

Navigating the maze: Qualitative research methodologies and their philosophical foundations

Authors: Bleiker, J. (corrensponding author), Morgan-Trimmer S., Knapp K.M. and Hopkins S.J.

Author details

Mrs Jill Bleiker, Medical Imaging University of Exeter Medical School Rm 1.26 South Cloisters St. Luke's Campus Exeter EX1 2LU e-mail: j.bleiker@exeter.ac.uk

Dr Sarah Morgan-Trimmer Institute of Health Research Room 2.25 College House St Luke's Campus Exeter EX1 2LU Tel: +44 (0)1392 726035

Professor Karen Knapp, Medical Imaging University of Exeter Medical School Rm 1.44 South Cloisters St. Luke's Campus Exeter EX1 2LU e-mail: k.m.knapp@exeter.ac.uk Tel: 01392 724133

Dr Susan Hopkins Medical Imaging University of Exeter Medical School Rm 1.29 South Cloisters St. Luke's Campus Exeter EX1 2LU e-mail: S.J.Hopkins@exeter.ac.uk Tel: 01392 726131

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Abstract

In meeting one of the three objectives of the Society and College of Radiographers, namely, the promotion and dissemination of research in radiography and radiotherapy, qualitative methodologies can offer valuable insights into the social, organisational, behavioural and interpersonal aspects of medical imaging from the perspectives of both staff and patients. These may include wellbeing, physical and psychological comfort, attitudes, perceptions and beliefs, leadership, management practices, education, professionalism and a wide range of issues around patients' experiences during medical imaging. Unlike their quantitative equivalent, qualitative research methodologies are less well understood, in particular the philosophical and epistemological assumptions which underpin the methods utilised. Demonstrating consistency between the philosophical position taken and the methods used within a study is an important aspect of research quality. This article aims to assist in the production of high standard research in radiography by explaining how transparency in reporting the underpinning philosophical basis of a study can be achieved in addition to the more customary descriptions of how data were collected and analysed.

Highlights

- Qualitative research methods are rooted in the philosophical assumptions which underpin them
- The quality of the research is enhanced when these are transparent and clearly articulated
- Data collection and analysis are reported more often than why chosen methods were used
- This article describes how to improve reporting of qualitative methodology

Introduction

Evidence-based practice is regarded as key to enhancing and improving patient care and outcomes, and embedding and expanding radiography research in education and professionalism is key to this¹. High standards of research quality are achieved through

the development of skills in both conducting research and clear communication of findings. It could be argued that the highly technical nature of medical imaging procedures^{2,3} justifies the predominance of objective measures of matters such as dose optimisation and image quality. A review of papers published in *Radiography* from 2017 to 2019 indicates that the majority of published radiography research utilised quantitative methods. On closer inspection however, the published studies can be seen to reflect a broad spectrum of research undertakings; examples include wellbeing, physical and psychological comfort, attitudes and beliefs, leadership, management, education, professionalism and a wide range of issues around patients' experiences during medical imaging. Whilst research in these areas can be conducted using quantitative methodologies which can provide scales and measures and establish the generalisability and statistical significance of the findings, qualitative methods can bring richness and depth, offering insights into how individuals interpret and make sense and meaning of their experiences. However this equally valid method tends to be less well understood, and qualitative studies in particular often lack a rationale for the chosen research methodology. Articles pertaining to research methods previously published in *Radiography* and in its sister publications^{4,5} have presented overviews of qualitative methodologies, but are less illustrative of how these are rooted in the philosophical assumptions which underpin them. Adams and Smith published a proposed framework for qualitative methods in radiography research⁶ and Ng and White outlined three broad approaches, or research traditions which they argue can be applied to radiography research⁷. More recently, Metsälä and Fridell organised radiography research around three core domains of interest: technical/procedural, understanding/perceptions and questioning/critical. They noted that methodologies used were not well explained in terms of their philosophical foundations, particularly in the case of qualitative studies which were more commonly described in terms of the way data were analysed³. One of the aims of this article is to provide the information which will enable those undertaking qualitative research in particular to clearly articulate how they identified and selected their methods and this paper augments the work of these authors in showing how all research methods are derived from the philosophical assumptions in which they are rooted. It was written during construction of the methods chapter of a qualitative doctoral thesis and reflects the author's personal navigation through the sometimes confusing maze of qualitative

