

Epistemology of Science: Sources and Validity of Knowledge in a Philosophical Perspective

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ARTICLE INFO	ABSTRACT
Volume: 4 ISSN: 2963-5489	This article aims to discuss the epistemology of science as a source and validator of knowledge from a philosophical perspective. This study employs a literature review method. Epistemology examines the process of acquiring knowledge, the essential factors in obtaining true knowledge, the nature of truth, and the standards by which it is measured. It seeks to explore how something occurs, how we come to know it, how we differentiate it from other things, and how we understand the state and condition of things within space and time. Various schools of epistemology—such as idealism, rationalism, empiricism, and positivism—offer diverse approaches to the sources and validity of knowledge. Each school contributes uniquely to our understanding of how scientific truth is achieved, ranging from a reliance on reason and sensory experience to a combination of both.
KEYWORD	
Epistemology, Source, Validity	

1. Introduction

Knowledge arises from the human curiosity toward something. Every type of knowledge has its own characteristics, depending on how it is acquired and the object of its study. The development of knowledge in human life is driven by two factors: first, humans possess the ability to use language, which enables them to convey information along with the logic that underlies it. Second, humans are capable of structured thinking, a process known as reasoning (Rokhmah, D., 2021).

Linguistically, philosophy is a discipline closely related to the philosophy of knowledge, or epistemology. In general, philosophy discusses the types and conditions of human experience, encompassing the study of methodology and logic. Humans learn and understand the meaning of knowledge through a long process, in which the knowledge they acquire is able to transform their way of thinking and their perspective toward science. Every action and behavior demonstrated by humans is a concrete manifestation of thoughts that they believe to be true.

There is a close reciprocal relationship between philosophy and science. Many philosophical problems require a scientific foundation so that their discussion does not become superficial or misguided. Modern science provides many important facts that enrich philosophical ideas, allowing the development of philosophy to remain aligned with scientific knowledge. Empirical inquiries accumulated through rational methodologies are expected to strengthen knowledge and make it increasingly rational (Achmad, F., 2019).

Epistemology aims to question how something comes to be, how we come to know it, how we distinguish it from other things, and how we understand its state and condition within space and time. Thus, what is the epistemological foundation

that allows the acquisition of knowledge about logic, ethics, and aesthetics, as well as the methods and procedures for attaining scientific truth.

2. Literature Review

Epistemology, as one of the main branches of philosophy, bridges the gap between fundamental philosophical questions about knowledge and the scientific methods used to acquire it. The term epistemology comes from the Greek words *epistēmē*, meaning knowledge, and *logos*, referring to study or theory. Thus, epistemology can be defined as the study or theory of knowledge. Within its framework, fundamental questions are raised about the sources of knowledge, the processes of its acquisition, as well as the limits and validity of that knowledge. Essentially, epistemology explores how we know and what we know, as well as how knowledge is organized and justified. According to the Kamus Besar Bahasa Indonesia (KBBI), knowledge is defined as everything that is known, intelligence, or anything related to a subject matter that is understood.

From several scholarly sources, epistemology is described as a theory of knowledge, which discusses how knowledge can be obtained from the object under consideration. D.W. Hamlyn defines epistemology as a branch of philosophy concerned with the nature and scope of knowledge and its presuppositions, and, more generally, with affirming the reliability of the claim that humans possess knowledge. Furthermore, Prof. Dr. Ahmad Tafsir explains that the epistemology of science is the study of the object of scientific knowledge, the methods of acquiring such knowledge, and the ways of measuring its truth or validity.

Epistemology, as a branch of philosophy, examines the foundations and limits of knowledge, serving as a discipline that has given rise to other fields of study (Pengemanan, Joan Imanuella Hanna, 2023). When discussing epistemology, there are three main areas of focus: first, the sources of knowledge and the processes through which it is obtained; second, the nature of knowledge itself, addressing how humans are able to know; and third, the truth of knowledge, which considers the extent to which human beings, with all their limitations, are capable of attaining it (Mochamad Hasyim, 2018).

It is important to understand that epistemology does not only concern itself with philosophical aspects, but also includes scientific dimensions. This involves examining the methods used in science to validate and acquire legitimate knowledge. Thus, epistemology is relevant not only to philosophers but also to scientists who seek to understand the foundations of their scientific reasoning.

3. Methodology

This research employs the literature review method, which was chosen to uncover theories relevant to the issues under study and to serve as references in the discussion of the research findings. This method is carried out by collecting books and journals from various sources, both national and international, obtained through databases such as Google Scholar.

4. Results and Discussion

Everyone acknowledges possessing knowledge; the question, however, is where does that knowledge come from, or through what means is it acquired? This gives rise to the inquiry: how do we obtain knowledge, or what are the sources of our knowledge? The knowledge we possess is acquired through various tools that utilize these sources of knowledge. In this regard, several perspectives exist concerning the sources of knowledge, including the following:

4.1 Idealism

Idealism is a school of thought which teaches that physical reality can only be understood in relation to the soul and spirit. The term idealism is derived from the word *idea*, meaning something present in the soul. Idealism emphasizes the importance of ideas, categories, or forms that exist in the mind as sources of knowledge. Plato (427–347 BC) can be regarded as the midwife of this school of thought. He asserted that sensory observations cannot provide solid knowledge because of their ever-changing nature. Something that is constantly changing cannot be relied upon as truth. For knowledge to provide certainty, it must originate from unchanging and permanent observations. Such knowledge, Plato argued, comes from a realm that is eternal and immutable—the realm of ideas—where humans, even before birth, possess innate ideas. Through these innate ideas, humans are able to recognize and understand all things. To comprehend something, one only needs to

recall these innate ideas. For Plato, therefore, the world of ideas constitutes true reality, while the sensory world is merely an imperfect reflection. An idealist philosopher, such as Plato, believes that knowledge of abstract concepts like justice, beauty, and truth can be discovered through critical thinking and reflection. By contemplating and internalizing these ideas, one can reach a deeper understanding of their true nature. For instance, a philosophy student seeking to grasp the concept of justice can achieve a deeper understanding by reflecting on Plato's notion of justice in the realm of ideas. This provides inspiration for their critical engagement with the topic. In this framework, critical thinking, reflection, and contemplation serve as legitimate sources of knowledge. Ideas within the realm of the ideal are accessed through mental processes, enabling humans to grasp the higher essence of knowledge.

