

## TWELVE TIPS

# Introducing medical educators to qualitative study design: Twelve tips from inception to completion

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## Abstract

Many research questions posed by medical educators could be answered more effectively by the application of carefully selected qualitative research design than traditional quantitative research methods. Indeed, in many cases using mixed methods research would expand the scope of a study and yield meaningful qualitative data in addition to quantitative data. Qualitative research seeks to understand people's experiences, the meanings they assign to those experiences, the psychosocial aspects of and language used in interpersonal interactions, and the factors that influence perspectives and interactions. This understanding is vital in exploring learning and teaching styles, learners' experiences and perceptions, implementing and studying the impact of educational interventions and faculty development. This article aims to advance medical educators' understanding and application of qualitative research principles in educational scholarship by summarising and consolidating the fundamental principles of research in medical education described in recent AMEE guides. The 12 tips below offer a systematic, yet practical approach to designing a qualitative research study, particularly targeting educators new to this arena.

## Introduction

Medical educators explore processes and outcomes such as behaviours, attitudes, interactions, learning environments and professionalism, which cannot always be understood adequately through numerical data (Pope & Mays 2006; Holliday 2007; Hanson et al. 2011, Sullivan & Sargeant 2011; Harding 2013). Qualitative research traditions, well established in fields such as anthropology, humanities and other social and behavioural sciences, are gaining acceptance as a valuable tool in the study of medical education, with a growing recognition that they can be pursued with rigour. However, staff development programmes for medical educators on educational research tend to emphasise quantitative methods and "measurable" outcomes.

Qualitative research is conducted in the "natural" setting, allowing educators to delve deeply into perceptions and meaning of experiences, institutional culture and practices, barriers and facilitators to change, and reasons for success or failure of interventions (Starks & Trinidad 2007; Hanson et al. 2011; Sullivan & Sargeant 2011; Creswell 2013, 2014). Though researchers may design their study informed by existing theories or their own observations, the primary goal is exploration of participants' experiences, understanding and interpretations of their experiences (Tavakol & Sandars 2014a). Qualitative studies can be combined with experimental studies or conducted independently when the reasons behind complex phenomena cannot be explained by quantitative research approaches (Ringsted et al. 2011). A judicious choice of

method ensures consistency between the research objectives and results, while ensuring that the results are useful and add to educational scholarship (Starks & Trinidad 2007).

## Educational research paradigms

Paradigms are world views that guide research and consist of how reality is viewed by a researcher, the importance of the knowledge to be gained (epistemology) and a systematic approach to acquiring that knowledge (methodology). These in turn guide what research methods are employed—sampling, data collection, analysis, etc. Some paradigms relevant to educational research are defined below. In a positivist paradigm, a hypothesis is postulated, tested by a researcher using deductive analysis, outcomes are objective and measurable, results are seen as generalizable to other situations (Denzin & Lincoln 2011, Tavakol & Sandars 2014a). Post-positivism follows above principles but allows more interaction between researchers and subjects and includes survey research, interviewing, participant observation, etc. In the interpretive or constructivist paradigm, social interactions within groups and between people and their environment are vital in enhancing existing knowledge on a subject (Carter & Little 2007; Creswell 2014). This tradition mostly uses inductive analysis, where the researcher begins with participants' experiences, behaviours, discussions and opinions. Interpretations or theories that emerge are grounded in participants' experiences (Sullivan & Sargeant 2011). The positivist paradigm guides quantitative research. The constructivist paradigm forms the backbone of

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most qualitative research design, however, there are some exceptions.

### Preparation for qualitative research

Areas of research interest are usually triggered by problems within local educational environments or new regulatory mandates (Hale et al. 2007; Hanson et al. 2011; Tavakol & Sandars 2014a). The topic is then transformed into a focussed researchable question of interest to medical educators outside their institutions (Ringsted et al. 2011). Areas best explored through qualitative study design include: needs assessment; programme evaluation; opinions, attitudes and behaviours of teachers or learners; challenges and barriers to implementation of curricula or assessment methods (Hanson et al. 2011; Ringsted et al. 2011). Qualitative studies are exploratory, study questions are open-ended, do not require a priori hypotheses and characterised by “how” and “why” rather than “what” questions. A well-formulated study question determines what understanding is to be gained and directly influences the study design and methods employed (Carter & Little 2007). In all forms of educational research, literature review should concentrate on the importance of the problem, what is known, existing knowledge gap, issues that warrant further study and potential benefits to other medical educators (Hanson et al. 2011; Ringsted et al. 2011).

