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HOW TO

THE CLINICAL TEACHER

How to … define clinical education research terminology: A glossary

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Abstract

Clinical education research (ClinEdR) utilises diverse terminology, which can lead to confusion. A common language is essential for enhancing impact. An expert panel drawn from various workstreams within the National Institute for Health and Care Research (NIHR) Incubator for Clinical Education Research was tasked with reviewing an initial list of terms for the development of a glossary of terms in the field of ClinEdR. The glossary was populated with terms, definitions and foundational papers by the authors and peer-reviewed for accuracy. The glossary of terms developed for ClinEdR should enable researchers to use a common language, promoting consistency and improving communication. We anticipate this will be useful for ClinEdR students and early career researchers. The glossary could be integrated into educational research methods courses in ClinEdR, and through critical and reflective use, enhance the quality and subsequent impact of ClinEdR.

1 | INTRODUCTION

Shakespeare famously asked, 'What's in a name?', suggesting that a name is arbitrary compared with its intrinsic qualities. However, in health care, clinical education and clinical education research (ClinEdR), the opposite is usually true. ClinEdR represents a broad range of research activities, including the development and evaluation of educational interventions, theoretical developments that shape our understanding of education and research regarding the experiences of learners, practitioners and partners within clinical education.[1] This broad range of research activity has led to a proliferation of diverse terminology,[2,3] and there is a pressing need for a contemporary 'How to' guide exploring how to define and use ClinEdR terms.

2 | THE IMPORTANCE OF COMMON LANGUAGE

Having a common language within health care and research associated with the development of health care services or workforce, such as ClinEdR, facilitates communication.[4] Technical language can often be perceived as jargon, which can be alienating for novices and those external to the field[5]; and clarity of discussion plays an important role in reducing communication errors.[6] Within ClinEdR, clarity of methodological and theoretical approach can enhance the resonance and impact of research beyond the settings in which it was conducted.[7] Misinterpreting research methods and practices due to confusion in appropriate terminology could lead to wasted effort, poor quality

research and the diffusion of non-evidence-based recommendations.[8] In addition, given the increase in global migration within ClinEdR, developing a common language can facilitate communication between team members with diverse experiences.[9]

The terminology used in ClinEdR is often rooted in fields such as medicine, sociology, psychology, anthropology, philosophy and education.[10] There is an assumption that those in the field have the same vernacular and interpret terminology in the same ways. However, recent research projects within ClinEdR have shown the importance of a common language and agreed-upon definitions. For example, Finn and colleagues reported a lack of shared understanding with respect to the definition and remit of a clinical academic.[11] The same study also observed that funding panellists often had assumed prior knowledge of educational terminology despite coming from a clinical trials background. Similarly, a study within dental education has shown how overly technical or legalistic jargon, presented in the absence of clear definitions, can create barriers to engagement with fitness to practice processes.[12] This real-world example highlights the need for clarity in definitions and how—even within a specialist field—language is not always universal.

3 | WHY HAS A COMMON LANGUAGE PROVED CHALLENGING IN ClinEdR?

Utilising a common language in ClinEdR has proved challenging as the interpretation, use and meaning of research terminology shifts through time. Once accepted, conventions no longer hold the same significance, or terms cease to be used. An example of this is the discourse surrounding the term 'saturation' within qualitative research that has influenced thinking and practice within ClinEdR. For many years within ClinEdR, data saturation was perceived as usual practice for determining when qualitative data collection could cease.[13] However, the term 'saturation' has been applied unquestioningly to a variety of qualitative research approaches, not all of which it suits.[14] Increasingly, the field has moved towards alternative practices to determine when the sample size of a qualitative project is sufficient, such as 'informational power' or 'theoretical sufficiency'.[14] This case demonstrates how clarity of contemporary thinking within ClinEdR terminology is important and demonstrates a need for this glossary, given recent advances in methodological thinking. However, it also highlights how this glossary represents a snapshot in time and discourse—there must be an ongoing effort to update, add to and remove terms from this collection.

4 | THE NEED FOR A ClinEdR TERMINOLOGY GLOSSARY

Given the importance of clarity within ClinEdR discussions, and such evolutions in practice since the formation of the field, we set about creating a glossary of terms frequently used within ClinEdR that is accessible, grounded within relevant interdisciplinary and discipline-specific literature and has achieved expert consensus across members of the NIHR Incubator for ClinEdR. We hope this will prove a useful resource, particularly for novices and early career researchers within ClinEdR, and move us towards greater conceptual clarity and impact as a field.

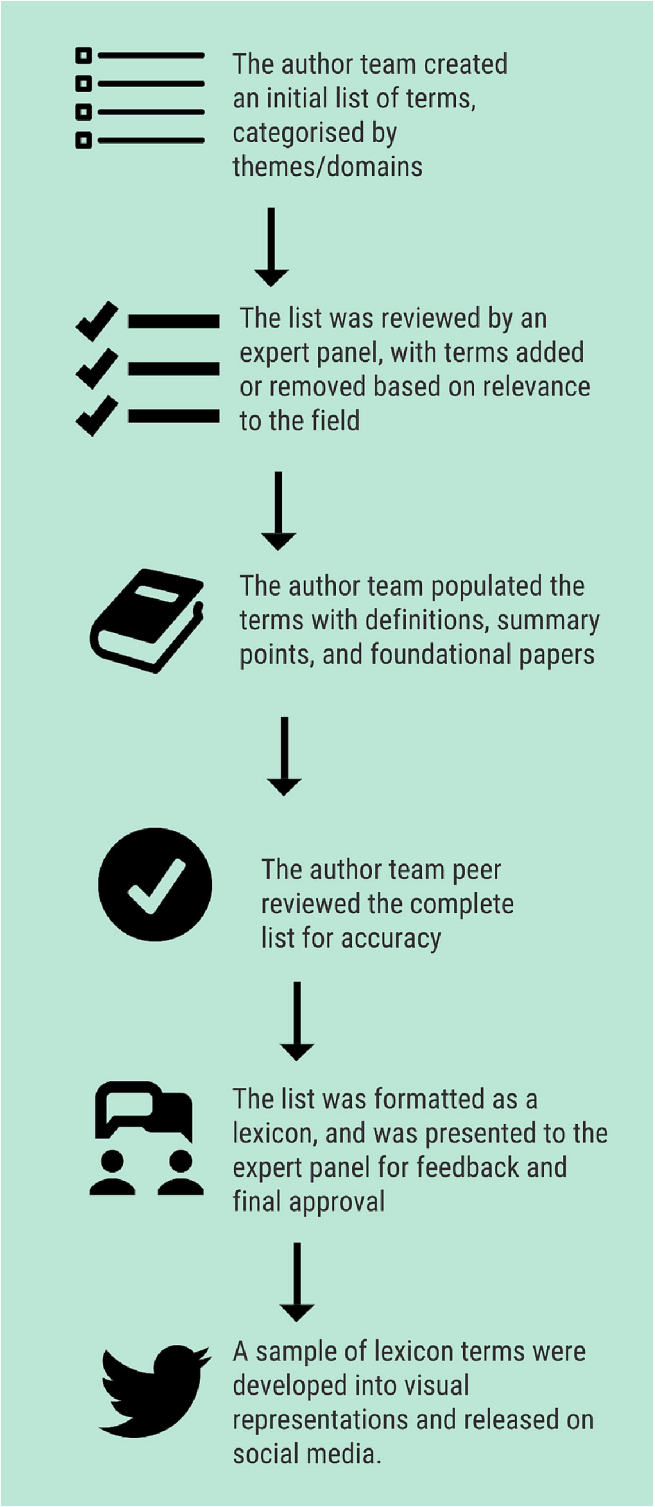

FIGURE 1 Innovation workflow.

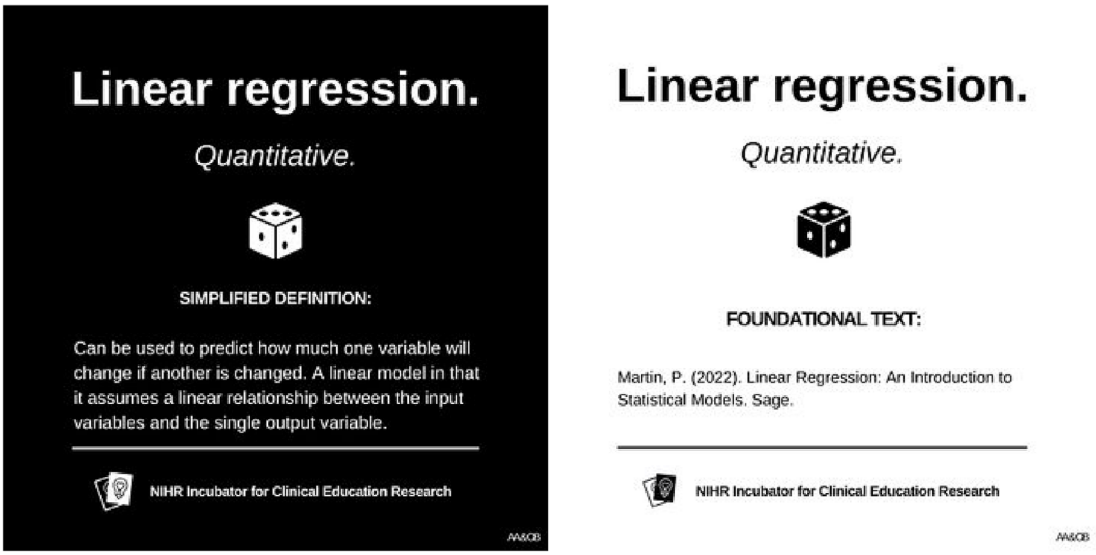

FIGURE 2 Example flashcard of one glossary term, used to promote engagement on social media.

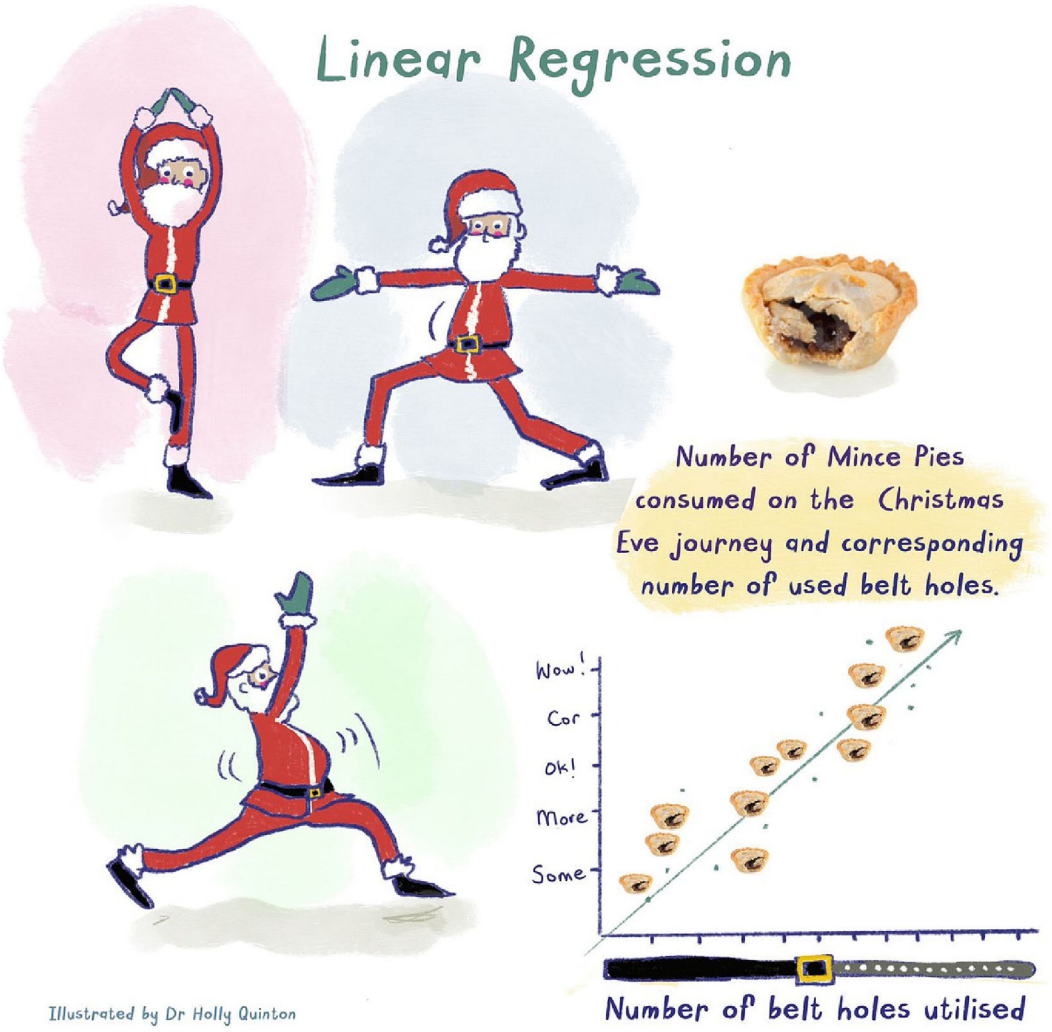

FIGURE 3 Example illustration of one glossary term, used to promote engagement on social media.

TABLE 1 Glossary for clinical education research. Terms, presented in alphabetical order, are categorised using colour-coding as (1) cross-approach (general) in blue, (2) mixed methods in yellow, (3) qualitative in pink and (4) quantitative in green. We have chosen to present the terms in this way to allow researchers working in clinical education research with specific preferred approaches and methods to screen the glossary for terms relevant to their practice quickly.

