Research Traditions in Medical Education

The purpose of health professions education research is to develop explanations about the ways healthcare professionals and their trainees teach and learn (Mcmillan, 2015). The explanations are informed by research paradigms. The three main paradigms underlying health professions education research and their adherents' aims in inquiry are introduced in this guide.

Paradigms

Natural and social science research (including education research) is characterised by different broad approaches and styles. These approaches and styles point to different paradigms (Pope & Mays, 2019).

Paradigms are "preferred ways of understanding reality, building knowledge and gathering information about the world" (Tracy, 2013, p.38) and underpin and regulate a scientific inquiry.

Each paradigm belies the researcher's assumptions about reality (ontology) and knowledge (epistemology), which in turn influence their conceptualisation of their research problem and their approach to conducting research. Ultimately, these underlying assumptions make up a researcher's philosophical worldview and shape her/his contribution towards knowledge construction in a discipline (Bunniss & Kelly, 2010). We explain briefly what these assumptions are:

Ontology: Theory of the view on reality. What is the nature of physical and social reality? (Bergman, deFeijter, Framback et al., 2012).

Epistemology: Theory of knowledge. What are the origins, nature and limits of knowledge about reality? (Bergman et al., 2012). How do we create knowledge?

Methodology: Strategic approach to answer the research question and to gain knowledge. Informs the research design.

Figure 1: The ontological and epistemological views underlying a paradigm shape an investigator's question and approach to research

Ontology → Epistemology → Paradigm → Methodology → Methods

Methods: How do we collect data? Quantitative and qualitative methods may be used in most paradigms. In medical education, the three commonly held paradigms and the aims of inquiry are:

(Post-)positivist paradigm

In the **(post-)positivist** paradigms, natural sciences methods are applied to understand social phenomena.

A **positivist** researcher assumes that there is a single true reality out there in the world which is completely knowable (Tracy, 2013).

Aim: Positivists seek to build tangible knowledge. So they conduct research where they observe, measure and predict empirical phenomena that reflect reality.

Post-positivists too believe that a single material reality exists. However, to them, this reality is not perfectly knowable. Researchers are human and their methods are inherently biased and limited (Tracy, 2013). The conclusions about a phenomenon can change with more data, and we can never prove the research results in a definite sense. Eg. Hodges & McIlory's (2003) assessment of the construct validity of analytic global OSCE ratings.

Aim: Like positivists, post-positivists seeks to measure, predict and control empirical phenomena. Conclusions should be generalizable, reliable and reflect reality (Tracy, 2013). The researcher comes up with a hypothesis based on what is known about a topic, and the hypothesis drives the process of gathering data to test the theory.

Interpretivist paradigm

In the **interpretivist** paradigm – also termed constructivist – reality is not something out there which the researcher can clearly explain, describe or translate into a research report (Tracy, 2013). Reality and knowledge are socially constructed and reproduced through language and interaction.

An **interpretivist** researcher believes that natural science methods cannot apply to social science. Rather, interpretations of social reality are culturally derived and historically situated. Each research participant has a unique experience of a social phenomenon and therefore a subjective interpretation of that experience. Eg. Different constructions of what it means to be a doctor occur amid conflicting discourses (Frost & Regehr, 2013). The different interpretations include the researcher's interpretations (Tracy, 2013).

Aim: To understand why and how certain social relations occur; to be useful and interesting; to provide opportunities for participant voice (Tracy, 2013).

Critical paradigm

In the **critical** paradigm, multiple truths exist, and they are influenced by power relations among people.

Like the interpretivist researcher, the **critical** researcher also regards all individual perspectives as important. The critical researcher, however, will argue that not all experiences are treated as equal because some experiences are the consequence of prejudice, discrimination and exploitation on the part of more powerful others (McMillan, 2015). Critical researchers focus on power and the ways in which power operates to marginalise some participants in social interactions (McMillan, 2015). Eg. Beagan (2005) uses class theory to reveal the experiences of exclusion and marginalisation of working class medical students.

Aim: To ask "what should be?" in order to improve and transform current experiences of research participants; to disrupt power relations (Tracy, 2013).

Table 1 Overview of three main paradigms

	(Post-)Positivist paradigm	Interpretivist paradigm	Critical paradigm
Ontology assumptions about the nature of reality)	Single reality out there and it can be known. Verified and non-falsified hypotheses that are (probable) facts or laws and mechanisms govern the workings of that reality. Research can find out the true/partial state of reality.	Multiple realities because meaning is grounded in experience. Knowledge can be derived from sources other than the senses. Reality is complex and context-dependent.	Reality may be objective or subjective. But truth is continually contested by competing groups.
Epistemology (assumptions about the nature of knowledge)	The researcher and the object are independent entities. It is possible to study something without influencing it. Good research employs strategies to reduce or eliminate any influence. What is found – if replicable – is true.	Knowledge is derived from people's experiences – both those of the researcher and her research participants. Perceptions and experiences of the research and participants affect what is seen and conceptualised. Multiple ways of knowing.	Power relations determine what and whose knowledge counts. Power is implicated in the relationship between the researcher and the researched. What can be known is inextricably intertwined with the interaction. between the researcher and the researched.
Related theories	Behaviourism	Social constructivism / social constructionist theory Socio-cultural theory Social materialism. Eg. Actor-Network Theory; Complexity theory.	Critical theory Critical realism Race or class theory
Methodology	Discover what exists through prediction and control. Theory is established deductively. Describe and predict patterns. Looks for causality and fundamental laws.	Focus on understanding. Uses inductive reasoning Meaning is constructed in the researcher-participant interaction in natural settings. Gathers diverse interpretations. Eg. Grounded theory; ethnography.	Focus on emancipation. Research is used for envisioning how things could change for the better. Seeks representation of diverse and under-represented views. Continual redefinition of problems and cooperative interaction. Eg. Action research.
Methods	Quantitative and qualitative methods systematically gathered and analysed data from representative samples. Eg. Surveys. Experiments. Analysis: verification or falsification of hypotheses. Statistical testing of hypotheses. Eg. RCT, questionnaires.	Tends to use qualitative methods to capture various interpretations of a phenomenon (Eg. Naturalistic observation, interviews, use of narrative.	Quantitative and qualitative methods in a participatory way. Iterative research design. Eg. Case studies, focus groups, participant observation.
Examples of research question	How do perceptions of reward and punishment influence what students learn?	How do students' understandings of assessment shape their learning behaviour?	What is the influence of diversity and the clinical learning environment in shaping competence of nursing students?

Based on Lincoln & Guba (2000); McMillan (2015).

Practice Points

It is important to make explicit the paradigm or philosophical worldview underlying your research idea or proposal for the assumptions here will influence your research strategy and activity.

- What is your philosophical worldview or paradigm as a person? As a researcher, what is your research orientation?
- Unpack the concepts, assumptions, methods and standards in that worldview and make them explicit to yourself before you begin your research.

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