People's Democratic Republic of Algeria

Ministry of Higher Education and Scientific Research

University of **Martyr Hamma Lakhdar – El Oued**

Faculty of Social and Human Sciences

Department of Social Sciences

# Epistemology of Social Sciences

**Directed to First-Year Students,**

**Common Core of Social Sciences** – First Semester

Prepared by

## Dr. Salim Sahli

**Academic Year: 2025–2026**

# Course Syllabus

**Bachelor's Degree Title:** General Sociology

**Semester:** First

**Unit Title:** Methodology Teaching

**Course Title:** Epistemology of Social Sciences

**Credits:** 03

**Coefficient:** 02

**Total Contact Hours per Semester:** 45 hours

**Weekly Contact Hours:**
1 hour 30 minutes Lecture
1 hour 30 minutes Tutorial

**Assessment Method:**
Continuous Assessment 40%
Final Exam 60%

## Course Objectives

- To analyze the nature of knowledge.
- To examine the relationship between knowledge and the concept of epistemological rupture.
- To study the processes and mechanisms of knowledge production.

## Prerequisite Knowledge

- Basic understanding of the concept of knowledge.
- Awareness of how knowledge is acquired.
- Familiarity with the foundations and principles of epistemology.

## Learning Outcomes

- Ability to develop scientific thinking.
- Ability to analyze and synthesize ideas.
- Ability to draw conclusions in the fields of science and knowledge.

## Course Content

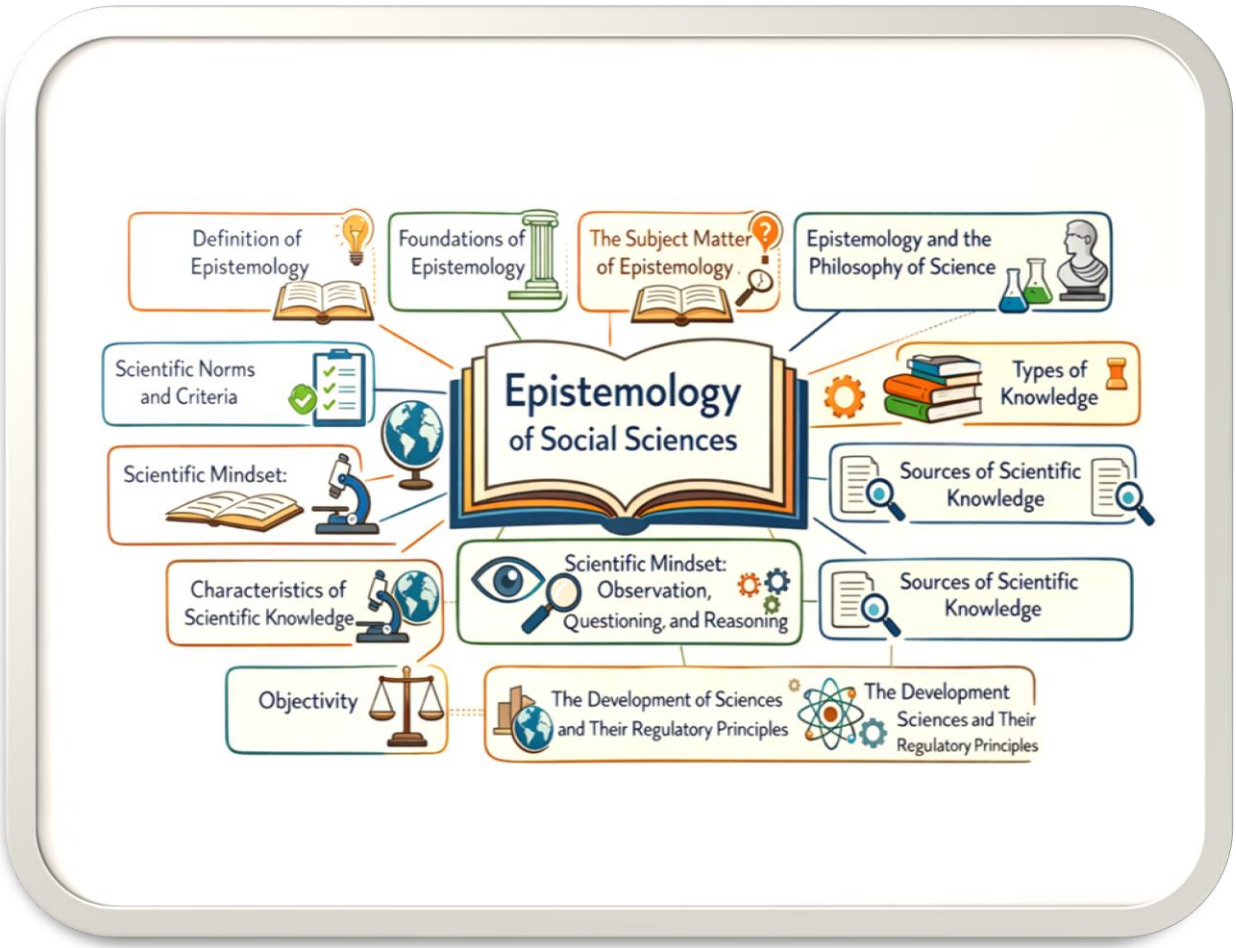
1. Definition of Epistemology
2. Foundations of Epistemology
3. The Subject Matter of Epistemology
4. Epistemology and the Philosophy of Science
5. Scientific Norms and Criteria
6. Scientific Mindset: Observation, Questioning, and Reasoning
7. Types of Knowledge
8. Characteristics of Scientific Knowledge
9. Objectives of Science
10. Sources of Scientific Knowledge
11. Sources of Scientific Knowledge
12. Main Characteristics of Scientific Concepts
13. Objectivity
14. The Development of Sciences and Their Regulatory Principles
15. Explanatory Models

## References


1. بول موري المنطق والفلسفة العلوم، ترجمة فؤاد زكريا القاهرة دار النهضة 1973
2. الجابري عابد محمد: مدخل الى فلسفة العلوم تطور الفكر الرياضي والعقلانية المعاصرة الجزء الأول، بيروت دار الطليعة،1982
3. سالم يفوت، بن عبد السلام: درس الأبستمولوجيا، دار البيضاء المغرب دار توبقال للنشر،1988
4. كامل فؤاد وآخرون: الموسوعة الفلسفية المختصرة بيروت، دار القلم بدون سنة
5. A Lalande ; Vocabulaire technique et critique de la philosophie, paris Ed PUF 1986
6. La rousse : Dictionnaire encyclopédique, librairie larousse, paris 1979 volume 13
7. R. Blanché ; L'épistémologie, paris éd PUF 197

## Semester 1 – ECTS-Based Curriculum Structure

| Teaching Unit | Course Title | ECTS Credits | Coefficient | Weekly Hours | Total Contact Hours (15 weeks) | Assessment |
|---|---|---|---|---|---|---|
| | | | | Lecture | Tutorial | Practicals |
| **Core Unit (UE C 1.1)** | | **20** | **8** | | | |
| | Introduction to Anthropology | 5 | 2 | 1h 30m | 1h 30m | – |
| | Introduction to Psychology | 5 | 2 | 1h 30m | 1h 30m | – |
| | Introduction to Sociology | 5 | 2 | 1h 30m | 1h 30m | – |
| | Introduction to Philosophy | 5 | 2 | 1h 30m | 1h 30m | – |
| **Methodological Unit (UE M 1.1)** | | **6** | **4** | | | |
| | Epistemology of Social Sciences | 3 | 2 | 1h 30m | 1h 30m | – |
| | Descriptive Statistics | 3 | 2 | 1h 30m | 1h 30m | – |
| **Exploratory Unit (UE E 1.1)** | | **2** | **2** | | | |
| | History of Algeria 1 | 1 | 1 | 1h 30m | – | – |
| | Documentary Research 1 | 1 | 1 | 1h 30m | – | – |
| **Horizontal Unit (UE H 1.1)** | | **2** | **2** | | | |
| | Introduction to Economics | 1 | 1 | 1h 30m | – | – |
| | Foreign Language 1 | 1 | 1 | – | 1h 30m | – |
| **Total Semester 1** | | **30 ECTS** | **16** | **13h 30m** | **10h 30m** | |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The Development Sciences and Their Regulatory Principles

# Practical Guidelines for Students

## How to Use This Handout

- This handout is **not a replacement for lectures**; it complements them.
- Read each lecture **before class** to be prepared for discussion and participation.
- After class, **review the lecture** and take your own notes.
- Focus on **key terms** (Epistemology, Objectivity, Accumulation, Interpretation…) and **rephrase them in your own words** for deeper understanding.
- Use the **tables and summaries at the end of each lecture** to reinforce your knowledge.

## Advice for You, Student

- Don't treat the material as **mere definitions**.
- Connect epistemology to your **daily life**: How do you know if news is true? How can you read a Facebook post critically? Is all knowledge useful? These are **epistemological questions**.

## Ask Yourself Regularly

- How do I know that what I know is true?
- Is what I study science or opinion?
- What is the difference between **interpreting** a social phenomenon and **judging** it?
- Can science ever be completely objective?

These questions are the **spirit of epistemology**. Don't fear them—engage with them. They are your gateway to becoming a **true scientific thinker**.

## Create a "Personal Epistemology Notebook"

- Dedicate a notebook to write in your own words what you understood from each lecture, **without copying verbatim**.
- At the end of each lesson, answer: *"What is the most important new idea I learned today?"*
- Record any **questions that puzzled you** and revisit them after further reflection or discussion.

- Note **connections between lecture concepts and your daily experiences or observations**.
- Rephrase **definitions and concepts in your own style**, using examples from your surroundings.
- Each week, write a short free paragraph titled: *"How has my understanding of science changed this week?"*
- At the end of the semester, review this notebook—you will notice how your **insights and understanding have evolved**.

**Where to Find Additional Resources**

- **Arabic References:**
  - Mustafa Al-Nashar, *Introduction to Philosophy of Science*
  - Abdel Salam Ben Abdel Ali, *Metaphysics and Science*
  - Jamil Saliba, *Philosophical Dictionary*
- **French References:**
  - Gaston Bachelard, *La formation de l'esprit scientifique*
  - Jean Ladrière, *Les enjeux de la rationalité*
- **Videos and Lectures:**
  - "Philosophy of Science" series by Dr. Mohamed Abed Al-Jabri on YouTube
  - CrashCourse Philosophy channel on YouTube (English, subtitled)
- **Useful Applications:**
  - Quizlet: for creating flashcards for each lecture
  - Miro or MindMeister: for concept mapping
  - Zotero: for organizing references and academic sources

**How to Prepare for Exams**

- Don't rely on memorization alone; **understand each concept and its context**.
- Connect lectures: how does knowledge evolve from a philosophical question to a scientific model?
- While reviewing, try to answer:
  - What is the difference between **scientific knowledge** and **everyday knowledge**?
  - Why do we need **rules in science**?
  - How does science change over time?
- Use **mind maps** to summarize each lecture.
- Practice writing **short paragraphs explaining concepts clearly**, as if you are teaching a classmate

## Introduction

Epistemology is one of the most important intellectual approaches for understanding the nature of science and its internal logic. It does not merely study knowledge in its content; rather, it analyzes the conditions of its production, the mechanisms of its formation, and the limits of its validity. Epistemology questions knowledge itself, examining its foundations, methods, and the nature of the relationship between the knowing subject and the object of knowledge. From this perspective, epistemology provides the theoretical background that guides social science researchers, enabling them to distinguish between what is based on belief or opinion and what is scientific, testable, and verifiable. A student who studies social phenomena without epistemological awareness remains confined to surface-level descriptions, whereas one equipped with epistemological tools becomes a critical agent, questioning established knowledge and reconstructing it according to a rigorous scientific logic.

The importance of epistemology in shaping a social researcher lies in its capacity to make the student understand that scientific knowledge is not given a priori; it is a historical and cultural construct that develops over time and is influenced by intellectual and societal changes. What is considered a scientific fact in one era may become a disputable hypothesis in another. This demonstrates that science is not a closed system of fixed laws but a continuous process of correction, review, and critique. Epistemological awareness distinguishes the researcher who understands the relativity of knowledge and recognizes that every scientific production carries within it both limits and possibilities. Objectivity does not mean the absence of the self; rather, it entails awareness and framing within the rules of the scientific method.

In the field of social sciences, this awareness becomes even more crucial because the researcher deals with a highly complex subject: humans within their social and cultural contexts. Humans are not static objects that can be measured or isolated; they are active agents who influence and are influenced, changing with time and place. Therefore, epistemological awareness is essential for distinguishing between natural and social phenomena. Social phenomena cannot be experimented upon in a laboratory in the same way as natural phenomena; they require methodological tools that consider context, history, culture, and meaning. A social researcher does not simply collect data; they strive to understand and interpret it, linking it to the system of symbols and values that shape collective consciousness. For this reason, epistemological training equips the researcher to be aware of the limits of the knowledge they produce and the necessary distance to maintain between themselves and their subject.

From this standpoint, this pedagogical text, directed at first-year social science students, serves as a formative tool aiming to instill the foundations of scientific and epistemological thinking while fostering critical and logical reasoning. It does not merely present abstract theoretical concepts but seeks to immerse the student in the experience of scientific thinking, teaching them how to question, doubt, analyze, and reason, rather than simply receiving knowledge passively. The text is organized in a logical, progressive sequence that accompanies the student through the development of scientific awareness—from basic concepts to more complex epistemological models.

The first lecture introduces epistemology, clarifying its foundations and subject matter while linking it to philosophy and science, posing the fundamental questions: How do we know? What makes knowledge scientific? The second lecture examines the sources and controls of scientific knowledge—from sensation, reason, and experimentation to methodological standards such as precision, objectivity, and verifiability—aiming to enable students to distinguish scientific knowledge from ordinary knowledge and to recognize that science is based on an organized method, not opinions or beliefs.

The third lecture addresses the characteristics and objectives of scientific knowledge, emphasizing accumulation, organization, explanation, prediction, and control, as features that distinguish scientific thinking from other types. It illustrates how scientific knowledge becomes a tool for understanding and managing social phenomena through systematic analysis.

The fourth lecture focuses on the scientific spirit and thinking skills, representing the practical side of epistemology. Students learn the values of impartiality, critical thinking, curiosity, and methodological accountability, alongside essential skills such as scientific observation, questioning, and logical reasoning based on induction and deduction. The fifth lecture traces the evolution of sciences and explanatory models, helping students understand that scientific thought itself evolves over time, and that each stage in the history of science produces different epistemological models guiding research—from classical to positivist, and then interpretive, structuralist, and postmodern approaches in social sciences.

These lectures are not isolated theoretical lessons but an integrated pathway to build epistemological awareness step by step, following a cumulative pedagogical approach that moves from concept to practice, from understanding to analysis, and from description to critique. This text aims to cultivate a critical scientific mindset that rejects rote learning and embraces the notion that true knowledge is built through questioning rather than memorization. The content is supported with real-life examples from social sciences, demonstrating how epistemological concepts are applied in field research, such as observation,

interviews, and qualitative analysis, highlighting the difference between ordinary and scientific thinking.

The ultimate goal of this text is to develop a social researcher equipped with scientific thinking tools, capable of constructive criticism, and able to understand the relationship between theory and practice, method and reality. Epistemology does not teach the student what to know but how and why to know. It represents intellectual training that liberates the mind from unquestioned assumptions and trains it to examine and reflect before making judgments. Scientific thinking is concerned not only with results but with the process, the methodology that produced them, and the conditions that make them understandable and open to critique.

In this sense, this pedagogical text constitutes a foundational component in forming university students in social sciences, providing them with the ability to think about knowledge before producing it and to recognize that every science is a human project, open to revision and improvement. It fosters a spirit of inquiry, continuous pursuit of truth, and trains students to regard knowledge as a social and cultural phenomenon, not as an absolute certainty. Epistemology teaches that science is not a mechanical accumulation of information but a continuous critical process aimed at a deeper understanding of humans and society. Therefore, this text is not merely an academic resource but a project for developing a critical social scientific mind capable of responsible knowledge production, methodological rigor, and an open humanistic vision.

## Lecture 1: General Concepts

### Introduction:

The issue of knowledge and its production is a fundamental concern in both philosophy and the sciences, with its questions resonating across various research fields, especially the social sciences. Understanding how knowledge is formed, what distinguishes scientific knowledge from other types, and what its limits and potentials are, contributes to establishing a solid foundation for any scientific study. These questions are particularly significant in the social sciences, where cultural, historical, and political factors intersect in shaping human understanding of reality.

Several philosophical domains focus on analyzing scientific knowledge from different perspectives, helping to clarify research methodologies in the social sciences. While some scholars focus on the foundations and conditions of knowledge, others analyze methods of scientific justification or investigate the methodological principles guiding the development of sciences. These distinctions are not merely theoretical categories; they directly affect how theories are formulated and research methods are chosen when studying society and human behavior. In social sciences, investigating scientific knowledge becomes more complex due to the influence of social and historical contexts on the phenomena studied, raising questions about researcher objectivity, the possibility of accessing stable truths, and the limits of interpretation.

Thus, reflecting on these issues is not limited to philosophers; it is an essential part of the work of social researchers who aim to understand society based on clear epistemological foundations and rigorous methodology. In this lecture, we aim to clarify key concepts and eliminate confusion by defining epistemology, theory of knowledge, philosophy of science, and methodology, and finally examining the distinctions between them to reduce ambiguity for first-year students.

### 1. Definition of Epistemology

#### a. Linguistic:

Epistemology, as a French term, is derived from the Greek words "ἐπιστήμη" (epistēmē), meaning “knowledge” or “science,” and "λόγος" (logos), meaning “study” or “discourse.” Linguistically, the term refers to the "study of

knowledge" or the "theory of knowledge.[1]" The term entered the French language in 1901 through the translation of Bertrand Russell's *Essai sur les fondements de la géométrie*.

**b. Technical/Philosophical:**

Philosophers have provided various definitions of epistemology. **La Lande** defines it as: "The philosophy of science, but in a more precise sense. It does not merely concern the study of scientific methods, which belong to methodology and logic, nor is it a hypothetical or intuitive construction of scientific laws. At its core, it is a critical study of the principles, hypotheses, and results of various sciences, aiming to determine their logical origin, value, and degree of objectivity."[2]

From this, epistemology can be understood as a critical study of scientific principles, hypotheses, and results, focusing on their objectivity and scientific value, independent of psychological origins. It examines the conditions for scientific knowledge, making it a critical analysis of science itself, while distinguishing it from other cognitive studies. It also separates philosophy of science from methodology, the latter concerning methods and classified under logic—divided into formal logic (focused on general reasoning structures) and applied inductive logic (studying scientific methods descriptively, not critically).

**Jamil Saliba**, in the ***Philosophical Dictionary***, defines epistemology as: "A branch of philosophy that examines the origin, nature, value, and limits of human knowledge and studies the truth of different kinds of knowledge and the means of attaining it."[3] This definition situates epistemology within philosophy, focusing on human knowledge, its origins, nature, value, and limits. It addresses how knowledge is acquired—through senses, reason, experience, or intuition[*]—and analyzes the reliability and value of knowledge, distinguishing scientific knowledge from ordinary or intuitive knowledge.

**Youssef Karam**, in ***History of Modern Philosophy***, defines epistemology as: "The study concerned with analyzing the nature and sources of knowledge,

[1] [1] La rousse dictionnaire encyclopédique, **librairie la rousse**, paris volume 13,1979, p : 501.

[2] la lande: **vocabulaire technique et critique de la philosophie**, 2eme édition, P.U.F paris, .1986,p : 293

[3] جميل صليبا، المعجم الفلسفي، الجزء الأول، دار الكتاب اللبناني، بيروت، 1982، ص 134.

[*] Intuition can be simply described as the immediate and direct awareness of facts without the need for reasoning or logical proof. For example, when a student enters the classroom, they might have a gut feeling that something is off, which later turns out to be true, such as the class being canceled

exploring its possibilities and limits."[1] This emphasizes epistemology as a theory of knowledge that examines its nature, sources, and the conditions under which knowledge can be considered true, addressing the reliability of evidence and the boundaries of human understanding.

## 2. Definition of Theory of Knowledge

### a. Linguistic:

The term consists of two words:[2]

- *Theory*: from the verb  (to look/consider), meaning reflection or contemplation to understand.
- *Knowledge*: from  (to know), meaning perception, comprehension, or awareness.

Thus, linguistically, the theory of knowledge refers to the study and reflection on the nature of perception and understanding.

### b. **in the technical sense**

The conflation of epistemology with the theory of knowledge has often led to treating them as a single concept, despite subtle distinctions between the two. Epistemology, as a Western philosophical term, refers to the critical study of knowledge, focusing on the systematic analysis of its conditions, sources, and limits, as highlighted in the previous definitions. This overlap has led us to approach epistemology as an attempt to understand knowledge within its philosophical framework, which necessitates clarifying the concept of the theory of knowledge in various contexts.