Colour key:	Cross-approach (general) Qualitative	Mixed methods Quantitative	
Term	Definition	Summary	Foundational text(s)
Abductive	Abduction is an inferential process that aims to produce new hypotheses and theories based on surprising results or findings. A middle-ground between deductive and inductive approaches. Originates from a pragmatist paradigm, abductive research is not driven by data (inductive), or by theory/hypotheses (deductive), but requires a researcher to engage both with their data and theory/other empirical research simultaneously, moving between the two interpret their findings. Abductive researchers do not approach their research as theoretically 'blank slates', nor do they attempt to fit results to a pre-existing theory. The purpose of abductive research is to find a clear and meaningful explanation for a phenomenon or puzzle within data.	A type of qualitative research design, alongside inductive and deductive research. Captures the process in which researchers move between constructing stories within their data and using theory to help interpret data. The purpose is to construct a logical explanation for a phenomenon or surprising finding within collected data.	Timmermans S, Tavory I. Theory construction in qualitative research: From grounded theory to abductive analysis. Sociological theory. 2012 Sep;30(3):167–86.
Action research	Approach to research used for exploration, intervention, evaluation and change—action is seen as central to bringing about change in an organisation or programme. Most often qualitative methods are used but not exclusively. Involves collaboration between practitioners and researchers. Cyclical nature to the research process to implement and evaluate changes, making further changes if necessary.	Focus of action research is change. Involves both researchers and practitioners and occurs in cycles to implement and evaluate change. Qualitative methods most often used	Eizenberg N. Action research in medical education: Improving teaching via investigating learning. In Action research for change and development 2021 Dec 24 (pp. 179–206). Routledge.
Alternative hypothesis	The opposite of the null hypothesis, a statement that is usually the objective of the study. It states that there is a difference between two approaches. E.g., this new approach to assessment more accurately assesses student competence than the current approach.	A statement that there is a difference between two approaches. H1 or Ha.	Toledo, A.H., Flikkema, R. and Toledo-Pereyra, L.H., 2011. Developing the research hypothesis. *Journal of Investigative Surgery*, *24*(5), pp.191–194.
Audio diary	Audio diaries involve the audio recording of participants' ideas, responses and reflections. They are typically collected over a period of time. They may be structured, in response to a prompt or series of prompts, or unstructured, and left at the discretion of the participants regarding what to record, and what to send. Length of audio diaries varies.	Method of collecting in the moment or reflective qualitative data. Typically a longitudinal approach. Ease of completion results in low attrition rates. Can be recorded on mobile phones for easy accessibility.	Crozier, S. E., & Cassell, C. M. (2016). Methodological considerations in the use of audio diaries in work psychology: Adding to the qualitative toolkit. *Journal of occupational and organizational psychology*, *89*(2), 396–419.

TABLE 1 (Continued)

Colour key:	Cross-approach (general)	Mixed methods	
	Qualitative	Quantitative	
Term	Definition	Summary	Foundational text(s)
Autoethnography	An ethnographic approach to research where an author focuses on their own thoughts, feelings and experiences in regard to a particular phenomenon or topic of interest.	Involves reflection on, and analysis, of personal experiences and thoughts as a type of research.	Farrell L, Bourgeois-Law G, Regehr G, Ajjawi R. Autoethnography: introducing 'I' into medical education research. Medical Education. 2015 Oct;49(10):974–82.
Axiology	Axiology is an important consideration in selecting a research paradigm. Axiological considerations help you decide what is valuable and ethical to research. It involves reflecting on your own values, the needs of the field and ethical processes of your research.	Part of considerations when selecting a research paradigm. Involves reflecting on value and ethics. Should be done before any research commences.	Killam L. Research terminology simplified: Paradigms, axiology, ontology, epistemology and methodology. Laura Killam; 2013 Nov 10.
BMAT	Stands for BioMedical Admissions Test. Used by some universities as a metric within selection to medical school, dental school, biomedical science degrees and veterinary science degrees. An aptitude test concerned with a participant's ability to apply scientific and mathematic knowledge, problem solving, critical thinking and written communication skills.	An aptitude test used for selection into some medical, dental, veterinary schools and some biomedical science courses. Stands for BioMedical Admissions Test.	Cambridge Assessment Admissions Testing. BioMedical Admissions Test. Available online: https://www.admissionstesting.org/for-test-takers/bmat/
Card sorting	Interactive, qualitative research method where research participants are asked to sort information organised on cards. Participants might group, label or prioritise cards. Researchers take the feedback from participants (from the activity and associated discussion) and use this to more effectively describe, group or label information of interest. Purpose of the card sort method is to explore how participants understand and organise concepts.	Qualitative research method, where participants are asked to sort information on cards. The activity and associated discussion offer information on how participants understand, organise and sometimes prioritise concepts.	Conrad, L. Y., & Tucker, V. M. (2018). Making it tangible: hybrid card sorting within qualitative interviews. *Journal of Documentation*.
Case study	In research, a case study is an entity that is studied as a single unit and has clear boundaries in both time and space (location). Case study research might focus on a particular event, specific programme or organisation. Data sources are usually qualitative in nature, and multiple data sources are used to explore each individual case.	Case studies are single, well-defined entities that become the focus of analysis in a qualitative research project. May be events, programmes, organisations, etc. Multiple data sources most usual in a case study analysis.	Ng SL, Baker L, Cristancho S, Kennedy TJ, Lingard L. Qualitative research in medical education: methodologies and methods. Understanding medical education: evidence, theory, and practice. 2018 Dec 3:427–41.
Categorical data	Data that may be divided into groups, e.g., gender, race and age group. Sometimes called a nominal variable. Categories that data are divided into are based on qualitative characteristics. Takes on a limited, and usually fixed, number of possible variables. Likert scale data are categorical.	Data that may be divided into groups based on qualitative characteristics.	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550

(Continues)

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
Chi-square test	A statistical test used to compare observed results with expected results. This will determine whether the is due to chance, or if it is due to a relationship between the variables you are studying.	Statistical test used to compare observed and expected results.	University of Southampton, Practical application of statistics in the social sciences. Chi Square. Available online: https://www.southampton.ac.uk/passs/full_time_education/bivariate_analysis/chi_square.page
Code	An element of qualitative analysis that represents a low-level label describing what a participant has said. Codes are combined and synthesised to develop themes.	Descriptive labels assigned to raw data to help make sense of what is being said throughout a transcript. Codes may contribute to the development of a coding framework, which summarise and describe the codes to be applied to an entire dataset, and can be developed inductively or deductively. Can be semantic or latent, as with themes	Kiger ME, Varpio L. Thematic analysis of qualitative data: AMEE Guide No. 131. Medical teacher. 2020 Aug 2;42(8):846–54.
Conceptual framework	Conceptual frameworks provide the justification for why a study is necessary—they describe what is known about a topic, identify gaps in knowledge and outline the study's methodological foundations.	Outline why a study is necessary. Typically found within a paper introduction. Involves identifying gaps in the literature and describing/justifying methodological foundations.	Varpio L, Paradis E, Uijtdehaage S, Young M. The distinctions between theory, theoretical framework, and conceptual framework. Academic Medicine. 2020 Jul 1;95(7):989–94.
Confidence intervals	The confidence interval is a range of values that is likely to contain the true value. The 95% confidence interval is 95% likely to contain the true value. It is a procedure for establishing possible error. The true value may refer to the true effect of an intervention. The confidence intervals always contain the result, because that is what the confidence interval is based around. It is important to remember that the result is taken from the sample, but the true value or effect reflects the population as a whole.	A range of values that is likely to contain the true value. 95% confidence intervals are a common approach when discussing confidence intervals. Procedure for establishing possible error.	Confidence intervals: the basics. Available online: https://faculty.etsu.edu/gardnerr/1530/Chapter14.pdf
Consensus methods	An umbrella term including approaches to research whose aim is to generate consensus, or agreement, amongst a group. A way of dealing with conflicting opinions, experiences or evidence. Approaches include the Delphi method and nominal group technique.	Umbrella term to capture methodologies whose focus is establishing consensus. Includes the Delphi method and nominal group technique.	Jones, J. and Hunter, D., 1995. Qualitative research: consensus methods for medical and health services research. *Bmj*, *311*(7001), pp.376–380.
Construct validity	Construct validity is the extent to which the assessment measures what it was designed to test. An central concern of validity research, some argue the overarching concern. An example of assessing	Tests how well a test or assessment measures what it claims to. One type of validity that specifies a measure's intended meaning.	Colliver, J.A., Conlee, M.J. and Verhulst, S.J., 2012. From test validity to construct validity … and back?. *Medical education*, *46*(4), pp.366–371.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	construct validity would be performing a factor analysis to check that survey items 'hang together' as expected, relate to a single factor and are unrelated to another in that they do not repeatedly test the same element of the factor you are interested in.		
Constructionism	Constructivism and constructionism are often used synonymously, yet the paradigms differ. Whilst both theories highlight the subjectivity of reality and knowledge, constructionism maintains knowledge and reality, are influenced by and exist only within social interactions—in other words, there is nothing outside the speech of an encounter, and you cannot speculate or infer conclusions beyond this. Constructionist research emphasises interaction, more frequently adopting observational methods of data collection and employing methods of analysis that focus on language.	Paradigm with a subjectivist ontology and epistemology. Nothing exists outside of social interactions; focus is on social groups and interactions themselves. Analysis focused on observational methods and exploration of language.	Rees CE, Crampton PE, Monrouxe LV. Re-visioning academic medicine through a constructionist lens. Academic Medicine. 2020 Jun 1;95(6):846–50.
Constructivism	A paradigm that highlights the subjectivity of reality and knowledge. Within this subjective reality, where knowledge is socially constructed, constructivism highlights the role of the individual in making sense of their experiences and in knowledge formation. Constructivist research often makes claims as to what people may be thinking or feeling based on their speech. This type of research gives primacy to the perspectives of individuals.	Paradigm with a subjectivist ontology and epistemology. Focusses on how individuals make sense of their experiences. Infers individuals' cognitive schemas and processes from collected data.	Bhaskar, R. (1975). A realist theory of science. York: Books.
Content analysis	Content analysis is an approach to analysis where written, visual or aural data are systematically categorised and recorded. Quantitative content analysis involves counting categories and data, whereas qualitative content analysis focusses on interpreting understanding within qualitative data. It can be a more descriptive way of analysing qualitative data. Quantitative content analysis is now uncommon, as understanding shifts within the field to recognise that assigning numerical labels to	The systematic categorisation and recording of qualitative data. Can be quantitative or qualitative, though quantitative approaches are no longer common.	Stemler, S. (2000). An overview of content analysis. *Practical assessment, research, and evaluation*, 7(1), 17.

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	qualitative data does not add meaning or depth and is incompatible with the philosophical foundations of most qualitative research.		
Content-related validity	This domain of validity assesses whether the items on a test measure all of the important aspects of a construct you are testing. This helps you analyse the content of an assessment to make sure it is covering the curriculum. For example, items on a written exam should assess all of the learning outcomes in an undergraduate module.	Assesses whether test items measure all the important aspects of the construct they are testing	Barry, A. E., Chaney, B., Piazza-Gardner, A. K., & Chavarria, E. A. (2014). Validity and reliability reporting practices in the field of health education and behaviour: A review of seven journals. *Health Education & Behaviour*, *41*(1), 12–18.
Continuous data	Data that can take any value, e.g., weight, height and temperature. There are an unspecified number of possible measurements between two realistic points. Continuous data are usually collected from very precise measurements. Continuous data are measurable, whereas discrete data are countable. Histograms or line graphs are usually used to display continuous data.	Data that can take any value—there are an unspecified number of possible measurements between two realistic points.	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550
Convenience sampling	A non-probability sampling technique. Also known as haphazard or accidental sampling. Members of the target population meet certain criteria (usually practical criteria); for example, they are easy to access and recruit.	Sampling based on practical criteria (e.g., ease of recruitment, geographical proximity to the researcher).	Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, *5*(1), 1–4.
Conversation analysis	Method for analysing communication using recordings of conversations.	Its theoretical focus is on identifying and characterising the 'machinery' underlying talk and social relations. Detailed transcriptions of recorded conversations that document both what was said and how it was said are produced and analysed looking for recurrent patterns within and across the data.	Leydon GM, Barnes RK. Conversation analysis. Qualitative research in health care. 2020 Jan 15:135–50.
Correlation	A statistical measure of dependence. Correlated variables move in relation to one another at a constant rate. The extent to which two variables are correlated shows to what degree the variables fluctuate in relation to one another (also known as the sample correlation coefficient). The variables may be randomly associated or bivariate. Correlation does not equal causation, and correlation cannot tell us about cause and effect or how much one variable will change as another is changed. The correlation coefficient (which	Expresses the extent to which two variables change together at a constant rate. A way of describing the relationship between two variables without making conclusions about cause and effect	Swinscow, T. D. V., & Campbell, M. J. (2002). *Statistics at square one* (pp. 111–25). London: Bmj.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	indicates how closely the points lie to a line drawn through plotted data) is denoted by the value *r*, which may lie between −1 and 1. $r = 1$ means there is a strong positive correlation (*y* always increases with *x*). $r = 0$ means there is no correlation. $r = -1$ means there is a strong negative correlation (*y* always decreases with *x*).		
Covariance	A measure of how two random variables are dependent on one another. Similar to variance—variance is a measure of how a single variable varies, whereas co-variance is a measure of how two variables vary together. A large co-variance can mean a strong relationship between variables. An alternative to calculating co-variance is the correlation coefficient. You cannot compare co-variances over datasets with different scales.	Measures how two random variables are dependent on one another. Can indicate the strength of relationships between variables. Limited by units.	Peck, R., Olsen, C., & Devore, J. L. (2015). *Introduction to statistics and data analysis*. Cengage Learning. Springer.
Creative enquiry	The use of the arts to deepen enquiry. Poetic inquiry is a type of creative enquiry. Creative enquiry also includes visual arts, music, movement and dance. Can be used in many ways within qualitative research including as an elicitation tool within qualitative interviews and as a way of analysing data. Participants may engage in creating art themselves, which alongside reflections on the process, may be analysed by researchers, or researchers may engage in creating art themselves to reflect upon the research process or interpret data.	Use of the arts to deepen enquiry. Includes many media of arts. Participants/researchers may be engaged in creating art to deepen data collection or analysis.	Mannay, D. (2015). *Visual, narrative and creative research methods: Application, reflection and ethics*. Routledge.
Credibility	Credibility is analogous to internal validity in quantitative research and refers to confidence in the quality and trustworthiness of the data within qualitative research. Credibility is about whether research findings represent a 'credible' interpretation of participant experiences or opinions. Some sources state it is about 'truth-value', but this has been challenged within qualitative research, which is often not engaged in identifying a singular truth. Instead, credibility concerns logical, transparent and high-quality	Confidence in the quality and trustworthiness of qualitative data. Steps to improve credibility include robust methods (including adequate follow up of participants) and rapport with participants to facilitate openness.	Korstjens, I. and Moser, A., 2018. Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, *24*(1), pp.120–124.

