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Understanding epistemology and its key approaches in research

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Abstract

Epistemology is a branch of philosophy that concerns itself with the theory of knowledge. It is regarded as a core area of philosophy because it deals with the nature of our knowledge. Drawing on the literature on epistemology, this article provides some basic definitions of the term epistemology and answers some key epistemological questions such as: "what is knowledge?" "what are the sources of our knowledge?" "what do we know?" and "what differentiates knowledge from wisdom and opinion?" The article also discusses key epistemological approaches, namely positivism, interpretivism, and pragmatism, which are central to research. The article concludes that a high degree of epistemic justification is required for knowledge claims and for the conduct of research.

Keywords: Epistemology; theory of knowledge; epistemological approaches; positivism; interpretivism; pragmatism

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Introduction

When it comes to research, terms such as ontology, epistemology, and axiology are not easy to understand. They are generally reserved for students at their advanced level of study (e.g., doctoral degrees) to peruse and digest their subtle meanings. According to Edelheim (2014), these three terms "lay the foundations for how we, as individuals, understand the world we live in, the determinations we make about issues relating to truth, and the matters we consider to be of value to us individually, and to society at large" (pp. 30-31). He explained each of these terms as follows:

> Ontology, or the study of being, creates the framework for how we, as individuals, connected in societies, make sense of the reality in which we live. The power of ontology is that it gives us the keys to unlock the way reality is understood, by taking as its object of study the actual being of things, matters, concepts, experiences, and words – essentially of everything.
>
> Epistemology, or the study of knowledge, receives in our rationalist society more emphasis because it sets out to explain why we jointly decide that certain things are true, and others are not.
>
> Axiology, or the study of value or of goodness, is definitely the philosophical strain out of these three that has received least attention, even though it is fundamentally linked to our actions in our daily lives. The value of something can be seen as having intrinsic properties, valuable in its own right, or to have extrinsic properties, valuable for the sake of something else, which in turn can have intrinsic properties. (Edelheim, 2014, p. 31)

Killam (2013), however, offered the following explanation for the three terms:

> Axiology addresses the nature of ethical behavior. The term originates from the Greek word *axios*, meaning value… In philosophy, axiology is a term that deals with ethics, aesthetics,

> and religion. In research, axiology refers to what the researcher believes is valuable and ethical.
>
> Ontology [originates] from the Latin word ontologia as well as from the ancient Greek word for "to be"... In research, ontology refers to the researcher's beliefs about the nature of reality. In philosophical terms, it refers to the study of our existence and the fundamental nature of reality or being.
>
> The word epistemology originates from Greek. It is derived from two Greek words: 1) episteme, meaning knowledge and 2) epistania, meaning to understand or know. Epistemology examines the relationship between knowledge and the researcher during discovery. (pp. 6-8)

Considering the difficulty in understanding these terms, in this article, we aim to provide a basic understanding of the term 'epistemology.' The article begins by providing different definitions for epistemology as defined by leading researchers/research methodologists. It then answers some key epistemological questions before discussing major epistemological approaches in research, namely positivism, interpretivism, and pragmatism. The article concludes that there is a need to provide sufficient and appropriate justification for our knowledge claims and for the choice of an epistemological approach adopted to guide the conduct of research.

Defining epistemology

According to Potter (2017), the term epistemology "was coined by the Scottish philosopher James Frederick Ferrier (1808–1864)" (p. 1). The term originated in the mid-19th century from two Greek words: episteme and logos (Steup & Neta, 2020). Episteme can be translated as "knowledge," while logos can be translated as "the study of" (Couper, 2020, p. 275). In general terms, epistemology is a branch of philosophy that deals with the theory of knowledge. In a more precise way, the Oxford English Dictionary defines epistemology as "the theory of knowledge and understanding, especially with regard to its methods, validity, and scope, and the distinction between justified belief and opinion."

The definition of epistemology centers around the word 'knowledge' given its root word 'episteme,' meaning knowledge. Many researchers and/or research methodologists have provided the definition for the term epistemology. Table 1 provides a summary of the different definitions given to the term.