There are multiple definitions of the theory of knowledge, among which the most notable is that of **Mohamed Abed al-Jabri** in his book ***Introduction to the Philosophy of Contemporary Rational Sciences and the Development of Scientific Thought.*** He defines it as the field concerned with investigating the possibility of acquiring knowledge about existence in all its forms and manifestations.[3]

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[1] يوسف كرم، **تاريخ الفلسفة الحديثة**، لجنة التأليف والترجمة، القاهرة، 1936، ص 45.

[2] مصطفى عبده، ***المعجم الفلسفي***، دار الفكر العربي، القاهرة، 2001، ص 210.

[3] محمد عابد الجابري، **مدخل إلى فلسفة العلوم: العقلانية المعاصرة وتطور الفكر العلمي**، مركز دراسات الوحدة العربية، بيروت، 1976، ص ص، 20-21.

In his definition of the theory of knowledge, Mohamed Abed al-Jabri emphasizes that its subject revolves around examining the possibility of attaining genuine knowledge about existence in all its forms and manifestations. This implies that the theory of knowledge does not merely describe knowledge itself, but investigates the conditions for its realization and its capacity to explain reality.

Descartes, in his definition of the theory of knowledge, emphasized the role of doubt, which he considered "a means to achieve certain knowledge."[1] This work represents a turning point in modern philosophy, as Descartes advocates for the use of reason and critical thinking as the foundation for acquiring knowledge.

John Locke defines the theory of knowledge as "the study of the relationship between ideas and experience," asserting that knowledge originates from sensory experience and mental reflection, rather than from innate ideas with which humans are born. In his work *An Essay Concerning Human Understanding*, Locke explains that the mind at birth is a blank slate (*Tabula Rasa*), and all our knowledge is constructed through sensory perception and experience.[2]

From this definition, it is clear that Locke sought to connect knowledge to sensory input, rejecting the existence of pre-existing innate ideas. All knowledge is acquired from direct interaction with the external world through the senses. These sensory data are then processed by the mind through various cognitive operations, such as reasoning, organization, and synthesis, establishing the senses as the primary and immediate source of knowledge.

## Third: Definition of the Philosophy of Science

### a. Linguistic Definition:

The term *Philosophy of Science* is composed of two words:

- **Philosophy:** Linguistically, the term originates from Greek, consisting of two components: *Philo*, meaning "love," and *Sophia*, meaning "wisdom." Thus, philosophy literally means "the love of wisdom."[3]

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[1] ربنيه ديكارت ، **مقال عن المنهج**، ترجمة محمود محمد الخضيري، دار المعارف، القاهرة، 1968، ص 32.

[2] جون لوك، ***الأعمال الفلسفية الفهم البشري - الأفكار***، ترجمة عبد الكريم ناصيف ، دار الفرقد للنشر والتوزيع، 2025، ص 33.

[3] يوسف كرم، **تاريخ الفلسفة اليونانية**، دار المعارف، القاهرة، مصر، 1936، ص 03.

- **Science:** The word *science* is the plural of ʻ**علم** in Arabic, derived from the verb ʻ**عَلِمَ**, meaning to perceive, understand, or comprehend. In its original linguistic sense, it refers to having complete knowledge of something. Science, therefore, is defined as the comprehension of a thing in its essence.[1]

Consequently, linguistically, the *philosophy of science* refers to deep and critical reflection on the principles and methods of scientific knowledge

**b. Terminologically:**

**Karl Popper** defines it as a "critical analysis of scientific methods, aimed at distinguishing genuine science from pseudo-science through the principle of falsifiability."[2] In other words, the philosophy of science should critically examine scientific methods to differentiate between real science and pseudo-science based on the principle of falsifiability.

But what do we mean by this concept? Falsifiability refers to the requirement that a scientific theory must be testable and refutable through empirical observation or evidence. In other words, there must be a possibility of proving the theory wrong if it does not correspond to reality. Theories that cannot be tested or potentially refuted are considered pseudo-scientific. For example, psychoanalysis, which relies heavily on concepts such as (Unconscious, Oedipus complex, repression) – these are some of the key concepts in psychoanalysis. If we attempt to subject them to empirical testing, we encounter a significant problem: the theory is structured in a way that it can accommodate any outcome. For instance, if a person experiences difficulties in a romantic relationship, Freud might explain it as evidence of an unresolved Oedipus complex; if the person succeeds in a relationship, the theory can claim that the complex has been resolved. In this way, the theory accounts for all possible scenarios, which makes it **immune to empirical falsification** and thus fails to meet the principle of falsifiability.

Therefore, **Popper** considered psychoanalysis not as genuine science but as **pseudo-science**, since it cannot be tested through scientifically falsifiable methods.[3] According to him, any field that does not rely on logically structured hypotheses cannot be considered true science, as it lacks empirical testability.

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[1] أحمد شلبي، **موسوعة العلوم الإسلامية والحضارة**، مكتبة النهضة المصرية، القاهرة، مصر، 1987، ص12.

[2] كارل بوبر، **منطق البحث العلمي**، ترجمة: محمد البغدادي، مركز دراسات الوحدة العربية، بيروت، لبنان، 2006، ص 45.

[3] كارل بوبر، **منطق البحث العلمي**، مرجع سبق ذكره، ص 37.

Genuine science, in Popper's view, must be **testable and executable**; otherwise, it falls into the category of pseudo-science.

Similarly, **Thomas Kuhn** defines it as "the study of the development of scientific knowledge through scientific revolutions that replace prevailing paradigms and establish new ways of scientific thinking."[1]

Through Thomas Kuhn's definition, we can see that the philosophy of science focuses on the **development of scientific knowledge**, rather than solely on the analysis of research methods as emphasized by **Karl Popper**. According to Kuhn, science does not progress in a simple linear or cumulative manner; instead, it undergoes **scientific revolutions** that replace prevailing paradigms[*] and establish new ways of scientific thinking.

According to Kuhn, the development of science passes through several stages:[2]

1. **Normal Science**: Scientists work within a prevailing paradigm, solving problems according to its framework.
2. **Crisis**: Problems arise that the dominant paradigm cannot explain, leading to a loss of confidence in it.
3. **Scientific Revolution**: The old paradigm is replaced by a new one with greater explanatory power.
4. **New Paradigm**: The new model becomes dominant, and a new cycle of normal science begins.

To illustrate Kuhn's idea, we can present an example from sociology. The concept of a scientific paradigm can be applied to the major theoretical schools that shaped the development of the discipline. A prominent example is the shift from **structural-functionalism** to **conflict theory**, which reflects a transformation in the dominant framework for understanding social phenomena.

1. **Dominant Paradigm: Structural Functionalism**
   Structural functionalism was the dominant paradigm in sociology during the first half of the twentieth century, particularly through the works of **Émile Durkheim** and **Talcott Parsons**.
   It assumes that society functions as an integrated system, where each institution plays a necessary role in maintaining social stability.

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[1] توماس كون، **بنية الثورات العلمية**، ترجمة: شوقي جلال، المنظمة العربية للترجمة، بيروت، لبنان، 2007، ص 85.

[*] The **scientific paradigm** refers to the intellectual or methodological framework that scientists rely on to interpret phenomena. It encompasses the **theories, concepts, methods, and tools** used by the scientific community during a specific period. An example of this is **Structural Functionalism**, as developed by **Émile Durkheim** and **Talcott Parsons**.

[2] المرجع نفسه، ص 89.

**Example:** Durkheim argued that religion reinforces social solidarity, while education contributes to the socialization of individuals according to societal requirements.

2. **Scientific Crisis: Challenges to the Functionalist Paradigm**
   By the 1960s, structural functionalism faced sharp criticism due to its inability to explain social conflict and rapid societal changes. Social movements, such as the civil rights movement in the United States, and political revolutions revealed the paradigm's weakness in addressing inequality and tensions within societies.
3. **Scientific Revolution: Emergence of Conflict Theory**
   Karl Marx originally introduced the concept of class conflict, which was later developed by sociologists such as **Ralf Dahrendorf** and **Lewis Coser** to explain society through conflicts between different groups rather than solely through functional integration.
   **New Concept:** Society is not necessarily balanced but is filled with conflicts resulting from class, ethnic, and economic disparities.
   **Example:** Whereas functionalism viewed education as a tool for societal development, conflict theorists see it as reproducing social inequality by privileging elites.
4. **New Science: Adoption of Multiple Theories**
   Structural functionalism no longer remained the dominant paradigm but became one approach among several.
   The **Symbolic Interactionism** paradigm emerged, focusing on the meanings individuals create through daily interactions, thereby broadening the scope of sociological analysis.

Through these definitions, we observe that the philosophy of science aims to analyze the nature of scientific knowledge, research methods, the limits of scientific explanation, and the relationship between scientific theories and reality. It also addresses issues such as the distinction between science and non-science, the structure of scientific theories, the role of hypotheses, and the nature of scientific progress.

## 4. Methodology

### a. Etymology:

The term *Methodology* is derived from the Greek word *methodos*, meaning "the path or approach followed to attain knowledge," and the suffix *-logia*, meaning "study" or "science." Therefore, linguistically, *Methodology* refers to the study of the methods or approaches used in research and knowledge acquisition.[1]

[1] Grix Jonathan, ***The Foundations of Research***, Palgrave Macmillan, 2010, p30

**b. Terminologically:**

Jonathan Grix, in his book *The Foundations of Research*, defines methodology as:

"The systematic study of the methods and procedures used in scientific research. It aims to analyze and evaluate research approaches, assessing their suitability and effectiveness in producing knowledge. Methodology differs from the 'method' in that it is not limited to the application of research techniques, but also concerns the philosophical and logical principles underlying these techniques."[1]

Grix's definition highlights the distinction between **method** and **methodology**. A careful reading shows that methodology involves **critical reflection on the methods and procedures used to produce knowledge**, grounded in philosophical and logical principles. In contrast, a method refers to **specific techniques and procedures** employed to collect and analyze data, such as surveys, interviews, or statistical analysis.

For instance, if a researcher aims to study the impact of social media on cultural identity, the **method** might involve using surveys to gather data from participants, conducting in-depth interviews, or performing content analysis of digital posts. The **methodology**, however, provides the theoretical framework that justifies the choice of these methods—such as adopting a qualitative approach to understand individuals' subjective experiences or a quantitative approach to measure prevailing patterns and trends.

As Grix further emphasizes in *The Foundations of Research*:

"Methodology goes beyond merely selecting tools; it involves a critical evaluation of research methods based on philosophical and logical foundations, thereby facilitating the production of more precise and coherent knowledge."[2]

In the Arab context, Dr. Yomna Tarif Al-Khouli, in her book *The Concept of the Scientific Method*, attempted to clarify the concept of methodology and move it beyond lingering ambiguities by defining it within a **philosophical and methodological framework**. She defines methodology as:

"The research methods of science that crystallize the refined essence of the remarkable progress achieved by modern experimental science. Methodology represents an effective applied logic that serves various sciences, whether

[1] Ibid

[2] Ibid,p43.

natural, social, or humanistic. It also contributes to shaping the civilizational structure by promoting productive modes of thinking. According to her, the term 'methodology' was originally formulated by the German philosopher Immanuel Kant, who distinguished between general logic and practical logic, the latter relating specifically to the methods of the sciences."[1]

Dr. Yomna Tarif Al-Khouli, in her book *Localization of Scientific Methodology: Philosophical, Historical, and Future Approaches*, further emphasizes that scientific methodology encompasses **mechanisms and logical rules that are globally shared**, yet it is influenced by civilizational and cultural contexts. In the Islamic context, methodology includes research methods, inference tools, and analytical and critical thinking skills, while also highlighting Islamic values and civilizational specificity. This contributes to **localizing scientific practices within the Islamic environment** and defining the ethics and objectives of scientific research.[2]

Thus, methodology is the field concerned with studying the **theoretical and procedural foundations** that guide scientific research across various disciplines. It aims to develop methodological tools that assist in analyzing and understanding phenomena in a systematic and precise manner, with a focus on selecting appropriate methods for data collection and analysis according to the nature of the subject under study. Furthermore, this field seeks to ensure **objectivity and accuracy in research** by adopting methodologies that align with research objectives and the diverse scientific contexts in which they are applied.

## 4. Differences between Epistemology, Theory of Knowledge, Philosophy of Science, and Methodology in Terms of Subject, Method, and Objectives

In philosophical and scientific research, concepts related to knowledge play a **central role in defining the foundations of scientific thinking and research methods**. Distinguishing between **epistemology, theory of knowledge, philosophy of science, and methodology** is essential for understanding the nature of scientific knowledge, how it is produced, and how it can be verified. Despite the overlap among these concepts, each has its **own domain of interest, methodology, and objectives**. This section aims to clarify the fundamental differences among them in terms of the subject of study, methods employed, and purposes served in philosophical and scientific fields.

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[1] يمنى طريف الخولي، **مفهوم المنهج العلمي**، مؤسسة هنداوي، المملكة المتحدة، 2015، ص 47.

[2] يمنى طريف الخولي، **توطين المنهجية العلمية: مقاربات فلسفية... تاريخية ومستقبلية**، مؤسسة هنداوي، المملكة المتحدة، 2019، ص 143.

Based on the definitions discussed previously, we can outline the main distinctions as follows:

- **Epistemology** is the philosophical branch that studies the nature, sources, and conditions of knowledge. It addresses questions such as: *How do we know? What are the limits of our knowledge?* It analyzes the reliability of methods of acquiring knowledge, including sensory perception, reason, and scientific inference. Epistemology relies on **analytical and critical methods**, seeking to verify human knowledge and distinguish truth from illusion.
- **Theory of Knowledge** is broader than epistemology, encompassing the philosophical study of knowledge as well as scientific and social aspects related to its production and circulation. It concerns different forms of knowledge—scientific, religious, or cultural—and analyzes their interaction with societal beliefs and values. While epistemology focuses on the philosophical foundations of knowledge, the theory of knowledge combines **philosophical analysis with empirical studies** to understand how knowledge is formed within societies.
- **Philosophy of Science** examines the philosophical foundations of science, the nature of scientific theories, and research methodologies. It explores the nature of scientific explanation, hypotheses, and the objectivity of scientific knowledge. It also addresses issues such as the boundaries between science and non-science, the role of **paradigms** in scientific development, and the relationship between science and reality. Philosophy of science relies on **philosophical and historical analysis** to understand the evolution of scientific knowledge and its connection to social and cultural contexts.
- **Methodology** refers to the systematic study of research methods and tools across different scientific disciplines. Its aim is to establish a **theoretical and procedural framework** that helps researchers select appropriate methods—qualitative or quantitative—to ensure the **accuracy and reliability** of research outcomes. Unlike philosophy of science, methodology focuses more on the **practical application of research methods** rather than on philosophical issues related to science.

To understand the position of epistemology within the broader field of knowledge, it is important to distinguish it from these other concepts. The following table can help clarify these differences:

| Concept | **Focus** | **Approach** | **Purpose** |
|---|---|---|---|
| Epistemology | The nature of knowledge. Its sources, | Critical and analytical examination of | Assessing the reliability of knowledge. |

| | | | |
|---|---|---|---|
| | conditions, and limits. | how knowledge is acquired. Study of the relationship between belief and truth. | Distinguishing truth from error. |
| Theory of Knowledge | Human knowledge in its various forms. Its connection to society. | Philosophical, social, and cultural analysis of knowledge. | Understanding how knowledge is formed and circulated. Examining its impact on societies. |
| Philosophy of Science | Foundations of science. Scientific theories and the objectivity of scientific inquiry. | Philosophical and historical analysis of scientific methods and theories. | Understanding the nature of science. Critically evaluating and improving scientific methodologies. |
| Methodology | Research methods and techniques across different sciences. | Applied and procedural study of scientific methods. | Developing effective research tools. Ensuring the production of accurate and reliable knowledge. |

**Table 1. Conceptual Differences between Key Knowledge-Related Concepts**

**Summary**

Epistemology is concerned with examining the nature of scientific knowledge, its foundations, and its governing principles. It seeks to explain how valid knowledge can be distinguished from false or unreliable claims. The theory of knowledge, by contrast, focuses on the ways human beings acquire knowledge and how its credibility can be assessed through sense perception, reason, and experience. Philosophy of science addresses the philosophical foundations of science itself and reflects on its aims and underlying assumptions, while

methodology concentrates on scientific procedures and research techniques required to produce accurate and reliable knowledge.

The distinction between these concepts lies in their focus, approach, and objectives. Epistemology investigates knowledge as such, the theory of knowledge examines the processes through which knowledge is obtained, philosophy of science offers a reflective analysis of science, and methodology deals with the practical tools and systematic steps of research. Together, these fields complement one another and provide students with a coherent understanding of scientific knowledge and the logical, methodical ways in which it is produced.

**Self-Assessment**

**1. Multiple Choice Questions:**

1. Which of the following concepts refers to the study of the conditions for producing scientific knowledge?
   a) Methodology
   b) Epistemology
   c) Ideology
   d) Phenomenology
2. According to Karl Popper, for a theory to be scientific, it must be:
   a) Empirically verifiable
   b) Irrefutable
   c) Falsifiable
   d) Consistent with philosophical intuition
3. Which of the following thinkers is known as the founder of the concept of "scientific revolutions"?
   a) Immanuel Kant
   b) Thomas Kuhn
   c) John Dewey
   d) Auguste Comte

**2. True or False (with correction if false):**

1. The theory of knowledge only deals with studying the sources of knowledge without considering its limits and possibilities. (True / False)
2. Descartes considers doubt as the primary means to reach certainty. (True / False)
3. John Locke believes that humans are born with innate knowledge. (True / False)
4. Philosophy and science do not share any methodological principles. (True / False)

5. Karl Popper rejects the idea that scientific theories should be falsifiable. (True / False)

**3. Fill in the Blanks:**

1. Lalande defines epistemology as .....
2. John Locke is one of the main pioneers of ..... philosophy, believing that knowledge comes from .....
3. One of the main criteria for science according to Karl Popper is ....., where theories must be .....
4. Thomas Kuhn focuses on the concept of ..... in explaining the development of science through stages of evolution and scientific revolutions.
5. Descartes believes that true knowledge should rely on ..... rather than .....

**4. Questions for Understanding and Reflection:**

1. How can philosophy and science be reconciled in the study of knowledge?
2. Discuss the impact of Thomas Kuhn's theory of scientific revolutions on the understanding of social sciences development.
3. What is the difference between sensory knowledge and rational knowledge? Which is considered more reliable for interpreting reality?
4. How did Descartes' philosophy influence the development of modern scientific thought?
5. Do you think all knowledge can be scientifically verified? Why or why not?

## Lecture Two: Toward an Integrated Epistemological Understanding Foundations, Subject Matter, and Significance

### Introduction

After becoming familiar in the first lecture with the concept of epistemology and its relationship to theory of knowledge and philosophy of science, this lecture moves toward a deeper engagement with epistemology through an examination of its foundations, its subject matter, and its significance.

The main aim is to enable you to understand how scientific knowledge is constructed, how it can be distinguished from non-scientific forms of knowledge, and how researchers approach the study of social phenomena from a methodological perspective.

This introduction prepares you to adopt a critical and systematic mode of thinking. It also equips you to apply the tools of scientific research with rigor and objectivity.

### First: The Foundations of Epistemology

When we speak of epistemology as a critical study of scientific knowledge, we are not limited to defining the concept or identifying its object of inquiry. We move instead toward examining the foundations on which it rests. These foundations consist of the intellectual and methodological principles that make it possible to distinguish scientific knowledge from other forms of knowledge.

These foundations did not emerge all at once. They were shaped historically through a long process of philosophical and intellectual accumulation. This process began with the attempts of Greek philosophers to understand the relationship between reason and reality. It continued through major transformations in modern scientific thought. It extends to contemporary debates concerning the nature of knowledge and its limits.

The significance of these foundations lies in their role in providing a critical framework for understanding the conditions under which scientific knowledge is produced, the standards that regulate it, and the criteria through which its validity is assessed. At their core lies a fundamental question: what makes knowledge scientific. For this reason, these foundations constitute the cornerstone of the epistemological structure.

Within this context, key concepts emerge, such as methodological doubt, experimentation, rationality, scientific language, cumulative knowledge, and epistemological ruptures. These concepts help you, as a researcher in the social

sciences, to recognize that knowledge is not a ready-made given. It is a complex constructive process governed by rigorous principles and shaped by a continuous history of critique and revision.

Through the study of these foundations, you become able to distinguish between opinion and knowledge, between scientific discourse and common discourse, and between what is scientific and what is ideological or mythical. This is precisely what makes epistemology indispensable for any researcher seeking to understand and evaluate the mechanisms through which knowledge is produced within scientific fields, especially in the domain of the social sciences.