### Objectives

This 12 tips article targets medical educators who are novices to qualitative research. It discusses a basic approach to qualitative research design from inception to completion emphasising the fit between study questions and methodology. Methods to ensure rigour in qualitative research are

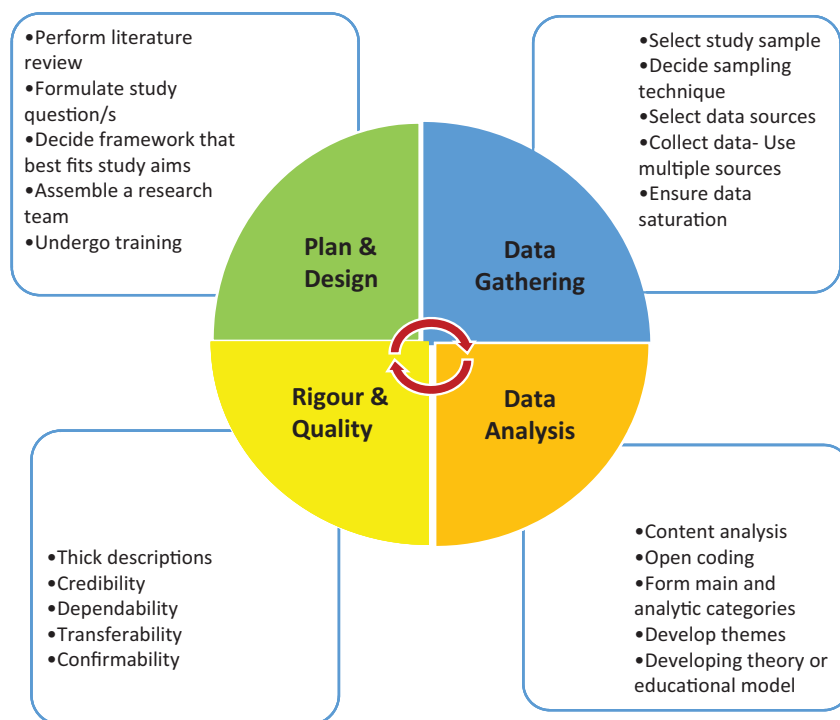
described in detail. Four key categories, essential for success in qualitative research and scholarship, are depicted diagrammatically (Figure 1).

### Tip 1

#### Choose an appropriate qualitative framework

As a first step, educators need to decide which qualitative approach is most likely to answer their study questions, which further determines research methods. Though not a complete list, four key approaches most applicable to research in medical education are described below (Creswell 2013, 2014):

- Ethnography aims to understand beliefs and behaviours of members of a cultural group. Studies are performed in a natural environment and ethnographers are interested in what group members say (language), do (behaviours) and use (artefacts) (Creswell 2013). Researchers immerse themselves within the group either as active participants or non-participant observers and carry out detailed observations, supplemented by field notes and interviews to obtain an insider’s view (Atkinson & Pugsley 2005; Collingridge & Gantt 2008; Reeves et al. 2008, 2013; Hanson et al. 2011; Creswell 2013). The social interactions, and similarities and differences in practices of distinct professional groups (students, physicians and nurses) engaged in an interprofessional curriculum, or observational studies of institutional culture are applications of ethnography in medical education.
- Phenomenology attempts to understand the world through the lens of others and explores people’s subjective experiences and the meaning they attribute to them. Such studies can also expose false assumptions about the experience (Hale et al. 2007; Starks & Trinidad 2007;



**Figure 1.** Four critical steps in qualitative research design.

Hanson et al. 2011; Creswell 2013). Interpretations of an event are often varied and may further change with social interactions. For example, phenomenology is appropriate to explore the reflections, emotions and understanding of a group of learners who have completed a palliative care rotation and interacted with terminally ill patients.

