ESSAY

# Epistemology and simulation-based healthcare education: the good, the bad and the ugly

Aaron Vage[1], Paul Murphy[2], Gerard J Gormley[3]

[1]Centre for Medical Education, Queen's University Belfast, Belfast, Ireland
[2]School of Arts, English and Languages, Queen's University Belfast, Belfast, Ireland
[3]InterSim, Queen's University Belfast, Belfast, Ireland

**Corresponding author:** Aaron Vage, avage01@qub.ac.uk

## ABSTRACT

Over the years, simulation has grown in popularity as a means to construct safe, but realistic environments in which to train healthcare professionals. Whilst many well-established guidelines have been put in place to ensure optimal educational outcomes, the lens through which those developing said guidelines see the world is often left undiscussed. Is it then possible that our assumptions and beliefs can act as a filter through which our reality is observed?

## Introduction

The term 'epistemology' is suggested to have been popularized by the Scottish philosopher James F. Ferrier in the mid-19th century. Coming from the Greek *episteme*, translating to knowledge or understanding, epistemology has developed into a theory concerned with the nature, sources and limits of knowledge [1]. Epistemology has many branches, each offering a unique position from which to view the world. Together, these branches create a landscape abundant in ways to define, teach and evaluate competence, evidence and professionalism [2]. In this introductory essay, we aim to unpack the aforementioned concept for those new to the term, or those keen to know more. We shall review some of the main epistemological positions, namely positivism, constructivism and pragmatism; discussing their strengths, weaknesses and implications for practice and research, whilst highlighting some of the challenges and controversies that arise from adopting certain positions in a dynamic field such as simulation-based healthcare education (SBHE).

## Positivism

Originating from the ideas of the French philosophers and sociologists Henri de Saint-Simon, Auguste Comte and Emile Durkheim, positivism is the view that knowledge is objective, universal and value free [3,4]. It is based on the assumption that there is a single reality that can be discovered and measured through empirical observation and experimentation. Positivism emphasizes the use of quantitative methods, standardized tests and evidence-based practice, aiming to produce generalizable and replicable results that can inform both decision-making and policy-making [5]. The good: positivism offers a rigorous and systematic approach to knowledge generation and validation. It provides clear criteria for evaluating the quality and validity of research and practice, fostering a culture of accountability and transparency. The bad: positivism tends to ignore or marginalize the role of human agency, context and values in knowledge production and application. It may oversimplify or reduce complex phenomena to measurable

variables, creating a hierarchy of knowledge that privileges certain forms of evidence over others. The ugly: positivism may lead to a narrow or rigid view of competence, evidence and professionalism in SBHE. It may exclude or devalue other forms of knowledge that are not easily quantifiable or generalizable, such as tacit, experiential or indigenous knowledge – developing a power imbalance between those who produce and control knowledge and those who consume and apply it. One example would be the use of a device that measures physiological responses to simulation environments – such as a heart rate monitor. Alone, the data obtained from the monitor will inform researchers about a variety of heart-related activities. However, these data in and of themselves neglect the embodied experience of the participants from which the data were collected.

## Constructivism

Described as the amalgamation of Immanuel Kant's philosophy and Jean Piaget's educational psychology [6], constructivism is the view that knowledge is subjective, contextual and value laden. It is based on the assumption that there are multiple realities constructed by individuals or groups through their interactions with others and their environment. Constructivism emphasizes the use of qualitative methods, reflective practice and collaborative learning – aiming to produce rich and nuanced understandings of diverse perspectives and experiences that can inform action and change [7]. Qualitative research produced in line with constructivism should be evaluated with rigour, albeit using differing criteria than quantitative-based research, but with the aim of discovering rich conclusions, nonetheless. The good: constructivism offers a flexible and holistic approach to knowledge generation and interpretation. It acknowledges the complexity and diversity of human phenomena and their meanings – lending itself to a culture of inquiry and dialogue. The bad: constructivism faces challenges in establishing both credibility and transferability of research and practice. It may lack clear criteria for evaluating the quality and validity of knowledge claims, creating potential difficulties in reaching consensus or agreement among different stakeholders. The ugly: constructivism may lead to a relativistic or subjective view of competence, evidence and professionalism – potentially undermining the authority or legitimacy of certain forms of knowledge that are based on objective or universal standards. For example, conducting interviews or engaging with focus groups may help researchers gain a rich, contextual understanding of participants' lived experiences. However, these forms of data are often not given to statistical analysis, which can create issues in terms of validation and population generalizability.

## Pragmatism

Born from the minds of the American philosophers and psychologists, Charles Sanders Peirce and William James, pragmatism is the view that knowledge is practical, functional and instrumental [8]. It is based on the assumption that there is no fixed or final truth, but rather provisional truths that work for specific purposes in specific situations. Pragmatism emphasizes the use of mixed methods, problem-based learning and outcome-based evaluation in SBHE – aiming to produce useful and relevant results that can solve problems and improve practice [9]. The good: pragmatism offers a logical and adaptive approach to knowledge generation and utilization – bridging the gap between theory and practice and encouraging a culture of innovation. The bad: pragmatism may neglect the underlying assumptions or values that inform knowledge application, as well as overlooking the broader implications of research and practice – creating possible conflicts between different goals or interests. The ugly: pragmatism may lead to a utilitarian or instrumental view of competence, evidence and professionalism in SBHE. It may compromise the integrity or quality of knowledge for the sake of efficiency, whilst generating a dependence on external demands or expectations. The use of a heart rate monitor and participant interviews would be an example of pragmatism. Combining both quantitative and qualitative data lends itself to flexibility in terms of approaching a single research topic – however, one element may become supplementary to the other. For example, heart rate may be the primary interest, whilst interviews serve to provide context. It is worth noting that some healthcare research exists under the guise of mixed methods. However, taking into account the differences between epistemologies, the notion of truly 'mixing methods' is certainly up for debate.

## Research question or questioning research?

Understanding how a research question aligns with an epistemological position can be easily overlooked. Nonetheless, it has the ability to transform not only the researchers' understanding, but the quality and relatability of the research produced. Take, for example, the questions, 'How many people are affected by structural inequalities in Northern Ireland?" and "Why do structural inequalities occur in Northern Ireland?' Having read the previous paragraphs, we could suggest that positivism would work well for the first question and constructivism for the second. However, what if the research question focuses on revealing the structural inequalities within Northern Ireland that influence access to health care and guide the development of SBHE? In this case, whilst we may choose to employ research methods that are grounded in positivism to examine the number of people suffering such inequalities and the ramifications such inequalities have on markers of health, positivism won't be our position; testing hypotheses won't be classified as objectives.

## Conclusion

Different epistemological positions have different implications for how we design, deliver and evaluate our educational practices. Being conscious of our epistemological position means being able to critically reflect on our own assumptions and beliefs about knowledge, learning and reality. Additionally, it also allows us to appreciate the diversity of perspectives that exist

among learners and colleagues – nurturing a culture of inquiry and innovation within SBHE.

## Declarations

### Acknowledgements

### Authors' contributions

Aaron Vage: conceptualization and major contributor to manuscript. Paul Murphy: contributor to manuscript. Gerard J Gormely: contributor to manuscript.

### Funding

### Availability of data and materials

None declared.

### Ethics approval and consent to participate

None declared.

### Competing interests

None declared.

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