Kennedy TJ and Lingard LA (2006) Making sense of grounded theory in medical education. *Medical Education*. 40: 101–8.
- 34 Dey I (1999) *Grounding Grounded Theory: Guidelines for Qualitative Inquiry*. Academic Press, San Diego, CA.
- 35 Ginsburg S, Kachan N and Lingard L (2005) Before the white coat: perceptions of professional lapses in the pre-clerkship. *Medical Education*. 39: 12–9.
- 36 Ginsburg S, Regehr G and Lingard L (2004) Basing the evaluation of professionalism on observable behaviors: a cautionary tale. *Academic Medicine*. 79: S1–4.
- 37 Ginsburg S, Regehr G and Lingard L (2003) The disavowed curriculum: understanding students' reasoning in professionally challenging situations. *Journal of General Internal Medicine*. 18: 1015–22.
- 38 Ginsburg S, Regehr G and Lingard L (2003) To be and not to be: the paradox of the emerging professional stance. *Medical Education*. 37: 350–7.
- 39 Ginsburg S, Regehr G, Stern D and Lingard L (2002) The anatomy of the professional lapse: bridging the gap between traditional frameworks and students' perceptions. *Academic Medicine*. 77: 516–22.
- 40 Ginsburg S, Regehr G, Hatala R et al. (2002) Context, conflict, and resolution: a new conceptual framework for evaluating professionalism. *Academic Medicine*. 75: S6–11.
- 41 Watling C, Driessen E, van der Vleuten CP and Lingard L (2012) Learning from clinical work: the roles of learning cues and credibility judgements. *Medical Education*. 46: 192–200.
- 42 Stake R (2005) Qualitative case studies. In: Denzin N and Lincoln Y (eds) *The Sage Handbook of Qualitative Research*, pp. 443–66. Sage Publications, Thousand Oaks, CA.
- 43 Aita V and McIlvain H (1999) An armchair adventure in case study research. In: Crabtree B and Miller W (eds) *Doing Qualitative Research*, pp. 253–68. Sage Publications, Thousand Oaks, CA.
- 44 Perley CM (2006) Physician use of the curbside consultation to address information needs: report on a collective case study. *Journal of the Medical Library Association*. 94: 137–44.
- 45 Creswell J (1998) Chapter 4: Five qualitative traditions of inquiry. In: Creswell J (ed.) *Qualitative Inquiry and Research Design: Choosing among Five Traditions*, pp. 47–72. Sage Publications, Thousand Oaks, CA.
- 46 Bearman M (2003) Is virtual the same as real? Medical students' experiences of a virtual patient. *Academic Medicine*. 78: 538–45.

- 47 Miller W and Crabtree B (1999) Clinical research: a multi-method typology and qualitative roadmap. In: Crabtree B and Miller W (eds) *Doing Qualitative Research*, pp. 3–32. Sage Publications, Thousand Oaks, CA.
- 48 Addison R (1999) A grounded hermeneutic editing approach. In: Crabtree B and Miller W (eds) *Doing Qualitative Research*, pp. 145–62. Sage Publications, Thousand Oaks, CA.
- 49 Addison RB (2006) Grounded interpretive research: an investigation of physician socialization. In: *Entering the Circle: Hermeneutic Investigation in Psychology*, pp. 39–56. State University of New York Press, New York.
- 50 Muller J (1999) Narrative approaches to qualitative research in primary care. In: Crabtree B and Miller W (eds) *Doing Qualitative Research*, pp. 221–38. Sage Publications, Thousand Oaks, CA.
- 51 Bleakley A (2005) Stories as data, data as stories: making sense of narrative inquiry in clinical education. *Medical Education*. 39: 534–40.
- 52 Pullman D, Bethune C and Duke P (2005) Narrative means to humanistic ends. *Teaching and Learning in Medicine*. 17: 279–84.
- 53 Ventres W (1994) Hearing the patient's story: exploring physician-patient communication using narrative case reports. *Family Practice Research Journal*. 14: 139–47.
- 54 Thesen J and Kuzel A (1999) Participatory inquiry. In: Crabtree B and Miller W (eds) *Doing Qualitative Research*, pp. 269–90. Sage Publications, Thousand Oaks, CA.
- 55 Kemmis S and McTaggart R (2005) Participatory action research: communicative action and the public sphere. In: Denzin N and Lincoln Y (eds) *The Sage Handbook of Qualitative Research*, pp. 559–604. Sage Publications, Thousand Oaks, CA.
- 56 Mowat H and Mowat D (2001) The value of marginality in a medical school: general practice and curriculum change. *Medical Education*. 35: 175–7.
- 57 Guillemín M and Gillam L (2004) Ethics, reflexivity and 'ethically important moments' in research. *Qualitative Inquiry*. 10: 261–80.