- Grounded theory studies seek to develop an explanatory theory or model of an educational process, studied in the environments in which they take place (Kennedy & Lingard 2006; Starks & Trinidad 2007; Lingard et al. 2008; Watling & Lingard 2012; Creswell 2013). It is essential that the theory or theories emerge from participant perceptions, discussions and interactions and not from researchers' hypotheses. These theories or models may be applied to improve future educational interventions. A model for teaching students effectively at the bedside may be developed based on study participants' perspectives on the challenges to and effective strategies for bedside teaching.
- Discourse analysis, explores modes of communication between people such as during educational or patient interactions and includes verbal and non-verbal communication (Starks & Trinidad 2007; Hodges et al. 2008; Kuper et al. 2013). Exploring different actions and language used by students to achieve similar objectives during their interactions with patients provides an example. The same words may be used and interpreted differently by different people: discourse analysis aims to explore this difference and eventually create shared meaning.

## Tip 2

### Ensure reflexivity

In the constructivist or qualitative approach to research, construction of knowledge results from interactions between researchers and participants: thus experiences, biases and assumptions of both groups influence data collection and interpretation (Tavakol & Sanders 2014b). As researchers are active participants in the research rather than neutral bystanders, their opinions on a subject will influence interview techniques, reaction to discussions, interpretation of narratives and conclusions. Subjectivity and lack of neutrality are often criticised by traditional researchers. Though subjectivity is an essential part of inductive research, neutrality is important in data analysis. Social scientists have described the concept of reflexivity to address this challenge. Reflexivity refers to acknowledgement of the influence of the researcher and research process on data collection and analysis in qualitative research (Pope & Mays 2006). The role of the researcher is to be reflexive, which involves the following: understanding and acknowledgement of their own opinions, personal and intellectual biases; "distance" between them and participants, and how these may affect data collection and interpretation (Carter & Little 2007; Hanson et al. 2011; Sullivan & Sargeant 2011; Creswell 2014). Investigators also need to tolerate ambiguity, opinions that may conflict with their own and accept that they may discover multiple realities. Reflexivity increases the credibility of the study by enhancing more neutral interpretations of data and reporting of results.

## Tip 3

### Address ethical concerns

Ethical concerns such as informed consent, risks and benefits, privacy and confidentiality are common to all research. However, qualitative researchers should be aware that they may be exploring sensitive topics and obtaining personal narratives face-to-face; eliciting feelings and opinions of participants about issues such as patient interactions, quality of teachers, curricula, educational experiences or institutional culture (Hewitt 2007; Morse 2007; Hanson et al. 2011; Sullivan & Sargeant 2011). Observational studies by their very nature can be intrusive. Investigators are usually introduced to the group by a group member (a gate keeper) and observe subjects in their "natural" environment. Familiarity with a study participant might lead to private conversations and be a threat to confidentiality (Cote & Turgeon 2005). Selection of focus group participants should consider factors such as hierarchy of group composition or their familiarity with each other. Participants may be unwilling to share their opinions if supervisors or colleagues in a position of authority are also present (Kuper et al. 2008a; Stalmeijer et al. 2014). Power relationships between the researcher and research participants might shape data collection.

Privacy of participants can be protected by reporting aggregate narratives, group rather than individual demographics, disclosure of investigators' plans to disseminate findings and allowing participants to request non-dissemination of specific quotes (Atkinson & Pugsley 2005; Starks & Trinidad 2007; Reeves et al. 2008, 2013; Hanson et al. 2011).

## Tip 4

### Determine and justify sampling strategy

Qualitative researchers typically employ purposive sampling, quota sampling or convenience sampling techniques (Starks & Trinidad 2007; Collingridge & Gantt 2008; Sargeant 2012). In purposive sampling, selected subjects have experienced the event of interest or are most qualified to provide rich perspectives. In quota sampling, researchers select sub-populations that could meaningfully contribute to the data and ensure appropriate representation among participant groups (gender and level of trainees). In convenience sampling, subjects are selected because of available access to them.