Table 1. *Different definitions of epistemology*

No.	**Definitions of epistemology**	**Researchers/research methodologists**
1	The theory of knowledge embedded in the theoretical perspective and thereby in the methodology.	Crotty (1998, p. 3)
2	The study of the nature of knowledge and justification: in particular, the study of (a) the defining components, (b) the substantive conditions or sources, and (c) the limits of knowledge and justification.	Moser (2009, p. 3)
3	A theory of knowledge. [It is] a stance on what should pass as acceptable knowledge.	Bryman (2012, p. 711)
4	The nature of knowledge and its construction	Merriam and Tisdell (2016. p. 84)
5	The philosophical underpinnings of researchers' beliefs regarding the nature of knowledge and how it is derived or created. The particular belief represents a person's *epistemological position*.	Yin (2016, p. 335, emphasis in original)
6	The branch of philosophy concerned with the nature of knowledge, its possibility, scope, and general basis.	Potter (2017, n.p.)
7	The study of knowledge, asking questions such as: "what is knowledge?" and "how do we know something?"	Couper (2020, p. 275)

As shown in Table 1, the term epistemology deals with the nature or theory of knowledge. It is concerned with how knowledge is acquired or how we know what we know (Killam, 2013). In fact, while ontology "is concerned with what exists and in what form," epistemology "is concerned with how humans can come to know and understand those things" (Potter, 2017, p. 1). In other words, ontology focuses on the *what* while epistemology focuses on the *how* (Potter, 2017).

In spite of the fact that the term epistemology is no more than a couple of centuries old, it is asserted that the field of this philosophy is at least as old as any other philosophy (Steup & Neta, 2020). In the view of many philosophers, epistemology is one of the core areas of philosophy because it deals with the nature of our knowledge (Klein, 2005).

Some key epistemological questions

What is knowledge?

People make many knowledge claims that they know something, but is knowing something knowledge? Epistemologists are particularly interested in clarifying what the so-called 'knowledge' means and under what conditions we can claim that what we know is knowledge. Simply put, what is knowledge? There has been much debate about what makes true knowledge in the literature on the philosophy of knowledge. However, a general consensus is that knowledge is justified true belief (Audi, 2011; Jensen, 2011; Lemos, 2007; Pritchard, 2018; Rescher, 2003). However, certain questions arise: "how about a true belief without appropriate justification?" and "is it a kind of knowledge?" Pritchard (2018) argued that knowledge cannot just be true belief because people can make a true belief in many weird or inappropriate ways, which cannot be regarded as knowledge. Pritchard (2018) provided an example to support his claim:

> […] Harry, who forms his belief about which horse will win the race by considering which horse's name most appeals to him. Even if the horse does go on to win the race, so that Harry's belief is true, he clearly did not know that this would happen. (p. 22)

Pritchard's (2018) epistemic position is that one's true belief must be justified so that it can become knowledge, meaning that one must have good reasons to think that what he or she believes is true. In a more concise way, as Rescher (2003) emphasized, knowledge is not simply a matter of having a true belief that is somehow justified but must be appropriately justified. Rescher (2003) offered the following example:

1. X believes that Smith is in London (which is false since Smith is actually in Manchester).
2. Smith's being in London entails that Smith is in England (which conclusion is indeed true since Smith is in Manchester).
3. X believes that Smith is in England (because he believes him to be in London). (p. 4)

From this example, it can be explained that X's true belief that Smith is in England is based on X's justification that Smith is in London. However, we would not want to say that X knows that Smith is in England because X's only reason is false, even if somehow justified. Pritchard's (2018) and Rescher's (2003) examples are mainly based on a well-known three-page case analysis of Gettier (1963). In line with these discussions, Vedala (2014) provides a diagram showing the classical definition of knowledge (see Figure 1).