## 1. Doubt: From Philosophical Skepticism to Scientific Vigilance

Doubt constitutes a foundational pillar in the epistemological construction of knowledge. It emerged as a driving force that enabled thought to move beyond the authority of tradition toward the horizon of critique. Modern philosophers regarded doubt as a primary condition for any rational form of knowledge.

With René Descartes, doubt ceased to be associated with ignorance or confusion. It became a systematic method aimed at reaching certainty. His well-known formulation, "I doubt, therefore I think, therefore I exist," reflects a decisive shift in the status of doubt within philosophical inquiry. Doubt, in this sense, was not intended as an act of destruction but as a process of rigorous examination.[1]

For Descartes, knowledge that does not pass through the filter of doubt remains vulnerable to error and illusion. Doubt thus functions as an epistemological safeguard, transforming uncertainty into a moment of intellectual vigilance and making it a necessary step in the production of reliable and justified knowledge.

However, this method did not remain confined to philosophy. It gradually became embedded in the structure of scientific thinking. In the social sciences, guided doubt is a necessary condition for freeing you, as a researcher, from fascination with surface appearances and from uncritical acceptance of cultural assumptions.

This is where the contributions of anthropologists and sociologists become particularly significant. They transformed doubt into an entry point for reading reality, not as something natural or self-evident, but as a socially produced reality. **Émile Durkheim**, for example, questioned the idea that morality and religion are innate or biologically given. He proposed instead that moral and religious phenomena should be analyzed through their social origins.

[1] **رينيه ديكارت** .*تأملات في الفلسفة الأولى* .ترجمة جميل صليبا، بيروت: دار التنوير للطباعة والنشر، دون سنة نشر، ص. 32.

Durkheim argued that social reality possesses an objective character and therefore requires analysis that is independent of individual consciousness. In this way, doubt becomes a methodological tool that allows social phenomena to be approached critically and examined as products of specific social conditions rather than as timeless or natural facts.[1]

Doubt also appears clearly in the work of the anthropologist Franz Boas, who rejected unilinear evolutionary theories that assumed all societies pass through the same stages of development. Boas employed doubt as a methodological tool to dismantle ready-made ethnographic assumptions. He argued that each culture must be understood within its own specific context, and that the generalization of Western models represents a disguised form of colonial projection.[2]

Doubt also functions as an effective instrument for the deconstruction of ideology, especially in the analysis of political and media discourses. In discourse analysis, you are not expected to accept the surface linguistic form of a text. You are required instead to question its structure and to investigate its implicit meanings and symbolic power.

This critical use of doubt is evident in Michel Foucault's analysis of the relationship between power and knowledge. He maintained that every discourse is the product of power struggles and cannot be understood without a critical attitude grounded in systematic doubt.[3]

In this sense, doubt does not signify absolute denial. Rather, it represents a necessary stage in the reconstruction of knowledge on solid foundations. It is not a position of nihilism but an epistemic practice aimed at examining limits, testing concepts, and uncovering assumptions that may serve to conceal social interests or symbolic domination.

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[1] **إميل دوركايم** .*قواعد المنهج في علم الاجتماع* .ترجمة سامي الدروبي، بيروت: دار الفكر، دون سنة نشر، ص. 87.

[2] ينظر: **بواس فرانز** .*ذهن الإنسان البدائي* .ترجمة حسين فوزي، القاهرة: لجنة التأليف والترجمة والنشر، 1945، ص. 55–70.

[3] **ميشيل فوكو** .*أركيولوجيا المعرفة* .ترجمة سالم يفوت، الدار البيضاء – بيروت: المركز الثقافي العربي، 1986، ص. 102.

In the Arab context, we find applications of doubt in studies such as the works of **Abdallah Laroui**, who employed methodological doubt in his reading of heritage and modernity. He argued that the Arab understanding of modernity often rests on uncritically examined historical or epistemic assumptions.[1]

Thus, it becomes clear that doubt is not merely a temporary stage in scientific thinking. It is a permanent foundation that renews itself with every attempt at understanding, every critique of reality, and every effort to liberate knowledge from its complicity with ideology or tradition.

## Objectivity: Toward the Researcher's Detachment from Subjectivity and Bias

Objectivity is one of the central epistemological pillars of scientific knowledge. It represents the effort to separate the researching self from its subject, minimizing the influence of personal desires, preconceptions, and preconceived notions in the process of knowledge production.

Historically, objectivity emerged as a response to subjectivity in philosophical knowledge. Thinkers such as **Auguste Comte** emphasized the necessity of treating social facts as "things" independent of the self, to be described and explained as they are, not as we wish them to be.[2]

In the sociological context, **Émile Durkheim** systematically highlighted this principle, insisting that the researcher "place themselves in a position of complete neutrality toward the studied phenomenon" and rejecting any moral or value-based justification prior to observation.

Accordingly, when **Durkheim** studied the phenomenon of suicide, he did not approach it as a deviant act or as morally or religiously condemnable. Instead, he treated it as a social fact that could be measured and analyzed objectively, relying on official statistics to interpret the social patterns underlying suicide. [3]

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[1] **عبد الله العروي**. *الإيديولوجيا العربية المعاصرة*. بيروت: المركز الثقافي العربي، 1995، ص. 13.

[2] **أوجست كونت**. *دروس في الفلسفة الوضعية*. ترجمة عادل زعيتر، القاهرة: لجنة التأليف والترجمة والنشر، 1945، ص. 103.

[3] **إميل دوركايم**. *الانتحار: دراسة سوسيولوجية*. ترجمة جورج سعادة، بيروت: المؤسسة الجامعية للدراسات والنشر والتوزيع، 1986، ص. 23.

However, objectivity does not imply a complete detachment from the self or from society. As Pierre Bourdieu emphasizes, it involves the researcher's awareness of their social position and the influence of their class and cultural background on the research process, and the continuous effort to critically examine and mitigate this influence.

For Bourdieu, objectivity is not a given condition but a "constant epistemological effort" that requires the researcher to practice "reflexive analysis" (réflexivité)—that is, to maintain an ongoing awareness of their position within the scientific and social field.[1]

The demand for objectivity acquires even greater significance in the social sciences, because the subject of study is not a material object but human beings—their interactions, beliefs, values, and interests. This makes the risk of value-based or ideological biases more pronounced. When examining issues such as gender, religion, or power, a researcher cannot ignore the influence of their own cultural framework.

Here lies the importance of objectivity as a critical effort to move beyond self-centered perspectives, rather than as a form of metaphysical neutrality.

For example, when the Moroccan scholar **Fatema Mernissi** studied the position of women in traditional Islamic society, she did not limit herself to describing phenomena. She aimed to deconstruct the ideological underpinnings of dominant texts while adhering to a scientific methodology that uses critique as a tool for objectivity, not as a means of moral judgment.[2]

In scientific research, objectivity does not mean complete detachment from the self. Rather, it represents a deliberate effort to regulate the relationship between the researcher and the subject in a critical, conscious, and systematic manner. It is the researcher's awareness of their own biases—not their denial—and the commitment to transcend them rather than remain captive to them.

As the anthropologist **Clifford Geertz** observed, "The deepest knowledge does not arise from neutrality, but from conscious, critical engagement."[3]

**Empiricism: From Sensory Data to Methodical Evidence**

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[1] **بيير بورديو** .*بؤس العالم* .ترجمة نظير جاهل، بيروت: دار الأهالي، 1997، ص. 14.

[2] **فاطمة المرنيسي** .*الحريم السياسي: النبي والنساء* .بيروت: المركز الثقافي العربي، 1991، ص. 65.

[3] **كليفورد غيرتز** .*تأويل الثقافات* .ترجمة فريد الزاهي، بيروت: دار توبقال للنشر، 2000، ص. 81–96.

Empiricism is one of the fundamental pillars upon which modern epistemology is built. It emphasizes reliance on sensory experience and direct observation of reality as the starting point for constructing knowledge.

Empiricism is grounded in the principle that humans are not born with innate ideas; rather, all knowledge arises from experience and interaction with the external world. John Locke, in his famous treatise *An Essay Concerning Human Understanding*, highlighted this idea, arguing that the human mind is initially a blank slate and that understanding is gradually built through sensory engagement and reflection on experience.[1]

However, empiricism is not limited to mere sensory observation. It requires moving from observation to controlled experimentation under methodological conditions to confirm or refute hypotheses. This is what gives scientific knowledge its evidential character: it is not enough to see; one must experiment, replicate, and control the conditions in order to understand the relationships between phenomena.

Although it is challenging to subject human phenomena to strict laboratory experiments as in physics or chemistry, experimentation takes a specific form in the social sciences, based on methodically designed social experiments. For example, in **1961**, social psychologist **Stanley Milgram** conducted his famous obedience experiment, placing participants in a situation where they were instructed to "inflict harm on others" under orders from an authority figure. The results revealed a tendency for individuals to comply with authority even when it conflicted with their own conscience.[2]

In sociology, many researchers employ field experimentation methods, such as randomized controlled trials, to study the effects of social support programs or public policies on vulnerable populations. For instance, Abdallah Laroui, in his analysis of Moroccan society, used techniques of careful observation and historical experimentation to uncover the traditional structures of the **Moroccan** collective mindset.[3]

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[1] **جون لوك**، ***الأعمال الفلسفية الفهم البشري - الأفكار*** ، مرجع سبق ذكره، ص. 57.

[2] **ستانلي ميلغرام** .*الطاعة للسلطة: التجربة التي صدمت العالم* .ترجمة عبد الله إسماعيل، الكويت: سلسلة عالم المعرفة، عدد 13، المجلس الوطني للثقافة والفنون والآداب، 1979، ص. 123.

[3] عبد الله العروي، مرجع سبق ذكره، ص: 165.

In anthropology, empiricism is applied through "participant observation," where the researcher immerses themselves in the studied community for an extended period, observing, interacting, and continuously testing hypotheses. This was exemplified by researcher **Fouad Fawaz** in her study of religious transformation among Arab youth, who noted, "I experimented with answers to my questions daily, in homes, cafés, and funerals, to reconstruct my original question."[1]

These examples demonstrate that empiricism in the social sciences is not a mere replication of the natural science experimental method. Rather, it is an adaptation tailored to the nature of human subjects, while maintaining the core principles of controlled observation, repeated testing, and systematic refinement of hypotheses. Scientific knowledge progresses not through abstract theorizing alone, but through concrete tests, continuously examined and reconstructed through experience.

Thus, empiricism asserts that there is no knowledge without testing, and no theory without resonance in reality. It places the researcher face-to-face with actual facts, rather than with their preconceived ideas about them, and urges them to test the limits of their assumptions rather than merely repeat them.

**Rationality: The Primacy of Methodical Thinking and the Construction of Knowledge on Logical Grounds**

Rationality constitutes one of the fundamental pillars in the epistemological structure of scientific knowledge. It is based on the principle that reason is a central tool for producing and justifying knowledge. From this perspective, the mind is not a passive intermediary that merely receives sensory data; rather, it is an active agent that reorganizes, analyzes, and connects information within a coherent logical framework.

The roots of this idea can be traced back to classical philosophy with Plato and Aristotle, but it took on a more systematic character with René Descartes in the seventeenth century, who advocated the use of the "rational method" as the sole path to epistemic certainty.[2]

In the social sciences, a researcher cannot rely solely on the collection of sensory data or empirical facts. These must be subjected to rational analysis

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[1] **فؤاد فواز** .*التحول والاعتقاد: دراسات في سوسيولوجيا الدين* .بيروت: دار الطليعة، 1993، ص. 88–90.

[2] **رينيه ديكارت** .*مقال عن المنهج*، مرجع سبق ذكره، ص. 15–22.

based on concepts and interpretive models. Reason does not generate knowledge from nothing; it regulates the processes of knowledge production: How are data collected? How are phenomena connected? How are relationships derived?

This approach is exemplified in the work of sociologist Max Weber, who employed "Ideal Types" to understand social phenomena. By constructing rational conceptual models, he was able to organize the apparent chaos of social reality into a coherent analytical framework.[1]

In contemporary Arab scholarship, **Abdallah Abd El-Da'em** highlighted the importance of rationality in the development of Arab scientific thought, emphasizing that "reason is not negated in the human sciences; rather, it guides the researcher's insight to uncover the deep symbolic structures of reality."[2]

Rationality in the social sciences also manifests through the use of theoretical models and abstract interpretations to understand phenomena. For example, in studies of social movements, protests are not explained solely by material conditions but also through systems of expectations and meanings that the mind organizes and analyzes within models such as "political opportunities" or "cultural frames."[3]

Even in anthropology, despite its strong reliance on observation, knowledge is only completed through a rational interpretation of rituals and symbolic meanings. Claude Lévi-Strauss, for instance, deconstructed myths and symbolic structures in so-called "primitive" societies using rigorous rational tools.[4]

Thus, rationality is not opposed to empiricism; rather, it complements it. While experience provides raw data, reason reorganizes, connects, and interprets it within a scientific framework. This form of rationality does not exclude reality; it conceptually reconstructs it, making knowledge not only a reflection of what exists but also an understanding of what must be interpreted and comprehended.

In conclusion, rationality, as an epistemological pillar, gives science its systematic character and serves as a bridge between reality and thought, between observation and analysis, and between disorder and conceptual order.

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[1] **Max Weber,** *Economy and Society: An Outline of Interpretive Sociology.* Edited by Guenther Roth and Claus Wittich, translated by Ephraim Fischoff et al., Berkeley: University of California Press, 1978 , pp. 20–22

[2] **عبد الله عبد الدائم** .*العقلانية والتجديد في الفكر العربي المعاصر* .بيروت: دار العلم للملايين، 1985، ص. 104–108.

[3] **Sidney Tarrow,** *Power in Movement: Social Movements and Contentious Politics.* 3rd ed., New York: Cambridge University Press, 2011, p56.

[4] **Claude Lévi-Strauss,** *The Savage Mind.* Chicago: University of Chicago Press, 1966,p120.

## Realism: Belief in an Independent Reality and Its Scientific Knowability

Realism represents a fundamental pillar of scientific epistemology. It is based on the belief that reality exists independently of the human mind and can be studied and understood through methodological tools. At its core, realism rejects the notion that knowledge is merely a projection of the self or a product of mental speculation. Instead, it asserts that there is an objective reality that science can approach and seek to comprehend in terms of its mechanisms and laws.

The British philosopher Karl Popper captured this stance by stating, "Reality is not what we wish it to be, but what imposes itself regardless of our desires."[1]

Realism serves as a cornerstone for understanding social phenomena as systems that have an actual existence within structures, institutions, and practices. For example, when studying social inequality, one does not analyze only individuals' feelings or perceptions; rather, the focus is on uncovering actual relationships in the distribution of wealth, power, and education—relationships that exist objectively within the social world.

The French sociologist **Pierre Bourdieu** emphasized the importance of treating social reality as a structure that can be understood, not merely as individual representations. For him, "society does not exist only in the minds of individuals, but in institutions, fields, and practices."[2]

Realism is also evident in field research that relies on systematic observation and both quantitative and qualitative data. When an anthropologist enters a local community to study rituals, they do not limit themselves to interpreting symbols; they also engage with real structures present in time and space, such as economic relations or family organization. Ibrahim Othman emphasized this point, stating: "Realist anthropology does not merely describe cultures; it seeks to explain social structures based on objective realities that cannot be reduced to subjective understanding."[3]

The critical realist approach, developed by **Roy Bhaskar**, extends this perspective by acknowledging the existence of reality while distinguishing three levels: the **real** (what actually exists), the **actual** (what actually happens), and the **empirical** (what is observed). This distinction is especially important in the

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[1] **Karl Popper.** *The Logic of Scientific Discovery.* New York: Basic Books, 1959, p108.

[2] **Pierre Bourdieu.** *Le sens pratique.* Paris: Les Éditions de Minuit, 1980,p72.

[3] **عبد الله عثمان**، *الأنثروبولوجيا والواقع الاجتماعي*. القاهرة: دار المعرفة الجامعية، 2010 ص 88

social sciences, because what occurs in society may not always be directly observable, yet it exists and has tangible effects.[1]

In the Arab context, **Hassan Hanafi** emphasized the realistic dimension of scientific knowledge, stating that "reality is the source and foundation of knowledge, and science grows only in the soil of daily human experience."[2]

Scientific realism thus enhances the credibility of science, as it presupposes the existence of study subjects that are not entirely subject to personal whims or subjective interpretations. The social scientist does not fabricate phenomena but studies them as they are, seeking to understand their mechanisms, approach them critically, and predict their changes. For this reason, realism is a necessary condition for any serious scientific endeavor.

## Experience: The Living Basis of Knowledge in Its Human and Social Context

Experience (***L'expérience***) is a central foundation in the epistemological construction of knowledge, particularly in the human and social sciences. It refers to the direct and dynamic interaction of humans with reality through their senses, emotions, observations, and behaviors. Knowledge does not emerge in a vacuum; it is built from the core of lived experience and daily engagement with the world.

Experience acquires its scientific significance when it is transformed into an organized process that is reflected upon, analyzed, and connected to concepts and theories. As John Dewey emphasized, "All knowledge begins with experience, but not all experience constitutes knowledge unless it is organized and understood."[3]

In the social sciences, experience has a dual dimension: it is both the subject of study—how people live their lives, what they feel, and how they interact with their environment—and a tool for the researcher to understand reality, particularly in qualitative and anthropological approaches. When a researcher engages in participant observation within a community, they do not merely describe phenomena; they live them and gain experiential knowledge that enriches their understanding and helps construct deeper interpretations.

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[1] **Roy Bhaskar,.** *A Realist Theory of Science.* Leeds: Leeds Books, 1975,p99.

[2] **حسن حنفي**، *مقدمات في علم الاستغراب*. القاهرة: دار التنوير للطباعة والنشر، 1996 ص 43.

[3] John Dewey. *Experience and Education*. New York: Macmillan, 1938, p56.

Malik Badri highlighted the importance of field experience in Islamic psychology, noting that "direct experience is the means to understand psychological tensions within their cultural and social environment."[1]

In contemporary anthropology, experience has become a primary entry point for understanding culture from within. The scholar does not limit themselves to data collection but immerses in interactions with the studied community, producing knowledge that is more vivid and profound. For example, when a researcher studies popular rituals in Algeria, actual participation in events, listening to conversations, and symbolic engagement in rituals allows them to grasp symbols and representations in ways that theoretical data alone cannot provide.

Historical experience also forms part of this foundation, as the experiences of past societies provide a source of knowledge about patterns of change and political and cultural transformations. Studying the experience of colonialism, for example, is not merely a matter of analyzing documents or statistics, but of understanding the collective experience and its lasting effects on memory and identity.

**Paul Ricoeur** emphasized the temporal dimension of experience, noting that "human experience is not only what we live through, but also what we remember and narrate."[2]

In the same vein, **Abdessalam Al-Masdi** points out that "the researcher's social and cultural experience is part of their epistemic tools, for the self cannot be separated from its object except hypothetically."[3] This highlights that experience is not only an external datum but also a subjective element that interacts with scientific knowledge.

Epistemologically, experience bridges theory and practice. It enables science to test its hypotheses and verify its findings. The social scientist observes, reflects, engages in experience, and then returns to construct or adjust their theoretical framework. This reciprocal relationship between experience and knowledge enriches science and ensures its continued connection to reality.

## The Subject of Epistemology

## Methods and Means of Acquiring Knowledge

[1] عبد الرحمن بدوي، *دراسات في السلوك الإنساني* .القاهرة: دار الفكر العربي، 1992 ص 55.

[2] Paul Ricoeur, *Temps et récit*. Paris: Éditions du Seuil, 1983,p89.

[3] عبد السلام المسدي، ***اللسانيات وأسسها المعرفية*** .بيروت: المركز الثقافي العربي، 2001 ص 45.

Methods of acquiring knowledge represent a central starting point in epistemology, raising the fundamental question: how can a human claim to possess knowledge? Answers have varied across philosophical and scientific traditions, but they can be summarized in five main avenues: **sensory perception, reason, experimentation, intuition, and experience.**

Sensory perception is considered the primary source of knowledge in empirical philosophy. **John Locke** argued that the mind is born as a blank slate (*Tabula Rasa*), upon which sensory data are inscribed.[1] Knowledge, in this view, begins with the external world and is transmitted to the mind through the senses.

This conception extends to many branches of the social sciences, where organized observation serves as a key tool for gathering information from lived reality. For example, ethnographic field studies in anthropology rely heavily on systematic sensory observation to collect data about social practices, behaviors, and interactions.

In contrast, the rationalist approach prioritizes reason as the primary means of producing knowledge. René Descartes, for example, argued that **"methodical doubt"** is the path to truth and that reason is the most reliable source of certain knowledge.[2] This approach is evident in the logical interpretation of social phenomena, particularly within positivist schools in sociology, which aim to explain social relationships through rational laws analogous to the laws of nature.

Experimentation, on the other hand, lies at the heart of the modern scientific method. Francis Bacon, the founder of empiricism, emphasized the necessity of observation, hypothesis formation, and experimental testing.[3] The social sciences have adopted this model partially, employing empirical tools such as surveys and interviews while taking into account the human being as a complex and context-dependent entity.