research methodologies, with the aim that readers contemplating qualitative research might find useful an overview and clarification of the main concepts. It will show how the logic of a research methodology follows from its ontology; the philosophical approach which denotes the 'position' of the researcher in terms of their beliefs about the nature of reality and truth which provides the starting point for research. For a qualitative research project to be deemed of good or high quality, ideally there will be consistency between the philosophical approach taken and the methods used, and transparency in the recording of this in the methods section of the report, although Tracy acknowledges that choosing the right criteria for appraising quality is sometimes difficult⁸. Examples of the relevant methods will be given, including data acquisition and analysis followed by criteria for appraising the quality of qualitative research.

Research ontology: the nature of reality and the truth

Research ontology is the term for the philosophical starting point for inquiry aimed at finding explanations that can be said to be true, whether by linking cause with effect, or else by seeking an understanding of concepts and ideas. In philosophy, the concept of truth itself is open to debate; whilst many will be familiar with the idea of the truth as something that objectively describes fact or reality, not all philosophers see truth in this way and some argue that it depends on subjective views and context. From this position truth is constructed in and by the mind from psychological processes such as memories and beliefs, and social factors, interactions and experiences. A researcher's overall approach to the question of what is true about the phenomenon they are exploring determines the entire pathway of the research project from conception to conclusion.

Table 1 shows some of the distinguishing features of the main ontological positions in relation to the overall approach, although the boundaries in qualitative research are not as solid as the table suggests. Positivists see truth as an objective reality and tend to make associations (correlation) or infer causality by manipulating observable and measurable phenomena to make generalisations and predictions. Examples of positivist research topics include comparison studies of two or more imaging techniques or dose optimisation experiments. Interpretivist researchers see the truth as socially constructed; knowledge is created, not discovered and reality is subjective. Studies undertaken from this position explore feelings and experiences, such as patients' perceptions of MRI. In

between these two perspectives lie a range of approaches, or attitudes to the truth and how to reach it. The philosophy of critical realism purports that the truth exists independently of anything else such as perceptions and beliefs but acknowledges the role of the mind in mediating this; there is a truth 'out there' but any research conducted by and on human beings is influenced by attitudes, beliefs, memories and perceptions. Closer to interpretivism lie social constructionism⁹ and constructivism¹⁰; both approaches placing heavier emphases on subjectivity and context.¹¹

Epistemology

Epistemology is the study of knowledge: i.e. the theoretical underpinning of the methods eventually used. For the research to be coherent, the researcher's ontological position must link with the epistemological approach; this in turn informs the methodology and the tools (methods) by which the research is conducted. Studying the natural world is the domain of the positivist researcher and tends to be termed objectivist; the corresponding term for the epistemology used in the study of the social world is often subjectivist. A subjectivist epistemology views its research participants less as objects on which to be experimented and more as 'actors' who play a role in the construction of reality. The constructionism described in table 1 is, at the epistemological level, distinct from constructivism; each see knowledge as constructed, but whereas constructionism emphasises social processes, constructivism places the individual closer to the foreground. Table 2 illustrates this.

Methodology

At some point a decision is made as to how data are to be collected and analysed, and the methodology is the strategy for data collection. Commonly used qualitative methods are interviews, focus groups and observation.¹² Any good research methods textbook will describe these in depth¹³⁻¹⁷, but a brief overview is presented here so that researchers can begin to understand some of the key differences and applications of the principal methods used in qualitative research.

Methods

Researchers are often constrained by practical considerations of time and budget and by availability of both themselves and their participants. Nevertheless the methods by which data are acquired should be determined by the aims of the study and the approach as described in the sections on ontology and epistemology. For example, research aiming to explore individual patient perceptions in rich detail and depth would suffer criticism if a quantitative survey from a positivist perspective were conducted; instead, interviews would be a more appropriate methodology.