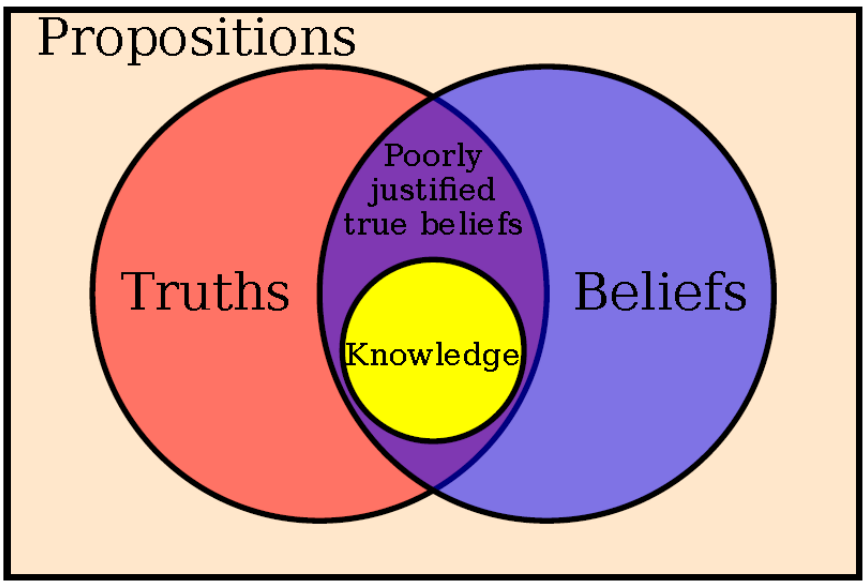


Figure 1. The classical definition of knowledge (Vedala, 2014)

As discussed above, key components of knowledge include truth, belief, and justification. The correspondence theory of truth makes two claims. A proposition is true if and only if it corresponds to facts and false if and only if it fails to correspond to the facts (Lemos, 2007). So, truth means being in correspondence to facts or reality. Belief, on the other hand, is the state of mind or mental attitude that a person has about the existence and truth of something without a solid and verified foundation required to guarantee its truth (Lotha, 2013). From an epistemological perspective, belief is referred to as one's mental representation of an attitude toward true or false ideas or concepts. According to Lemos (2007), our belief when considering a proposition can result in three different mental attitudes. We may believe and accept it as true, disbelieve it as we believe it is false, or withhold our belief in it for further judgment. Another key component that is needed to turn true belief into knowledge is justification (Steup, 2010). Like many other epistemologists, Steup (2010) argued that true belief, without proper justification, is insufficient for a knowledge claim because a belief can be true due to luck or other circumstances. However, as Gettier's (1963) well-known case analysis showed, true belief that is justified may not be insufficient for a knowledge claim as well. Conforming to that, Lemos (2007) advocated that true belief must be epistemically justified, meaning that a high degree of justification is required for true belief to be knowledge.

Even though there are many types of knowledge categorized by different epistemologists, two types of knowledge are often discussed in epistemology: propositional knowledge (sometimes referred to as knowledge-that) and ability knowledge (also known as know-how/how-to knowledge) (Lemos, 2007; Pritchard, 2018; Rescher, 2003). Propositional knowledge is the knowledge of facts, or that something is the case. For example, David knows that Tokyo is the capital city of Japan; David knows that Barack Obama is the 44th president of the United States of America. Ability knowledge, on the other hand, is one's knowledge about how to do something. For example, David knows how to drive a car; David can swim.

What are the sources of our knowledge?

As Steup and Neta (2020) mentioned, in order for our true beliefs to be regarded as knowledge, it is essential that they originate from sources we can consider

reliable. These sources include but are not limited to perception, memory, reason, and testimony.

A large amount of our knowledge about the world around us is largely acquired by our five perceptual faculties: sight, touch, hearing, smelling, and tasting (Audi, 2011; Pritchard, 2018; Steup & Neta, 2020). For example, our perceptual knowledge about the environment around us could be that it was raining outside when we looked through a window and could hear the sound of continuous raindrops. While much of our knowledge comes from our perception, Pritchard (2018) argued that things do not always look the way they are; we may make false beliefs if left unchecked. He explained by giving an example of a straight stick that will look bent when placed underwater, arguing that "If one did not know about light refraction, for example, then one would think that the stick really is bending as it enters the water" (p. 67).

Memory, another source of knowledge, is "a psychological process that stores information so that it can be used at a later time" (Senor, 2010, p. 520). Steup and Neta (2020) refer to memory as our capacity to maintain the knowledge acquired in the past. However, our memory can be a present fact or future event, for example, remembering a close friend's name or the date of a coming national examination. Like our perceptual knowledge, our memory cannot always be trustworthy, meaning that it can be fallible (Pritchard, 2018; Senor, 2010; Steup & Neta, 2020). Steup and Neta (2020) differentiated between *remembering something* which entails the truth and *seeming to remember something* which does not entail the truth. Moreover, our memory for something that is not true is not genuinely knowledge (Senor, 2010). That is why sufficient epistemic support from non-memorial grounds is required as a means of justification for memory-based belief to become knowledge (Pritchard, 2018).