Intuition represents a special dimension of knowledge and is often used in psychology to grasp what cannot be perceived through the senses or logical

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[1] أنظر: زكريا إبراهيم، **مشكلة الإنسان**، القاهرة: مكتبة مصر، 1980، ص 45.

[2] مصطفى النشار، **فلسفة التاريخ: من التفكير الأسطوري إلى التفكير العلمي**، القاهرة: دار المعارف، 1999، ص 102.

[3] Bertrand Russell, **The Problems of Philosophy**, London: Williams and Norgate, 1912, p. 68.

analysis. It is particularly relevant in methodologies such as psychoanalysis or self-reflective approaches in qualitative research.[1]

Finally, experience plays a crucial role in shaping knowledge, especially in social research that relies on prolonged field observation, as in ethnographic methods, where knowledge emerges from direct and repeated interaction with the studied community.[2]

Thus, knowledge is acquired through multiple avenues that sometimes complement each other and sometimes conflict, depending on the nature of the phenomenon under study and the methodology employed.

## The Truth of Knowledge

The question of the truth (or validity) of knowledge lies at the heart of epistemological inquiry. Knowledge can only be considered genuine if it is true or logically justified. Its truth depends on its correspondence with reality, its internal coherence, or its practical applicability, according to different theoretical perspectives.

The **Correspondence Theory** is one of the oldest theories of truth, holding that an idea is true if it accurately reflects external reality. Rationalist philosophers, such as Aristotle, adopted this view, stating: "To say of what is that it is, and of what is not that it is not, is true."[3]

In the social sciences, this approach is evident when researchers seek to explain a social phenomenon based on objective field data, aiming for their description to reflect reality as it exists, as seen in quantitative sociological studies.

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[1] كامل الشيبي، **الصلة بين التصوف والتشيع**، بغداد: دار آفاق عربية، 1986، ص 133.

[2] محمد عابد الجابري، **تكوين العقل العربي**، بيروت: مركز دراسات الوحدة العربية، 1986، ص 89.

[3] أنظر: محمد عابد الجابري، **العصبية والدولة: معالم نظرية خلدونية في التاريخ الإسلامي**، بيروت: مركز دراسات الوحدة العربية، 1982، ص 112.

In contrast, the **Coherence Theory** is based on the consistency of an idea with other knowledge within a given intellectual framework. This approach is particularly prominent in interpretive methodologies in the social sciences, as exemplified by **Max Weber**, who emphasized the importance of understanding (*Verstehen*) and interpreting meanings without requiring strict correspondence with physical reality.[1]

Here, truth is conceived more as logical consistency within a system of knowledge than as sensory or empirical correspondence.

The **Pragmatic Theory**, defended by **William James** and John Dewey, holds that the truth of an idea is measured by its practical consequences: what works is true. This perspective is evident in fields such as social psychology or community development, where the validity of knowledge is tested by its effectiveness in changing reality or influencing collective behavior.[2]

The concept of truth remains one of the most complex in contemporary epistemology. It is no longer understood as a fixed relationship between thought and reality, but is redefined according to the theoretical and methodological framework in which it is produced. Among modern approaches that expand this understanding is the **Interactive or Negotiated Truth** theory, which emerged within interpretive and social-constructivist perspectives, particularly in qualitative research with a humanistic and social orientation.

This perspective posits that knowledge is neither a pre-existing given nor a direct reflection of reality; rather, it emerges from interactions among social actors, with both the researcher and the participants contributing to the construction of meaning. In this view, the research process becomes a space for negotiating interpretations and meanings, rather than a neutral activity aimed at uncovering a pre-existing "truth." Consequently, truth in this context is understood more as a matter of social and consensual acceptance than as correspondence with physical reality.

Within this framework, Lincoln and **Guba argue**[3] that in qualitative research, the standard of truth is not measured by objectivity or replicability, as in the positivist approach, but by **credibility**, **transferability**, and **dependability**—that is, the extent to which participants recognize that the researcher has

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[1] عبد الله العروي، **مفهوم العقل**، الدار البيضاء: المركز الثقافي العربي، 1992، ص 56.

[2] William James, **Pragmatism: A New Name for Some Old Ways of Thinking**, New York: Longmans, Green, and Co., 1907, p. 34.

[3] Yvonna S Lincoln, and Guba, Egon G., **Naturalistic Inquiry**, Beverly Hills, CA: Sage Publications, 1985,p88.

accurately and fairly represented their experiences. Interactive truth, therefore, depends on dialogue and mutual understanding within the social and cultural context of the study.

This shift in the concept of truth also reflects a broader transformation in the structure of modern epistemological thought. It marks a move away from the positivist tendency that equates truth with material correspondence, toward a more transactional and interactive view, which understands knowledge as shaped within relations of power, language, and discourse. Accordingly, the standard of truth varies according to theoretical orientation:

- For **objectivists**, truth is the correspondence of thought with reality.
- For **coherence theorists** or systemists, it is the consistency of a judgment within the overall system of knowledge.
- For **pragmatists**, as William James argued, truth is what works practically in guiding human action.
- For **interactive and constructivist approaches**, truth is a continuous, negotiated process concerning meaning and rationality.

This plurality of truth criteria does not imply absolute relativism; rather, it highlights the richness of contemporary epistemology and its capacity to adapt to the specificities of the studied subjects. This is especially important in complex domains such as human behavior, identity, and social values, where understanding truth depends on our ability to engage with human experiences in their real contexts, rather than reducing them to abstract concepts.

## Caution Toward Knowledge

Despite the tremendous progress humanity has achieved through knowledge, epistemology emphasizes the need for caution, as knowledge is not always benign or neutral. It can be used as a tool for domination, serve ideological interests, or be produced in ways that distort reality rather than reveal it. This makes caution toward knowledge a fundamental principle of critical thinking in the human and social sciences.

Michel Foucault points out that knowledge is never neutral; it is always linked to relations of power. As he states, “every knowledge practice involves a form of power.”[1] In his analysis of institutions—such as schools, prisons, and hospitals—he demonstrates how knowledge can become an instrument of social

[1] Michel Foucault, **Discipline and Punish: The Birth of the Prison**, New York: Pantheon Books, 1977, p. 27.

control, reproducing the existing order rather than transforming it. This is evident in curricula that glorify certain values while marginalizing others, or in official statistics that conceal as much as they reveal.

**Abdallah Laroui** warns against the "false consciousness" that arises when epistemological concepts are imported from outside their context without critical scrutiny, leading to a distorted understanding of reality shaped by pre-packaged frameworks that do not reflect its particularities. In such cases, knowledge shifts from being a tool of liberation to an instrument for reproducing dependency.[1]

**Laroui** argues that false consciousness occurs when Arab researchers adopt Western concepts or theories without considering their suitability for understanding their own social realities. The problem is not knowledge itself, but its application outside its proper context. Knowledge, in these instances, ceases to emancipate thought and instead reinforces subordination.

For example, in sociology, some Arab researchers have applied concepts such as social class or alienation, as developed by **Marx** in industrial Europe, to rural or traditional Arab societies without modification. These societies do not share the same class structures or labor relations, making such analyses inaccurate and detached from local realities.

Laroui advocates for **reproducing concepts within the Arab context**, meaning that researchers should start from their own social reality to develop context-sensitive tools and concepts, rather than importing them wholesale from different historical and cultural experiences.

**Pierre Bourdieu** emphasized the need to uncover the "symbolic violence" exercised by academic knowledge when it presents itself as objective and neutral, while in reality it is conditioned by the researcher's position within the social field. For example, in studies of social classes,[2] a researcher's classification of taste or behavior may unconsciously reflect value judgments, thereby contributing to the reproduction of class distinctions rather than analyzing them.

By "symbolic violence," **Bourdieu** refers to the subtle form of control exerted by institutions and knowledge when they claim neutrality and objectivity, yet in fact reproduce power relations within society. Academic knowledge, from his perspective, is never produced in a vacuum; it emerges from a specific social position. The researcher themselves is part of the social field, carrying conscious

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[1] أنظر: عبد الله العروي، مرجع سبق ذكره، ص 103.

[2] Pierre Bourdieu, **Distinction: A Social Critique of the Judgement of Taste**, Cambridge, MA: Harvard University Press, 1984, p. 110.

and unconscious representations and judgments influenced by their class and cultural background.

For instance, when studying social classes or cultural taste, a researcher does not merely describe reality but also participates in defining what is considered "refined" or "inferior." If the preferences of the wealthy class in art or cuisine are labeled as "superior," this confers cultural legitimacy on the norms of the upper class, presenting them as natural or universal. This is symbolic violence: imposing a particular class's perspective on others without awareness that it is conditioned by social position.

For example, if a sociologist analyzes the behaviors of working-class urban populations and describes them as "uncultured" or "low-taste," the researcher is not providing a neutral scientific judgment but reproducing the perspective of the middle or upper class, which sees itself as the standard for proper taste. Here, research shifts from a tool to understand social phenomena into a means of reinforcing class distinctions.

Bourdieu calls on researchers to be aware of their social position within the scientific field and to practice **reflexivity**, continuously reflecting on how their background, values, and interests shape the way they formulate questions and interpret results. In his view, science cannot be innocent of the society that produces it unless it consciously recognizes its limits and sources of bias.

In the same context, in psychology, Erich Fromm warns against "technical knowledge," which separates means from ends and produces a person lacking a moral compass—someone who knows **how** to do things but does not ask **why**.[1] This is reflected in the use of psychological knowledge to shape public opinion or manipulate consumer behavior, as seen in marketing psychology.

Fromm argues that contemporary humans possess an enormous amount of technical knowledge—knowledge that focuses on **how** to perform tasks—but neglects the more important question: **Why do we do them?** This type of knowledge separates means from ends, making a person capable of controlling nature or behavior, yet deprived of the ethical guidance that should direct that control.

For Fromm, the problem is not the technology itself, but the dominance of **instrumental reason**, which evaluates everything solely according to utility and efficiency, ignoring human values and meaning. In such cases, science becomes a tool for control rather than understanding, for direction rather than liberation.

[1] Erich Fromm, **The Sane Society**, New York: Rinehart and Company, 1955, p. 45.

In psychology, this danger is particularly evident in **marketing or advertising psychology**. Instead of using psychology to understand humans and support their personal growth, it is used to manipulate desires, making individuals more consumptive and compliant. For example, companies use behavioral psychology studies to identify colors or words that influence purchasing decisions or to design advertisements that provoke emotion rather than rational thinking.

Here, psychological knowledge becomes a tool for **economic and social influence**, not a means of freeing individuals from pressure. People know **how to persuade others**, but they do not ask **why they should do it** or **whether the act is just or ethical**.

Fromm warns that the dominance of technical knowledge may produce humans who are effective in a practical sense but **empty inside**, lacking purpose and meaning, measuring success by their ability to control rather than their capacity for understanding, love, or creativity.

Therefore, caution toward knowledge does not mean doubting it, but entails **awareness of its ideological dimensions, analyzing the conditions of its production, and questioning who produces it and for whom**. This caution does not call for rejecting knowledge but for using it with critical awareness, especially in the social sciences, where humans are treated not as silent objects but as **active, interpretive, and complex beings**.

**The Importance of Epistemology**

Epistemology forms the backbone of any scientific or philosophical project because it does not merely provide cognitive tools; it raises the fundamental questions that define the very nature of knowledge: How do we know? What makes our knowledge true? And what are the limits of this knowledge? Without such inquiries, science becomes a mere descriptive accumulation of data, and philosophy turns into reflection isolated from human reality. Epistemology gives scientific and philosophical thought **self-awareness of its logic, limits, and legitimacy**.

**First,** distinguishing scientific knowledge from other types of knowledge is a fundamental pillar of epistemology. Scientific knowledge differs from mythological or ideological knowledge in that it is based on **self-criticism and continuous falsification**. In this context, Karl Popper's position stands out: he considered the **falsifiability of a theory** as the criterion of its scientific nature. According to him, science is not about confirming hypotheses but about testing and potentially refuting them, because knowledge that cannot be falsified cannot be considered scientific. Therefore, science progresses to the extent that it

allows itself to be wrong.[1] This epistemological perspective makes **doubt and experimentation the core of scientific knowledge**, rather than a threat to it.

**Second**, epistemology enables the researcher to understand the philosophical foundations underlying their research methods. Choosing a method is not merely a technical decision but an **epistemological stance**. For instance, a sociologist using a qualitative approach starts from an epistemological perspective that views social reality not as a purely objective entity, but as the product of human meanings and interactions. Consequently, understanding social phenomena is not achieved solely through quantitative measurement, but through interpreting the meanings that actors assign to their actions. This awareness of epistemological assumptions, as Benton and Craib highlight, makes the researcher more conscious of their **position and the limits of their knowledge**.[2]

**Third**, epistemology plays a **critical and emancipatory role**, as it uncovers the interests and ideologies underlying scientific discourse. Knowledge is never neutral; as Michel Foucault emphasized, it is always linked to **power**. Every knowledge system, no matter how objective it may appear, conceals power relations that determine what can be said and what must be hidden. For instance, when a discourse presents "natural differences between the sexes" as scientific truth, epistemology allows us to **question this discourse**: Where do its assumptions come from? Whose interests does it serve? Does it reflect patriarchal power structures in society? In this way, epistemology becomes a **tool for critiquing science itself**, not rejecting it, but promoting awareness of its limitations and the need for justice in its application.[3]

**Fourth**, epistemology teaches us **epistemic humility**, reminding us that truth is not absolute and that reality is too complex to be reduced to a model or equation. Edgar Morin pointed out that contemporary scientific thought has begun to move away from strict reductionism and to acknowledge complexity. Science no longer aims at producing ultimate certainty, but at achieving a **probabilistic and evolving understanding**. Morin calls this "complex thought," which combines doubt and certainty, unity and multiplicity, order and chaos. In his view, true science is that which "inquires without concluding definitively."[4]

**Fifth**, the importance of epistemology manifests in **researcher formation**, as it provides awareness of their position within the field of knowledge and frees

[1] Karl Popper, **The Logic of Scientific Discovery**, p. 27.
[2] Ted Benton, and Craib, Ian, **Philosophy of Social Science: The Philosophical Foundations of Social Thought**, 2nd edition, Basingstoke: Palgrave Macmillan, 2011, p. 5.
[3] Michel Foucault, **Power/Knowledge: Selected Interviews and Other Writings, 1972–1977**, New York: Pantheon Books, 1980, p. 81.

[4] Edgar Morin, **Introduction à la pensée complexe**, Paris: Éditions du Seuil, 2005, p. 74.

them from rote repetition. An epistemologically-informed researcher does not only ask “What should I study?” but also “How should I study it? And why should I study it?” This critical mindset produces independent researchers capable of reframing questions and expanding the horizon of knowledge, rather than merely reproducing it. Epistemology is therefore not just theoretical reflection but a **method of scientific thinking** that makes every research endeavor an exercise in questioning both self and reality.

In the **social sciences**, epistemology forms the core of scientific thinking because it does not only determine how knowledge is produced but also interrogates the researcher’s relationship with social reality and the feasibility of attaining genuine objectivity in studying humans and societies. Social knowledge does not emerge in a vacuum; it is produced within a **historical, cultural, and political context** that influences both the researcher and the subject. Thus, epistemology in this field is not merely philosophical reflection but a **critical stance guiding the research process**.

In **natural sciences**, a researcher can study a chemical or physical phenomenon independently of themselves, as their presence does not alter the interaction or outcome. In contrast, social phenomena are influenced by the researcher’s presence because they are **human and meaningful**, carrying symbols and meanings embedded in language and culture. When studying topics like religiosity, identity, or daily practices, the researcher engages in an interactive relationship with participants, making the resulting knowledge a product of **social interaction**, not mere external observation.

This highlights a fundamental distinction in social science epistemological approaches:

1. **The positivist-interpretive approach** seeks to discover general laws governing social phenomena, such as divorce rates, unemployment, or crime, often using statistics. This approach assumes that society can be analyzed similarly to a natural phenomenon.
2. **The interpretive-hermeneutic approach** focuses on the meanings individuals assign to their actions, such as understanding immigrants’ experiences, the significance of religious rituals, or how people construct identity within a group. Here, numbers alone cannot reveal the depth of human experience, as every social act is fundamentally symbolic and meaningful. For example, religious rituals cannot be explained merely by counting participants or repetitions; one must understand what the ritual represents to the actors: Is it a way to approach the sacred? To affirm group belonging? To express cultural identity? This understanding requires adopting a **qualitative epistemological perspective**.

Epistemology also enables researchers to be conscious of their **position within the social field**. Knowledge is not produced in isolation but within a **network of political, economic, and cultural forces**. Awareness of one's social and epistemic position helps avoid projecting biases onto the research subject and fosters **reflexivity**—continuous reflection on how one's background and interests shape the knowledge produced.

Moreover, epistemology helps transcend traditional dichotomies that have hindered understanding social phenomena, such as self versus object or individual versus structure. It promotes a **complex view of reality**, acknowledging that individuals act upon social structures while simultaneously being influenced by them. For instance, unemployment can be understood not only as an economic outcome but also as a social structure that produces diverse subjective experiences: frustration, loss of status, and pursuit of informal alternatives.

**Finally**, epistemology grants the social researcher **intellectual immunity against over-reliance on natural science models**, resisting the idea that society is a mere experimental lab. Humans are not measurable objects; they are **linguistic and cultural beings embedded in networks of values and relationships**. Consequently, the study of humans cannot follow the same methodologies as the study of matter. The specificity of social sciences lies in combining **interpretive understanding with critical analysis**, and in balancing the search for patterns with attention to meanings.

In this sense, epistemology is not merely a branch of philosophy but a **comprehensive critical awareness** guiding the researcher to understand the limits of knowledge, to rethink the relationship between self and society, understanding and change, science and humanity.

**Summary:**

This lecture focuses on providing a comprehensive epistemological understanding of the social sciences by reviewing the foundations of epistemology, which rely on careful observation, experimentation, critical analysis, and logical reasoning to ensure the validity of knowledge. The lecture also addressed the subject of epistemology, namely the study of the nature of scientific knowledge, its limits, and the methods for verifying its credibility, while highlighting the distinction between scientific and non-scientific knowledge. Epistemology gains its importance from its ability to equip students with tools for critical and methodological thinking, enabling them to regulate scientific research and distinguish between scientific facts and personal opinions, thereby enhancing their capacity to understand social phenomena accurately and objectively.

**Self-Assessment:**

**Exercise 1: True or False (with corrections)**
Determine the correctness of the following statements and correct any errors:

1. Doubt in epistemology means denying all truths.
    - **False:** Methodical doubt does not deny truth; it aims to **test hypotheses and ensure the objectivity of knowledge**.
2. Experimentation is a fundamental requirement for building knowledge in the social sciences.
    - **True:** Especially in empirical approaches, experimentation allows for testing hypotheses and collecting objective data.
3. Rationalism means rejecting experience in favor of intuition only.
    - **False:** Rationalism prioritizes **reason and logical analysis**, but it does not necessarily reject experience when needed for knowledge verification.
4. Realism assumes that reality can be studied as it is, without researcher intervention.
    - **Partially false:** Realism assumes an objective reality exists, but **the researcher still interprets phenomena within its social context**, so complete non-intervention is inaccurate.

**Exercise 2:**
**Question:** Discuss the relationship between "methodical doubt" and "building scientific objectivity" in social research, with an example from the field.

**Exercise 3:**
Read the text and answer:
*"A scientific study cannot be conceived without epistemological awareness, as epistemology acts as a shield that protects the researcher from falling into common knowledge, and helps distinguish between opinion and scientific knowledge."*

- **Central idea:** Epistemology safeguards researchers from misconceptions and enables the distinction between personal opinion and scientifically verified knowledge.
- **Explanation:** This demonstrates epistemology's importance in scientific research, as it guides the researcher to maintain rigor, critical thinking, and objectivity.

**Exercise 4:**
*"Epistemology is not just theoretical knowledge; it is a condition for the scientific process itself."*

- **Discussion:** This emphasizes that epistemology shapes the researcher's understanding of methodology, guiding **how and why research is conducted**. For sociology students, it fosters **critical thinking, methodological awareness, and independence**, enabling them to frame questions and interpret data responsibly.

**Exercise 5: Case Study**
In a study on "symbolic violence in media discourse," the researcher relied only on personal opinions and analysis without examining the content or using a clear methodology.

- **Epistemological error:** The researcher **ignored systematic data collection and analysis**, relying solely on subjective interpretation.
- **Conflict with epistemology:** This approach contradicts epistemology as a **structured source of knowledge**, which requires methodical observation, verification, and transparency.
- **Most appropriate epistemological method:** A **qualitative content analysis** combined with a **systematic interpretive or critical approach**, ensuring that interpretations are grounded in data rather than personal bias.