(Continues)

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	interpretation. It can be improved through strategies such as triangulation, continuous observation of subjects for adequate periods of time and extended participation to build trust with participants.		
Criterion related validity	Criterion-related validity compares a test (e.g., an assessment) to a criterion, or set of criteria, that is held as important for professional development or ensuring professional standards. An example of criterion related validity is that UCAT scores should be related to medical school performance.	Compares a test (e.g., an assessment) to a criterion that a researcher or educator thinks is important	Barry, A. E., Chaney, B., Piazza-Gardner, A. K., & Chavarria, E. A. (2014). Validity and reliability reporting practices in the field of health education and behaviour: A review of seven journals. *Health Education & Behaviour*, *41*(1), 12–18.
Critical realism	Critical realism (CR) differentiates between the 'real' world and the 'observable' world. The 'real' cannot be observed and exists independent from human perceptions, theories and constructions. The world as we know and understand it is formed through what is 'observable' from our own perspectives and experiences.	Real' world versus 'observable' world Unobservable structures cause observable events The social world can only be understood if the structures that generate events are understood.	Archer, M. S. (1998). Critical realism: Essential readings. London; New York: Routledge. Bhaskar, R. (1975). A realist theory of science. York: Books.
Critical theory	A social theory that emphasises the importance of studying and critiquing culture and society. Research utilising critical theory perspectives aim to unmask the ideology falsely justifying some form of social, political, cultural or economic oppression—to reveal it as ideology—and so contribute to the task of ending that oppression.	Social theory concerned with studying and critiquing culture to challenge and end oppression.	Kumagai, A. K., & Lypson, M. L. (2009). Beyond cultural competence: critical consciousness, social justice, and multicultural education. Academic medicine, 84(6), 782–787.
Cronbach alpha	Developed by Lee Cronbach. Measures internal consistency (homogeneity) of a set scale or test items. A measure of test reliability. Cronbach's alpha is expressed as a number between 0 and 1. Calculating Cronbach alpha has become common practice in medical education when multiple-item measures of a concept or construct are employed. If the items in a test are correlated to each other, the value of Cronbach alpha is increased. However, a high Cronbach alpha does not always mean a high degree of internal consistency. This is because alpha is also affected by the length of the test. If the test length is too short, the value of Cronbach alpha is reduced. Therefore, to increase Cronbach alpha, more related items testing the same concept should be added to the test. It is also	Measures internal consistency (homogeneity) of a set of scale or test items. Measure of reliability. Longer tests allow for more accurate assessments of internal consistency.	Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International journal of medical education*, *2*, 53.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	important to note that Cronbach alpha is a property of the scores on a test from a specific sample of testees. Therefore, investigators should not rely on published Cronbach alpha estimates and should measure alpha each time the test is administered.		
Crystallisation	An interpretivist alternative to triangulation (which is rooted in a positivist paradigm and is concerned with validating findings and assumes a fixed point around which data can be triangulated). Crystals are complex and multi-dimensional, and so crystallisation within qualitative research means bringing together multiple diverse perspectives and explorations of experience into a coherent account. Bringing together various sources and types of data builds a rich picture of a phenomena. Crystallisation can be enhanced through using multiple methods, reflexivity and recruiting diverse participants.	Alternative to triangulation, more suitable for interpretive qualitative research. Bringing together multiple diverse perspectives and data sources to build a rich picture of a phenomena.	Richardson, L., & St Pierre, E. (2000). A method of inquiry. *Handbook of qualitative research*, 923–948.
Data management	Data management is the organisation, storage, maintenance, preservation and sharing of research study data. It involves managing data collected from research participants and data generated by the researcher during daily work (e.g., it includes a consistent way of naming files so that they can be easily searched for and identified). Data management should be a core consideration within research design. There can be ethical concerns in regard to data management and medical education research, and data security is an important consideration within data storage and transfer.	The organisation, storage, maintenance, preservation and sharing of research study data. Includes participant and researcher data. There is an ethical domain to data management.	Managing and sharing data: best practices for researchers. UK Data Archive. Available online: http://www.data-archive.ac.uk/media/2894/managingsharing.pdf
Debriefing	Debriefing is a directed, intentional conversation that can be used for knowledge or skill attainment, or to answer questions about threats to patient safety and patient care based on a recent event or a hypothetical situation. In the context of qualitative research, debriefing information is often provided following a research interaction, e.g., a	An intentional conversation to support research participants and answer questions regarding the research process.	Network, Patient Safety. "Debriefing for Clinical Learning." (2019). Available online: https://psnet.ahrq.gov/primer/debriefing-clinical-learning#:~:text=Debriefing%20is%20a%20directed%2C%20intentional,event%20or%20a%20hypothetical%20situation.

(Continues)

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	qualitative interview to ensure participants are adequately supported to make sense of their research experience.		
Deductive (research or coding)	Deductive research aims to test an existing theory. In qualitative research, deductive coding means begins with predefined set of codes that are applied to the data.	Deductive research tests existing theories.	Hyde, K.F. (2000), "Recognising deductive processes in qualitative research", Qualitative Market Research, Vol. 3 No. 2, pp. 82-90. https://doi.org/10.1108/13522750010322089
Delphi method	Delphi may be characterised as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem. Purpose is to generate consensus on a complex topic or set of problems. The Delphi method assumes a realist ontology, and prizes group opinion as a way of coming to know a shared reality. Usually involves 'rounds' of discussion or feedback where, in-between rounds, researchers make edits to what has been suggested (e.g., suggested definitional statements and suggested syllabi statements), which is discussed again, until the group agrees to include or reject statements, or a pre-set number of rounds (typically 2–3 in a modified Delphi approach) is reached.	Also known as Estimate-Talk-Estimate or ETE. Is a structured communication technique or method. One way of reaching consensus amongst a group, typically a group of experts on a topic. Can be useful in establishing definitions and creating national syllabi. Can be run in-person, through the post, and now most typically online.	The Delphi Method Techniques and Applications. Book by Harold Linstone & Murray Turoff 2002
Dependability	Stability of qualitative data and research procedures over time and in varying conditions. Analogous to reliability in quantitative data. Dependability involves consistency of approach, and clearly documenting the research procedures follows. Dependable research should allow someone external to follow, audit and critique the research process. Data (e.g., that collected from interviews or focus groups) would likely appear similar (though not identical, as each researcher brings their own perspective and knowledge to their research) if collected by another team or individual in the same way. Important to establishing trustworthiness within qualitative data.	Stability of qualitative data and research process over time. Helps establish trustworthiness. Research procedures should be clearly discussed and documented.	Korstjens, I. and Moser, A., 2018. Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, *24*(1), pp.120–124.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
Descriptive statistics	Provides basic summaries about a sample and the observations made. The sample may either be representative of the entire population or a sub-sample. Descriptive statistics include measures of central tendency, measures of distribution and measures of variability. Because they are explanatory, descriptive statistics are not usually concerned with the differences between two or more types of data.	Provides basic summary of data and describes the characteristics and features of a dataset. Explanatory.	Byrne, G. (2007). A statistical primer: Understanding descriptive and inferential statistics. *Evidence based library and information practice*, *2*(1), 32–47.
Diary research	A longitudinal research method in which participants collect information by recording a personal diary about the subject of interest. Can be used to collect answers in response to questions about a phenomenon or event or capture data as events take place.	Feedback studies ask participants to answer questions about the subject of interest at assigned times or intervals, whilst elicitation studies are more contemporaneous and capture data as events unfold.	Sullivan, Brian K. (August 9, 2012). "5 methods to collect data with diary studies". Big Design. Retrieved September 24, 2016
Discourse analysis	Analysis of both written and spoken language in relation to social context. Aims to uncover meaning and context behind written and spoken language by focussing on the connections between text, practice and shared meanings in society.	Involves analysis of written and spoken language in light of social and cultural norms and context.	Kärreman, D., & Levay, C. (2017). The interplay of text, meaning and practice: methodological considerations on discourse analysis in medical education. Medical Education, 51(1), 72–80
Discrete data	Data that can be counted and involves integers, e.g., the number of students in a class, the number of resources purchased for a workshop. Only a limited number of values is possible. In many cases, discrete data can be prefixed with the phrase 'the number of …' (students, resources, etc.). Discrete data are useful within simple statistical analysis. It is usually displayed using bar graphs and pie charts.	Data that can be counted and involves integers.	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550
Dissemination	The sharing of research findings, outputs and recommendations. May take the form of written publications, written summaries, conference presentations or seminars where results are presented. Involves sharing findings with stakeholders (those who have an interest or concern in relation to your research). Key to maximising the benefit and impact of clinical education research.	Sharing of research with stakeholders in order to maximise the impact of clinical education research.	NIHR. How to disseminate your research. Available online: https://www.nihr.ac.uk/documents/how-to-disseminate-your-research/19951#:~:text=of%20being%20utilised.-,What%20does%20NIHR%20mean%20by%20dissemination%3F,of%20the%20research%20without%20delay.

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
Documentary research	The analysis of text or non-text based documents to generate insights about context, events or situations not easily evaluated through more interactive forms of research, like interviews. Documents are treated like qualitative interview transcripts during analysis.	Analysis of text or non-text based documents. Suitable for generating insight about context, events or situations.	Scott, J.P. (1990) A matter of record: documentary sources in social research. Cambridge. Polity Press.
Educational concept	Concepts are general ideas regarding how the world and empirical observations relate—they are the definitional terms (e.g., of coaching) that are the basis for theory-building.	Distinct from theories, concepts are the building blocks for theory-building	Varpio L, Paradis E, Uijtdehaage S, Young M. The distinctions between theory, theoretical framework, and conceptual framework. Academic Medicine. 2020 Jul 1;95(7):989–94.
Educational framework	Educational frameworks encompass educational goals against which trainee competence or progress is evaluated. Frameworks can be analytic, synthetic or developmental. Analytic frameworks conduct evaluation of trainee competence through examining competence in individual domains. Synthetic frameworks view competence more holistically and undertake evaluation of real-world activities. Developmental frameworks conceptualise learning as a trajectory and focus on milestones in the progression towards competence.	Educational goals against which competence is evaluated. There are different types of frameworks with a variety of aims.	Pangaro L, Ten Cate O. Frameworks for learner assessment in medicine: AMEE Guide No. 78. Medical Teacher. 2013 Jun 1;35(6):e1197–210.
Epistemology	The nature of knowledge—how knowledge about an entity is formed and represented. Epistemology largely defines methodology.	Asks philosophical questions about the nature of knowledge. Part of selecting an appropriate paradigm for your research that will guide methodological and methods selection. Important to reflect on your position prior to beginning research.	Varpio L, Ajjawi R, Monrouxe LV, O'Brien BC, Rees CE. Shedding the cobra effect: problematising thematic emergence, triangulation, saturation and member checking. Medical education. 2017 Jan;51(1): 40–50.
Ethical approval	A process by which research is approved as ethical by an institutional ethics board or committee. Required for most medical education research that involves human subjects as participants. Usually involves a formal application and often a research proposal and supplying relevant study materials for review by the board.	Process by which research is deemed ethical by an approved committee of experts. Necessary for research involving human participants. Usually involves a formal application, research should not start until approval is gained.	Jagsi R, Lehmann LS. The ethics of medical education. Bmj. 2004 Aug 5;329(7461):332–4.
Ethnography	A research approach used in anthropology and the social sciences to describe and explore a culture, subculture or social group in its natural setting. Can use quantitative and qualitative approaches. Qualitative ethnography relies on fieldwork, where	An approach to explore and describe a culture, subculture or social group. Researchers become a part of the culture or group they are investigating. Methods can be quantitative or qualitative.	Goodson L, Vassar M. An overview of ethnography in healthcare and medical education research. Journal of educational evaluation for health professions. 2011;8.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	a researcher will spend a prolonged period immersed in a culture, interacting with its various stakeholders, in order to adequately describe that culture.		
Evidence synthesis	Review and analysis of literature to generate either broad or specific insights into a particular research topic or question of interest. Also known as a literature review. There are many approaches to evidence synthesis, each with their own purpose and methods. The feature that unites these diverse approaches is the combination of findings or insights to create a connected whole.	Umbrella term to describe approaches to generating new insights based on diverse literature published across time, across journals, countries, etc.	Dias, S., Welton, N.J., Sutton, A.J. and Ades, A.E., 2013. Evidence synthesis for decision making 1: introduction. Medical decision making, 33(5), pp.597–606.
Feminist research	Research focussed on casting light on gender-based oppression and inequality. Most often utilises feminist theory. Purpose of feminist research is to end sexism, exploitation and oppression. Feminist research is concerned with action, often political action. Feminist theory is an umbrella term, where various concepts, theories and principles are united by the umbrella of the feminist movement. Feminist theory can be classified according to which 'wave' of feminist thought it originated from. Feminist approaches spring forth from each of the four waves, and each approach has various theories associated with the worldview the approach adopts.	Research where the focus is exploring and challenging gender-based oppression and inequality. Often utilises feminist theory to do so. Usually concerned with action.	Finn, G. M., & Brown, M. E. L. (2022). Ova-looking feminist theory: a call for consideration within health professions education and research. *Advances in Health Sciences Education*, 1–21.
Fieldnotes	Records that refer to qualitative notes taken by researchers during or after a period of observation of the subject being studied.	Qualitative notes taken during or after observation	Merriam, S.B. (1997). Qualitative research and case study applications in education. San Fransico, Jossey-Bass.
Focus group	A method of qualitative data collection that involves a researcher interacting with a group of participants. Research focused on interaction between participants or reaching consensus on a topic might use focus groups. Questions are asked in a group setting, and participants discuss their views on these, whereas a researcher facilitates the discussion.	A type of group interview. Most appropriate for research wishing to analyse the interaction between participants or consensus generation on a particular topic. Facilitator or facilitators necessary to oversee discussion.	Gill P, Stewart K, Treasure E, Chadwick B. Methods of data collection in qualitative research: interviews and focus groups. British dental journal. 2008 Mar;204(6):291–5.
Forest plot	Usually found in meta-analyses and provides graphical representation of the strength of evidence of the constituent studies. Squares are centred on the	Graphical representation of the strength of evidence of the constituent studies. If the confidence intervals of the forest plot summarised effect cross	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	result of the study, the size of the square represents weight of the study in the meta-analysis. The line running through the square shows confidence intervals, usually 95%. Beneath the studies is the result, in the shape of a diamond, with the centre displaying the mean value, and lateral edges showing the confidence intervals. If the confidence intervals cross the line of no effect, the meta-analysis shows the intervention's effect is not significant.	the line of no effect, the meta-analysis shows the intervention's effect is not significant.	
Framework analysis	From the field of social policy research but now well-established within medical education. A framework is created either from existing theory or from inductive analysis of one or more cases of data from within the study. The framework is a summary of data consisting of rows (the cases), columns (codes), with summarised data within each cell. The framework is applied to each case (charting the data), applying the agreed-upon codes to that case. Once data have been synthesised using the framework, data are compared and contrasted and themes constructed to summarise commonalities and divergences.	A framework is created from either theory but most usually inductive analysis of one or more cases included within the research. This coding framework is then applied to all cases, and each case is charted in the framework. Similarities and differences in the data, and connections, are then studied to create themes.	Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC medical research methodology*, *13*(1), 1–8.
Funnel plot	Used to demonstrate the existence of publication bias in meta-analyses. Intervention effect on the *x*-axis, study size on the *y*-axis. Symmetrical inverted funnel shape indicates that publication bias is unlikely. Asymmetrical funnel indicates relationship between study size and intervention effect, meaning either publication bias or systematic difference between smaller and larger studies.	Used to demonstrate the existence of publication bias in meta-analyses.	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550
GAMSAT	Stands for Graduate Medical School Admissions Test. An aptitude test for graduates applying to (mostly) graduate-entry medicine or dentistry degrees. The test involves assessment of reasoning in the humanities and social sciences, written communication skills and reasoning in the biological and physical sciences.	An aptitude test used mostly to test graduates' suitability for studying medicine or dentistry. Stands for Graduate Medical School Admissions Test.	ACER. GAMSAT. Available online: https://gamsat.acer.org/