When it comes to epistemological reasoning as a source of knowledge, there has been much discussion about *a priori* (non-empirical) and *a posteriori* (empirical) knowledge/justification (Carter & Littlejohn, 2021; Pritchard, 2018; Steup & Neta, 2020). A priori knowledge is justified independently of any experience and uses only reasons, for example, 5 + 5 = 10. On the other hand, a posteriori knowledge depends on specific sensory experiences and the use of reasons, such as knowledge of colors, shapes, and other natural sciences. However, rationalists and empiricists have long argued for the existence of a

priori knowledge (Carter & Littlejohn, 2021; Steup & Neta, 2020). While rationalists maintain that truths of logic or mathematics are not necessarily dependent on experience, empiricists hold a firm argument that to engage in any propositional content, one must involve a mental process (Carter & Littlejohn, 2021). According to Carter and Littlejohn (2021), the mental process is a certain kind of experience and thus implies that a priori knowledge is non-existent.

Testimony is different from other sources of knowledge given its independence from other cognitive faculties mentioned above; rather, we come to know things based on others' testimony, such as news articles, delivery of information on TV/radio, books, or other media (Steup & Neta, 2020). However, like other sources of knowledge, the testimony we receive can be false or misleading. As Pritchard (2018) argued, "Someone with a political agenda might try to make us think that a certain problem, such as immigration, is much worse than it actually is in order to further their own political ends" (p. 78). To avoid false testimony, Pritchard (2018) advised that we should put the suspect testimony we received under scrutiny, compare it, and evaluate it against other testimony we received and/or reliable sources.

What do we know?

In epistemology, another critical question is "What do we know?" or "What is the scope of our knowledge?". When it comes to this overarching question, most philosophers will discuss a complex philosophical position of skepticism. According to Klein (2010), skepticism is a philosophical view that we as human beings lack knowledge about the external world, the past, and other minds beyond the contents of our own minds and that we do not know as much as we think we do. Skeptics construct arguments to conclude that we know little to nothing (Carter & Littlejohn, 2021; Lemos, 2007). Global (most extreme) skepticism claims that we do not or cannot have any knowledge, while local (less extreme) skepticism holds that we do or can have some knowledge except for some particular domains, such as the external world, the past, and other minds (Lemos, 2007). Such bizarre conclusions are hard to believe but are supported by some skeptical arguments that are quite plausible. Reflecting on skepticism, Lemos (2007) formulated several skeptical arguments to show that

we do not or cannot have any knowledge about the external world. Let us look at two of his plausibly skeptical arguments: certainty and infallibility.

The certainty argument (Lemos, 2007, p. 134):

(1) One cannot be certain about what the external world is like.
(2) One knows that *p* only if one is certain that *p* (is).
(3) Therefore, one cannot know what the external world is like.

The infallibility argument (Lemos, 2007, p. 136):

(1) We are not infallible about the existence and character of the external world.
(2) If S knows that *p*, then S is infallible about *p*.
(3) We do not have knowledge about the existence and character of the external world.

Even though skeptical arguments seem plausible, philosophers have made a variety of responses to the widespread skepticism. Some well-received responses include the undermining of skepticism itself, George Edward Moore's response (commonly known as Moore's response), and the fallibilism about knowledge. One of the responses to skepticism is the claim that skepticism is self-undermining. The skeptics, especially the most extreme ones, claim to know that nothing can be known (Lemos, 2007), and if that is so, how can they claim to know that? So, it appears that the skeptics are undermining themselves. George Edward Moore, one of the well-known common-sense philosophers of the 20th century, claimed that we as human beings know many things we think we know and holds that the skeptics' conclusion of nearly universal ignorance must be mistaken (Carter & Littlejohn, 2021; Lemos, 2007). Moore offers a simple but fairly adequate anti-skeptical reasoning that we have two hands by holding up his two hands and, while making certain gestures, showing that there is one left hand and one right hand. Moore's proof goes to show that the external world does exist; thus, it is reasonable not to abandon our knowledge claims (Lemos, 2007). Carter and Littlejohn (2021) put Moore's response (M) to skepticism in the following counterargument:

M1. Here are two hands.