Interviews can be conducted, usually with a single participant, with questions structured so that they are asked the same way every time or semi-structured to allow the conversation to range more widely around the topic. Semi-structured interviews often consist of more open-ended questions such as ‘how did you feel about...’ whereas structured ones will contain closed questions, for example ones which require yes or no answers; examples include exploring stress and coping in radiation therapists and oncology patients’ experiences in CT^{18,19}. Responses can be narrowed by offering a restricted range of options with which to answer the question making them more quantifiable. In qualitative research this is acceptable so long as it aligns with the approach taken at the outset. For example, and depending on the research question being answered, noting the number of times participants mentioned feeling anxious during an MRI scan would be relevant in a study conducted from a critical realist position, but not in one from a constructivist one.

Focus groups are conducted when data can be produced from how a group of people discuss an idea and the way they communicate and interact with each other. Examples include research into radiographers’ perceptions of patient care and students’ experiences of the transition to qualified practitioner^{20,21}. When conducting focus groups it can be helpful for the researcher either to be accompanied by a colleague who can observe and take notes, or else to video record the focus group, subject to participants’ agreement. The researcher also should be wary of pitfalls such as the tendency for members of the group to coalesce around an idea and a reluctance to disagree with one another.

Questionnaires and surveys are a relatively efficient way of acquiring qualitative data, but require designing and testing before being rolled out. Free text boxes can be added to questionnaires for participants to add their own comments. Larger numbers of participants can be recruited and this has been successfully achieved in radiography research, for example in research into emotional intelligence²²⁻²⁴.

Online data acquisition is becoming increasingly popular in all areas of research. It can be acquired via social media such as Twitter discussions, blogs and forums for example and has the advantage of being relatively quick and easy to conduct with data ready-transcribed, affording considerable savings in time and budget. Disadvantages include the readiness with which participants can adopt an online persona which may differ to their real-world one and the challenges of keeping up with a sometimes rapidly moving online conversation.^{25,26}

Observation is a method drawn from the ethnographic tradition in qualitative research, the idea being that as participant observer, the researcher watches behaviour in as naturalistic setting as possible. The intention is to remove any artificiality or bias created by participants answering questions in ways they believe to be desirable or acceptable, although it has been shown that behaviours can change in response to being observed²⁷. In practice there are ethical considerations around consent which can be time consuming to address and researchers must further convince their readers that they have thought carefully about the subjectivity inherent in their observations. This is a consideration in all qualitative research and can be addressed through a reflexive process of self-examination.

Reflexivity

Very often, the key to qualitative research is the immersion into another's world and trying to understand from their perspective, rather than the researcher's own, how they interpret their world and the meanings they make; this is termed the research qualia. Most qualitative research acknowledges that the researcher influences the social world and the data they are exploring and reflexivity gives an account of the influence of the researcher in the data being reported; radiographers engaging with reflective practice as part of their CPD will be familiar with this concept.²⁸⁻³¹ Self-awareness is essential to illuminate the

impact of the researcher on their data and make this transparent. Topics suitable for inclusion in a reflexive analysis include: what motivated the choice of research question and the influence of the researcher's gender, age, educational background and other social factors on the interaction with research participants. Consideration can also be given to the researcher's feelings throughout the research process and how these affected the analysis and findings. Qualitative research can be written up from a subjective standpoint with the researcher acknowledging their role in the research rather than positioning themselves outside it and making any claim of neutrality. The value of employing a research/field diary to record impressions, reactions and decisions made cannot be underplayed; keeping field notes allows the researcher to record their perceptions of their role in the research.

Analysis

The way analysis is undertaken must, like the methods used, align with the ontological and epistemological position. The continuum described in the sections dedicated to ontology and epistemology is mirrored in qualitative analysis, with critical realist research commonly utilising highly structured code based analysis, and what is termed the discursive and more subjective types of analysis undertaken in interpretivist and constructivist research. For some qualitative research methods such as narrative inquiry the terminology reflects the building of an account of the data rather than 'analysis' as such. Table 3 sets out some of the main ways in which qualitative data can be analysed.