- 58 Mauthner NS and Doucet A (2003) Reflexive accounts and accounts of reflexivity in qualitative data analysis. *Sociology*. 37: 413–31.
- 59 Diccio-Bloom B and Crabtree BF (2006) The qualitative research interview. *Medical Education*. 40: 314–21.
- 60 Miller W and Crabtree B (1999) Depth interviewing. In: Crabtree B and Miller W (eds) *Doing Qualitative Research*, pp. 89–107. Sage Publications, Thousand Oaks, CA.
- 61 McCracken G (1988) *The Long Interview*. Sage, Newbury Park, CA.
- 62 Reeves S, Lewin S and Zwarenstein M (2006) Using qualitative interviews within medical education research: why we must raise the 'quality bar'. *Medical Education*. 40: 291–2.
- 63 Barbour RS and Barbour RS (2005) Making sense of focus groups. *Medical Education*. 39: 742–50.
- 64 Brown J (1999) Focus group interviews. In: Crabtree B and Miller W (eds) *Doing Qualitative Research*, pp. 109–24. Sage Publications, Thousand Oaks, CA.
- 65 Maa A and McCullough LB (2006) Medical education in the public versus the private setting: a qualitative study of medical students' attitudes. *Medical Teacher*. 28: 351–5.
- 66 Hammersley M and Atkinson P (1995) *Ethnography: Principles in Practice*. Routledge, London.
- 67 Bogdewic S (1999) Participant observation. In: Crabtree B and Miller W (eds) *Doing Qualitative Research*, pp. 47–69. Sage Publications, Thousand Oaks, CA.
- 68 Bannister SL, Hilliard RI, Regehr G and Lingard L (2003) Technical skills in paediatrics: a qualitative study of acquisition, attitudes and assumptions in the neonatal intensive care unit. *Medical Education*. 37: 1082–90.
- 69 Stern DT (1998) In search of the informal curriculum: when and where professional values are taught. *Academic Medicine*. 73: S28–30.
- 70 Sinclair S (1997) *Making Doctors: An Institutional Apprenticeship*. Berg, New York.
- 71 Heath C, Luff P and Sanchez SM (2007) Video and qualitative research: analysing medical practice and interaction. *Medical Education*. 41: 109–16.
- 72 Creswell J (2003) Chapter 9: Qualitative procedures. In: Creswell J (ed.) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, pp. 179–209. Sage Publications, Thousand Oaks, CA.
- 73 Olney CA, Livingston JE, Fisch S and Talamantes MA (2006) Becoming better health care providers: outcomes of a primary care service-learning project in medical school. *Journal of Prevention & Intervention in the Community*. 32: 133–47.
- 74 Krippendorff K (2004) *Content Analysis: An Introduction to Its Methodology*. Sage Publications, Thousand Oaks, CA.
- 75 Burack JH, Irby DM, Carline JD, Ambrozy DM, Ellsbury KE and Stritter FT (1997) A study of medical students' specialty-choice pathways: trying on possible selves. *Academic Medicine*. 72: 534–41.
- 76 Finlay L (2006) Mapping Methodology. In: Finlay L and Ballinger C (eds) *Qualitative Research for Allied Health Professionals: Challenging Choices*, pp. 9–29. John Wiley & Sons Ltd., West Sussex, England.
- 77 Cameron D (2001) Chapter 1: What is discourse and why analyse it? In: Cameron D (ed.) *Working with Spoken Discourse*, pp. 7–18. Sage Publications, London.
- 78 Mills S (2004) *Discourse (2e)*. Routledge, New York.
- 79 Maynard DW and Heritage J (2005) Conversation analysis, doctor-patient interaction and medical communication. *Medical Education*. 39: 428–35.
- 80 Hekelman FP and Blase JR (1996) Excellence in clinical teaching: the core of the mission. *Academic Medicine*. 71: 738–42.
- 81 Hekelman FP, Blase JR and Bedinghaus J (1996) Discourse analysis of peer coaching in medical education: a case study. *Teaching and Learning in Medicine*. 8: 41–7.
- 82 Richardson L (2004) Writing: a method of inquiry. In: Nagy Hesse-Biber S and Leavy P (eds) *Approaches to Qualitative Research: A Reader on Theory and Practice*, pp. 473–95. Oxford University Press, New York.
- 83 Charmaz K (2004) Premises, principles, and practices in qualitative research: revisiting the foundations. *Qualitative Health Research*. 14: 976–93.
- 84 Mays N and Pope C (2000) Qualitative research in health care. Assessing quality in qualitative research. *British Medical Journal*. 320: 50–2.
- 85 Mays N and Pope C (1995) Rigour and qualitative research. *British Medical Journal*. 311: 109–12.