M2. If hands exist, then there is an external world.
M3. So there is an external world. (p. 366)

Another widespread response to skepticism is the view of fallibilism. Fallibilism concerns "a thesis of knowledge and justification: that we can have fallible justifications for our beliefs, and that it is possible to know that something is the case even if one has only a fallible justification for believing it" (Leite, 2010, p. 370). Simply put, just because our justification for believing a thing could be false does not mean that it is not true. Fallibilists hold that if we believe something, it could still be true even if we are not certain.

What differentiates knowledge from wisdom and opinion?

In the study of epistemology, it may be helpful to differentiate some key terms, particularly knowledge, wisdom, and opinion. These terms indicate the extent to which we can or cannot claim to know things. Thus far, the term 'knowledge' has been defined but is briefly mentioned again here to connect with the other two terms.

As discussed above, most epistemologists hold that knowledge is justified true belief. One can claim to know or have knowledge of something if one holds a true belief about it that is appropriately justified, meaning that one must have good reasons to believe that something is the case. However, some think that this definition of knowledge can be rendered to be more accurate. Some philosophers would substitute belief with a more precise term, such as psychological certainty or acceptance. So, they would prefer to say that knowledge entails justified psychological certainty or acceptance (Luper, 2010).

With regard to wisdom, most dictionaries refer to wisdom as one's ability to make the right decisions and sound judgments about matters relating to life and conduct by utilizing existing knowledge and experience. In philosophy, the concept of wisdom concerns different conditions that make a person wise. Ryan (1992) discussed several principles that make a person wise. Some of them include:

- S is wise about x iff[1] S knows a lot about x.

[1] iff = if and only if

- S is wise iff S has a lot of intrinsically valuable knowledge.
- S is wise at t[2] iff at t (i) S knows, in general, how to live well, (ii) S lives well, and (iii) S's living well is caused by S's knowledge about how to live well.
- S is wise at t iff at t (i) S knows, in general, how to live well, and (ii) S has a general appreciation of the true value of living well. (pp. 120-135)

Unlike knowledge and wisdom, an opinion is something that is not conclusive; it may be very subjective to the person expressing the opinion and open to further inquiry. However, our typical verbal exchange is made through the expression of personal opinions (Damer, 2009). An opinion can be a belief, a point of view, or a statement that usually lacks factual accounts. Even though an opinion is regarded as "an unsupported claim," collective opinions or opinions from professionals or experts can provide substantiated merits for acceptance (Damer, 2009, p. 15).

Key epistemological approaches in research

Positivism

Positivism stems from the 19th-century French philosopher Auguste Comte who used the term to indicate a philosophical position (Cohen et al., 2018). It is also an epistemological approach to research that concerns itself with observable facts based on scientific methods (Flick, 2018). Positivist researchers, therefore, claim that only facts obtained from scientific methods can be genuine knowledge (Jansen et al., 2009). The core argument of positivism is that there are facts about the external world to be discovered, and our knowledge is based on our sensory experience, which can only be measured by means of observation and experiment: the empirical/scientific inquiry (see Cohen et al., 2018; Flick, 2018; Gray, 2004).

Another underlying principle that positivism holds is that any research should aim to achieve representativeness, generalizability, and objectivity (Flick, 2018). Therefore, positivist research is often quantitative. Positivist research employs the random sampling technique and depends on statistics and large numbers

[2] t is used to represent something

of research participants. For positivism, research must be done in a way that is free from the researcher's own values and thus achieve objectivity, meaning that the researcher's position must be separate from and not influence the research outcomes (Cohen et al., 2018; Gray, 2004).

Even though positivist researchers advocate that both natural and social sciences can and should apply empirical inquiry to collect and analyze data, critics of positivism object that the principles of positivism are not suitable for all research issues, especially for social science research (Flick, 2018; Cohen et al., 2018). Cohen et al. (2018) argued:

> Where positivism is less successful, however, is in its application to the study of human behaviour, where the immense complexity of human nature and the elusive and intangible quality of social phenomena contrast strikingly with the order and regularity of the natural world. This point is apparent in the contexts of classrooms and schools where the problems of teaching, learning and human interaction present the positivistic researcher with a mammoth challenge. (p. 10)

Flick (2018) explained that if we want to study a biographical experience of a person losing a partner due to a deadly disease, it will be challenging to apply the principles of positivism, for example, having a standardized measurement. As Flick (2018) justified, "If you want to understand such experience from the viewpoint of your research participants, you will need to set up an open research situation in which you will apply methods (like a narrative interview)" (p. 35).