## Lecture Three: Scientific Knowledge: Its Limits, Sources, and Epistemological Principles

**Introduction:**
The topic of scientific knowledge has been a central concern in human thought since the dawn of civilization. Questions such as “How do we know?” and “What makes our knowledge true or false?” have accompanied every stage of human intellectual development, as they define humanity’s relationship with the

world, reality, and the self. The scientific progress we witness today would not have been possible without distinguishing organized scientific knowledge from other prevailing forms of knowledge in earlier stages, such as myth, religion, speculative philosophy, and popular knowledge.

At its core, the pursuit of knowledge is an existential necessity. Since the earliest times, humans have sought to understand the phenomena surrounding them—thunder, rain, death, disease, and time. Initially, these phenomena were interpreted through imagination, symbols, and myths, gradually giving way to rational and empirical explanations. From this evolution, science emerged as a qualitative shift in human thought, grounding knowledge in observation, experimentation, and verification, rather than in tradition and imitation.

However, differentiating science from other types of knowledge has not been straightforward; it is the result of a long philosophical and epistemological development. Philosophers and scientists have sought to establish criteria that define what constitutes scientific knowledge. Scientific knowledge does not merely explain phenomena; it investigates their causes, constructs generalizable and testable models, and subjects itself continuously to critique and revision.

This lecture is therefore important because it seeks to clarify the boundaries between scientific knowledge and other forms of knowledge, to highlight the sources from which scientific knowledge emerges, and to outline the principles that ensure its objectivity and credibility. This clarification is not intended to diminish the value of other types of knowledge, but rather to emphasize the distinctiveness of the scientific method in producing accurate and organized knowledge that contributes to understanding and controlling reality.

In the social sciences, this discussion becomes even more significant because social phenomena differ from natural phenomena: they are governed by symbols and meanings and are influenced by human culture and history. Hence, epistemological awareness becomes an essential condition for any social researcher aiming to produce scientific knowledge that goes beyond subjective impressions and moral judgments.

The objectives of this lecture are to enable students to:
- Distinguish between different types of knowledge.
- Understand the foundations of scientific knowledge.
- Recognize the ethical and methodological principles governing it.
- Appreciate its value in building a society grounded in critical and rational thinking.

In this way, distinguishing scientific knowledge becomes not merely a mental exercise, but a crucial step in developing a scientific mindset capable of

questioning reality rather than submitting to it, and producing objective knowledge rather than repeating inherited beliefs.

## I. The Concept of Scientific Knowledge

### 1. Linguistic Definition of Knowledge

According to *Lisan al-Arab*, knowledge means perceiving a thing as it truly is, with certainty. It derives from the root **'know**, which signifies distinguishing and recognizing something after perceiving it through the senses or intellect.[1] Thus, in its linguistic sense, knowledge refers to understanding and awareness based on distinction and consciousness.

### 2. Technical (Epistemological) Definition

Scientific knowledge is one of the most important forms of knowledge that humans have sought to build and organize over time, aiming to understand, explain, and predict phenomena. It differs from other forms of knowledge, such as philosophical, religious, or sensory knowledge, in that it relies on a systematic method and precise criteria for truth and objectivity.

Linguistically, knowledge refers to perceiving a thing in its true form with certainty. Technically, definitions of scientific knowledge vary according to different intellectual schools. **Zakaria Ibrahim** defines scientific knowledge as "a set of interconnected propositions reached through a systematic method and subject to testing and verification." This definition highlights two essential elements: the methodology used to acquire knowledge and the empirical verification that distinguishes it from belief or opinion. Science does not rely solely on abstract contemplation but on observation and experimentation.[2]

**Mohamed Talbi** adds that scientific knowledge "is a systematic effort aimed at building a framework of laws that explain phenomena and help control them." This definition expands understanding toward the practical function of science. It shows that science is not limited to comprehension and explanation but also seeks regulation and control over phenomena, making it an effective tool for advancing human life.[3]

According to **Talbi**, scientific knowledge is a structured endeavor aimed at constructing a system of laws that explain phenomena and enable humans to manage them. This implies that science goes beyond mere understanding or explanation of events to include the capacity for practical intervention and

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[1] ابن منظور *لسان العرب*. بيروت: دار صادر، 1997، ج9، ص 237.

[2] زكريا إبراهيم. *مشكلة الإنسان* ، ص 45.

[3] **محمد الطالبي**، *مقدمة في منهجية البحث العلمي*. بيروت: دار الفكر العربي، 1994، ص 62.

application. For example, the study of infectious diseases did not stop at identifying their causes; it led to the development of vaccines and treatments that prevent and control disease spread, thereby protecting societies and improving human life. In this sense, science becomes an active instrument of change and improvement, linking theoretical understanding of phenomena with practical applications that serve humanity and enhance its ability to confront natural and social challenges.

From the philosophy of science perspective, Karl Popper offered a different definition that emphasizes the critical nature of scientific knowledge. He argued that science does not advance by proving hypotheses but by falsifying them. True scientific knowledge is that which can be tested and potentially refuted through empirical observation. In other words, science grows through error and correction, rather than by accumulating final, unquestionable facts. This approach positions science as an ongoing process of critique and revision, never reaching absolute certainty.[1]

According to **Popper**, scientific knowledge is characterized by its critical and testable nature. Progress does not occur by establishing permanent truths but by formulating hypotheses that can be falsified and empirically tested. Any scientific theory is always open to critique and modification. For example, in the study of physical phenomena, a theory might be proposed to explain planetary motion. When new observations contradict the theory, it is revised or replaced with a more accurate one. In this way, science is a continuous process of trial and error, critique, and revision. It does not achieve final certainty but gradually develops through ongoing verification and correction of mistakes.

In the same vein, Abdullah Abdul Daim views scientific knowledge as objective knowledge grounded in systematic observation, experimentation, and logical analysis. This distinguishes it from everyday knowledge, which may rely on personal impressions or individual experiences. Scientific knowledge seeks to transcend subjectivity by ensuring that results adhere to standards agreed upon among researchers, allowing for verification and reproducibility.[2]

For instance, when studying the effect of a particular drug on blood pressure, a researcher does not rely on personal feelings or anecdotal experience. Instead, controlled experiments are conducted on a group of participants, outcomes are measured accurately, and data are analyzed logically to reach conclusions that other scientists can verify. In this way, scientific knowledge becomes a reliable tool for understanding phenomena and making decisions based on objective evidence rather than intuition or isolated experience.

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[1] **Karl Popper,.** *The Logic of Scientific Discovery*, p. 27.

[2] **عبد الله عبد الدائم،** *التربية والمستقبل في الوطن العربي* .بيروت: مركز دراسات الوحدة العربية، 1985، ص 91.

## Abd Rahman Badawi's Perspective

**Abd Rahman Badawi** emphasizes that what distinguishes scientific knowledge is its simultaneous verifiability and falsifiability. Scientific knowledge does not claim to possess absolute truth; instead, it proposes hypotheses that remain open to continual review. This characteristic makes science dynamic and evolving over time.[1]

For example, Darwin's theory of evolution was not accepted solely based on initial observations; it has undergone continuous evaluation and refinement with the discovery of new fossils and modern genetic studies, enhancing its accuracy and comprehensiveness. Thus, scientific knowledge remains renewed and progressive because it relies on ongoing review and the search for new evidence, rather than asserting final and fixed truths.

**Core Features of Scientific Knowledge**:

1. **Methodical**: Follows organized steps in research.
2. **Empirical**: Based on observation and testing.
3. **Objective**: Seeks to overcome individual biases.
4. **Cumulative**: Builds on prior knowledge.
5. **Critical**: Open to continuous review and correction.

For instance, when a psychologist studies anxiety, they do not limit themselves to describing it as a subjective feeling. They employ tools such as surveys and experiments to measure it, analyze its causes, and compare results with previous data. This transforms personal understanding into scientific knowledge that is testable and reproducible.

In this way, scientific knowledge is not merely a collection of information, but a comprehensive system of structured understanding of reality, verified through experimentation, built on critique, and developed cumulatively.

A visual diagram can further illustrate the sequential stages of scientific knowledge production—from questioning and observation to hypothesis testing and law formulation—helping students grasp the logic and progressive development of scientific thinking step by step:

[1] **عبد الرحمن بدوي**، *موسوعة الفلسفة* .الجزء الأول. بيروت: المؤسسة العربية للدراسات والنشر، 1983، ص 54.


**Figure 02: A Visual Diagram of the Stages of Scientific Knowledge Production (AI-Supported)**

This diagram illustrates that the construction of scientific knowledge is a structured process that passes through multiple stages, from observation to experimentation, and finally to theoretical interpretation. These stages distinguish science from other forms of knowledge, as it is based on evidence and verification. Every scientific inquiry begins with a question and culminates in a result that can be tested, which is what gives it its credibility and value.

## II. Distinguishing Scientific Knowledge from Other Types of Knowledge

Human knowledge is a multifaceted phenomenon, manifesting in diverse forms and acquired through different methods depending on the purpose and means of inquiry. Each type of knowledge highlights a particular aspect of human

experience with the world, whether through direct experience, intellectual reflection, religious belief, or cultural tradition. Scientific knowledge, however, occupies a distinct position among these forms. It combines methodological rigor with objectivity, providing a framework for understanding phenomena in a way that can be practically and empirically verified. To fully grasp this distinction, it is essential first to review the various types of knowledge and then to clarify the fundamental differences that make science a unique epistemic tool.

- **Sensory Knowledge**

Sensory knowledge relies on direct experience and interaction with the surrounding environment, primarily through the five senses. However, it is inherently subjective, as each individual's perception of a phenomenon may differ from another's. For example, the perception of heat or cold can vary from person to person, as can the experience of taste or smell. Consequently, it is difficult to generalize or objectively verify such knowledge. As the French philosopher Maurice **Merleau-Ponty** notes, "the body is the primary medium of perception, which makes sensory experience unique to each individual."[1]

Sensory knowledge forms the foundation of human engagement with the world. It arises directly from interaction with the environment through sight, hearing, smell, taste, and touch. These senses allow humans to gather immediate information about natural and social phenomena, such as feeling temperature changes, hearing the sound of rain, or tasting food.

Despite its importance, sensory knowledge remains limited by its subjective nature. Individual perceptions vary depending on personal sensitivity and prior experiences. For instance, one person may feel heat more intensely than another under the same conditions, or responses to a specific scent may differ among individuals. This variability makes it difficult to generalize sensory knowledge or evaluate it objectively in a way that is universally acceptable.

Furthermore, sensory knowledge goes beyond mere surface observation. It requires awareness of the interaction between the body and the environment, meaning that every sensory experience is not just the reception of stimuli but an active engagement where the body shapes the quality of perception and interpretation of phenomena.

Additionally, sensory knowledge often represents an initial stage in the construction of more advanced forms of understanding, serving as a gateway to scientific or intellectual knowledge. Humans begin by perceiving phenomena

[1] موريس ميرلوبونتي، *الظاهراتية والجسد*، ترجمة: أحمد عبد الله، دار النهضة العربية، 2010، ص. 45

through their senses, then may seek to interpret them more deeply through reasoning or scientific experimentation. For this reason, sensory knowledge is a necessary starting point, but on its own, it is insufficient for developing a comprehensive or objective understanding of reality.

- **Philosophical Knowledge**

Philosophical knowledge relies on rational thinking and logical analysis, aiming to explore existential, ethical, and epistemological questions. This type of knowledge often does not undergo direct empirical testing, yet it deepens understanding and expands intellectual insight. For instance, René Descartes' reflections on self-certainty (such as his statement, "I think, therefore I am") open new epistemological horizons, although their practical verification remains limited.[1]

While the senses provide an initial gateway to understanding the world through direct experience, the human mind does not stop at mere observation. It seeks to interpret what lies beyond phenomena, to understand their causes and purposes. This is where philosophical knowledge emerges, using rational thought and logical analysis to address fundamental questions about existence, knowledge, and values.

Philosophy goes beyond the limits of sensory input. It does not merely collect data about phenomena; it analyzes them, reflects on their causes and consequences, and investigates issues such as human nature, morality, and the meaning of life. Through tools of logical reasoning and intellectual introspection, philosophy can reach coherent conclusions, even though this knowledge is rarely subject to direct empirical testing, which limits its practical verification.

An example is René Descartes' meditation on self-certainty, expressed in the phrase: "I think, therefore I am." This statement illustrates how the mind can achieve internal certainty without relying on direct sensory experience, yet it remains theoretical knowledge that cannot be empirically tested in a scientific manner.

In this way, philosophical knowledge complements sensory knowledge. It takes the initial information provided by the senses and processes it intellectually to analyze phenomena, understand their causes and purposes, and develop critical and systematic thinking skills.

- **Religious Knowledge**

[1] رينيه ديكارت، *تأملات في الفلسفة الأولى* ، ص. 63

Religious knowledge is based on revelation and faith, with its primary goal being spiritual guidance and the pursuit of meaning and purpose, rather than empirical testing or practical verification. For example, explanations of earthquakes or rainfall in religious traditions often focus on the symbolic and spiritual significance of the event, rather than its natural causes, making them beyond empirical testing.[1]

Religious knowledge provides a framework for understanding phenomena from a symbolic and moral perspective. It interprets events not only in terms of physical causes but also in terms of divine messages or spiritual principles that humans are expected to follow. In this way, religious knowledge addresses questions about values and meaning—questions that human reason alone may not fully answer.

Although it is not empirically testable, religious knowledge plays a vital role in guiding human behavior and shaping our understanding of existence and our relationship with the surrounding world. Thus, religious knowledge complements both sensory and philosophical knowledge: sensory knowledge provides the initial data, philosophical knowledge processes and analyzes it intellectually, and religious knowledge adds a spiritual and moral dimension that gives life meaning and purpose.

- **Ideological Knowledge**

Ideological knowledge is influenced by political or intellectual affiliations, aiming to support a specific perspective rather than pursue objective truth. For instance, some historical narratives may serve political agendas without fully adhering to documented evidence.[2]

After humans direct their reasoning toward philosophical reflection and seek spiritual meaning through religious knowledge, another type of knowledge emerges under the influence of political and ideological commitments—ideological knowledge. This form of knowledge does not necessarily pursue objective truth but seeks to support a particular viewpoint, often serving the interests of a group or authority.

Ideological knowledge manifests in historical or political accounts that are presented in a way that promotes a specific agenda, often omitting or selectively interpreting evidence. For example, historical events may be portrayed in a biased or condensed manner to reinforce a nationalist or political idea. This demonstrates that ideological knowledge is often directed and constrained by

[1] فواز الرازي ، *الأسس الدينية والتفسير الرمزي للظواهر*، دار المعرفة، 2005، ص. 112

[2] أحمد عبد الرحمن ، *الأيديولوجيا والتاريخ المعاصر*، دار الفكر، 2013، ص .95

predefined goals, unlike scientific knowledge, which strives for objectivity and empirical verification.

However, ideological knowledge can also be seen as a natural extension of human attempts to understand the world. It reflects how beliefs and ideas interact with social and political contexts and demonstrates that all knowledge is influenced by the surrounding intellectual and cultural environment. Consequently, ideological knowledge is connected to previous forms of knowledge: sensory knowledge provides the initial data, philosophical knowledge analyzes it, religious knowledge adds the spiritual dimension, and ideological knowledge shapes it according to a specific perspective.

The Distinctiveness of Scientific Knowledge The fundamental distinction of scientific knowledge lies in its reliance on a precise and systematic method, empirical evidence, and the falsifiability of hypotheses that can be revised in light of new data. Science does not claim ultimate truth but presents hypotheses subject to continuous review. For example, Einstein's theory of relativity corrected the limitations of Newtonian laws in explaining the motion of objects at high speeds or in strong gravitational fields, illustrating that science is a dynamic, ongoing process based on criticism, review, and continuous development

## III. Sources of Scientific Knowledge

Scientific knowledge represents the highest level of human understanding of reality, as it relies on precise and systematic methodological foundations that ensure objective, verifiable, and reviewable results. While sensory knowledge provides initial data through direct experience and the senses, philosophical knowledge analyzes these phenomena and reflects on their meanings and causes through rational and logical thinking. Similarly, religious knowledge adds a spiritual and moral dimension to life and existence, whereas ideological knowledge interprets information according to specific political or intellectual perspectives.

What distinguishes scientific knowledge from these types is its ability to integrate direct experience, rational analysis, language, and the scientific method within a comprehensive framework that allows for verification of results and their correction when new data emerge. Science does not rely solely on observation, nor only on rational reflection, faith, or ideological commitments. Instead, it seeks to construct a holistic understanding of phenomena based on evidence and demonstrable proofs that can be examined and reviewed.

From this perspective, the sources of scientific knowledge constitute the essential pillars for its construction: observation and experimentation provide

accurate initial data, the mind analyzes and connects these data to infer laws, language organizes and facilitates the exchange of information among researchers, and the scientific method ensures that these processes follow a systematic and sequential approach, allowing any researcher to verify, reproduce, or further develop the findings.

### 1- **Observation and Experimentation**

Observation and experimentation constitute the primary sources of scientific knowledge, enabling researchers to collect precise data on natural or social phenomena. Scientific observation is not a superficial glance; it is a systematic and methodical process aimed at identifying patterns and relationships among variables. In sociology, for instance, field observations and interviews are employed to understand social behavior from within, such as examining interactions within families or local communities.[1] This approach provides rich qualitative data that can be subsequently analyzed. Such emphasis on direct experience distinguishes scientific knowledge from philosophical or religious knowledge, which relies on reflection or revelation.

Observation and experimentation together form the pillars of scientific knowledge, serving as the tools that give research its empirical and objective character. Science does not rely on mere intuition or personal insight; it follows a structured methodology based on careful observation and controlled testing of phenomena to verify hypotheses and derive laws. Unlike ordinary perception, scientific observation is deliberate and methodical, aimed at uncovering relationships among variables. It must be organized, verifiable, and goal-oriented. In the social sciences, including sociology and anthropology, field observation and interviews enable researchers to grasp the meanings individuals attach to their actions and practices within families or local groups. This form of observation goes beyond superficial description, delving into the lived human experience to understand how social and cultural patterns are constructed from within.

Experimentation represents the methodological extension of observation, moving researchers from mere observation to testing hypotheses under controlled conditions. In the natural sciences, experiments are conducted in laboratories where phenomena are reproduced under specific conditions. In the social sciences, experimentation may take the form of social simulations or

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[1] لويس كوهين، لورانس مانيون ، *مناهج البحث في العلوم الاجتماعية والتربوية*، ترجمة: كوثر حسين كوحك، دار العربية للنشر والتوزيع، 2011، ص. 57

carefully structured surveys that examine the effects of specific variables on behavior or attitudes. Through experimentation, scientific knowledge acquires its evidential character, allowing verification, replication, and evaluation of hypotheses based on evidence rather than opinion.

What distinguishes observation and experimentation within scientific knowledge is their ability to produce objective findings that can be verified by other researchers, unlike philosophical knowledge, which relies on rational reflection, or religious knowledge, which depends on faith and revelation. Scientific knowledge is not built on personal conviction or rhetorical argumentation; it is grounded in precise observation and systematic testing. Émile Durkheim exemplified this approach in his classic study on suicide, employing statistical observation and indirect experimentation to demonstrate the relationship between social phenomena and structural factors, thereby establishing the concept of the social fact as measurable and scientifically interpretable.

Through the integration of observation and experimentation, the essence of scientific knowledge is formed. Observation allows for the description of reality as it is, while experimentation enables its interpretation and the control of variables. Knowledge thus transforms from mere reflection into an organized, rational construct based on evidence and verification, granting it credibility, objectivity, and efficacy as a tool for understanding and influencing the world.

### 2- **The Mind**

The mind is a central tool in the construction of scientific knowledge, enabling the logical analysis of data derived from observation and experimentation, and facilitating the synthesis of information and formulation of hypotheses. Science relies on the mind's capacity to connect variables and deduce the laws and theories that explain phenomena. For example, when studying a social phenomenon such as school violence, the researcher uses the mind to link field findings with economic, social, and cultural variables to achieve a comprehensive understanding of causality.

The mind is the core instrument in building scientific knowledge, giving meaning and interpretive power to observation and experimentation. It transforms research from mere data collection into the construction of a coherent intellectual system. The mind organizes observations, compares phenomena, and infers relationships and laws, thereby elevating knowledge from description to understanding and analysis. Without the intervention of the mind, data collected through observation and experimentation remain raw information devoid of scientific significance, because scientific knowledge depends not only on what is seen but also on what is comprehended and explained.

In this context, the mind is not merely a mental faculty but a methodological instrument that allows the researcher to analyze facts according to principles of causality and interconnectedness. It mediates between reality and theory, between experience and inference. Through logical reasoning, the researcher can interpret relationships between variables and construct hypotheses that guide investigation. René Descartes, for instance, regarded the mind as the supreme source of knowledge, enabling humans to grasp truth through a method of doubt and analysis. Scientific knowledge, at its core, is the product of an organized mind functioning according to the rules of logic.