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
Gantt chart	A way of planning the timeline of a study, adopted from the field of project management. Assists in the scheduling of various tasks associated with a project, and can help researchers stay on track, and make realistic projections regarding time required. The rows of a Gantt chart display research tasks and the column periods of time. The chart is a horizontal bar chart, with cells filled with colour for each task, demonstrating the periods of time that task will span. Gantt charts can be made easily in Excel.	Horizontal bar chart used to manage project scheduling and make predictions regarding project duration.	Kumar, P. P. (2005). Effective use of Gantt chart for managing large scale projects. *Cost engineering*, *47*(7), 14.
Generalisability	This means that the findings of a piece of research are applicable to a whole population. A term most often used in quantitative research. Can be attended to through considering whether a study's participants are representative of the population from which they are drawn.	A quantitative marker of quality. Concerns how easily findings can be extrapolated to an entire population. Representative sample key.	Varpio L, O'Brien B, Rees CE, Monrouxe L, Ajjawi R, Paradis E. The applicability of generalisability and bias to health professions education's research. Medical education. 2021 Feb;55(2):167–73.
Grounded theory	A systematic approach to qualitative analysis that involves the development of theory in under researched areas. Core features of the approach include theoretical sampling, constant comparison, theoretical sufficiency and iterative data collection and analysis.	Qualitative methodology focused on theory creation. Umbrella term that includes Glasserian approaches, Strausserian approaches and constructivist approaches. Approaches share several common features including theoretical sampling, constant comparison, theoretical sufficiency and an iterative approach.	Kennedy TJ, Lingard LA. Making sense of grounded theory in medical education. Medical education. 2006 Feb;40(2):101–8.
Group interview	A method of qualitative data collection. Focus groups are a type of group interview, but others also exist. Group interviews may not focus on interactions of participants, instead a researcher using group interviews might be more interested in collecting individual responses from a large group of people in a group setting for convenience.	Includes focus group interviews but not exclusively focus groups. Some group interviews focus less on interaction but are used by researchers to interview many participants concurrently.	Frey JH, Fontana A. The group interview in social research. The Social Science Journal. 1991 Jan 1;28(2):175–87.
Guided walks	A mobile and dynamic study method in which participants are led through a known environment that holds some degree of significance. This provides a context-rich setting in which research can take place. Experiences in and beyond the environment participants walk through are explored in-depth through probing questioning.	Type of qualitative interview that involves walking with a participant through a known environment that holds significance to the research question of interest. Beneficial in unpacking context.	Dubé, T.V., Schinke, R.J., Strasser, R. and Lightfoot, N., 2014. Interviewing in situ: employing the guided walk as a dynamic form of qualitative inquiry. *Medical Education*, *48*(11), pp.1092–1,100.

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TABLE 1 (Continued)

Colour key:	Cross-approach (general) Qualitative	Mixed methods Quantitative	
Term	**Definition**	**Summary**	**Foundational text(s)**
Hawthorne effect	The 'Hawthorne effect' refers to the way in which individuals who are being examined or assessed consciously change an aspect of their behaviour, as they are aware of being observed. An issue throughout clinical education and clinical education research, where focus is often on assessment or evaluation. Most applicable to measures of exam performance.	The tendency to modify behaviour in response to being observed. Of concern in regard to measures of exam performance.	McCarney R, Warner J, Iliffe S, Van Haselen R, Griffin M, Fisher P. The Hawthorne Effect: a randomised, controlled trial.. BMC medical research methodology. 2007;7(1):1–8.
Heterogeneity	Differences in the effect sizes or findings of similar studies	Differences can arise due to: - Differences in the population, intervention, comparison and outcome - Study design and methodology Important when performing meta-analysis - High heterogeneity suggests there are differences between the included studies - Limits generalisability	Cochrane Handbook for Systematic Reviews of Interventions: Analysing data and undertaking meta-analyses
Hypothesis	A statement or idea based on pre-existing research or experience that has not yet been proven to be true. Hypotheses should be testable and specific. They describe what a researcher believes will happen in a specific circumstance.	A testable and specific proposition that has not yet been proven to be true.	Toledo, A.H., Flikkema, R. and Toledo-Pereyra, L.H., 2011. Developing the research hypothesis. *Journal of Investigative Surgery*, *24*(5), pp.191–194.
Illuminative evaluation	A type of evaluation that focusses on using qualitative methods to illuminate the conditions of an educational programme or intervention. A naturalistic form of inquiry. Concerned with how and why programmes or interventions did or did not achieve their goals.	Approach to evaluation that employs strictly qualitative methods to explore the conditions of a programme or intervention. Assesses how and why a programme or intervention achieved or did not achieve its goals.	Burden, B. (2008). Illuminative evaluation. Frameworks for practice in educational psychology–a textbook for trainees and practitioners.
Individual interviews	A method of qualitative data collection that involves interacting with individuals to consider a topic of interest. May be unstructured, semi-structured or structured. Can be conducted face-to-face or virtually.	One-to-one conversations with the purpose of collecting data on a particular topic or experience. May be unstructured, semi-structured or structured. Face-to-face or virtual.	Ryan F, Coughlan M, Cronin P. Interviewing in qualitative research: The one-to-one interview. International Journal of Therapy and Rehabilitation. 2009 Jun;16(6):309–14.
Inductive	An inductive approach is about generating or building new theories and findings through observation of the data. It is a broad method of reasoning, often associated with qualitative research.	A broad method of reasoning where researchers generate findings or theory from data. The data are the principal source of theory or findings generation.	Soiferman LK. Compare and Contrast Inductive and Deductive Research Approaches. Online Submission. 2010 Apr. https://files.eric.ed.gov/fulltext/ED542066.pdf

TABLE 1 (Continued)

Colour key:	Cross-approach (general)	Mixed methods	
	Qualitative	Quantitative	
Term	Definition	Summary	Foundational text(s)
Inferential statistics	Focus on making generalisations about a larger population based on a representative sample. Inferential statistics focus on making predictions, and results are usually in the form of a probability.	Focus is making predictions at a population-level. Results usually a probability. Requires a representative sample.	Byrne, G. (2007). A statistical primer: Understanding descriptive and inferential statistics. *Evidence based library and information practice*, *2*(1), 32–47.
Information power	Concept pioneered by Malterud et al. to offer guidance on deciding upon a qualitative sample size in grant application writing. Information power is where qualitative data are able to say something meaningful. Recommends that a study with a broad aim, non-specific or few particular inclusion criteria, a more inductive/exploratory approach, thinner data generated from participants, analysis focused across a dataset and analysis conducted by a novice researcher generally requires a larger participant sample to have adequate information power.	Information power is where qualitative data are able to say something meaningful. Can be used to plan sampling strategy/targets within qualitative research.	Malterud, K., Siersma, V. K., & Guassora, A. D. (2016). Sample size in qualitative interview studies: Guided by information power. *Qualitative Health Research*, *26*(13), 1753–1760.
Insider research	Research undertaken involving a community where the researcher is also a member of that group. Insider researchers are able to draw on their own lived experiences to build rapport and shape data interpretations. Some insider research involves including members of the research team as participants within data collection. Attention to reflexivity is critical in this approach and deepens analysis.	When a researcher is a member of the community or group being studied. Researchers may become participants in their own research, though this is not a universal feature of insider research.	Aburn, G. E., Gott, M., & Hoare, K. (2022). Experiences of an insider researcher–interviewing your own colleagues. *Nurse Researcher*, *30*(1).
Institutional ethnography	A novel methodology through which to generate and analyse data about 'real life' in health professionals education. This methodology aims to map the relationships between different people to explore how activity is mediated or influenced by different institutions. The everyday lives and experiences of people are the starting point for institutional ethnography. The ultimate goal is to trace how such experiences are linked to trans local processes.	A methodology through which to generate and analyse data about 'real life' in health professionals education. This methodology aims to map the relationships between different people to explore how activity is influenced by various institutions.	Kearney, G. P., Corman, M. K., Hart, N. D., Johnston, J. L., & Gormley, G. J. (2019). Why institutional ethnography? Why now? Institutional ethnography in health professions education. *Perspectives on medical education*, *8*(1), 17–24.
Interdisciplinary	Relating to more than one discipline—that is, more than one subject or more than one branch of knowledge. It is suggested by many that medical education is an interdisciplinary field, because it draws on knowledge, ways of thinking and	Relating to more than one discipline. Interdisciplinary fields draw on knowledge and theory, etc. from several different disciplines.	Albert, M., Rowland, P., Friesen, F., & Laberge, S. (2020). Interdisciplinarity in medical education research: myth and reality. *Advances in Health Sciences Education*, *25*(5), 1,243–1,253.

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	research from varied, diverse fields (including, but not limited to, psychology, sociology, philosophy, the humanities). Other scholars suggest that medical education does not go far enough in regard to drawing on theory and knowledge from other disciplines and mainly uses perspectives developed in health research.		
Interpretative description	General or generic qualitative inquiry. Sometimes termed 'qualitative description'. A methodology. Methodologically flexible. Aims to explore and understand a phenomenon, process or experience through the perspectives of those involved. Represents a move away from the jargon of more structured methodologies. Research should concern participants' subjective experiences, and the focus should be external, on experiences or things that are 'out' in the world. Usually selected for pragmatic reasons.	A flexible qualitative methodology whose aim is to describe participants' subjective experiences of external phenomena, processes or experiences.	Cooper S, Endacott R. Generic qualitative research: a design for qualitative research in emergency care?.. Emergency Medicine Journal. 2007;24(12):816–9.
Interpretative phenomenological analysis (IPA)	An approach to data analysis not fully aligned with either a descriptive or interpretative approach to phenomenological analysis. Increasingly popular within clinical education. Whilst IPA draws on both descriptive and interpretative phenomenology, it also integrates concepts from idiography due to its focus on in-depth analysis of single cases and individual perspectives. Consequently, within IPA, researchers focus on detailed analysis of individual cases before making statements about that, which is universal between cases.	Approach to phenomenological analysis that integrates aspects of descriptive and interpretative approaches with concepts from idiography. Focusses on detailed analysis of individual cases before making universal statements across cases.	Smith, J.A., 2004. Reflecting on the development of interpretative phenomenological analysis and its contribution to qualitative research in psychology. *Qualitative research in psychology*, *1*(1), pp.39–54.
Interpretivism	Interpretivism is a paradigm within which researchers focus on how people make sense of reality. Much qualitative research has roots in interpretivism. Interpretivists view reality as subjective and knowledge as socially constructed.	Paradigm concerned with how people make sense of reality. Most appropriate for qualitative research. Reality is subjective and knowledge socially constructed.	Schwandt T. Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics and social constructism. In: Denzin NK, Lincoln YS, editors. Handbook of qualitative research, 2nd ed. Thousand Oaks, CA: Sage; 2000. p. 189–214.
Iterative	Adopting an iterative approach to research means that researchers do not wait until all their data are collected before they begin this analysis—analysis occurs concurrently with data collection in cycles and informs ongoing collection, e.g., the questions	Data collection and analysis happen at the same time. Analysis informs ongoing data collection in cycles. Most common in grounded theory approaches.	Kekeya J. Analysing qualitative data using an iterative process. Contemporary PNG Studies. 2016 May;24:86–94.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	participants are asked in later interviews, to develop theory. Most common in grounded theory approaches.		
Likert scale	A psychometric scale used commonly in questionnaires. A unidimensional scale, most often used to collect data on participant attitudes, opinions, feelings and habits. Participants are asked to mark their agreement, the frequency of a habit, their interest or perceived importance of some factor (e.g., they might mark their agreement between strongly agree and strongly disagree) on a scale that assumes the strength of an attitude is linear. A non-comparative scaling technique. Likert scale 'points' (e.g., a 7-point Likert scale) describe the number of options presented to a participant that they are able to choose from to indicate the strength or intensity of their feelings or habits.	Psychometric, unidimensional scale commonly used in questionnaires to collect data on the strength of participant attitudes, opinions, feelings and habits. Non-comparative scaling technique. Assumes the strength of an attitude is linear.	Sullivan, G. M., & Artino Jr, A. R. (2013). Analysing and interpreting data from Likert-type scales. *Journal of graduate medical education*, *5*(4), 541–542.
Limitations	Flaws or shortcoming characteristics of a study design or methodology that impacts the interpretation of the results or findings. Description of limitations allows readers to make judgements regarding the relevance of a study's findings to their own contexts.	Often described in the discussion section of a paper. A discussion of the flaws or shortcomings of aa study.	Price, J. H., & Murnan, J. (2004). Research limitations and the necessity of reporting them. American journal of health education, 35(2), 66
Linear regression	Can be used to predict how much one variable will change if another is changed. The variable you are interested in predicting is called the dependent variable; the variable you are using to predict the other variable's value is known as the independent variable. A regression equation may be formed ($y = a + bx$) where y is the variable being calculated, a is the intercept value when $x = 0$, b is the slope/gradient of the line or 'regression coefficient' and x is the second variable.	Can be used to predict how much one variable will change if another is changed. A linear model in that it assumes a linear relationship between the input variables and the single output variable. If there is a single input variable, linear regression is referred to as simple linear regression. If there are multiple input variables, linear regression is referred to as multiple linear regression.	Martin, P. (2022). *Linear Regression: An Introduction to Statistical Models*. Sage.
Love and break up letter methodology (LBM)	Novel approach to qualitative research from User Experience research where participants are asked to write love and break up letters to some aspect of their experience, context or concept. Can be used as a focus group prompt, within questionnaires or as a standalone approach. Particularly useful for exploring the emotional domain of participants' experiences.	Novel qualitative research approach. Involves asking research participant to write love and break up letters to an aspect of their experience, context, or a defined concept.	Laughey, W. F., Brown, M. E., Liu, A., Dueñas, A. N., & Finn, G. M. (2021). Love and breakup letter methodology: A new research technique for medical education. *Medical education*, *55*(7), 818–824.