4.2 Empiricism

The next perspective is empiricism, or realism, which places greater emphasis on the significance of sensory observation as both the source and the instrument for acquiring knowledge. Aristotle (384–322 BC), often regarded as the father of empiricism, firmly rejected the notion of innate ideas proposed by his teacher, Plato. For Aristotle, laws and understanding are achieved through the long process of human empirical experience. Within the paradigm of empiricism, the senses are considered the most valid instruments for connecting humans with their world. This does not mean reason has no importance, but reason itself is subordinated within the framework of empiricism. That is, reason follows experimentation, as it possesses nothing to attain truth except through the mediation of the senses. Reality cannot be perceived otherwise. Based on this view, John Locke argued that at birth, the human mind is like a *tabula rasa* (a blank slate), empty of knowledge. Experience then fills this blank mind, thereby producing knowledge. On this blank slate, sensory observations are recorded (Louis O. Katsoff, 1995). Empiricism thus regards human knowledge as derived only from concrete observation, not from abstract rational reasoning or revealed experience that lacks factual justification. David Hume, another prominent empiricist, stated that humans are not born with innate knowledge; instead, observation is the source of knowledge. Observation produces two things: impressions and ideas. Impressions refer to direct experiences—such as feeling one's hand burn—while ideas are faint images of these impressions, recalled or reflected upon in the mind. According to this theory, reason merely organizes sensory concepts, arranging and classifying them. In empiricism, therefore, the primary source of knowledge is empirical data obtained through the senses. Reason plays only a minimal role, and even then, only as vague ideas. However, this school of thought has several weaknesses:

1. The senses are limited. For example, a distant object may appear small, even though in reality it is not. Such limitations can lead to false knowledge.
2. The senses can be deceptive. For instance, during malaria, sugar tastes bitter, or the air feels cold—resulting in inaccurate empirical knowledge.
3. Objects can be misleading. Examples include mirages or illusions, where objects do not appear as they truly are, thereby deceiving the senses.
4. Both senses and objects have limitations. For example, the human eye cannot see the entirety of a buffalo at once, nor can the buffalo reveal its entire body simultaneously. Thus, knowledge derived from such limited interaction is incomplete.

In summary, empiricism's weakness lies in the limitations of human senses. Nonetheless, it emphasizes that the main source of knowledge is sensory experience acquired through human perception. A concrete example can be seen in the work of a scientist conducting experiments to understand chemical reactions. Here, the scientist collects data through direct observation, measurement, and experimentation. The sensory experiences gained during these experiments form the basis of legitimate knowledge. By observing changes in color, temperature, or other physical and chemical properties, the scientist gathers empirical data that leads to valid scientific conclusions. Hence, within empiricism, knowledge of the physical world and natural phenomena is obtained through systematic observation, experimentation, and sensory experience. Such experiences constitute the foundation of reliable and trustworthy knowledge.

4.3 Rationalism

The next paradigm is rationalism, a school of thought which holds that truth can be attained through reasoning. In some cases, reason is considered capable of discovering and affirming truths even without empirical evidence. Rationalism is represented by thinkers such as René Descartes (1596–1650), Baruch Spinoza (1632–1677), and Gottfried Leibniz (1646–1716). According to this school, every object contains inherent ideas and general propositions, known as necessary propositions, which can be demonstrated as truths independent of empirical verification. This school asserts that reason is the foundation of certainty in knowledge; true knowledge is acquired and measured through reason. Knowledge arises from

the human mind's engagement with objects. Rationalists argue that errors within empiricism, caused by the fallibility of the senses, can be corrected through the use of reason. Rationalism does not deny the usefulness of the senses in acquiring knowledge; rather, sensory experience is required to stimulate the intellect and provide the material upon which the mind operates. However, arriving at truth, according to rationalism, is ultimately the work of reason alone. Sensory reports are considered unclear material, requiring rational consideration. The mind organizes this material, forming true knowledge. Thus, the role of the senses is only to supply raw data from the external world, while reason connects and interprets this data to produce knowledge.

4.4 Positivism

The problems found in empiricism and rationalism, particularly concerning the production of scientific methods, gave rise to positivism, developed by Auguste Comte and Immanuel Kant. Auguste Comte argued that while the senses are indeed important in acquiring scientific knowledge, they must be sharpened with tools and reinforced through experimentation. Do you want me to continue translating the Positivism section in more detail (expanding on Comte and Kant, if your source text continues), or should I stop here at the point you provided?

5. Conclusion

Epistemology, as a branch of philosophy, plays an essential role in constructing a theoretical framework that explains how knowledge is acquired, validated, and applied. Its main focus is to establish the criteria of truth through rational, empirical, or combined approaches, which are often embodied in the scientific method. By providing a systematic and accountable methodological foundation, epistemology ensures that knowledge develops logically, objectively, and in a relevant manner. Various epistemological schools of thought—such as idealism, empiricism, rationalism, positivism, and revelation—present diverse approaches to the sources and validity of knowledge. Each school offers a unique contribution to our understanding of how scientific truth is attained, whether through reliance on reason, sensory experience, or a synthesis of both.

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