In the social sciences, the mind plays a crucial role in transforming field data into theoretical knowledge. Researchers do not merely describe phenomena as they appear; they employ their cognitive faculties to connect economic, cultural, and psychological factors to explain them. When studying school violence, for example, the mind helps the researcher understand how social pressures interact with economic conditions and the institutional environment to produce aggressive behavior. Here, the mind functions as a tool for abstraction and interpretation, enabling the transformation of complex phenomena into explanatory models that can be tested and generalized.

The role of the mind in science lies in its ability to transcend fragmentation and apprehend systems. It gives science its unified methodological character and allows human understanding to serve as a tool for controlling and predicting reality. Scientific knowledge, therefore, emerges from a dialectical interaction between experience and the mind: experience provides the raw material, while the mind shapes it into a theoretical structure capable of explaining and regulating phenomena. This integration of sensory data and rational thought drives the continual advancement of science, as each empirical discovery generates new intellectual questions, and each theoretical idea requires empirical testing for validation or refutation.

### 3- **Language**

Language plays a fundamental role in scientific knowledge, serving as the medium through which ideas are organized and communicated among researchers. Scientific language enables precise description of phenomena, formulation of hypotheses, and dissemination of results in ways that allow others to verify or refine them.[1] In sociology, for example, interview forms and

[1] فاروق عبد المعطي، *اوغست كونت مؤسس علم الاجتماع الحديث*، دار الكتب العلمية، بيروت، لبنان، 1994 ، ص. 88

field observation reports are written in clear and precise language so that other researchers can replicate studies or compare findings.

Language is not merely a means of communication; it is an intellectual tool that structures experience and gives it meaning. Science does not exist outside language, as it provides the framework in which concepts are formulated, hypotheses constructed, and results presented. Scientific language differs from ordinary language in its pursuit of accuracy, clarity, and objectivity: it avoids ambiguity and emotional bias, focusing instead on conceptual and terminological precision. Consequently, any advancement in science is accompanied by linguistic development, as new concepts require precise expressions that reflect both their theoretical and practical content.

The relationship between language and knowledge is reciprocal. Language does not simply transmit ideas; it contributes to their formation. It is the instrument through which researchers think and reconstruct reality. What cannot be expressed linguistically cannot enter the domain of scientific knowledge. From this perspective, language provides the structure that allows the mind to organize observation and experimentation, making them describable and analyzable. In this sense, language is an epistemological component as essential as observation and reasoning.

In the social sciences, language assumes an even greater significance because it is not only a tool for description but also part of the subject of study itself. Sociologists and anthropologists use language to document interviews and observations while simultaneously examining how language is employed within society to express values, power, and identity. In this context, interview forms and observation reports function as linguistic instruments that translate social reality into analyzable data. The clarity and precision of language allow other researchers to replicate studies or compare results, giving scientific knowledge its cumulative and interactive character.

Therefore, language is not merely a vessel for scientific knowledge; it is an integral component of its structure. It enables researchers to think, analyze, and share their findings within the scientific community. Without language, science loses its capacity to communicate and evolve, as any knowledge that cannot be expressed remains incomplete, unverifiable, and unbuildable. In this sense, scientific language embodies the relationship between thought, observation, and reasoning, conferring both a human and rational dimension to knowledge.

### 4- **The Scientific Method**

The scientific method is a systematic approach to acquiring knowledge, based on specific stages: observation, hypothesis formulation, experimentation,

analysis, and ultimately, drawing conclusions. This method ensures objectivity and verifiability of results, while allowing hypotheses to be revised when new data emerge. In sociology, for example, a researcher may study the impact of education on social behavior by designing a field study, collecting data, testing hypotheses, and then deriving conclusions in a logical and methodical manner.[1]

Thus, the scientific method represents the organized path that researchers follow to acquire knowledge accurately and objectively. It provides a framework that defines the methodological steps necessary to understand phenomena, analyze them, and extract the laws governing them. The process begins with observation, where the researcher focuses on a specific phenomenon in reality, aiming for precise description and careful recording of its characteristics. This is followed by hypothesis formulation, which involves proposing a preliminary explanation linking potential variables. Experimentation or field study then tests this hypothesis against empirical data, followed by analysis, where the researcher organizes, classifies, and identifies relationships among the data, leading to conclusions that offer general explanations or laws that can be generalized.

The scientific method is distinguished by its capacity to achieve objectivity through measurable and verifiable criteria, allowing other researchers to replicate studies and confirm the validity of results. It is also flexible, permitting modification of hypotheses when new data or unforeseen variables appear. This openness makes scientific knowledge dynamic and continuously evolving, as it does not treat truth as an absolute but as a field subject to ongoing review and scrutiny.

In sociology, these steps are embodied in field studies aimed at understanding human behavior within its social and cultural context. For instance, when examining the impact of education on social behavior, a researcher begins by precisely defining the phenomenon, formulates hypotheses regarding the relationship between educational level and behavioral patterns, then collects data through observation, interviews, or surveys. Subsequently, the results are analyzed to test the validity of the hypotheses, culminating in conclusions that clarify the nature of the relationships among the studied variables. This methodological rigor renders social research scientific, as it goes beyond mere description of reality to its explanation based on tangible and logical evidence.

In this way, the scientific method functions as a link connecting observation, reasoning, and language. It integrates sensory data, analytical thinking, and

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[1] عبد الله محمد عبد الرحمن، مناهج وطرق البحث الاجتماعي، دار المعرفة الجامعية، الإسكندرية، مصر، 2000، ص. 134

organized linguistic expression. Through this integration, scientific knowledge becomes precise, coherent, and reliable, surpassing the limits of individual experience, philosophical reflection, or religious belief, as it is grounded in principles of verification, evidence, and replication. In this sense, the scientific method constitutes the structural foundation that ensures the objectivity of knowledge and empowers its continuous development, contributing to the accumulation of human understanding of reality.

## III. Principles of Scientific Knowledge

Scientific knowledge is grounded in a set of principles that ensure its accuracy, credibility, and neutrality, distinguishing it from other forms of knowledge that may be influenced by emotion, belief, or bias. These principles serve as both ethical and methodological foundations guiding the researcher in data collection, analysis, and presentation of results. The most prominent of these principles include:

### -1 Objectivity

Objectivity requires the researcher to avoid any preconceived judgments or personal opinions that might influence the interpretation of phenomena. Science is based not on subjective impressions but on observable and measurable data. Objectivity demands that the researcher observes phenomena as they are, not as they wish them to be. In sociology, for example, when studying a phenomenon such as divorce, the researcher must set aside moral or religious judgments and analyze it as a social reality with its own causes and conditions. Adhering to objectivity ensures that scientific findings reflect reality itself rather than the personal beliefs of the researcher.[1]

### -2 Precision

Precision entails the use of well-defined concepts and rigorous methodological tools during data collection and analysis. Science requires clarity and operational definitions to ensure concepts are measurable. For instance, when a researcher discusses “poverty,” they must specify whether they mean financial poverty, educational deprivation, or lack of social services. Such specificity prevents ambiguity and allows for comparison across studies. Precision also involves adherence to standardized measurement methods, such as carefully designed surveys or structured observation tools, since any measurement error can produce invalid results.[2]

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[1] عبد الله محمد عبد الرحمن، مناهج وطرق البحث الاجتماعي، ص 57.

[2] عبد الرحمن بدوي، *أسس البحث العلمي ومناهجه* .بيروت: المؤسسة العربية للدراسات والنشر، 1987 ص 83.

**-3 Verifiability**

A fundamental feature of scientific knowledge is its verifiability by other researchers. Science does not rely on belief or trust but on the possibility of replicating studies and obtaining consistent results. This property makes science cumulative and collective, rather than a closed, individual endeavor. For example, if one researcher studies the effect of unemployment on crime in a specific city, another researcher can replicate the study in a similar context to confirm the findings or identify new variables. Verifiability ensures the strength and continuity of scientific knowledge.[1]

**-4 Relativity**

Scientific knowledge is inherently relative, as it does not claim absolute truth. Every theory or finding remains valid within the temporal, spatial, and contextual conditions in which it was produced. When data or research tools change, results may also change. For instance, classical physics provided an absolute understanding of motion until Einstein's theory of relativity revised the prevailing framework. In the social sciences, behaviors considered deviant in one society may be normal in another. Researchers must recognize that their findings are provisional and subject to revision, and that scientific progress relies on continual reevaluation.

5- **Scientific Ethics**

Scientific ethics constitutes the value framework guiding researchers in their work. It demands honesty in data collection, analysis, and documentation, respect for participants' rights, and avoidance of data fabrication or plagiarism. In field research, for example, the researcher must clearly explain the study's purpose to participants and maintain confidentiality of their information. References and sources must be accurately cited, as academic dishonesty undermines the credibility of research and the trustworthiness of science as a whole.

These principles demonstrate that scientific knowledge is not merely a mental or empirical activity but also an ethical and methodological practice requiring awareness and responsibility. A genuine scientific researcher does not aim to prove personal opinions but to uncover truth as it is, using precise tools, rigorous methods, and ethical standards that preserve the integrity and continuity of science.

[1] جون ديوي، *المنطق: نظرية البحث* .ترجمة زكي نجيب محمود. القاهرة: لجنة التأليف والترجمة والنشر، 195 ص 124.

## V. The Epistemological Value of This Distinction

The epistemological significance of distinguishing between types of knowledge lies in its crucial role in defining what counts as science and what falls outside it, as well as in fostering critical awareness in researchers regarding the nature and limits of their sources. This distinction is not merely a theoretical classification; it forms a foundational element in constructing scientific thought itself, as it directs researchers toward modes of reasoning and methodologies that ensure objectivity and precision. Recognizing that scientific knowledge differs from philosophical or religious knowledge in both tools and purpose enables the production of verifiable knowledge, rather than following mere reflections or beliefs. Gaston Bachelard captures this idea, stating that "science advances at the expense of opinion; every scientific knowledge corrects a previous knowledge that was closer to opinion than to science."[1] Thus, the epistemological distinction serves as a continual mechanism for purifying scientific thought from slips into common sense or ungrounded beliefs.

This distinction also guides researchers toward critical awareness of the sources they rely upon. A social scientist who understands the difference between empirical observation and philosophical reflection or religious belief is better equipped to develop objective research tools. For example, when studying addiction, the researcher does not rely solely on moral or rhetorical explanations but collects field data and analyzes it statistically to understand the structural factors that explain behavior. This critical awareness allows the researcher to differentiate between testable empirical knowledge and symbolic or rhetorical knowledge that relies only on value-laden interpretation. Edgar Morin emphasizes this perspective, noting that "the scientific mind does not merely gather data; it reflects on how the data are produced and subjects its own tools to continuous scrutiny."[2]

The epistemological value of this distinction also protects science from sliding into ideology or superstition. The absence of clear boundaries between types of knowledge allows metaphysical or rhetorical interpretations to infiltrate scientific inquiry. For example, interpreting social phenomena based on preexisting beliefs or ideological affiliations turns research into a tool for justification rather than understanding. Karl Popper highlights this principle by asserting that "what distinguishes a scientific theory is not its absolute truth, but its falsifiability—that is, its openness to testing, debate, and criticism."[3] This

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[1] غاستون باشلار، تكوين العقل العلمي، ترجمة خليل أحمد خليل، دار التنوير، بيروت، 2005، ص 15

[2] Edgar Morin, **Introduction à la pensée complexe** . p. 74

[3] كارل بوبر، منطق البحث العلمي ، ص 91.

principle prevents science from becoming a closed ideology or rigid dogma and ensures that it remains open to correction and development.

Thus, the epistemological value of distinguishing scientific knowledge extends beyond cognition to ethical and methodological dimensions. It equips researchers with the capacity for continuous critical review and instills a sense of scientific responsibility toward the truth. Distinguishing between what is scientific and what is not preserves the purity of methodology and guarantees the ongoing advancement of human knowledge within an objective and open horizon.

## V. Practical Examples

The practical value of the epistemological distinction between types of knowledge is evident in how researchers approach social and psychological phenomena scientifically, moving beyond moral judgments or metaphysical explanations toward systematic analysis based on evidence, observation, and experimentation. This distinction is not merely a theoretical exercise; it is what gives research its scientific character and enables objective interpretation of reality. This is illustrated in several applied examples from sociology and psychology.

In sociology, the distinction becomes clear in the study of poverty. Moral or popular explanations often attribute poverty to laziness, lack of ambition, or absence of personal responsibility. Such approaches impose value judgments on the phenomenon, blaming the individual while ignoring the social and economic structures that produce and reproduce poverty. A scientific approach, by contrast, treats poverty as the product of specific social and economic structures and relies on precise field tools—such as surveys, interviews, and statistical analysis—to interpret it within a broader system of relationships, including education, unemployment, unequal resource distribution, and state policies.

Pierre Bourdieu, in his study of social classes, emphasizes that "economic inequality can only be understood in the context of the symbolic and cultural relationships that reproduce it."[1] In this sense, poverty cannot be studied in isolation from the cultural and educational capital that shapes individuals' opportunities within society. Families possessing strong cultural resources—education, knowledge, skills—can maintain their social position, while deprived groups remain trapped in structural poverty regardless of effort. This structural analysis, grounded in field observation and statistical data, demonstrates the importance of a scientific approach in transcending moralistic discourses, as it

[1] بيار بورديو، *التمييز: نقد اجتماعي للحكم*، ترجمة عبد السلام بنعبد العالي، المنظمة العربية للترجمة، بيروت، 2012، ص 58

explains phenomena within their material and symbolic relations rather than through normative judgment.

In psychology, the epistemological distinction is reflected in treating human behavior as a scientifically investigable phenomenon rather than as an expression of supernatural or metaphysical forces. For instance, when an individual experiences disorders such as depression or anxiety, religious or cultural narratives may interpret them as a lack of faith or spiritual trial, whereas psychology considers them cognitive–behavioral disorders rooted in patterns of thought, emotion, and perception.

Aaron Beck, the founder of cognitive-behavioral therapy, asserts that "negative emotions are not the direct result of events, but of the way we perceive them."[1] Accordingly, researchers or therapists subject these phenomena to systematic observation, hypothesis testing, and intervention aimed at correcting distorted thought patterns that produce exaggerated emotional responses. In this way, psychological suffering becomes a measurable, diagnosable, and treatable scientific subject, far removed from moralistic or sermonic explanations.

A third example can be drawn from social anthropology to illustrate the impact of the epistemological distinction in field research. When studying magic rituals or traditional beliefs, anthropologists do not treat these practices as mere superstition or logical deviation but seek to understand them within their cultural and social context. Bronisław Malinowski, in his classic study of the Trobriand Islanders, demonstrated that "magic in traditional societies serves social and psychological functions and is used as a mechanism to cope with anxiety and uncertainty."[2] This scientific understanding does not pass judgment but interprets phenomena within their cultural logic, representing the essence of the epistemological method in the social sciences.

These examples show that the epistemological distinction between scientific knowledge and other forms is not purely theoretical but a methodological principle guiding and regulating scientific practice. It frees research from value-laden constraints and normative discourse, establishing an understanding of reality based on observation, analysis, and evidence. Without this distinction, the social and human sciences lose their specificity as scientific fields of interpretation, becoming ideological or sermonic narratives far removed from

[1] Aaron T Beck, *Cognitive Therapy and the Emotional Disorders*, International Universities Press, New York, 1976, p. 45

[2] Bronislaw Malinowski, *Magic, Science and Religion and Other Essays*, Doubleday Anchor, New York, 1954, p. 17

their fundamental goal: understanding humans and society in light of empirical data that can be tested and critically assessed.

**Summary:**

This lecture focuses on understanding the nature of scientific knowledge and distinguishing it from other forms of knowledge such as myth, religion, reflective philosophy, and popular knowledge. It emphasizes that scientific knowledge emerged from humanity's continuous effort to understand surrounding phenomena in a rational and empirical manner, relying on observation, experimentation, verification, and continuous critique. The lecture also highlights the epistemological foundations of scientific knowledge and the ethical and methodological principles that ensure its objectivity and credibility.

In the social sciences, epistemological awareness is especially important because social phenomena are shaped by meanings, culture, and history. Therefore, the researcher's ability to distinguish between scientific knowledge and subjective impressions is crucial for producing precise, testable, and analyzable knowledge, and for developing a scientific mindset capable of questioning reality and generating objective understanding of social phenomena.

- **Self-Assessment Exercises**

**Comprehension Exercises**

**Question 1:**
Explain in your own words the difference between sensory knowledge and scientific knowledge.
Give two examples from your daily life for each type.

**Question 2:**
Why does Karl Popper argue that science advances through falsification rather than confirmation?
Provide an example from the social sciences.

**Question 3:**
What is meant by the objectivity of scientific knowledge?
Mention two behaviors that a researcher can adopt to ensure this objectivity.

**Question 4:**
Rewrite Zakaria Ibrahim's definition of scientific knowledge in simple language.
Which element does this definition emphasize?

**Comparison Exercises**

**Question 5:**
Compare religious knowledge and scientific knowledge in terms of:

- Source
- Method of access
- Verifiability
- Ultimate goal

**Question 6:**
Compare philosophical knowledge and scientific knowledge.
What are the points of integration between them in studying social phenomena?

**Question 7:**
Compare ideological knowledge and scientific knowledge.
How does the former influence individual awareness?
How does the latter attempt to overcome this influence?

**Application Exercises**

**Question 8:**
Give an example from daily life where sensory observation is transformed into scientific knowledge.
Explain the six stages of producing scientific knowledge in this example.

**Question 9:**
Given the following phenomenon:
*"The rise in school violence in recent years"*
Provide:

- A scientific question
- A hypothesis
- A data collection method
- A method to verify the hypothesis

**Question 10:**
Give an example of a personal bias a researcher in the social sciences might have.
How can epistemological controls reduce this bias?

**Question 11:**
Rewrite Abdel Rahman Badawi's definition of scientific knowledge in a short

paragraph.
Then provide an example illustrating the falsifiability of knowledge.

**Student Self-Assessment**

**Question 12:**
Can you now distinguish between the five types of knowledge?
Write one sentence explaining each type.

**Question 13:**
Which concept was the most difficult for you?
Explain why.

**Question 14:**
Rate yourself from 1 to 5 in understanding the following points:

- Sources of scientific knowledge
- Limits of scientific knowledge
- The difference between science and non-science
- The experimental method
- Epistemological controls

**Question 15:**
Write three new questions of your own about the lecture.

## Lecture Four: Defining Science, Its Standards, Objectives, and Characteristics

**Introduction**

This lecture represents a fundamental stage in developing the student's scientific awareness. Its aim is to present science not as a collection of isolated facts, but as an integrated system of knowledge grounded in clear and objective foundations. Defining science goes beyond viewing it as a mere accumulation of information; it positions science as a means of understanding phenomena, analyzing the relationships between them, and developing the ability to predict and influence them. In this sense, science functions as a cognitive tool that enables humans to move beyond personal impressions and spontaneous explanations toward a structured understanding based on evidence that can be tested and verified.

Scientific knowledge is built upon precise standards that distinguish it from other forms of knowledge. Accuracy in observation, repetition in experimentation, the testability and revisability of results, and neutrality in dealing with data are all elements that make science a methodological practice grounded in rational reasoning and systematic observation. These standards do not merely regulate research procedures; they also ensure the credibility of scientific knowledge and the validity of its conclusions, allowing it to be applied across diverse contexts, whether in the natural sciences or the social sciences.

Moreover, the objectives of science play a decisive role in guiding scientific inquiry and determining its practical value. Science seeks understanding and explanation, but it does not stop there. It extends toward prediction and control, enabling it to offer solutions to real-world problems and to improve living conditions. Within this framework, science fulfills its role as a tool for change and critical analysis, allowing researchers to question social, economic, and political realities and to uncover the underlying causes and hidden relationships among different phenomena.

The characteristics of scientific concepts add another dimension to scientific awareness. These concepts are marked by abstraction, precision, and generality, enabling the transition from particular cases to a deeper understanding of general patterns. Such characteristics equip students with an analytical and critical perspective, allowing them to comprehend complex phenomena in a coherent and systematic manner while avoiding personal bias and errors resulting from random or unsystematic observation.

In summary, this lecture serves as an entry point to understanding science both as a method and as a mode of knowledge production. It enables students to distinguish scientific knowledge from other forms of knowledge, to adhere to ethical and methodological standards, and to expand their capacity for critical and analytical thinking in the study of social and human phenomena.