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TABLE 1 (Continued)

Colour key:	Cross-approach (general)	Mixed methods	
	Qualitative	Quantitative	
Term	Definition	Summary	Foundational text(s)
Mean	A measure of average within a dataset with two or more items. The mean summarises the dataset with a single number which represents the data's central point—i.e., it is a measure of central tendency. It is calculated by adding up all the numbers in a dataset and dividing this total by the number of items.	Measure of average within a dataset. Calculated by dividing the total of all numbers in the dataset by the number of items.	Hayslett, H. T. (2014). *Statistics*. Elsevier.
Median	The middle number in a list of data sorted into ascending or descending numbers. Can be a more descriptive way of indicating central tendency of a dataset than calculating the average of that set. Can be thought of as the 'middle-value' of a dataset, which separates the upper and lower halves of that set. If the number of items in a dataset is even, then the median is the average of the two items in the middle of the dataset.	Middle value of a dataset, when that dataset is sorted sequentially into ascending or descending values. Descriptive way of indicating central tendency.	Manikandan, S. (2011). Measures of central tendency: Median and mode. *Journal of pharmacology and pharmacotherapeutics*, *2*(3), 214.
Member checking	Previously a popular technique for exploring the 'validity' of qualitative data. Has now fallen out of fashion, as it is recognised that qualitative data do not need verifying in order to have importance. Involves sharing either a brief summary of the data/findings or sharing the whole findings with the research participants or another relevant group.	Also known as participant or respondent validation. One of many validation techniques that used to be specified for qualitative research. Has now fallen out of fashion. Advice recommends need for awareness of limitations of this approach, philosophical foundations and to be clear exactly how and why member checking is being used.	Birt L, Scott S, Cavers D, Campbell C, Walter F. Member checking: a tool to enhance trustworthiness or merely a nod to validation? Qualitative health research. 2016 Nov;26 (13):1802-11. https://journals.sagepub.com/doi/full/10.1177/1049732316654870?casa_token=UZPlUKW-8x8AAAAA%3AQkCBe6xxB8YgJWUqPEhw95lEhX89m2WTx2706nTcUF2cljZSr7_LspSH4NAd5orRgr4o-iAOOvo.
Meta-analysis	A quantitative approach to combine similar outcomes from multiple studies	Purpose is to combine similar quantitative outcome data from multiple studies Provides an average effect size with a confidence interval, significance value and estimate of heterogeneity	Cochrane Handbook for Systematic Reviews of Interventions: Analysing data and undertaking meta-analyses
Meta-ethnography	An approach to qualitative literature synthesis. A meta-ethnography differs from other qualitative approaches to synthesising literature as reviewers re-interpret the conceptual data (themes, concepts or metaphors) of primary studies whilst taking into account the primary data (participant quotes) to create higher order themes across all included studies. Meta-ethnographies are particularly useful in regard to developing theory from the literature.	Qualitative literature synthesis, focused on theory creation. Researchers re-interpret empirical and conceptual data of included studies to generate new insights across studies.	Sattar, R., Lawton, R., Panagioti, M., & Johnson, J. (2021). Meta-ethnography in healthcare research: a guide to using a meta-ethnographic approach for literature synthesis. BMC Health Services Research, 21(1), 1–13.

TABLE 1 (Continued)

Colour key:	Cross-approach (general)	Mixed methods	
	Qualitative	Quantitative	
Term	Definition	Summary	Foundational text(s)
Metatheory	The abstract considerations that provide the philosophical underpinnings of a research study. Metatheories are theories about theories, which allow researchers to organise, compare, evaluate and analyse competing bodies of ideas. Metatheories maintain that theory comes from theory—in other words, all theories we use in educational research are themselves based on specific theoretical foundations that make claims regarding the nature of reality, knowledge, etc.	Theories about theories, which provide a way to describe the assumptions inherent to different educational theories regarding the nature of reality and knowledge.	Zhao, S. (1991). Metatheory, metamethod, meta-data-analysis: What, why, and how?. Sociological perspectives, 34(3), 377–390.
Methodological borrowing	Borrowing elements of one qualitative methodology to inform research conducted using another methodology. Enables researchers to draw on specific features of different methodologies to best answer their research question(s).	Intentionally and purposefully borrowing elements of one methodology to direct another methodological approach.	Varpio L, Martimianakis M, Mylopoulos M. Qualitative research methodologies: embracing methodological borrowing, shifting and importing. Researching medical education. In: Cleland J, Durning S, editors. Researching medical education. First ed: Chichester, West Sussex: John Wiley & Sons, Ltd.; 2015.
Methodological slurring	Where researchers confuse and muddle methods within a single piece of research that have different philosophical foundations without acknowledging that this is what they are doing (e.g., are based on different epistemologies). This can make results difficult to interpret and makes answering research questions coherently difficult.	Unintentional and inappropriate combination of methodological approaches. Results from confusion regarding the meta-theoretical foundations of different methodological approaches.	Baker C, Wuest J, Stern PN. Method slurring: the grounded theory/phenomenology example. Journal of Advanced Nursing. 1992. 17(11): 1355–1,360.
Methodology	The metatheoretical framework underlying research methods. Distinct named methodological frameworks exist, or the term can be used to describe a more general approach.	Philosophical discussion of background assumptions underlying use of methods of data collection and analysis within a research project. Often conflated with 'methods', but the terms do differ. Examples include grounded theory and interpretative description.	Mackenzie N, Knipe S. Research dilemmas: Paradigms, methods and methodology. Issues in educational research. 2006 Oct;16(2):193–205.
Methods	The details of how a research project is undertaken. Methods describe what is done. Contrast with Methodology, which describes the metatheoretical framework underlying data collection.	Systematic description of how a project was undertaken. Often conflated with 'methodology', but the terms do differ. Description of the strategies, processes and techniques utilised within data collection or analysis.	Mackenzie N, Knipe S. Research dilemmas: Paradigms, methods and methodology. Issues in educational research. 2006 Oct;16(2):193–205.
Mixed-methods	Research designs that use different methods as part of a coherent methodological framework in a single study. Usually a term in reference to combining qualitative and quantitative research methods but not exclusively so.	Research that uses different methods within a single study. Most typically used to refer to a combination of quantitative and qualitative approaches within one study.	Schifferdecker KE, Reed VA. Using mixed methods research in medical education: basic guidelines for researchers. Medical education. 2009 Jul; 43(7):637–44.

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TABLE 1 (Continued)

Colour key:	Cross-approach (general) Qualitative	Mixed methods Quantitative	
Term	Definition	Summary	Foundational text(s)
Mode	The value that appears most often in a dataset. A dataset can have no mode, one mode or multiple modes. A distribution with two modes is known as bimodal. When the mean and median cannot be calculated, the mode is useful for finding the most frequently occurring value and indicating the central tendency or central point of a dataset.	The value that appears most often within a dataset.	Manikandan, S. (2011). Measures of central tendency: Median and mode. *Journal of pharmacology and pharmacotherapeutics*, *2*(3), 214.
Multivariate Analysis	A type of statistical analysis involving the analysis of data involving more than one type of measurement or observation. Describes the relationships between two or more variables. Rather than describing data, the relationships between multivariate measurements and their structures are critical.	Analysis of data involving more than one type of measurement or observation. Focuses on the relationships between measurements and their structures.	Timm, N. H. (Ed.). (2002). *Applied multivariate analysis*. New York, NY: Springer New York.
Narrative research	Though the definition of narrative research is disputed, what unites many definitions is a focus on the stories that research participants tell to explore different and sometimes contradictory layers of meaning at both individual and social levels. Narratives can be oral, written and visual. Narrative is often used to describe broader structures, story to refer to 'little' narratives. Many narratives and stories focus on the experience of time or some type of sequence like a spatial sequence. Transformation is another common topic of focus.	Research that focusses on the stories participants tell. Can be used to explore layers of meaning, contradictions in meaning and different levels of meaning. The terms 'narrative' and 'story' are contested, though narrative is often taken as an overarching storied structure and stories as 'little' narratives.	Culler, J., 1980. Fabula and sjuzhet in the analysis of narrative: Some American discussions. *Poetics Today*, *1*(3), pp.27–37.
Narrative review	A broad and flexible description of previous research. Useful for focusing and summarising broader topics, rather than answering a specific research question. Readers may find the search strategy is non-systematic and inclusion, and exclusion criteria are absent. Authors often use expertise to focus on key issues using a subjective qualitative approach rather than using systematic or meta-analyses.	Flexible. Useful for focusing and summarising broader topics. Readers may find the search strategy is non-systematic, and inclusion and exclusion criteria are absent.	Grant, M. J., & Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. Health information & libraries journal, 26(2), 91–108.
Natural experiment	An observational type of study, where control and experimental variables are not artificially manipulated by researchers (like in randomised control trials). External forces influence data.	Observational study adhering to experimental principles. External forces (experimental variables) are allowed to influence data.	Leatherdale, S.T., 2019. Natural experiment methodology for research: a review of how different methods can support real-world research.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	Natural experiments are distinguished from purely observational studies as they otherwise adhere to the principles of experimental study (e.g., test and control groups).		*International Journal of Social Research Methodology*, *22*(1), pp.19–35.
Naturalistic inquiry	A qualitative research method where the focus is exploring people's lives in context-bound settings, rather than experimental inquiry, which focuses on controlling context. An interpretative type of research. Originally developed in anthropology and sociology. Researchers meet participants where they are (where they live and where they work) to explore their experiences through observations, interviews and other descriptive approaches to data collection. Researchers also draw on their own experiences to inform interpretation. The purpose of naturalistic research is to create rich descriptions of social phenomena that account for context.	Focus is exploring people's lives where they live or where they work to generate rich descriptions of social phenomena.	Guba, E.G., 1979. Naturalistic inquiry. *Improving Human Performance Quarterly*, *8*(4), pp.268–76.
Nominal group technique	Method focussed on generating consensus amongst a group of experts quickly. A structured method for gathering group thoughts that encourages contributions from everyone. Involves facilitating discussion and reaching agreement on the importance of issues, problems or solutions. The group starts by collating ideas silently, then ideas are presented and discussed as a group and ranked.	Method whose aim is to generate consensus within group discussion. Group prioritises issues, problems or solutions to or on a topic of interest.	Harvey, N., & Holmes, C. A. (2012). Nominal group technique: an effective method for obtaining group consensus. International journal of nursing practice, 18(2), 188–194.
Non-parametric tests	A classification of statistical procedures. Non-parametric tests, in opposition to parametric tests, do not make assumptions about the shape or 'parameters' of population distribution. Non-parametric tests include Mann-Whitney U (for unpaired data), Wilcoxon signed-rank test (for paired data), the chi-squared test (used to compare proportions or percentages) and Spearman's rank test (correlation).	Non-parametric statistical tests do not make assumptions about the shape or 'parameters' of population distribution.	Sheskin, D. J. (2003). *Handbook of parametric and nonparametric statistical procedures*. Chapman and Hall/CRC.
Normalisation process theory	Approach to studying implementation. Focuses on identifying, describing and explaining mechanisms and processes that promote or inhibit the incorporation of interventions or innovations into	Methodology for studying implementation of complex interventions and making recommendations for improving uptake or integration into routine practice.	Murray, E., Treweek, S., Pope, C., MacFarlane, A., Ballini, L., Dowrick, C., … & May, C. (2010). Normalisation process theory: a framework for