Purposive sampling strategies are selected depending on whether information is needed from a group or a group representative of certain characteristics is needed (Kennedy & Lingard 2006; Kuper et al. 2008a; Hanson et al. 2011; Watling & Lingard 2012):

- Typical cases—subjects likely to provide common and similar perspectives.
- Extreme or deviant cases—subjects whose opinions differ the most from typical cases.
- Critical cases—subjects likely to yield the most detailed information on the subject.
- Maximally diverse cases—groups that include the most varied experiences and perspectives.

- Theoretical sampling—focus is on theory that emerges from the data; sampling strategies may evolve as data are collected and interpreted, and multiple comparison groups are usually needed.
- Snowball sampling—subjects referred by previous participants, with similar experiences and likely to provide meaningful data.

As each individual can generate several concepts and perspectives, large samples are not required in qualitative research (Starks & Trinidad 2007). It has been stated that rich information can be obtained from 10–20 individual interviews, three focus groups with a total of 10–60 participants or 1–10 subjects in phenomenological studies (Starks & Trinidad 2007; Hanson et al. 2011). The term “data saturation” should also be mentioned, where investigators continue to sample participants until no new concepts emerge from the data (Kuper et al. 2008a; Sargeant 2012; Watling & Lingard 2012). This concept is particularly important in grounded theory studies or general qualitative studies where thematic analysis is performed.

## Tip 5

### Define sources of data to match study outcomes

Narrative data in qualitative research include: transcripts of recorded conversations, personal stories and reflections, responses to open-ended questions, observations by researchers in the form of field notes, transcripts of participant discussions at workshops, photographs, journals and documents such as syllabi or mission statements (Hanson et al. 2011; Sullivan & Sargeant 2011; Creswell 2013). Study outcomes include attitudes, behaviours, barriers, challenges, use of language and development of theory.

In ethnographic studies, where investigators attempt to understand the behaviour and interactions of “cultural” groups, field notes and recordings from observations form the primary data source but can be supplemented by archival documents and interviews (Atkinson & Pugsley 2005).

In phenomenological studies, where researchers explore perspectives of those who have experienced an event (new curriculum, challenging clinical rotation), the outcome would be the meaning of the experience viewed through the lens of participants. Sources of data include interviews and focus groups (Starks & Trinidad 2007; Creswell 2013).

In a grounded theory study, where researchers attempt to discover themes or create theoretical constructs from data, multiple data sources such as documents, interviews of participants, researcher notes, audio-visual data, etc. are used (Kennedy & Lingard 2006; Watling & Lingard 2012; Creswell 2013).

Discourse analysis aims to capture actions, use and meaning of language in social interactions; data sources include participant conversations or documents. Interviews may be used to clarify the intended meaning of words used by participants and to avoid misinterpretations (Starks & Trinidad 2007).

## Tip 6

### Decide appropriate data collection methods

Qualitative data can be collected through observation, individual or focus group interviews, field notes, audio or video recordings and in-depth review of archival documents individually, or in combination (Denzin & Lincoln 2011; Creswell 2013). During this process, researchers need to set aside their personal assumptions, hypotheses and opinions in order to maximise objectivity, a process called bracketing (Tavakol & Sandars 2014b). In qualitative research, individuals being observed or interviewed are participants rather than subjects of the study; they may influence the direction of the conversation rather than investigators. This is a major departure from quantitative research.

Observations are a rich source of data, but immersion of investigators within groups for long periods of time may be impractical; thus, careful selection and planning of observations are important. Thus, they are often supplemented by other methods of data collection.

In one-on-one interviews, interviewers use open-ended prompts and probe skilfully to explore participant opinions, encourage detailed narratives and confirm the accuracy of their interpretations (Hanson et al. 2011; Creswell 2013). The degree to which the interview is structured depends on the study objectives, however, researchers facilitate rather than direct interviews.

- Structured interviews use a fixed set of questions to allow the researcher to guide the discussion in a specific direction. This is not the most commonly used method as qualitative research is usually exploratory.
- Unstructured interviews are open-ended, where a topic is introduced by the researcher but participants are allowed to choose the direction and guide the discussion.
- Semi structured interviews use a list of questions as a framework, but participants have the freedom to direct the conversation. The interviewer redirects the discussion from time to time to ensure that all key topics are explored.