Somewhat confusingly, there are methods of conducting qualitative research which contain the term 'analysis' in their title but which are more than analytic tools. Two examples of this are Interpretive Phenomenological Analysis (IPA) which is used in applied psychology, especially health psychology and wellbeing research. IPA focuses on the individual and their experience of a specific event or events, sometimes termed their lifeworld. In IPA, the researcher brings into mind, then sets aside, their own ideas in order to understand the essence of another person. A second example is Concept Analysis; a methodology used to understand and give meaning and clarification to concepts that are vague or ambiguous, the aim being to give theoretical and operational definitions of a concept. For a recent example in radiography see Taylor et al (2017).³²

Positivist and some critical realist analyses, then, tend to quantify and produce objective or semi-objective measures with varying degrees of confidence and certainty as to the truth or veracity of a theory or idea, whilst constructionist and interpretivist analyses create concepts and generate new ideas and theories which can either be adopted or taken further for testing and evaluation.

Appraising the quality of qualitative research

The subjectivity of the researcher is one of the key criticisms levelled at qualitative methodologies allegedly because of the bias that this introduces to the research. Bias, however tends to be a positivist term for which there is no qualitative equivalent; reflexivity and inherent subjectivity merely add to the richness of the data in qualitative research. The quality of positivist research is measured in terms of the significance, reliability and validity of the analysis; however, these terms have different meanings, if they exist at all, in qualitative research. Some, in particular critical realist qualitative researchers retain the positivist language and concepts of reliability and validity whilst de-emphasising such quantitative elements as measurement; others, such as those using constructionist approaches refer to other criteria altogether; for a more detailed discussion, see Bryman 2016; p383.¹³ Alternative criteria for evaluating the trustworthiness of the outcome of a qualitative research study depend on the initial approach taken, and may include: credibility; transferability; dependability; respondent validation; originality; resonance and usefulness.^{13,15,33,34} Table 4 summarises the key features of criteria by which quality in qualitative research can be evaluated.

Conclusion

This article has compared some of the key methodological differences in qualitative research and their roots in the differing philosophical positions taken as to the nature of truth and knowledge. It has demonstrated that qualitative research pathways can be made less maze-like by clearly articulating the starting point in terms of assumptions about the nature of truth, the approach taken to exploring it and the subsequent methods of data acquisition and analysis. This will enable qualitative researchers in particular to produce high quality reports of their work through transparent reporting of the reasons for their choice of methods in terms of their roots in philosophical and epistemological beliefs about

the nature of truth. Qualitative research does not deserve to be seen as the poor relation in the research family; it rises to the challenges inherent in investigating the complexities of the social world in a way that quantitative methodologies tend to ignore or attempt to eliminate. Radiography is far more than a technical discipline and, despite appearances, at the heart of the profession is the patient, not the radiographic image. As such, research interests cannot be confined to quantitative measures alone. Adams and Smith (2003) summarise well the justification for qualitative methodologies in radiography research thus:

“If we focus strictly upon the formal setting of radiography care we are confronted with another issue that lends itself to qualitative inquiry: the radiographer–patient relationship and interactions. ... Radiographers are commonly in the unique position of interceding between the patient and potentially threatening health care technology. Qualitative methods can help radiographers to systematically examine both the patient’s role in care and decision making and their own professional communication skills.”⁶

Conflict of interest

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<u>Overall approach to research</u>	<u>Quantitative</u>	<u>Qualitative</u>		
<u>Philosophical position</u>	<u>Positivism</u>	<u>Critical Realism</u>	<u>Constructionism</u>	<u>Interpretivism</u>
<u>Truth</u>	<u>Exists as an external reality independent of the researcher</u>	<u>There is a reality 'out there', but one that is filtered through the mind of the researcher</u>	<u>Truth is socially constructed through interactions between people; reality is subjective</u>	<u>The truth depends on the sense and meaning-making of a person or groups of people</u>
<u>Typical or commonly used methodology</u>	<u>Experimental, manipulative, hypothesis testing and deduction</u>	<u>Can be experimental but include qualitative</u>	<u>Grounded theory¹⁻³</u>	<u>Ethnography, Phenomenology⁴</u>
<u>Data</u>	<u>Empirical, numerical</u>	<u>Any mixture of numerical and linguistic</u>	<u>In depth; 'what' and 'how' questions, although some numbers can be counted</u>	<u>Rich ('thick') descriptions of a person's world (Geertz⁵)</u>
<u>Typical analysis</u>	<u>Quantitative; eg SPSS</u>	<u>Quantitative and qualitative</u>	<u>Thematic, coding and categorising</u>	<u>Thematic, narrative or discourse analysis</u>