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	usual practice. Studies complex interventions and asks 'what is the work?', 'who does the work?', 'how does the work get done?' and 'how is the work understood?', to generate understanding of how an intervention is or is not adopted into routine practice by a team.		developing, evaluating and implementing complex interventions. *BMC medicine*, *8*(1), 1–11
Null hypothesis	Sometimes depicted as H0, a statement that two approaches (e.g., two treatments) are equally effective. E.g., this new approach to education is no more effective than the current approach in use.	A statement that two approaches are equally effective. H0.	Toledo, A.H., Flikkema, R. and Toledo-Pereyra, L.H., 2011. Developing the research hypothesis. *Journal of Investigative Surgery*, *24*(5), pp.191–194.
Objectivity	The idea that a researcher can comprehend something about the real world as it truly exists, that there is a reality independent of the researcher that can be grasped. This view leads to the belief that researchers, scientific methods, design and analysis should not be influenced by any particular perspectives or judgements and should try to remain as neutral as possible to generate accurate results. The concept of bias within research finds its home here.	•Research and researchers should remain neutral to create results that accurately reflect the world as it truly exists.	Ratner, C., 2002, September. Subjectivity and objectivity in qualitative methodology. In Forum Qualitative Sozialforschung/Forum: Qualitative Social Research (Vol. 3, No. 3).
Observation	Observational research involves observing participants and social or interactional phenomena in natural settings (i.e., not within a lab and not within a structured, created environment like a focus group). This offers a different perspective on participants and their lives, as researchers can explore how they make decisions and react to certain situations in their natural environments.	Involves observing participants and phenomena in natural settings, rather than in structured environments like a focus group setting. Offers insight into how participants' natural settings influence their decision making processes and the ways in which they react to events or interactions.	Baker, L., 2006. Observation: A complex research method. *Library trends*, *55*(1), pp.171–189.
Ontology	The nature of reality—the extent and way in which an entity or object of study 'exists'	Asks philosophical questions about the nature of reality. Part of selecting an appropriate paradigm for your research that will guide methodological and methods selection. Important to reflect on your position prior to beginning research.	Varpio L, Ajjawi R, Monrouxe LV, O'Brien BC, Rees CE. Shedding the cobra effect: problematising thematic emergence, triangulation, saturation and member checking. Medical education. 2017 Jan;51(1): 40–50.
Outcomes evaluation	A type of evaluation that focusses on outcomes—this type of evaluation tells you whether a programme or intervention achieved its goals.	Approach to evaluation that focusses on results or outcomes. Assesses whether a programme or intervention achieved its goals.	Allen, L. M., Hay, M., & Palermo, C. (2022). Evaluation in health professions education—Is measuring outcomes enough?. Medical Education, 56(1), 127–136.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
P-value	The probability of obtaining a result by chance that is as least as extreme as the one that was actually observed, assuming that the null hypothesis is true. $p > 0.05$ is not statistically significant (as this means there is a more than 5% chance that the result could be due to chance alone, which is held to be too great).	Likelihood that the observed result is due to chance. $p > 0.05$ is not statistically significant.	Peck, R., Olsen, C., & Devore, J. L. (2015). *Introduction to statistics and data analysis*. Cengage Learning. Springer.
Paired data	Comes from a single group of participants, e.g., measurement before and after an intervention, whereas unpaired data come from two groups, e.g., receiving different interventions	Comes from a single group of participants.	Peck, R., Olsen, C., & Devore, J. L. (2015). *Introduction to statistics and data analysis*. Cengage Learning. Springer.
Paradigm	A metatheoretical 'wrapper' that brings together axiology, epistemology, ontology and methodology. Sometimes used synonymously with methodology, sometimes with theoretical framework, though these terms all differ and 'paradigm' is a distinct entity. It describes the overall worldview of a piece of research. Coherence between axiology, epistemology, ontology and methodology within a study is essential to research rigour.	A set of common beliefs about research—a shared worldview. Guides decisions regarding methodology and methods. Clear consideration of one's paradigm helps ensure research rigour and assists researchers in answering their research questions in a coherent way.	Brown, M. E., & Dueñas, A. N. (2020). A medical science educator's guide to selecting a research paradigm: building a basis for better research. *Medical Science Educator*, *30*(1), 545–553.
Parametric tests	A classification of statistical procedures. Parametric tests are based on assumptions about the distribution of the population from which a sample is taken. The most common assumption that parametric tests make is that data are normally distributed into a 'bell-shaped' curve. Parametric tests include student's t-tests and Pearson's product moment coefficient.	Parametric statistical tests are based on assumptions about the distribution of the population from which a sample is taken.	Sheskin, D. J. (2003). *Handbook of parametric and nonparametric statistical procedures*. Chapman and Hall/CRC.
Patient and public involvement (PPI)	Meaningful inclusion and engagement with patients and the public throughout the process of a research project. Research is conducted with patients, rather than about, or to, them. Patient and public views should be sought and integrated during research project design, management, implementation and dissemination. Now an expected component of clinical education research from many funding bodies.	Involving patients and/or members of the public throughout research planning, design, implementation and dissemination. A way of co-producing clinical education research with its most central stakeholders.	Boivin, A., Richards, T., Forsythe, L., Grégoire, A., L'Espérance, A., Abelson, J., & Carman, K. L. (2018). Evaluating patient and public involvement in research. *Bmj*, *363*.

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
Pedagogy	The method and practice of teaching. Concerns the theory of education and how education influences the growth of learners. Where education is the 'what', pedagogy is the 'how'.	Often confused with education but a distinct term. Concerns the theory and practice of teaching. Education is the 'what', pedagogy is the 'how'.	McLeod PJ, Steinert Y, Meagher T, McLeod A. The ABCs of pedagogy for clinical teachers. Medical education. 2003 Jul;37(7):638–44.
Pen portrait analytic process (PPAP)	The Pen Portrait Analytic Process (PPAP) is an analytic technique from the field of applied health research that provides a way to synthesise large quantities of longitudinal qualitative data into a more manageable format. Derived from the summary mapping tool, 'pen portraits' are short documents that capture the brief history of a case. Constructed chronologically, condense and highlight key topics, circumstances and developments in the life of an individual or collective.	Analytic technique within longitudinal qualitative research. Researchers create 'pen portraits' for participant journeys or cases (short written summary documents) to manage data. Pen portrait creation can be analytic in that the design of the pen portrait can be informed by one's research question or focus.	Sheard L, Marsh C. How to analyse longitudinal data from multiple sources in qualitative health research: the pen portrait analytic technique. BMC medical research methodology. 2019 Dec;19(1):1–0.
Phenomenography	A qualitative research methodology that aims to identify the qualitatively different ways in which different people or groups of people experience, conceptualise, perceive and understand various kinds of phenomena. Distinct to phenomenology (where phenomenology explores the phenomenon itself, phenomenography is most concerned with conceptions of that phenomenon). Developed within education.	Involves identifying the different ways in which people experience and discuss phenomena. Often conflated with, but different than, phenomenology.	Marton, F. (1986). Phenomenography—a research approach to investigating different understandings of reality. Journal of thought, 28–49
Phenomenology	An in-depth way of studying human experiences. It is both a philosophy and method to explore individuals' lived experience—we discuss it here as an approach to qualitative analysis. Involves in-depth data collection and analysis with small, homogenous samples of participants. May be descriptive (focussed on describing a phenomenon) or interpretative (focussed on examining the meaning of human experience/the meaning inherent to how humans experience a phenomenon).	Both a philosophy and a method, discussed here as a method to qualitative research. Examines lived experience of individuals to either describe a phenomena of interest in-depth or explore the meaning of the way in which people experience a phenomena.	Neubauer BE, Witkop CT, Varpio L. How phenomenology can help us learn from the experiences of others. Perspectives on medical education. 2019 Apr;8(2):90.

TABLE 1 (Continued)

Colour key:	Cross-approach (general) Qualitative	Mixed methods Quantitative	
Term	Definition	Summary	Foundational text(s)
Pilot study	A pilot study is often conducted as the first step of an entire research protocol. It usually involves running a smaller-sized study, assisting in planning and modification of the main study. Data collection tools may be trialled, and modifications made depending on participant understanding. Explicit feedback should be sought on data collection tools and processes. Enables researcher familiarity and comfort with research plans and logistical requirements of the study.	Small-scale initial study to test processes and plans for main study.	In, Junyong. "Introduction of a pilot study." *Korean journal of anaesthesiology* 70, no. 6 (2017): 601–605.
Poetic inquiry	The practice of reflecting on or writing poetry to deepen inquiry. A qualitative research method. Poems can be participant-voiced and created from participant data by researchers (or co-created by participants and researchers), researcher-voiced (as a way of reflecting on the process of research) or literature-voiced, as a way of summarising issues or gaps within a literature base.	Novel qualitative research method. Poetry deepens inquiry. Types include participant-voiced, researcher-voiced and literature-voiced poetic inquiry.	Brown, M. E., Kelly, M., & Finn, G. M. (2021). Thoughts that breathe, and words that burn: poetic inquiry within health professions education. *Perspectives on medical education*, *10*(5), 257–264.
Positivism	A paradigm, or worldview, based on the natural sciences. Positivists believe in the existence of an objective reality and that 'truth' can be discovered through rigorous methods of experimentation and observation. In positivist research, researchers concern themselves with maintaining objectivity and neutrality. Most positivist research is quantitative in nature.	Paradigm originating in the natural sciences. There is one objective reality. Humans can know that objective reality through careful experimentation and observation.	Park YS, Konge L, Artino AR. The positivism paradigm of research. Academic Medicine. 2020 May 1;95 (5):690–4.
Post-positivism	A paradigm that builds on the foundations of positivism to suggest that, though there is one objective reality, we can only ever imperfectly know that reality because of the presence of human error in our observations and experiments. Much quantitative research is post-positivist in orientation.	Paradigm building on positivist views. Whilst post-positivists also believe in the existence of an objective reality, they maintain it can only ever be imperfectly known due to human error.	Ryan AB. Post-positivist approaches to research. Researching and Writing your Thesis: a guide for postgraduate students. 2006:12–26.
Pragmatism	Pragmatism is a paradigm that focuses on research outcomes. It does not place value on considering the ontology or epistemology of one's approach, instead focussing on what works in practice to answer research questions of interest.	Paradigm that focuses on research outcomes. Unlike other paradigms, ontology and epistemology are not explicitly considered. Most concerned with what works in practice to answer research questions of interest.	Morgan DL. Pragmatism as a paradigm for social research. Qualitative inquiry. 2014 Oct; 20(8):1045–53.

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
Probability distribution	A probability distribution is the mathematical function that gives the probabilities of occurrence of different possible outcomes for an experiment. Probability distributions are usually displayed in graphs and tables. 'Normal distribution' is a probability distribution that describes a symmetrical plot of data around a mean value, with the width of the curve defined by the standard deviation of the dataset.	Gives the probabilities of occurrence of different possible outcomes for an experiment. Normal distribution is a type of probability distribution.	Probability and statistics e-book. Available online: http://wiki.stat.ucla.edu/socr/index.php/Probability_and_statistics_Ebook
Process evaluation	A process evaluation is a means of assessing a complex intervention that is itself an attempt to solve a problem, in a structured and consistent way. Process evaluations tell you how and why a programme or intervention did or did not achieve their goals.	Relies on 3 fundamental pillars •Implementation—what was done and how? •Mechanisms—how did it lead to change? •Context—how does the context of the intervention affect the outcomes?	*Moore, G., Audrey, S., Barker, M., Bond, L., Bonell, C., Hardeman, W., Moore, L., O'Cathain, A., Tinati, T., Wight, D. and Baird, J., 2015. Process evaluation of complex interventions: Medical Research Council guidance. BMJ, 350(mar19 6), pp.h1258-h1258.*
Pseudonym	A fictitious name. Used in some qualitative research instead of participant numbers to identify participants, with the intent of humanising data. Names selected should not be actual participant names or lead to identification of participants. Some researchers assign participants pseudonyms; others allow participants to choose their own pseudonyms. It is important to be cognisant of the cultural roots and origins of names and try to attend to these when choosing and using pseudonyms.	A fictitious name used in some types of qualitative research to identify participants.	Allen, R. E., & Wiles, J. L. (2016). A rose by any other name: Participants choosing research pseudonyms. *Qualitative Research in Psychology*, *13*(2), 149–165.
Publication bias	Failure to publish or include results from valid studies, often because they show a negative or uninteresting result. Important in meta-analyses and systematic reviews where studies showing negative results may be excluded.	Failure to publish or include results from valid studies, often because they show a negative or uninteresting result.	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550
Purposive sampling	Also known as deliberate sampling. A non-probability sampling technique. The researcher selects which characteristics they would like their sample to have. Common approach in qualitative research when researchers are looking to explore a phenomenon of interest within a particular population (e.g., medical students making the transition to practice as new doctors—this would	Researchers select a sample from the overall population based on their own thought or judgements.	Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, *5*(1), 1–4.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	be a form of homogenous purposive sampling). Umbrella term for various techniques including maximum variation sampling, homogenous sampling, typical case sampling, extreme case sampling, critical case sampling, total population sampling and expert sampling.		
Qualitative	Data that are usually represented textually, visually or as audio and methods for analysing that data. Qualitative research data may include, for example, audio data of individual or group interviews, textual data from transcribed interviews and written researcher field notes made during interviews or the process of analysis.	Data represented textually, visually or using audio. Non-numerical data. There are many types of qualitative research and qualitative data.	Cristancho SM, Goldszmidt M, Lingard L, Watling C. Qualitative research essentials for medical education. Singapore medical journal. 2018; 59(12):622.
Quantitative	Data that are represented numerically. Quantitative research focusses on collecting and analysing numerical data. There are four main types of quantitative research: descriptive, correlational, causal-comparative/quasi-experimental and experimental research.	Data represented numerically. Involves collection and analysis of numerical data. There are four main types of quantitative research.	Norman G, Eva KW. Quantitative research methods in medical education. Understanding medical education. Oxford, UK: Wiley-Blackwell. 2010 Jul 30:301–22.
Questionnaire	A research instrument or tool used for collecting information from individuals. It contains a series of questions relating to the research aims, as well as questions about the individuals completing the questionnaires.	Used for collecting information from individuals to address the research aims. Can be in paper form, electronic form or via a computer-based programme, such as Survey Monkey or Qualtrics. Individuals (or groups) can complete the questionnaires by themselves or with the help of someone else (usually the researcher). The questions may have responses that are numerical (numbers) or textual (words) or both.	Check J., Schutt R. K. Survey research. In: J. Check, R. K. Schutt., editors. Research methods in education. Thousand Oaks, CA:: Sage Publications; 2012. pp. 159–185
Range	The difference between the highest and lowest values in a dataset. Simple measure of variability within a large dataset.	The difference between the highest and lowest values in a dataset.	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550
Rapid review	A simplified systematic approach to synthesise knowledge in a short period of time	Steps of a systematic review are often streamlined or omitted. This may include: Limiting inclusion criteria such as not reviewing grey-literature and limiting years search A single reviewer for selection and data extraction A descriptive summary of findings rather than meta-analyses	Cochrane Rapid Reviews: Interim Guidance from the Cochrane Rapid Reviews Methods Group

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
Realism	As an ontology, the belief that a reality exists independent of the perceptions of humans—this involves the presumption of an objective reality. As an approach to research, realism involves exploring why complex interventions work by examining contexts, mechanisms and outcomes of interventions.	Both an ontology and approach to research. Realist ontologies maintain an objective reality exists independent to the perceptions of humans. Realist approaches to research explore why complex interventions work.	Ellaway RH, Kehoe A, Illing J. Critical realism and realist inquiry in medical education. Academic Medicine. 2020 Jul 1;95(7):984–8.
Realist review	A theory-orientated and explanatory approach to evidence synthesis. It interrogates the literature to understand how an intervention produces its effects, i.e., to explain what works, for whom, in what circumstances, in what respects and why. A core element of a realist review is the development of a programme theory of how an intervention is supposed to work.	It interrogates the literature to understand how an intervention produces its effects, i.e., to explain what works, for whom, in what circumstances, in what respects and why. A core element of a realist review is the development of a programme theory of how an intervention is supposed to work. A realist review adopts a generative approach to causation: to suggest a causal outcome (O) between two events (x and y), we need to understand the underlying mechanism (M) that links them and the context (C) in which the relationship occurs.	RAMESES publication standards: realist syntheses RAMESES Training Materials
Recall bias	Errors in the accuracy of recollection of study participants. Issue when there are differences in recollection between groups. May be influenced by whether or not study group has outcome of interest.	Difference in the accuracy of recollection of study participants, possibly due to whether they have the outcome of interest or not.	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550
Reflexivity	Critical reflection on what has been thought and done in a qualitative research project. Can be done individually or in groups. Involves recognising, sometimes challenging and sometimes embracing previous experiences, assumptions and values.	Critical reflection on own experiences and position. Individually and/or in groups. Adds depth to data analysis and ensures transparency for readers.	Ramani S, Könings KD, Mann K, van der Vleuten CP. A Guide to Reflexivity for Qualitative Researchers in Education. Academic medicine: journal of the Association of American Medical Colleges. 2018 Aug 1;93(8):1257-.
Relativism	A philosophical term that refers to the position that there is no universal absolute truth—everything is relative to some stance or frame of an individual mind. Reality also depends on the perspective and stance of different people.	Philosophical term, most often used to describe an individual's epistemological beliefs. There is no universal truth—everything is relative to the stance of an individual.	Hirani SA, Richter S, Salami BO. Realism and relativism in the development of nursing as a discipline. Advances in Nursing Science. 2018 Apr 1;41 (2):137–44.