In focus group discussions, a key goal is to tap into and learn from the interactions between participants (Barbour 2005; Stalmeijer et al. 2014). The ideal number of participants is 6–10. Homogeneous groups are used if researchers believe that discussion can be hampered by inclusion of senior participants or those in a position of authority. Heterogeneous groups can be used if investigators believe that differing opinions could stimulate discussion to provide a variety of perspectives. As in interviews, these discussions can vary from more structured to less structured, but most qualitative research experts recommend a few open-ended questions as triggers followed by “structured eavesdropping” (Kitzinger 1995).

Interviews, observations, focus groups, audio-visual material or existing documents can be used to collect data for discourse analysis. It is important for the investigator to verify their interpretation of words, phrases, behaviours and actions with participants.



## Tip 7

### Prepare data for qualitative analysis

Qualitative studies provide large volumes of narrative data that need to be systematically transcribed, read, sorted and interpreted through a process of content analysis (Hale et al. 2008; Harding 2013; Sullivan & Sargeant 2011; Sargeant 2012). Although some studies present counts and frequencies of statements or themes, quantification is not considered particularly meaningful by many experts (Pope & Mays 2006). Textual data are coded, categorised and interpreted to describe or explain observed phenomena.

Data collection and analysis occur concurrently, allowing the researcher to plan additional sampling strategies, formulate new questions and pursue emerging themes in greater depth (Pope & Mays 2006; Sargeant 2012; Harding 2013). Concurrent collection and analysis allows researchers to determine when to stop data collection or when data saturation has occurred.

Software packages are tools to help researchers, but the investigators themselves are responsible for rigorous and systematic analysis (Watling & Lingard 2012; Tavakol & Sandars 2014b). Some examples of software packages include Atlas Ti (<http://atlasti.com/>), NVivo ([http://www.qsrinternational.com/products\\_nvivo.aspx](http://www.qsrinternational.com/products_nvivo.aspx)), MAXQDA (<http://www.maxqda.com/>) and the web-based dedoose (<http://www.dedoose.com/>). These packages facilitate management of large data sets, organisation of data into codes and coding categories, linking codes and memos and converting it into a searchable database (Watling & Lingard 2012). They can also help calculate the frequency with which certain concepts are raised, identify exceptions and help with graphic representation of results.

## Tip 8

### Perform basic data analysis

Data are analysed using an inductive rather than deductive approach; theories and concepts emerge from participant perspectives (Pope et al. 2000; Barbour & Barbour 2003; Pope & Mays 2006; Hanson et al. 2011; Tavakol & Sandars 2014b). During content analysis, a verbatim read helps researchers to make sense of the data and absorb the tone and content of the discussion. Three stages have been described for interpretive analysis to occur: deconstruction, interpretation and reconstruction (Sargeant 2012; Watling & Lingard 2012).

Basic coding during data deconstruction phase focuses entirely on participant narratives, not researcher interpretations. Text that best communicates participant perspectives are highlighted with investigator notes written on the margin. Key words, incidents, interactions and behaviour as noted by the investigators form the initial codes (Creswell 2013). Codes similar in context are then grouped into coding categories to break down large volumes of data into small meaningful units (Starks & Trinidad 2007; Hanson et al. 2011; Sargeant 2012; Tavakol & Sandars 2014b). Interesting or unique terms, relating to or opposing the group norm, can also form the basis of categories. In the initial analytic step, categories are

added as needed to reflect the nuances in the data, the aim is not to reduce the data to a set number of codes or categories.

During the interpretation phase, data relevant to each category are compared with the rest of the text to establish analytic categories, a process termed constant comparison (Hanson et al. 2011; Sargeant 2012). Using their interpretations of data and observations during data collection, the entire research team combines similar categories into a reduced list of main categories with appropriate subcategories. If one were studying barriers to teaching physical examination, the initial categories might include: time constraints, increased documentation requirements, declining faculty skills, lack of confidence in teaching these skills, etc. The main categories might then be: teacher skills and confidence (declining skills and lack of confidence), barriers related to work environment (time and documentation).