Table 1: some of the distinguishing features of the main ontological positions. These categories can overlap: methodologies can be used flexibly and should be chosen for their effectiveness in answering the research question as well as according to philosophical approach.

	Constructionism	Constructivism
More commonly applied in	Sociology	Psychology
Outcome of research	Social constructs	Individual perceptions
Unit of study	Relationships: Negotiation Co-operation Conflict Rhetoric Roles	The individual: Perception Attention Beliefs Opinions Memories

Table 2: Distinguishing constructionism and constructivism

<u>Analysis</u>	<u>Type of data</u>	<u>How does it work</u>
<u>Thematic analysis</u>	<u>Data from interviews & focus groups</u>	<u>Finding patterns: themes that recur or are common across the dataset. Not frequency but where and in what circumstances the theme occurs.</u> <u>Not linked with any particular theoretical framework: can be realist, constructionist or interpretivist.</u>
<u>Content analysis</u>	<u>Media representations of reality: newspapers, magazines, book, radio, TV, policy and protocol documents</u>	<u>Records the occurrence of certain words or themes.</u> <u>Production of categories.</u> <u>Linked to a theoretical framework; naturalistic paradigm, i.e. it is semi-quantitative.</u>
<u>Framework analysis</u>	<u>Interviews and focus groups</u>	<u>Developed by National Centre for Social Research to inform policy development⁶. A method involving summarising and classifying data. A more structured type of thematic analysis with a tendency to focus on top-down themes, most commonly a deductive analysis.</u>
<u>Discourse analysis</u>	<u>Analysis of written text or spoken language</u>	<u>Explores how things are said, not just what. Analyses when and in what way, words are used and for what purpose, i.e. to create an impression, exert power.</u>
<u>Narrative analysis</u>	<u>An individual's story in its totality</u>	<u>Attending not just to the resulting themes but the overall structure of the story.</u>
<u>Conversation analysis</u>	<u>A close (micro-level) examination of the details of an interaction.</u>	<u>Very structured and rigorous – every little nuance is analysed including not just the verbal, but also the pauses, gaps, silences and other non-verbal cues.</u>

Table 3: Distinguishing qualitative analyses

Criterion (quantitative equivalent in brackets)	Key features
Credibility (Internal Validity)	The research should have answered the original question, with enough data to substantiate the findings and conclusions. Analysis should be systematic, logical and with adequate evidence for claims made.
Transferability (External validity)	Instead of providing indicators that the measures of a concept are doing what they claim, the aim in transferability is to utilise the rich detail produced in qualitative research so that others can evaluate its potential for application of the findings in other spheres. Lincoln & Guba refer to this as a 'database' ⁷
Dependability (Reliability)	Since measures are not a feature in qualitative research, the question of whether the outcome of the research is stable and consistent is best addressed by providing records of such features of the research process as participant selection, field notes, anonymised transcripts, and reflective notes at each stage as evidence. This forms an audit trail for those assessing the research
Respondent Validation	Returning the analysis and/or findings to the participants who generated the data for their opinions as to whether they feel it represents what they wanted to communicate
Originality	The categories resulting from the coding process should offer new ways of looking at the topic; there should be something about them that is significant to the reader such that they stand out from existing ideas concepts and practices.
Resonance	Theories or concepts resulting from the analysis should make sense to those involved in their generation and uncover insights previously hidden.
Usefulness	The findings should offer something of practical use

Table 4: Some criteria for appraising the quality of qualitative research

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