TABLE 1 (Continued)

Colour key:	Cross-approach (general) Qualitative	Mixed methods Quantitative	
Term	**Definition**	**Summary**	**Foundational text(s)**
Research aim	A statement referring to the overall goal or purpose of a research project. May be quite brief. Acts as a focal point for research and used to orientate readers and researchers to a study's intended purpose. Emphasises what needs to be achieved through a research project and can be used to reflect on achievement at the end of a research project.	The overall goal or purpose of a project. A focal point for research design and evaluating achievement.	Doody, O., & Bailey, M. E. (2016). Setting a research question, aim and objective. *Nurse researcher*, *23*(4).
Research approach	The plan and procedures for research that include broad assumptions to detailed methods of data collection, analysis and interpretation	Informed by the nature of a research question 3 approaches to research: quantitative, qualitative and mixed-methods	Creswell JW. The selection of a research approach. Research design: Qualitative, quantitative, and mixed methods approaches. 2014:3–24.
Research diary	A written account kept by each researcher within a research team of that researcher's activities, thoughts and feelings throughout the research project. Useful across different types of research, particularly within qualitative research. A research diary should be kept throughout research design, data collection, analysis, writing and presenting of research. It is an important way of enhancing researcher reflexivity (sometimes referred to as reflexive journaling or a reflexive diary), but is also way of keeping track of decisions made and rationale, and can provide an audit trail when writing up research. Research diaries can also offer a space in which to capture 'fringe thoughts', thoughts that exist on the margins of our mind and may spring forth as a result of any stimuli within our external environment (from music, art, a walk, etc.). Fringe thoughts may seem initially unconnected, but if they can be captured in a research diary can go on to build towards an important analytical thought within data interpretation.	A written record of research activities and a researcher's thoughts and feelings throughout the entire process of research design, implementation and dissemination. Can also be a space for reflecting on the meaning of 'fringe thoughts'.	Burgess, R. G. (1981). Keeping a research diary. *Cambridge Journal of Education*, *11*(1), 75–83. Mills C. The sociological imagination. Oxford: Oxford University Press; 2000.
Research question	Constructing a research question is one of the first methodological steps when undertaking research. A research question should be accurate, clearly defined, answerable and relevant.	The question your research is seeking to answer. Research questions guide research design and methods. They should be clear and relevant. Tools like PICO, SPICE and population/situation exist to	Stone P. Deciding upon and refining a research question. Palliative medicine. 2002 Apr;16(3): 265–7.

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	PICO framework can be used to construct research question. Population: describes the group you are interested in Intervention: says what you are going to do to the group selected Control (if relevant): says what we are to compare the intervention with Outcome: measures of how effective the intervention has been PICO can be a challenging fit for educational research, particularly qualitative research. Other frameworks include the population/situation tool and SPICE.	help structure questions but are not mandatory to use.	
Rigour	Rigour within research is the degree to what that research has been carried out to a high standard. Rigorously conducted research allows readers to have confidence in reported findings. Rigour involves clearly documenting the process of research and decisions taken. In quantitative research, it might involve validity and reliability. In qualitative research, it might involve reflexivity and use of qualitative methods in a way that befits their underlying philosophical orientation.	Rigour is a way to establish credibility within research. It is the degree to which research, either quantitative or qualitative, is carried out to a high standard.	Allen, M. ed., 2017. *The SAGE encyclopaedia of communication research methods*. SAGE publications.
Sampling	Selecting a group of individuals from the population being studied, to take part in a study. In quantitative research, this group should be representative of the population being studied, so that the results can be applicable to this population. In qualitative research, sampling is to ensure access to a population whose experiences will help answer the research question or questions of interest.	Selecting part (subset) of a population being studied (target population). This subset, called sample, should be representative of the target population in quantitative research or offer access to experiences or phenomena of interest within qualitative research. There are various methods of selecting a sample, and the method used should be carefully considered depending on the purpose of the research, its assumptions and resources available.	Morse, J.M., 1991. Strategies for sampling. *Qualitative nursing research: A contemporary dialogue, 127*, p.145.
Saturation	The endpoint of some approaches to qualitative analysis, where a decision is made that no additional themes are likely to be found. Of late, this term has fallen out of favour and is often replaced by discussions of informational power or theoretical sufficiency.	An increasingly outdated term, with roots in grounded theory. Refers to the point at which researchers decide they have enough data and may cease data collection. Increasingly understood data can never be fully saturated, instead informational power or theoretical sufficiency are discussed to guide discussions regarding when to stop data collection.	Varpio L, Ajjawi R, Monrouxe LV, O'Brien BC, Rees CE. Shedding the cobra effect: problematising thematic emergence, triangulation, saturation and member checking. Medical education. 2017 Jan;51(1): 40–50.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
Scoping review	A systematic approach to identify and map available evidence. Often used as an exploratory method. The review may identify the knowledge available and knowledge gaps, as well as the main concepts and theories available on a topic.	Purpose is to identify and map the available evidence using an systematic approach. Often used as an exploratory method. The review may identify the knowledge available and knowledge gaps, as well as the main concepts and theories available on a topic.	PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation Arksey H, O'Malley L. 2005. Scoping studies: towards a methodological framework. Int J Soc Res. 8(1):19–32
Selection bias	Error in assigning individuals to groups leading to differences that may influence the outcome. The subjects are not representative of the population. Includes sampling bias, where the selected subjects are not representative of the population; volunteer bias, where the volunteers are not representative of the population; and non-responder bias, where the respondents are not representative of the population.	Error in assigning individuals to groups leading to differences that may influence the outcome. Types include sampling bias, volunteer bias and non-responder bias.	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550
Sensitising concept	Sensitising concepts are most commonly associated with constructivist grounded theory, where it is acknowledged that each researcher applies their prior knowledge to analysis (even within inductive studies). Increasingly, the term is used within thematic analysis. Sensitising concepts are identified as relevant throughout the process of inductive research as core concepts that appear inductively and repeatedly within the data are identified. Researchers then undertake a period of theoretical immersion in associated theory and background literature to better conceptualise and understand relevant facets of their data. These insights are applied to the inductive data and may shape the report produced. Varpio et al. refer to this approach to inductive analysis as 'theory-informing inductive data analysis'.	Theoretical concepts, of which a researcher is already familiar with, or becomes familiar with, following identification of inductive data's resonance with a theory or theories. These concepts go on to inform the interpretation or presentation of inductive data analysis.	Varpio, L., Paradis, E., Uijtdehaage, S., & Young, M. (2020). The distinctions between theory, theoretical framework, and conceptual framework. *Academic Medicine*, *95*(7), 989–994.
Snowball sampling	A non-probability sampling technique. Existing research participants recruit further participants to the research study. The sample is said to grow like a rolling snowball. Sometimes known as chain-	Sampling where existing study participants recruit further participants who share relevant characteristics or experiences.	Parker, C., Scott, S., & Geddes, A. (2019). Snowball sampling. *SAGE research methods foundations*.

(Continues)

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	referral sampling, as participants refer their friends, colleagues and acquaintances to the study, and this creates a chain of recruitment. Often used when samples are difficult to access or have traits that are uncommon.		
Stakeholder	An individual, or group of individuals, with an interest or concern in something. In clinical education research, stakeholders are commonly those the research or changes in practice as a result of that research will affect (for example, patients, students/learners) and those that have roles in instigating recommended change (e.g., organisational leaders, employers, funding bodies, regulators, etc.). Stakeholders are increasingly involved in shaping clinical education design, delivery and interpretation through stakeholder analysis (which may involve patient and public involvement or PPI).	An individual, or group of individuals, with an interest or concern in clinical education research.	Deverka, P. A., Lavallee, D. C., Desai, P. J., Esmail, L. C., Ramsey, S. D., Veenstra, D. L., & Tunis, S. R. (2012). Stakeholder participation in comparative effectiveness research: defining a framework for effective engagement. *Journal of comparative effectiveness research*, *1*(2), 181–194.
Standard deviation	The standard deviation is a measure of the amount of variation or dispersion of a set of values. It is calculated as the square root of variance. It indicates how spread out data around the mean value are and allows us to know what is 'normal', i.e., how close data is to the mean. It is also useful in comparing sets of data that may have the same mean but a different range.	Measure of variation in a set of values. The square root of variance.	Lee, D. K., In, J., & Lee, S. (2015). Standard deviation and standard error of the mean. *Korean journal of anaesthesiology*, *68*(3), 220–223.
State of the art review	A state of the art review considers and reflects on the most important and current research in a given area, with the goal of describing the 'state of the art' at the present time. It may be used to highlight where deficits in knowledge exist or to guide new research questions.	Considers and reflects contemporary research in a given area at a specific point in time. Can guide further research.	Grant, M. J., & Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. Health information & libraries journal, 26(2), 91–108.
Statistical power	The probability of correctly rejecting the null hypothesis when it is false, i.e., detecting a statistically significant difference between two approaches or interventions. Power can be increased by increasing sample size. The power of a study is equal to 1 minus the probability of a type 2 error.	The probability of correctly rejecting the null hypothesis when it is false. Can be increased by increasing sample size.	Peck, R., Olsen, C., & Devore, J. L. (2015). *Introduction to statistics and data analysis*. Cengage Learning. Springer.

TABLE 1 (Continued)

Colour key:	Cross-approach (general)	Mixed methods	
	Qualitative	Quantitative	
Term	Definition	Summary	Foundational text(s)
Subjectivity	The way in which a researcher's questions or activities are influenced by the researcher's thoughts, perceptions, biases and social experiences. This position is embraced within qualitative research, where the philosophical foundations of the approach are such that it is acknowledged no one, universal reality (or way of knowing that reality) exists. Researchers should consistently engage in discussions concerning reflexivity to add depth to their approach and acknowledge the ways in which their own thoughts and experiences may be shaping analysis and interpretation. This enhances the transferability of research.	Research and researchers cannot remain neutral and must embrace their unique perspectives to add depth to their study. Making these perspectives, and how they have informed the study clear within reflexivity discussions and statements is critical.	Allen, M. ed., 2017. *The SAGE encyclopaedia of communication research methods*. SAGE publications.
Survey	A research method that uses questionnaires to collect information (facts, opinions, feelings) from a group of individuals by asking them a number of questions. This can be done using quantitative methods (e.g., questionnaires with numerical data) or qualitative methods (e.g., using open-ended questions) or both.	Involves collecting information from a sample of individuals. This sample is a subset of the population that is being studied; the goal is to make the sample representative of the population being studies. Information is usually collected using questionnaires (containing numerical or textual data or both) or interviews.	Check J., Schutt R. K. Survey research. In: J. Check, R. K. Schutt., editors. Research methods in education. Thousand Oaks, CA:: Sage Publications; 2012. pp. 159–185
Systematic review	Answers a specific question through a comprehensive synthesis of available studies, using a prospective protocol to identify and select studies and analyse outcomes.	Purpose is to answer a focused research question A transparent strategy is used, and this consists of a pre-registered protocol that pre-defines all steps of the methodology that will be used Studies are identified through a literature search across multiple research databases using the same search terms Clearly defined inclusion and exclusion criteria are used to select studies Chosen outcomes are extracted using a proforma, and data are analysed according to the protocol Quality of studies is assessed using risk of bias tools	Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71 Systematic reviews in medical education: a practical approach: AMEE guide 94
Template analysis	Involves development of a coding template to analyse qualitative data, where themes identified by the research team as important are summarised and applied to the entire dataset. Similar to framework analysis but represents a distinct approach to analysis. Template analysis is more concerned with hierarchy and structure within coding—there are	Often used interchangeably with framework analysis, but the terms do differ. Template analysis involves the creation of a coding template from analysis of study data, which involves themes within a coding hierarchy (broad and more specific themes). The coding template is then applied to all data to classify them within agreed upon themes.	King, N. (2012). Doing template analysis. *Qualitative organizational research: Core methods and current challenges*, *426*(10.4135), 9,781,526,435,620.

(Continues)

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	broad themes and specific themes within the coding template. Creation of the coding template usually begins with analysis of data; the template is modified and once agreed upon, applied to all data.		
Thematic analysis	An approach to qualitative analysis that seeks to identify higher level, abstracted meaning. Whilst often inductive, or driven by the data, it can also be deductive or driven by prior theoretical knowledge. It is used to describe a multitude of approaches and the distinct analytical approach known as 'reflexive thematic analysis'.	A form of analysis within qualitative research. It emphasises identifying, analysing and interpreting patterns of meaning within qualitative data. The distinct approach of reflexive thematic analysis was developed by Braun & Clark, though thematic analysis predates their formalisation of the analytic method.	Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77–101.
Theme	An element of qualitative analysis that represents a higher level, more abstracted level of meaning derived from data. Themes represent patterns of meaning within data or between codes. Themes can be latent or semantic. Semantic themes represent surface level connections between codes, whereas latent themes reflect deeper underlying connection.	Common to many qualitative analyses. Abstract patterns of meaning that connect and make sense of codes. Can be semantic or latent.	Kiger ME, Varpio L. Thematic analysis of qualitative data: AMEE Guide No. 131. Medical teacher. 2020 Aug 2;42(8):846–54.
Theoretical framework	Theoretical frameworks are developed by researchers to structure their study—including their analysis and discussion. Theoretical frameworks connect sets of concepts from one or more theories to what has been done within one's research. Theory can be used at many different points within a study; there is no one right way, but clarity when describing one's approach is key. Theory can be used deductively, where a study tests a theory or some aspect of a theory and inductively, where theory is approached at a later stage within analysis to inform data interpretation and the study discussion.	Connect sets of concepts from one or more theories, or use an established theory, to structure a study. Often conflated with the term 'conceptual framework', though the terms differ.	Varpio L, Paradis E, Uijtdehaage S, Young M. The distinctions between theory, theoretical framework, and conceptual framework. Academic Medicine. 2020 Jul 1;95(7):989–94.
Theoretical sampling	Sampling used when the aim of research is theory creation. Critical to grounded theory approaches. Data collection and analysis occur concurrently, and analysis informs subsequent recruitment and data collection. New participants may be recruited to add depth or detail to an underdeveloped area of theory or an experience within that theory that has not yet been adequately explored.	Technique in grounded theory studies used to generate additional data on underdeveloped concepts within a theory. Iterative analysis informs recruitment and data collection.	Glaser, B. G., & Strauss, A. L. (2017). Theoretical sampling. In *Sociological methods* (pp. 105–114). Routledge.