## Tip 9

### Additional data analysis

The study objectives determine whether thematic analysis is relevant. The main categories, discussed in the previous step, form the foundation of thematic analysis. Themes are key concepts that adequately and appropriately capture the meaning of the experience from the perspective of the participants as well as researcher interpretations and overlap multiple categories (trainees' experiences on an oncology rotation, exposure to a new curriculum, etc.). Combination of key themes might lead to generation of theories or development of a framework for future educational initiatives in a grounded theory study (Sargeant 2012; Watling & Lingard 2012; Creswell 2013).

During the reconstruction phase, themes may also be consolidated into major and minor themes (Hale et al. 2008). Different themes are compared and contrasted to explore relationships between them; the team should also report opinions that do not conform to the majority opinion (Sargeant 2012). The entire research team should discuss thematic analysis and resolve internal conflicts in coding and interpretations. Investigators' observations, interpretation of data and comparison with previous studies or theories contribute greatly to the "meaning" in qualitative studies (Sargeant 2012; Creswell 2014).

When analysis moves from the categorical level (exploring perceptions and their meaning) to the conceptual level (exploring relationships between categories and understanding meaning), theory can be developed to explain and understand the process being studied (Kennedy & Lingard 2006; Watling & Lingard 2012).

## Tip 10

### Maintaining rigour in the study

Qualitative research has been accused of lacking scientific rigour in a field dominated by biomedical researchers and quantitative research methods. Qualitative experts have

described several techniques to ensure quality in qualitative research described below, including: confirmability, credibility, dependability and transferability (Pope & Mays 2006; Collingridge & Gantt 2008; Kuper et al. 2008a, b; Hale et al. 2008; Hanson et al. 2011; Sargeant 2012; Tavakol & Sandars 2014b). It needs to be emphasised that overly rigid application of these criteria only ensures that investigators have ticked all the boxes; educators need to use their knowledge and wisdom to evaluate whether study design is consistent with study questions and if the results are meaningful (Carter & Little 2007).

Researchers should select the most appropriate framework and study design to answer their study questions and describe their methods in detail (Cote & Turgeon 2005; Carter & Little 2007). They should also justify the selection of their study population; with detailed descriptions of participant characteristics relevant to the study question and appropriateness to obtain rich perspectives or develop theory (Starks & Trinidad 2007; Kuper et al. 2008a). The role of the researcher and any relationship to the participants should be mentioned.

Confirmability refers to the extent to which the results can be confirmed by other researchers. “Thick” descriptions provide detailed information for readers to understand the context of the research setting. The Hawthorne effect, changes in participant actions and behaviours due to the presence of an observer, is especially important where data collection is primarily through observation (Kuper et al. 2008a). As observers spend more time in the field without interjecting their opinions and hypotheses, the Hawthorne effect can be minimised. Opinions of the majority as well as those that are run contrary to the majority opinion, that is, negative cases, should be included in data analysis.

Credibility, comparable with internal validity, can be ensured by triangulation, prolonged observations and skilful interviews. Triangulation refers to the use of multiple data sources and data collection methods to get the most comprehensive information on the subject of research. Researchers can triangulate data sources (narratives, audio or video recordings, field notes, archival documents), data collection methods (observation, interview, document analysis) and analysis (multiple investigators independently analysing data and resolving disagreements by consensus) (Cote & Turgeon 2005; Kuper et al. 2008a). Details of the analytical process must be provided to enable readers to determine credibility.

Dependability, comparable with reliability, can be maximised by multiple observations, systematic data sampling and analysis and respondent validation, where researchers show their collected data and interpretations to participants to ensure accuracy (Kuper et al. 2008a; Hanson et al. 2011).

Transferability is comparable with external validity in quantitative research (Kuper et al. 2008a; Hanson et al. 2011). Detailed descriptions of the study design and analysis along with reference to literature can help other investigators assess whether the study can be reproduced in their own setting or if the results can be transferred to their setting.