- 86 Inui TS and Frankel RM (1991) Evaluating the quality of qualitative research: a proposal pro tem. *Journal of General Internal Medicine*. 6: 485–6.
- 87 Rowan M and Huston P (1997) Qualitative research articles: information for authors and peer reviewers. *Canadian Medical Association Journal*. 157: 1442–6.
- 88 Lincoln Y and Guba EG (1985) *Naturalistic Inquiry*. Sage Publications, Thousand Oaks, CA.
- 89 Sandelowski M (2004) Using qualitative research. *Qualitative Health Research*. 14: 1366–86.
- 90 Sandelowski M (1997) 'To be of use': enhancing the utility of qualitative research. *Nursing Outlook*. 45: 125–32.
- 91 Lincoln Y and Guba EG (2000) Paradigmatic controversies, contradictions and emerging confluences. In: Denzin N and Lincoln Y (eds) *Handbook of Qualitative Research*, pp. 163–88. Sage Publications, Thousand Oaks, CA.
- 92 Wolf FM (2004) Methodological quality, evidence, and Research in Medical Education (RIME). *Academic Medicine*. 79: S68–9.
- 93 Britten N (2005) Making sense of qualitative research: a new series. *Medical Education*. 39: 5–6.
- 94 van Manen M (1997) *Researching Lived Experience: Human Science for an Action Sensitive Pedagogy*. Althouse Press, London, ON.

- 95 Rolfe G (2006) Validity, trustworthiness and rigour: quality and the idea of qualitative research. *Journal of Advanced Nursing*. **53**: 304–10.
- 96 Campbell ML and Gregor FM (2002) *Mapping Social Relations: A Primer in Doing Institutional Ethnography*. Rowman Altamira, Aurora, Canada.
- 97 Kuzel AJ (1999) Sampling in qualitative inquiry. In: Crabtree BF and Miller WL (eds) *Doing Qualitative Research*. Sage, Newbury Park, CA.
- 98 Holden JD (2001) Hawthorne effects and research into professional practice. *Journal of Evaluation in Clinical Practice*. **7**: 65–70.
- 99 Klag M and Langley A (2012) Approaching the conceptual leap in qualitative research. *International Journal of Management Reviews*. **15**(2): 149–66. Available early online: doi: 10.1111/j.1468-2370.2012.00349.x.
- 100 Eakin JM and Mykhalovskiy E (2003) Reframing the evaluation of qualitative health research: reflections on a review of appraisal guidelines in the health sciences. *Journal of Evaluation in Clinical Practice*. **9**: 187–94.
- 101 Bowen GA (2006) Grounded theory and sensitizing concepts. *International Journal of Qualitative Methods*. **5**: Article 2. (http://www.ualberta.ca/~iiqm/backissues/5_3/pdf/bowen.pdf; accessed 15 January 2012).
- 102 Glaser BG (2002) Constructivist grounded theory? *Forum, Qualitative Sozialforschung / Forum, Qualitative Social Research*. **3**: Art. 12. (<http://www.qualitative-research.net/index.php/fqs/article/view/825/1792>; accessed 15 January 2012).
- 103 Morse J, Stern P and Corbin J (2008) *Developing Grounded Theory: The Second Generation*. Left Coast Press, Walnut Creek, CA.
- 104 Smith D (ed.) (2006) *Institutional Ethnography as Practice*. Rowman & Littlefield Publishers, Inc, Lanham, MD.
- 105 Sandelowski M (2000) Whatever happened to qualitative description? *Research in Nursing & Health*. **23**: 334–40.

Further reading

- Britten N (2005) Making sense of qualitative research: a new series. *Medical Education*. **39**: 5–6.
- Crabtree B and Miller W (eds) (1999) *Doing Qualitative Research*. Sage Publications, Thousand Oaks, CA.
- Creswell J (1998) *Qualitative Inquiry and Research Design: Choosing among Five Traditions*. Sage Publications, Thousand Oaks, CA.
- Crotty M (1998) *Foundations of Social Research: Meaning and Perspective in the Research Process*. Sage Publications, Thousand Oaks, CA.
- Denzin N and Lincoln Y (eds) (2005) *The Sage Handbook of Qualitative Research*. Sage Publications, Thousand Oaks, CA.
- Miles MB and Huberman AM (1994) *Qualitative Data Analysis: A Sourcebook of New Methods*. Sage Publications, Thousand Oaks, CA.
- Schwandt TA (2007) *The Sage Dictionary of Qualitative Inquiry* (3e). Sage Publications, Thousand Oaks, CA.
- Strauss A and Corbin J (1998) *Basics of Qualitative Research*. Sage Publications, Thousand Oaks, CA.