TABLE 1 (Continued)

Colour key:	Cross-approach (general) Qualitative	Mixed methods Quantitative	
Term	**Definition**	**Summary**	**Foundational text(s)**
Theoretical sufficiency	The point at which adequate data have been collected to generate a theory to explain connections in the data or answer one's research question. A popular alternative to 'Saturation', as theoretical sufficiency recognises that data can never be fully saturated—it will always offer something new—but can be sufficient to generate an explanatory theory. Can be a helpful concept to reflect upon when deciding when to cease qualitative data collection. Most commonly used in approaches whose aim is theory generation, e.g., grounded theory.	The point at which adequate data have been collected to generate a theory to answer one's research question. Alternative to saturation. Can be reflected upon as a guide for when data collection can cease.	Dey I. (1999). *Grounding grounded theory*. Academic Press.
Theory	A grouping of related concepts with explanatory power. Theory is what helps us to make sense of what happens in the world using abstract ideas. Social theorists distinguish between grand theory and middle range theory—grand theory is broad, providing a framework for structuring idea; whereas middle-range theory addresses more narrowly defined phenomena, they are more specific.	Theories group related concepts to explain a phenomena or experience. Some distinguish between grand theory and middle-range theory.	Varpio L, Paradis E, Uijtdehaage S, Young M. The distinctions between theory, theoretical framework, and conceptual framework. Academic Medicine. 2020 Jul 1;95(7):989–94.
Thick description	Rich detail within a qualitative study and its associated outputs that enable readers to judge whether a piece of work is transferable to their own local context and experience. There is no single answer to what makes a thick description rich or thick. Thick descriptions of context might include rich descriptive accounts of study data—e.g., information regarding the setting of a study, sample, participant demographics and exact data collection processes. Considering the paradigm from which one's work was conducted, and author reflexivity, is also important. It is important to note that thick descriptions concern more than just context—they also involve detailed exploration of the phenomenon under study.	Rich detail within a qualitative study (of context and of a phenomenon under study) that allows a reader to make a decision regarding whether or not that work is transferable to their own context or work.	Guba EG, Lincoln YS. Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (pp. 191–215). Sage Publications Ltd.
Transcript	A written account of spoken words. It is produced by typing out verbatim (word-for-word) what was said during focus groups or interviews—this is known as transcription. The transcript is checked against the recorded speech and then analysed.	Researchers can produce a transcript by listening to spoken words and typing it out word-for-word. There are notation conventions that it is helpful to adhere to. Can be done by the researcher, or a private transcription company, using transcription	Davidson, C., 2009. Transcription: Imperatives for qualitative research. *International journal of qualitative methods*, *8*(2), pp.35–52.

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TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
		software or apps. Transcribing data manually (i.e., yourself) can foster immersion in one's data but takes time. The transcript should be checked against the recorded speech to correct mistakes and punctuation. Some forms of analysis also require the nuances of speech to be added, for example, pauses and urmms.	
Transferability	Transferability is a common marker of research rigour within qualitative research. It concerns applicability to another's context and is a judgement made by the reader of research. Researchers can attend to transferability by offering 'thick descriptions' of the context and relevance of their research.	A qualitative marker of quality or trustworthiness. Concerns applicability of findings beyond the context of a study, but acknowledges differences in local context make generalisability less appropriate for qualitative research. 'Thick descriptions' of research help promote transferability.	Anney VN. Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria.
Triangulation	The process by which the same problem or topic of interest is explored from different perspectives in the same study. Some researchers suggest that this enhances the validity of the study's findings. Increasingly recognised that triangulation is rooted in a positivist paradigm (it assumes that researchers are triangulating around a fixed truth point), and so is less appropriate for interpretivist qualitative research. An alternative way of attending to quality and exploration within qualitative research is through the concept of crystallisation.	The same topic of interest is explored from different perspectives. Different stakeholders involved. For some, this enhances perceived validity of findings. •Increasingly understood as incompatible with interpretivist qualitative research.	Heale R, Forbes D. Understanding triangulation in research. Evidence-based nursing. 2013 Oct 1; 16(4):98-.
Type 1 error	A type of error that can occur when testing the null hypothesis in a study. The null hypothesis is rejected when it is true. In other words, the study shows a difference between two interventions when, actually, neither is better than the other. A type 1 error may also be known as a false positive. This type of error is not affected by sample size and is increased by an increased number of end-points (more likely that one will occur by chance). The probability of making a type 1 error is sometimes called alpha.	A false positive—the null hypothesis is rejected when it is true. Sometimes called alpha.	McKillup, S. (2011). *Statistics explained: An introductory guide for life scientists*. Cambridge University Press.
Type 2 error	A type of error that can occur when testing the null hypothesis in a study. The null hypothesis is accepted when it is false. In other words, the study fails to spot the difference between the	A false negative—the null hypothesis is accepted when it is false. Sometimes called beta.	McKillup, S. (2011). *Statistics explained: An introductory guide for life scientists*. Cambridge University Press.

TABLE 1 (Continued)

Colour key: Term	Cross-approach (general) Qualitative Definition	Mixed methods Quantitative Summary	Foundational text(s)
	interventions, when one is actually better than the other. May also be known as a false negative. The risk of this error is reduced by smaller sample sizes. The probability of making a type 2 error is sometimes known as beta.		
UCAT	Stands for University Clinical Aptitude Test (UCAT). Previously known as UKCAT. An admissions test used by some universities to help in selection of students for medical and dental degrees. The aptitude test covers verbal reasoning, decision making, quantitative reasoning, abstract reasoning, and situational judgment. Some universities set thresholds that candidates' UCAT score must exceed to be called to interview.	Aptitude test used by some universities to assist in selection of students for medical and dental school. Stands for University Clinical Aptitude Test.	UCAT website. Available online: https://www.ucat.ac.uk/
UKMED	Stands for UK Medical Education Database. A national database for collating data on the characteristics and performance of UK medical students and doctors-in-training across the continuum of medical education. Applications can be made to UKMED to request data for quantitative study. UKMED links undergraduate and postgraduate data within its database. Applications to request data can be made twice a year.	A national database for collating data on the characteristics and performance of UK medical students and doctors. Stands for UK Medical Education Database.	UKMED website. Available online: https://www.ukmed.ac.uk/
UKMLA	Stands for UK Medical Licensing Exam. Planned for introduction in 2024, to be sat at the end of medical school training. Will be necessary for all doctors who wish to practice medicine within the UK. A two-part assessment, consisting of an applied knowledge test (AKT) and a clinical and professional skills assessment (CPSA). Will replace PLAB (Professional and Linguistics Assessments Board test) for international medical graduates.	National medical licencing exam, due for introduction in the UK from 2024 onwards. Stands for UK Medical Licensing Exam.	UKMLA website, available online: https://www.ukmla.info/. Sharma P, Alsaffarini K. Preparation for practice and the arguments for standardisation in view of the forthcoming medical licensing exam: A literature review.. Medical teacher. 2020; 42(4):451–6.
Univariate analysis	The analysis has only one (uni) variable. Involves describing and finding patterns in data. It does not usually investigate causation or relationships.	Analysis of only one variable. Usually involves describing data and finding patterns.	Huberty, C. J., & Morris, J. D. (1992). Multivariate analysis versus multiple univariate analyses.

(Continues)

TABLE 1 (Continued)

Colour key:	Cross-approach (general) Qualitative	Mixed methods Quantitative	
Term	**Definition**	**Summary**	**Foundational text(s)**
Validity	The state of being true, well-grounded, logical and meaningful. Validity concerns the extent to which a concept is accurately measured within a study.	The extent to which a concept is accurately measured within a study.	Cypress, B., 2017. Rigor or Reliability and Validity in Qualitative Research. Dimensions of Critical Care Nursing, 36(4), pp.253–263.
Variable	A variable is that which you are trying to measure in some way within a quantitative study. It may be a person, place, thing or phenomenon. Variables can be dependent or independent. A dependent variable depends on other factors that are measured and are expected to change as a result of any experimental manipulation of independent variables. Independent variables are stable and unaffected by other variables; they are the variable that researchers change or intentionally manipulate in an experiment.	What is measured within a quantitative study. Variables can be people, places, things or phenomena. They can be independent (the variable a researcher changes) or dependent (variable affected by change in the independent variable).	Flannelly, L. T., Flannelly, K. J., & Jankowski, K. R. (2014). Independent, dependent, and other variables in healthcare and chaplaincy research. *Journal of health care chaplaincy*, *20*(4), 161–170.
Variance	The average of the squared differences from the mean. Used to calculate standard deviation of a dataset. Variance gives a broad idea of spread within a dataset, whereas standard deviation provides exact distances from the mean.	The average of the squared differences from the mean. Measure of spread within a dataset.	Online statistics book. Available online: http://pcool.dyndns.org:8080/statsbook/?page_id=550

5 | HOW WE DEVELOPED THE GLOSSARY OF TERMS

The development of this glossary was a fundamental activity of the Incubator for ClinEdR, a National Institute for Health Research (NIHR) initiative in the United Kingdom to develop ClinEdR as an academic field and enhance the impact of the work done within the field.[1] The Incubator has a critical mass of researchers who work in the field of clinical education, basic sciences, clinical sciences and within intersecting interdisciplinary fields such as sociology, psychology and philosophy. The structure of the incubator comprises separate workstreams overseen by an executive committee.

Expert panellists who reviewed the terms within the glossary were drawn from across Incubator workstreams and the larger Incubator advisory group. The expert panel who reviewed items was drawn from a diverse range of health professions backgrounds, academic disciplines and methodological expertise. The members were from the United Kingdom and Republic of Ireland, and at the time of submission included 72 members.

As the glossary was part of the NIHR ClinEdR activity, and the imagery will be disseminated through that route, we have used the term Clinical Education. The terms 'health professions education', 'clinical education' and 'medical professions education' are often used interchangeably within our field, our glossary it fit for purpose across all these disciplines. The glossary was developed within the context of the United Kingdom, and thus, some terms may be UK-centric.

Figure 1 presents a workflow of the development of the glossary of terms. The authors created an initial list of terms, which were categorised by themes and domains, for example 'qualitative research'. This starting position list was then reviewed by the expert panel both asynchronously by email communication and within live online workstream meetings of the Incubator. Through these discussions, terms were added or removed based upon their relevance to the field of ClinEdR. Following this first pass review, the authors populated the glossary with terms, their definitions and foundational papers, working as a small team asynchronously. Once complete, the authors met to discuss the glossary and peer reviewed the terms for accuracy. The completed glossary of terms was presented to the expert panel for final approval—both by email and within online incubator workstream meetings. Finally, the terms were road-tested on social media to our target audience of early career ClinEdR researchers, including graphical representations of the term, and its definition (Figures 2 and 3).

6 | DEFINING ClinEdR TERMINOLOGY: THE GLOSSARY

Table 1 presents the Incubator for ClinEdR glossary; 172 terms are provided, with a definition, a summary and a reference to a foundational paper in the literature that either offers a description or critique of the term or has used the relevant approach.

7 | HOW TO USE THIS ClinEdR GLOSSARY

The glossary of terms we have constructed enables researchers, from novices to those with mastery in the field, to use a common language to discuss ClinEdR throughout the lifespan of a project (from research design, through development, to publication and dissemination).

The development of a glossary has important implications for ClinEdR. It provides a shared understanding of the terms and concepts used in the field, promoting consistency and improving communication. This clarity reduces confusion and misunderstandings, enhancing transparency and the quality of research in ClinEdR. We hope that the glossary can be used by authors to demonstrate the quality of their approach and facilitate comparisons of studies. Additionally, it serves as a valuable educational resource for ClinEdR students and early career practitioners, improving their understanding of the field and challenging common misconceptions across professions and stages of training. We see opportunities to integrate this glossary into educational research methods courses in ClinEdR. We have outlined our recommendations to this end in Table 2, below.

For ClinEdR to become a more impactful field, clarity and rigour in research approaches are crucial. This glossary, which brings together relevant literature and expert opinions on various methodologies, can support these efforts. Names are not arbitrary within a glossary; they are informed by meaning—cultural, personal and

TABLE 2 Suggestions for ways to incorporate this glossary into educational research methods courses.

Recommendation	Description
Introduce glossary in the course syllabus	Include the glossary as a required resource for the course and outline the importance of understanding key terminology in Clinical education research
Assign glossary terms as pre-reading for live sessions in a 'flipped classroom' format	Assign students to select a certain number of glossary terms to research and present in class
Use glossary terms in assignments	Incorporate glossary terms into the language of assignments and/or ask students to define and explore key terms in course assignments
Glossary quiz	Create a quiz based on the glossary to test knowledge of the definitions supplied
Glossary-based discussion	Hold a class discussion based on key glossary terms and (possibly) points of debate identified in the glossary
Guest speaker question and answer session based on key terms in the glossary or conflicts in term definition and use	Invite a guest speaker (an expert in Clinical education research) who is familiar with the terms in the glossary to speak about their use or points of debate/conflict in use

historical meanings within our field. Diversion from this glossary and the shifting of the labels we assign the concepts in this glossary is, of course, acceptable—indeed, we expect diversion that leads to future development in this space. Through critical and reflective use of this glossary, we believe that we can enhance the quality and subsequent impact of ClinEdR, which has important applications to the endeavour of improving patient care.

'What's in a name?'—well, rather a lot.

AUTHOR CONTRIBUTIONS

Gabrielle M Finn: Conceptualization; investigation; writing—original draft; methodology; writing—review and editing; supervision; data curation. **Ben Charmer:** Writing—review and editing; visualization; writing—original draft. **Oliver E. Burton:** Writing—review and editing; visualization; resources. **Aqua Asif:** Visualization; writing—review and editing; resources. **Matthew H. V. Byrne:** Writing—review and editing; investigation; writing—original draft. **Nicola Brennan:** Writing—review and editing; validation. **Megan E. L. Brown:** Writing—original draft; conceptualization; investigation; project administration; visualization; validation; methodology; writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

ETHICAL APPROVAL

The authors have no ethical statement to declare.

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