**First: Definition of Science**

## a. Linguistic Meaning

The term (science/knowledge) is derived from the triliteral Arabic root *(ʿ–l–m)*[*], which conveys the meanings of perception, knowledge, and distinction. According to *Lisān al-ʿArab*, *ʿilm* refers to the apprehension of a thing in its true reality. It originates from the verb *ʿalima* (to know), from which are derived *ʿālim* (knower) and *maʿlūm* (that which is known). In its linguistic sense, therefore, *ʿilm* denotes a form of certain understanding based on recognition and clarity, distinguishing what is known from what is unknown.[1]

According to *Al-Mu'jam Al-Waseet*, "al-'ilm (knowledge) is the opposite of ignorance, and it represents certain understanding that corresponds to reality."[2] Linguistically, *al-'ilm* refers to the perception and comprehension of a thing in its true nature, and it stands in contrast to ignorance. In *Maqāyīs al-Lughah* by Ibn Faris, it is noted that the triliteral root (ʿ–l–m) originates from a single root indicating a mark or feature in a thing that distinguishes it from others.[3]

In English, the term *science* derives from the Latin ***Scientia***, which broadly means knowledge. Interestingly, the term *scientist* was coined only in the **1820s** by the philosopher William Whewell, who defined it as "the systematic study of the structure and behavior of the physical and natural world through observation and experiment," that is, the methodological study of the structure and behavior of the physical and natural world through observation and experimentation.[4]

## b. Terminological Definition

## From a Western Perspective:

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[*] في الكتابات الأكاديمية، نستخدم **al-'ilm** بدل العلم، للحفاظ على النطق الصحيح تقريبا.الغرض هو الحفاظ على الشكل الأصلي للكلمة العربية عند ذكر المصطلحات فعند دراسة المصطلحات الفلسفية أو العلمية، يفضل عدم ترجمتها حرفيا إلى"science" ، بل الاحتفاظ بها لشرح المفهوم الأصلي باللغة العربية، ثم ذكر الترجمة الإنجليزية بجانبه، وبالتالي **الحرف "ع"** يمثل بعلامة(')عليها فاصلة معكوسة **بالترانسل**:**iteration** في العربية، الحرف "ع" صوت حنجري خاص لا يوجد في الإنجليزية.يرمز له بـ' لتسهيل القراءة الأكاديمية وتمييزه عن أي حرف آخر.

[1] ابن منظور، جمال الدين محمد بن مكرم .**لسان العرب**، الجزء 12. بيروت: دار صادر، 1993، ص 417.

[2] مجمع اللغة العربية .**المعجم الوسيط**، الجزء 2. القاهرة: دار الدعوة، 2004، ص 605.

[3] ابن فارس، أحمد بن فارس .**معجم مقاييس اللغة**، تحقيق عبد السلام هارون، الجزء 4. بيروت: دار الفكر، 1979، ص 115.

[4] Oxford University Press. **Oxford English Dictionary** (3rd ed.). Oxford: Oxford University Press, 2010, p. 1256.

Science is defined as the pursuit of acquiring knowledge and understanding the natural and social world through a systematic methodology grounded in evidence.[1]

According to this definition, science is understood as a continuous process through which human beings seek to acquire knowledge and comprehend how the world around them operates, whether in the natural domain—such as physics, chemistry, and biology—or in the social domain—such as sociology and anthropology. Science relies on an organized and systematic methodology; it is not a random accumulation of information, but a structured process that follows precise steps, including observation, experimentation, analysis, and the testing of hypotheses.

At its core, science is fundamentally based on evidence. Any scientific knowledge must be supported by verifiable facts rather than personal opinions or subjective beliefs. Through this methodological and evidence-based approach, science enables an objective understanding of natural and social phenomena, contributing to technological advancement, problem-solving, and informed decision-making grounded in reliable data.

In this context, Karl Popper proposed his own definition of science, viewing it as "a system of statements that are empirically testable and falsifiable."[2] According to this perspective, any scientific theory must remain open to criticism and subject to refutation if it fails to correspond with empirical evidence. This principle constitutes a fundamental criterion for distinguishing genuine scientific knowledge from non-scientific beliefs, as scientific knowledge is grounded in the possibility of testing hypotheses and rejecting them when contradictory evidence emerges.

In the social sciences, this idea can be illustrated through theories examining the relationship between poverty and crime. Suppose a researcher claims that "poverty always leads to higher crime rates." Although this statement may appear scientific, it is not falsifiable, since many impoverished societies do not necessarily experience high levels of crime. By contrast, the hypothesis can be reformulated as follows: "In societies with high levels of poverty, the likelihood of increased crime rates rises." This revised hypothesis is empirically testable through the collection and statistical analysis of data examining the relationship between poverty and crime. If evidence reveals the existence of poor societies with low crime rates, the theory may be partially or entirely falsified, thereby opening the way for further revision and refinement. In this manner, the principle of falsifiability ensures that social theories remain open to

[1] The Science Council**. "What is Science?"** London: The Science Council, 2009, p. 3.
[2] Karl Popper,. ***The Logic of Scientific Discovery***, p. 40

development and continuous revision, rather than solidifying into rigid and unquestioned beliefs.

**Francis Bacon** defined science as "a process of interpreting nature through observation and inductive reasoning."[1] This definition highlights the idea that science relies on the systematic collection of data and their analysis in order to derive generalizations and universal laws. The inductive method is based on observing repeated individual cases and then inferring a general rule from them, rather than starting with a preconceived theory and imposing it upon reality.

This approach can be applied to the study of social behavior patterns. For example, if a sociologist observes that a large proportion of students who learn in interactive educational environments achieve better academic outcomes, repeated observation and data analysis may lead to the conclusion that interactive environments play a significant role in enhancing academic performance. Such a conclusion is not final or absolute; rather, it provides a preliminary foundation for further studies and experiments that may confirm, refine, or revise this interpretation. This process reflects the cumulative nature of science, which is grounded in inductive reasoning and continuous empirical inquiry.

**Among the Arabs:**

**Al-Farabi** defines science as "to apprehend existing things and know them in their realities."[2] In other words, science is the process of understanding phenomena and objects as they truly are, not as we imagine or wish them to be. This definition emphasizes the necessity of objective verification of information, rather than relying solely on conjectures or personal impressions. Science aims to reach the truth of things through methodological tools such as observation, analysis, and experimentation.

If we apply this definition to the social sciences, it can, for instance, be used in the study of social identity. A researcher seeking to understand how identity forms in a particular society cannot rely solely on personal opinions or assumptions. Rather, they must gather empirical data through interviews, surveys, and analyses of individuals' behaviors in different contexts. In this way, science becomes a means to understand social reality as it is, free from biases or preconceived beliefs.

**Ibn Khaldun** shares a similar perspective with **Al-Farabi**, defining science as "knowing a thing in its true nature, which is achieved through reason or

[1] Francis Bacon, ***Novum Organum.*** London: J. Bill, 1620, p. 35.

[2] أبو نصر الفارابي، **إحصاء العلوم** .بيروت: دار المشرق، 1985، ص 104.

experience."[1] Accordingly, for him, scientific knowledge depends on apprehending reality as it is, not as it is imagined or conceived. Knowledge must therefore be acquired either through reason (deductive and inferential thinking) or through experience (observation and experimentation). This reflects the scientific methodology in studying phenomena, especially social phenomena.

For example, if a researcher wants to examine the relationship between poverty and unemployment, they cannot rely on personal impressions or superficial explanations. They must collect empirical data and analyze it using scientific methods, such as conducting statistical studies on unemployment rates across different social groups or interviewing unemployed individuals to understand the causes and economic impacts of unemployment. By doing so, the researcher gains an accurate understanding of the phenomenon based on reason and experience, fully consistent with **Ibn Khaldun's** conception of science.

## II. Objectives of Science

Science is humanity's tool for understanding the world around us. It is not merely a collection of knowledge, but an organized process aimed at uncovering the laws and patterns governing natural and social phenomena. Science relies on a precise methodology that combines observation, experimentation, and analysis, enabling us to form a clearer and more accurate picture of reality.

Through this methodology, science seeks to achieve four main objectives: description, explanation, prediction, and control. Description allows us to identify phenomena and observe their characteristics, while explanation helps us understand their causes and influencing factors. Prediction enables us to anticipate the occurrence of phenomena in the future based on prior knowledge, and control provides the ability to manage and guide phenomena to achieve specific goals.

These objectives make science a fundamental force in societal development, as its role extends beyond discovering facts to improving human life through the practical and effective application of knowledge. Through these objectives, science attempts to answer the fundamental questions: How does the phenomenon under study occur, and why does it occur? The main features of these objectives can be summarized in the following diagram:

[1] عبد الرحمن ابن خلدون، **المقدمة** .بيروت: دار الفكر، 2004، ص 448.

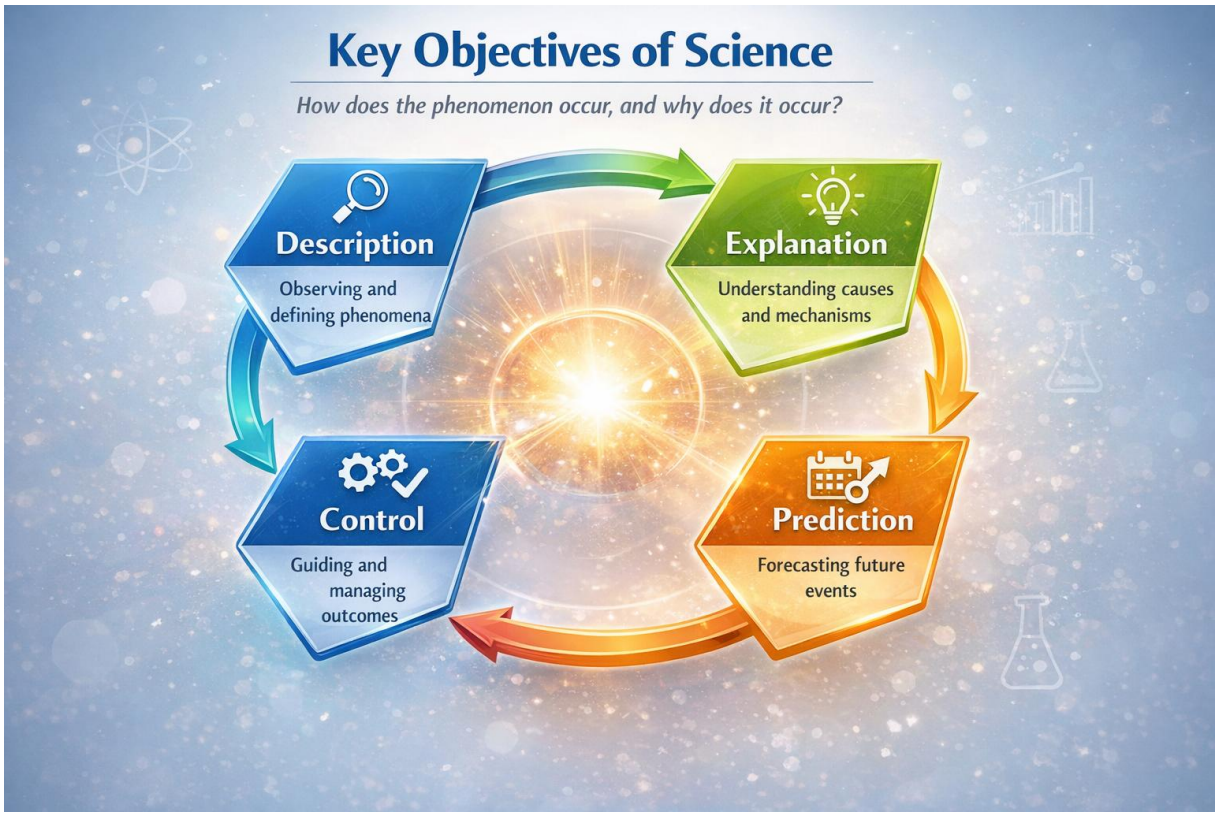


**Figure 03:Illustration of the Main Objectives of Science**

1- **Description (How does the phenomenon occur and manifest?)** Description constitutes the foundational first stage in scientific research, aiming to identify phenomena, classify them, and document their characteristics accurately according to a systematic methodology. It relies on observation and experimentation as tools for collecting data related to the phenomenon without interfering in its natural course, enabling researchers to establish a solid knowledge base on the subject under study.

Description is not a simple task as it might appear; rather, it is a precise scientific activity requiring a methodical effort to uncover the phenomenon and understand its various attributes and dimensions. It goes beyond mere data recording, encompassing the analysis and classification of information according to defined scientific criteria. This process often involves the use of diverse research tools such as structured observation, surveys, and document analysis to ensure comprehensive and accurate data collection. The accuracy of description plays a crucial role in subsequent stages of research, serving as the foundation upon which explanation, prediction, and control are built. Mastering descriptive skills is therefore essential, particularly in the social sciences, where it contributes to uncovering behavioral patterns and societal changes in an objective and methodical manner.

**Pierre Bourdieu**, in his study on social distinction and cultural taste in *Distinction: **A Social Critique of the Judgement of Taste***,[1] employed description to analyze the relationship between cultural preferences and social classes. He collected field data through surveys and interviews with individuals from different social strata in France, examining their consumption patterns of art, music, and literature, and then classified these according to social variables such as education, income, and occupation. **Bourdieu** further analyzed individual responses to understand how cultural preferences reflect social position, noting that upper classes tend to favor "high" arts like opera and classical painting, whereas lower classes prefer popular arts such as commercial music and sports. His descriptive approach did not merely highlight cultural differences but revealed a strong link between cultural taste and symbolic capital, showing how culture functions as a tool for reproducing social inequalities.

Similarly, **Manuel Castells**, in his study of the network society in ***The Information Age: Economy, Society, and Culture***,[2] relied on description to analyze the transformations induced by digital technology in social and economic structures. His research drew on data and statistics regarding Internet use and its impact on social relationships, categorizing phenomena according to variables such as economic structure, labor market, and patterns of social interaction.

This demonstrates that systematic and accurate description in scientific research provides a rigorous foundation for understanding complex social phenomena and enables subsequent stages of analysis and interpretation.

**Castells** focused on analyzing patterns of communication and interaction within digital environments, illustrating that the emergence of the Internet led to the formation of a **"network society,"** where social and economic relationships are no longer confined by geographic boundaries but are shaped by the flow of information through digital networks. Through careful observation and descriptive analysis, he showed how digital globalization reshaped power dynamics, whereby control is no longer limited to traditional structures but is exercised by actors capable of managing the flow of information.[3]

These examples highlight the critical role of scientific description in understanding phenomena, particularly social phenomena, as it helps document

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[1] أنظر: بيار بورديو، ***التمييز: نقد اجتماعي للحكم***، *ص 54.*

[2] **M Castells,**. ***The Information Age: Economy, Society and Culture***, *Volume I: The Rise of the Network Society*. Oxford: Blackwell. 1996, p 89.

[3] Ibid

social and technological changes and lays the groundwork for deeper analysis of the relationship between technology and society in the information age. According to Creswell, "description in social research goes beyond recording phenomena; it extends to analyzing the contexts in which they occur, thereby revealing social patterns and trends."[1]

Descriptive analysis also facilitates the comparison of social phenomena across different societies, allowing researchers to understand cultural and social differences. For instance, in studying the impact of economic transformations on consumption patterns in urban communities, descriptive research can analyze how individual consumption behaviors change in response to economic shifts, such as rising income levels, inflation, or economic globalization. One might compare consumption patterns in major industrial cities such as Shanghai, New York, and Dubai to examine how economic and cultural factors influence consumer behavior.

In such cases, description helps categorize different consumer groups, identify high-demand products, and analyze the factors driving changes in purchasing habits, including the impact of digital advertising or shifts in social values. By analyzing these data, researchers can gain a deeper understanding of the interplay between economy and consumer culture, which informs marketing strategies or economic policies aligned with societal transformations.

In conclusion, description is not merely superficial recording of phenomena; it is a scientific method that enables researchers to understand social interactions, anticipate future trends, and develop strategies to address social issues. Through systematic data collection and rigorous analysis, descriptive research contributes to building scientific theories that explain social phenomena, making it an essential step in both academic and applied research.

## 2- Explanation (Why does the phenomenon occur?)

Explanation constitutes one of the fundamental objectives of science, aiming to understand why phenomena occur and what factors contribute to their emergence. Scientific explanation differs from ordinary explanation in that it relies on systematic analysis, experimental testing, and scientific theories to identify causes and relationships among variables, allowing for the construction of more accurate and objective knowledge.

According to Creswell, "Scientific explanation goes beyond merely describing a phenomenon; it seeks to analyze the factors influencing it, test causal

[1] Creswell, J. W. ***Research Design: Qualitative, Quantitative, and Mixed Methods Approaches***. Sage Publications, 2014. p. 55.

relationships, and develop explanatory models that can be generalized to other contexts."[1] In other words, scientists and researchers must adopt this approach to provide a deeper understanding of phenomena, enabling them to predict their recurrence or future development.

Scientific explanation also aims to establish cause-and-effect relationships by analyzing the factors affecting the studied phenomenon, providing a deeper understanding of its origins and evolution. Instead of merely observing the phenomenon, explanation analyzes causal relationships—what factors led to its occurrence, and to what extent does each factor influence the phenomenon? According to **Berkman**, "Explanation relies on statistical and experimental models to test the relationships among variables, allowing precise measurement of each variable's impact on the phenomenon."[2]

For example, regression analysis can be used to determine the contribution of carbon dioxide emissions, increased automobile usage, and deforestation to rising average temperatures. Experimental methods, such as simulating the effects of increased greenhouse gases on climate change, can also be employed to understand causal relationships empirically.

Explanation does not stop at understanding variables and their interrelations; it can also contribute to the development of theories that provide a deeper understanding of social phenomena by analyzing influential factors and causal links among variables. The following examples from anthropology, psychology, and sociology illustrate this approach.

- **Anthropology: Gift Exchange and Social Economy**

In his study on gift exchange, **Marcel Mauss** emphasizes that exchange is not merely an economic process but encompasses social and cultural dimensions that connect individuals and communities through reciprocal relationships

[1] Ibid,p78.
[2] Berkman, L. F. ***Social Epidemiology***. Oxford University Press, 2000. p. 45.

grounded in moral obligation.[1] **Mauss** goes beyond simply describing the phenomenon; he explains how these relationships build social networks based on the principle of mutual giving. This explanatory model helps us understand traditional societies and how the concept of the gift functions to reproduce social ties and relationships.

- **Psychology: Cognitive Dissonance**

**Leon Festinger** proposed the theory of cognitive dissonance, which explains how individuals strive to reduce inconsistencies between their beliefs and behaviors. For instance, if a person smokes while knowing that smoking is harmful, they may either downplay the health risks or alter their behavior to reduce dissonance.[2] This explanation goes beyond mere description, contributing to practical applications in therapeutic and psychological interventions for understanding changes in human behavior.

- **Sociology: Liquid Modernity**

**Zygmunt Bauman** interprets the concept of "liquid modernity" to refer to social transformations that render relationships and institutions more flexible and unstable compared to traditional societies.[3] This explanation does not stop at describing the phenomenon but analyzes the structural causes of this shift, such as globalization and economic changes. It provides a framework for understanding changing lifestyles and social interactions in contemporary society.

These examples illustrate that scientific explanation goes beyond identifying relationships between variables; it involves constructing theories that offer deeper insight into social phenomena and open avenues for practical applications in understanding human behavior.

Ultimately, explanation can be considered one of the fundamental objectives of science, aiming to understand the causes of phenomena and analyze influencing factors rather than merely describing them. Scientific explanation differs from ordinary explanation by relying on systematic analysis, experimental testing, and statistical models to examine causal relationships among variables. This approach allows for the construction of more robust theories, enabling

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[1] مارسيل موس، ***مقالة في الهبة: أشكال التبادل في المجتمعات الأرخية وأسبابه*** .ترجمة وتحقيق محمد الحاج سالم. بيروت: دار الكتاب الجديد المتحدة، 2006، ص ص 55-78.

[2] Festinger, L *A **Theory of Cognitive Dissonance***, Stanford University Press, 1957, pp. 1-22

[3] Bauman, Z, ***Liquid Modernity***, Polity Press, 2000, pp. 12-40

predictions about the development and recurrence of phenomena across different contexts. By employing diverse research methods, such as observation, interviews, and experiments, scientific explanation contributes to the development of analytical frameworks that enhance our understanding of human behavior and social trends in a detailed and comprehensive manner.

## 3- Prediction

Science does not merely describe, explain, or understand phenomena; it also extends to predicting them before they occur, based on methodological principles. The processes of description and explanation do not stop at systematic analysis and testing causal relationships among variables; they also aim to anticipate the future by identifying clear patterns and objective laws. This involves using statistical and experimental tools to draw precise conclusions about future developments.