## Tip 11

### Write up the results

Strategies emphasising a systematic approach to writing up qualitative research studies have been described (Cote & Turgeon 2005; Kuper et al. 2008b; Denzin & Lincoln 2011; Sullivan & Sargeant 2011). The title should clearly reflect the nature, subject of the study and framework used. The abstract is a summary of the study and includes background, objectives, methods, results and conclusions. The introduction section outlines the focus of the study, the reasons for choosing the topic and its broader context, choice of study setting and the study objectives. This is similar to quantitative research (O’Brien et al. 2014).

Some distinctive features of qualitative research reports are emphasised below. Qualitative studies present research in terms of human relationships, participants’ feelings and opinions, thus investigators need to anticipate and react appropriately to unexpected discoveries (Holliday 2007). The methods section should include: details and reasons for the framework used; study design; data collection methods; analysis strategies and their appropriateness to answer the study questions; choice of subjects and sampling strategies; their relationship with participants and interactions between participants; data saturation if applicable (Holliday 2007; O’Brien et al. 2014). In addition, researchers need to report how they managed their own subjectivity, hypotheses and beliefs (reflexivity).

The results section should describe the key findings/themes that emerged from the narratives, investigators’ interpretations and the logic behind these interpretations firmly backed by participant quotes. How the research team performed the coding, categorised the codes and discovered themes should be explained in sufficient detail and well referenced. If a theory or model was described, it should be clear if this emerged entirely from the data (inductive) or if it is a combination of researchers’ hypothesis and participant perspectives (deductive and inductive) (Cote & Turgeon 2005; Kuper et al. 2008a; Creswell 2013; O’Brien et al. 2014; Stalmeijer et al. 2014).

The discussion section summarises key findings, compares and contrasts findings with previous studies, discusses how study expands on prior scholarship, whether findings are applicable to other settings, recommends next steps and areas for future research and discusses the strengths and limitations of the study including researchers’ efforts to ensure rigour in their study (O’Brien et al. 2014).

## Tip 12

### Training in qualitative methods is critical for success

Medical educators interested in qualitative research should participate in training in these methods; just possessing the usual sense and sensibilities does not make the medical educator a skilled observer or qualitative researcher. A global faculty development approach is insufficient; targeted training in areas such as observation, interviewing as well as narrative

data analysis is required. Reflexivity is a vital concept in qualitative research; training is needed for researchers to be aware of and acknowledge their biases (Reeves et al. 2008).

First, training in data collection methods such as observation, interviewing and facilitating focus groups is essential. Observation is more than mere presence and looking around. It takes a skilled ethnographer to gain entry into a group as a participant or non-participant, and record conversations, behaviours and interactions unobtrusively without interjecting subjective biases (Reeves et al. 2008). Interviewing requires effective application of the techniques of listening, probing, respondent checking and absorbing the mood and emotional undertones (Hale et al. 2008). Focus group discussions are not meetings convened by the investigator, but involve open-ended questioning techniques, facilitation of group participation, probes to elicit meaning of statements, and ensuring that key points are covered based on study objectives (Stalmeijer et al. 2014).

Second, training in analysis of language and discourse is required. Even if researchers decide to include qualitative experts on their study team, principal and co-investigators must participate in data analysis, decide when further sampling is required and whether the findings answer their study questions (Hanson et al. 2011; Watling & Lingard 2012; Creswell 2013; Stalmeijer et al. 2014). Deriving meaning from narrative data requires a set of skills that are markedly different than those required by quantitative researchers. Though researchers interpret the data subjectively, their interpretations, themes and theories should be backed by raw data.

Finally, researchers will need to learn to record field notes systematically, write descriptively, discard trivial details and validate their observations rigorously (Creswell 2013).

## Concluding remarks

Despite the growing use and acceptance of qualitative study designs in educational research, many medical educators find it challenging to get started on a qualitative study, understand different frameworks and approach the research systematically. Frequently, there is a mismatch between study questions and study design and underestimation of the complexity of data analysis. Staff development and collaborations with qualitative research experts are key in increasing teachers' comfort and skills in this area. The tips described in this article will provide medical educators, who are new to qualitative research, with systematic strategies to plan, implement and complete a qualitative research project.

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**Declaration of interest:** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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