Interpretivism

Interpretivism is another major epistemological position that contradicts the view of positivism (Gray, 2004). Interpretivists hold that our knowledge of the world depends greatly on our interpretation or understanding of human actions, experiences, and environments (Gray, 2004; O'Reilly, 2009). For this reason, the role of researchers is indispensable, making interpretive research more subjective in nature (Alharahsheh & Pius, 2020; Diaz Andrade, 2009).

Some common approaches that fall under interpretivism include phenomenology, symbolic interactionism, and hermeneutics (Gray, 2004).

Interpretivist researchers are particularly interested in the social world, where "our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents, tools, and other artifacts" (Klein & Myers, 1999, p. 69). In order to interpret meanings from human actions or experiences, interpretivist researchers usually employ qualitative approaches in collecting and analyzing data, meaning that interpretive research seeks to gain in-depth and rich meanings from smaller numbers of participants, for example, through in-depth interviews. However, interpretive research cannot be generalized due to indispensable subjectivity in the research process and generally smaller sample sizes as opposed to the positivist approach.

Pragmatism

Pragmatism is a philosophical view that originated in the United States in the second half of the 19th century. The most prominent pragmatists include Charles Sanders Peirce (1839-1914), William James (1842-1910), and John Dewey (1859-1952) (Catherine & Hookway, 2021; Kaushik & Walsh, 2019; Ormerod, 2006). The underlying principle of pragmatism is the focus on practical effects or solutions to address problems that are suitable for existing situations or conditions. Savin-Baden and Major (2013) stressed that, for pragmatism, any ideas or principles are true depending on their workability. Therefore, pragmatist researchers hold that knowledge can be obtained through different methods and reject any notion that claims access to the truth about the real world is only possible through a single scientific method (Kaushik & Walsh, 2019; Savin-Baden & Major, 2013). The epistemology of pragmatism is that knowledge is a self-correcting process based on experience (Kaushik & Walsh, 2019; Ormerod, 2006) and is fallible (Hack, 2010). Thus, it must be evaluated and revised in view of subsequent experience (Ormerod, 2006).

In research, pragmatist researchers emphasize the research problem or question and use all available approaches, including data collection and analysis, to understand the problem and answer the research question (Creswell &

Creswell, 2018; Savin-Baden & Major, 2013). Within this view, pragmatist researchers often use mixed methods or pluralistic approaches to gain insights into the research problem (Creswell & Creswell, 2018). Savin-Baden and Major (2013) contended that "Indeed, pragmatists emphasize the importance of trying different methods and then evaluating them based upon their effectiveness. Therefore, good research is a trial-and-error process" (p. 61).

Conclusion

This article has discussed the basic definitions of the term epistemology. It has answered some critical epistemological questions about what knowledge is, the sources of our knowledge, the extent to which we know things, and the differences between knowledge, wisdom, and opinion. Moreover, it has also touched on an important philosophical position of skepticism and how anti-skeptics respond to skeptical arguments. Three key epistemological approaches to research, such as positivism, interpretivism, and pragmatism, have also been discussed.

Epistemology is a complex but vital field of philosophy concerned with a range of questions and related philosophical topics. This philosophical concept helps us evaluate how we make sense of the world around us and beyond and gain knowledge that we may use to solve particular problems. Even though there are many arguments about conditions that constitute our knowledge, common-sense epistemologists view knowledge as the true belief that must be sufficiently and appropriately justified. This justification is central to our knowledge.

In research, it is essential to adopt a specific epistemological approach, be it positivism, interpretivism, or pragmatism, as it provides a lens through which knowledge and reality can be viewed or created. With a clear epistemological approach, researchers are guided by a philosophical stance which can in turn inform or provide guidance for the selection of the most appropriate research methodology for a particular research purpose. Thus, understanding epistemology as a theory of knowledge and its different approaches in research is crucial for the pursuit of knowledge creation.

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