In the social sciences, many scholars have attempted to understand and predict human and societal behavior, despite its inherent complexity. For example, Karl Marx predicted social and economic transformations by analyzing the concepts of modes of production and class conflict. He argued that "capitalist societies will face recurring economic crises, which will drive them toward socialism." Based on these structural contradictions, Marx anticipated that economic crises and class struggles would give rise to revolutionary social movements aimed at overthrowing or radically reforming the capitalist system. Some of the most notable effects included the emergence of labor movements, socialist and communist movements, and the Great Depression of **1929**.[1]

Similarly, Alvin Toffler, in his book ***Future Shock***,[2] proposed a predictive model focusing on technological changes and their societal impact. He suggested that the rapid pace of innovation and the proliferation of digital information would lead to social and cultural disruptions, with societies struggling to adapt to rapid transformations. This may generate feelings of alienation and psychological instability among individuals. **Toffler's** analysis can be seen as an extension of **Marx's** ideas regarding structural changes, but instead of focusing on class struggle, **Toffler** emphasizes the technological revolution and its social consequences—a phenomenon increasingly visible today in digital transformations and changing patterns of work and communication.

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[1] كارل ماركس، **نقد الاقتصاد السياسي**، ترجمة: فالح عبد الجبار، دار الفارابي، بيروت، 2013، ص ص 198.

[2] Toffler, A, ***Future Shock***, New York: Random House,1970,p78.

Prediction is also central in demography. Warren Thompson proposed the Demographic Transition Theory, which explains how societies progress through sequential demographic stages—from high birth and death rates to population stabilization. This theory has been used to forecast population growth in developing countries, where improvements in education and healthcare are expected to gradually reduce fertility rates, impacting population planning.[1]

These examples illustrate that prediction spans multiple social science disciplines, enabling a deeper understanding of social, economic, political, psychological, and cultural changes. Consequently, prediction is a fundamental tool in the social sciences, guiding research and planning for the future of societies in an ever-changing world.

## 4- Control

The goal of scientific research goes beyond merely describing, explaining, or predicting phenomena; it extends to the ability to **control and manage** them. According to Mohamed Abdel Rahman, control is defined as "the ability to regulate the factors and variables that influence the phenomenon under study, allowing their effects to be reduced or enhanced according to research objectives, thereby enabling outcomes to be guided within a scientific framework that can be utilized both theoretically and practically."[2]

The degree of control over phenomena varies according to their nature and the complexity of their elements. Some phenomena, such as those studied in the natural sciences, can be controlled with high precision. In contrast, social phenomena are more complex due to multiple interacting factors and the influence of cultural and historical contexts.

### 1. Experimental Control

Experimental control is a fundamental method in scientific research used to ensure that changes in the dependent variable are solely due to the influence of the independent variable, without interference from external factors. This is achieved through carefully designed experiments, such as assigning experimental groups exposed to the independent variable and control groups that are not, allowing researchers to compare results and determine the true effect.[3]

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[1] Thompson, W. S, ***Population***. American Journal of Sociology, 34(6),1929, p 959.

[2] عبد الله محمد عبد الرحمن، **مناهج وطرق البحث الاجتماعي** ، ص 87.

[3] Creswell, J. W., & Creswell, J. D**.** ***Research Design: Qualitative, Quantitative, and Mixed Methods Approaches***. Thousand Oaks, CA: Sage Publications **2009**. p. 105

Random assignment of participants and systematic manipulation of variables are also used to ensure results are not influenced by uncontrolled factors.

For example, in a study on the effects of active learning strategies on student performance, researchers divided students into two groups: an experimental group engaged in interactive, discussion-based learning, and a control group continuing with traditional methods. After a period of observation, the experimental group showed significant improvement, indicating the effectiveness of active learning. Factors such as the learning environment, study hours, and students' backgrounds were controlled to ensure that observed differences were solely due to the teaching method used. Experimental control is essential to maintain objectivity and accuracy, providing results that can be generalized and used to make evidence-based decisions.[1]

## 2. Statistical Control

Statistical control refers to "the use of statistical methods to manage the influence of extraneous variables, enabling the researcher to isolate the relationship between the independent and dependent variables and ensure that observed changes are due to the actual relationship rather than other factors.[2]" Daniel Stockemer and Jean Nicolas Bordeleau define it as "the procedure that relies on statistical tools and techniques to control confounding variables, aiming to minimize their effects and ensure that the relationship between primary study variables reflects the true effect rather than external influences."[3]

Statistical control is essential in social research to manage variables that may distort the relationship between primary variables, ensuring accurate and reliable results. Techniques such as regression analysis and analysis of variance help isolate external influences and confirm that findings reflect true relationships. For example, when studying the effect of educational level on unemployment rates, other factors such as geographic location, gender, or economic background could distort results. Applying multiple regression analysis isolates each factor's influence, providing a more accurate understanding of the education-unemployment relationship. Similarly, in analyzing the media's role in shaping public opinion, analysis of variance can control demographic variables like age, education, and economic level, ensuring that observed effects reflect the media's true influence.

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[1] عبد الله محمد عبد الرحمن، **مناهج وطرق البحث الاجتماعي** ، ص 117.

[2] المرجع نفسه. ص 145.

[3] Daniel Stockemer, & Bordeleau, Jean-Nicolas**. *Quantitative Methods for the Social Sciences: A Practical Introduction with Examples in R***. Springer, 2023, p 133.

### 3. Methodological Control

Methodological control consists of procedures followed by researchers to ensure control over factors affecting the phenomenon under study, reducing errors from bias or unwanted external factors and enhancing the accuracy and validity of findings. It relies on careful research design, including defining independent and dependent variables, selecting appropriate data collection tools, and employing precise analytical methods.

According to Daniel Stockemer and Jean Nicolas Bordeleau in *Quantitative Methods for the Social Sciences: A Practical Introduction with Examples in R*, methodological control includes "a set of checks and procedures that ensure the consistency of research instruments and the control of extraneous variables, enabling the study to be replicated in different contexts and produce consistent results, thus enhancing the validity and reliability of scientific research."[1]

For instance, in a study on the effects of sleep deprivation on concentration, other factors such as participants' health or stress levels could influence outcomes. To control these, the researcher can:

- Use a control group: divide participants into those with adequate sleep and those sleep-deprived, keeping all other conditions identical.
- Standardize experimental conditions: conduct tests at the same time and environment to ensure differences are due solely to sleep.
- Measure potential confounders: monitor stress levels or caffeine intake to account for their influence.

### 4. Environmental Control

Environmental control involves regulating the conditions surrounding an experiment or study to prevent external factors from affecting the variables, ensuring accurate and valid results. This includes controlling lighting, noise, temperature, and any other environmental influences.

Sami Al-Sharif defines it as "procedures followed by the researcher to manage environmental factors affecting participants or the phenomenon under study, aiming to minimize the influence of external variables on result accuracy. This includes controlling physical conditions such as lighting, temperature, and noise, as well as social and cultural factors influencing participants' responses."[2]

[1] Ibid,p154.

[2] أحمد حسين الرفاعي. **مناهج البحث العلمي: تطبيقات إدارية و اقتصادية**. دار وائل، 2014، ص134.

Environmental control is crucial in research to ensure that external conditions do not bias results. For example, in studying the effect of social interaction on community integration, factors like cultural background, economic level, and demographics must be considered. By controlling these variables through sample homogenization or statistical techniques, researchers can ensure that differences in integration levels are due to social interaction itself rather than uncontrolled environmental factors.[1]

This comprehensive approach to control—experimental, statistical, methodological, and environmental—ensures research accuracy, reliability, and validity, allowing scientific studies to provide credible, evidence-based insights.

## III. Characteristics of Science

Understanding the characteristics of science is essential for students to fully grasp academic standards and comprehend scientific methodologies correctly. Science is not merely a collection of isolated facts; it is an integrated system based on clear principles that distinguish it from other forms of knowledge, such as philosophy or traditional beliefs. The characteristics of science help define its standards and methods, enabling researchers and students to approach phenomena with accuracy and objectivity. These characteristics can be summarized as follows:

### 1. Objectivity

Objectivity is one of the most important features distinguishing scientific knowledge from other forms of knowledge. It entails the researcher's neutrality in studying phenomena, avoiding personal or ideological biases, thereby ensuring the accuracy and generalizability of results. Objectivity relies on rigorous research methods that control for factors potentially affecting the study, making scientific knowledge verifiable by other researchers.

However, achieving objectivity in the social sciences presents particular challenges, as the researcher is part of the society under study, which may influence their analysis and interpretation. Scholars have debated the extent to which objectivity is achievable in social research. Some argue that social sciences should follow the same objective approach as natural sciences, while others contend that the researcher's personal values and beliefs cannot be entirely separated from their scientific work.

[1] باسم سرحان، ***طرق البحث الكمي في العلوم الاجتماعية*** .المركز العربي للأبحاث ودراسة السياسات، 2017، ص154.

Émile Durkheim asserted that social sciences should be as objective as natural sciences, emphasizing the need to treat social phenomena as "things" (choses) independent of individual consciousness. He applied this approach in his study on suicide, using statistics and empirical data to examine the relationship between suicide rates and social integration, without imposing personal interpretations, making his work a model of objective social research.[1]

Max Weber critiqued the notion of absolute objectivity, arguing that social sciences cannot be entirely neutral because researchers are influenced by their values and beliefs. He emphasized "value neutrality," where researchers acknowledge their personal biases and strive to minimize their impact through rigorous methodology.[2]

Objectivity is particularly important in social sciences because researchers study their own societies, making them susceptible to cultural and social influences. Maintaining objectivity helps mitigate these effects and allows a deeper understanding of social phenomena based on empirical evidence and scientific analysis. Furthermore, objectivity strengthens the role of research in decision-making by providing reliable data rather than personal opinions or unscientific interpretations, contributing to the advancement of social sciences and the development of robust, evidence-based knowledge.

## 2. Precision and Abstraction

Science does not rely on random observations or subjective interpretations. It is based on clear concepts, defined measurement tools, and scientific standards that ensure accurate explanations of studied phenomena. At the same time, science does not treat individual cases in isolation; it emphasizes **abstraction**, which involves generalizing results and formulating theories and laws to understand phenomena across different contexts.

Understanding the importance of these two characteristics requires exploring their meaning and how they are applied in social sciences compared to natural sciences, with illustrative examples that reflect their role in building reliable scientific knowledge.

## 3. Precision

Precision is a fundamental characteristic of science, aimed at reducing ambiguity and ensuring that concepts are clear and well-defined. Science does not rely on general observations or rough estimates; it uses standardized

[1] É Durkheim, **Les règles de la méthode sociologique**. Paris: Félix Alcan,1895. p. 34.

[2] M Weber, **The Methodology of the Social Sciences**. New York: Free Press,1949. p. 64.

measures and instruments to ensure the reliability of results, whether in natural or social sciences. Precision allows researchers to replicate and verify findings, enhancing the credibility of scientific knowledge.

In natural sciences, phenomena are measured using precise instruments, such as sensitive scales, electron microscopes, and astronomical telescopes. For example, temperature measurement relies on precise scales like Kelvin or Celsius rather than vague terms like "high" or "low." According to Popper, accurate measurement of natural phenomena is essential for testing hypotheses and is a prerequisite for falsifiability and replicability in scientific research.[1]

In social sciences, achieving precision is more complex due to the dynamic nature of human phenomena. Researchers rely on structured tools, such as surveys, interviews, and statistical measures, to collect reliable data. For instance, studying poverty requires precise indicators like "annual per capita income" or "percentage of households living below the poverty line," providing measurable and comparable data. Precision in both natural and social sciences facilitates the production of trustworthy conclusions and accurate data. For example, in public health, disease prevalence is measured using specific indicators, such as "number of cases per 100,000 population," which allows the development of effective response strategies.

### 4. Abstraction

Abstraction is another fundamental characteristic of science. It allows researchers to move beyond specific details to develop general concepts and laws that explain phenomena objectively and accurately. This cognitive process focuses on the essential features of phenomena while ignoring secondary aspects, enabling the construction of theoretical models to systematically understand reality.

In natural sciences, abstraction is reflected in universal laws and theories that explain phenomena regardless of individual cases. For example, Newton's law of gravitation describes the behavior of all objects universally, independent of their type or location. Similarly, the periodic table classifies elements based on shared properties, enabling predictions about the behavior of undiscovered elements.

In social sciences, abstraction appears through theoretical concepts and models used to understand social phenomena beyond individual cases. Max Weber developed an abstract model of bureaucracy as an ideal administrative structure

[1] Karl Popper, . ***The Logic of Scientific Discovery***,p78.

operating according to specific rules, even if real institutions do not fully conform to it. Likewise, the concept of "social class" abstracts economic differences to analyze society without focusing on individual cases. Abstraction allows researchers to develop standardized measurement tools to compare phenomena across time and space, though it must be balanced with precision to avoid losing critical details that may affect interpretation.

In anthropology, the concept of social structure serves as a key abstraction to understand social relationships and the organization of human communities. This model assumes that every society possesses an underlying structure organizing relationships among individuals according to defined roles and positions, regardless of individual cases or superficial cultural differences.

Claude Lévi-Strauss, a leading figure in structural anthropology, proposed that human societies, despite their diversity, are governed by general social and symbolic rules. In his study of kinship systems, he presented an abstract model showing that marital and alliance relationships are not random but follow consistent social principles such as exchange and balance. One of his prominent models, the "absolute prohibition of incest," is a theoretical abstraction that explains why nearly all human societies impose restrictions on marriage within the immediate family. This model helps anthropologists analyze social organization across cultures without focusing on individual exceptions.[1]

Abstraction in anthropology does not negate cultural differences; rather, it identifies general rules linking different social systems, allowing a comprehensive understanding of humans and society.

**Table: Abstraction in Natural vs. Social Sciences**

| Element | Abstraction in Natural Sciences | Abstraction in Social Sciences |
|---|---|---|
| **Definition** | Use of mathematical models and physical laws to explain natural phenomena, independent of direct sensory details. | Simplification of social phenomena through models and theories that help understand relationships and behavioral patterns. |
| **Purpose** | To derive general and stable laws that explain natural phenomena. | To understand and interpret social phenomena through abstract, generalizable patterns. |
| **Tools of Abstraction** | Mathematical equations, physical models, | Sociological concepts, theoretical models, quantitative |

[1] Claude Lévi-Strauss, Les Structures élémentaires de la parenté. Paris: Presses Universitaires de France, 1949,p212

| | | |
|---|---|---|
| | computational simulations. | and qualitative methods. |
| **Testing and Application** | Abstraction can be tested through laboratory experiments and practical applications. | Abstraction is often tested through field studies and cross-cultural comparisons. |
| **Challenges** | Sometimes abstraction is excessive, making it difficult to apply to complex cases such as climatic phenomena. | Achieving complete abstraction is difficult due to the complexity of social phenomena and their dependence on cultural and historical contexts. |
| **Examples** | Newton's laws of motion, Bohr's atomic model, Schrödinger's equation in quantum mechanics. | Marx's social class theory, Max Weber's bureaucracy model, Gramsci's concept of cultural hegemony. |

## 5- **Universality and Certainty**

**Universality** represents one of the fundamental pillars of science, meaning that the laws and theories established by researchers are not limited to a specific time, place, or context but apply to similar cases under different conditions. In the natural sciences, this property is more apparent. For example, Newton's second law of motion applies equally to a body in China as it does to a body in Brazil.[1]

However, in the social sciences, universality becomes more complex and problematic. Human behavior is intertwined with culture, history, and social structures, making the generalization of laws in this field challenging. For instance, Auguste Comte (19th century) attempted to establish a "sociology" based on laws similar to those governing physics, aiming to discover general rules for the development of human societies. He proposed that societies pass through three stages: theological, metaphysical, and scientific.[2]

This perspective faced significant criticism, particularly from anthropologists like Franz Boas, who emphasized that generalizing social laws often overlooks specific cultural contexts. A prominent example of the limitations of universality

[1] A. F Chalmers. ***What is this thing called Science?*** (3rd ed.). Buckingham: Open University Press,1999 ,p28

[2] أوغست كونت ، ***محاضرات في الفلسفة الوضعية*** .ترجمة وتقديم: نبيل أبو صعب، منصور الحجلي، دار الفرقد للطباعة والنشر والتوزيع. الامارات العربية المتحدة، 2020، ص 44.

in social sciences is the failure of the Modernization Theory of the 1950s, which assumed that all societies would follow the same path toward Western-style modernization. This theory failed to explain the experiences of Asia, Africa, or Latin America, highlighting the contextual nature of social phenomena.

Thus, the problem of universality in social sciences not only reveals the limits of applying general laws but also raises deeper questions about the nature of knowledge itself: Can human behavior be understood using strict scientific models like those in physics or chemistry? Social phenomena are not purely measurable entities; they are imbued with meaning, change over time, and are intertwined with cultural, historical, and political structures.[1]

Therefore, instead of seeking universal laws applicable to all times and places, many thinkers advocate an approach that understands social reality through its particularities and multiple contexts. Here, the researcher's role is not to extract universal generalizations but to comprehend how and why social experiences vary and what shapes their forms according to different contexts. This approach does not diminish the value of scientific research; rather, it redefines it according to the logic of flexibility and multiplicity. Universality in social sciences is not an absolute goal but a critical horizon approached with caution and awareness, requiring methodological tools that balance scientific rigor with openness to human complexity. In this sense, true sociological thinking poses questions rather than imposing answers and acknowledges diverse perspectives instead of silencing them under the guise of a "general law."

**Certainty** also constitutes a fundamental pillar of science as a knowledge project aimed at explaining reality and controlling its laws. Science does not rely solely on superficial observation but seeks to provide accurate, structured, and verifiable knowledge that offers humans the ability to understand, control, and predict. Certainty here means that scientific results are not based on guesswork or intuition but on rational conclusions supported by reproducible empirical evidence.

In the natural sciences, certainty is exemplified by classical physics laws, such as Newton's law of gravity or the law of conservation of energy. When a physicist states, "Energy cannot be created or destroyed,"[2] this reflects cumulative and verifiable knowledge demonstrated through multiple experiments under various conditions. These laws exemplify certainty because they precisely and reliably explain reality.

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[1] Arturo Escobar, ***Encountering Development: The Making and Unmaking of the Third World,*** Princeton: Princeton University Press, 1995, pp. 40–43

[2] Richard Phillips Feynman***, The Character of Physical Law,*** United States: Modern Library, 1965, p. 173.

Yet, this certainty is not absolute; it is "relative certainty," revisable when new evidence emerges. For example, Einstein's general theory of relativity modified many assumptions established by Newton, particularly regarding gravity, mass, and velocity. Nevertheless, Newton's laws remain valid in certain contexts, indicating that scientific certainty is open to ongoing knowledge advancement, distinguishing it from dogmatic beliefs that claim absolute truth.[1]

In social sciences, certainty is more problematic. Social phenomena are complex and constantly changing because they involve humans influenced by psychological, cultural, historical, and religious factors. Social sciences thus aim for "probabilistic certainty," interpreting general trends rather than strict laws. For instance, in sociology, one cannot assert that all societies pass through the same developmental stages as proposed by **Auguste Comte**. This model faced criticism from Franz Boas, who emphasized that societies differ in their cultural and historical trajectories, and generalizing such laws overlooks local specificities.[2]

Another example is the Modernization Theory of the 1950s, which assumed that all traditional societies would gradually evolve to mirror industrialized Western nations. However, experiences in South Korea, Malaysia, Iran, and some African countries revealed multiple developmental paths. Thus, insisting on certainty in social sciences can sometimes lead to oversimplified and misleading representations of reality.

Moreover, scientific knowledge that seeks certainty relies on precise criteria, such as reproducibility, internal consistency, and alignment with empirical data. For example, a researcher claiming a relationship between unemployment and divorce in a given society does not produce certain scientific knowledge unless supported by statistics, comparative studies, and causal analysis based on objective data. Scientific certainty, therefore, results from rigorous methodology, not preconceived beliefs.

**Summary:**

The lecture focuses on defining science and understanding its rules, objectives, and characteristics. Science is not merely a collection of facts but an integrated knowledge system enabling humans to understand phenomena, analyze relationships, and predict and control outcomes. Science provides a foundation to distinguish scientific knowledge from other forms based on impressions or traditions.

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[1] محمد عابد الجابري، **تكوين العقل العربي** ، ص 214.

[2] محمد سبيلا، ***الحداثة وما بعدها***، الدار البيضاء: دار توبقال، 2000، ص 88.

Scientific knowledge relies on precise controls ensuring validity and reliability, such as observation accuracy, reproducibility of results, neutrality in data handling, and evidence-based interpretation. These controls make science a methodological practice rooted in rational thinking and logical reasoning, producing knowledge applicable in multiple fields, particularly in social sciences, where symbols and culture intersect with studied phenomena.

The goals of science go beyond mere comprehension, encompassing explanation, prediction, and control, enabling researchers to propose practical solutions and critical analysis of reality. Features such as precision, universality, and abstraction empower researchers to generalize from specific cases, enhancing students' critical and analytical thinking skills.

In short, the lecture teaches students to approach science as both a method and logic, employing its controls to produce reliable knowledge and fostering the ability to critically analyze and differentiate scientific knowledge from unstructured or non-scientific understanding, especially when studying complex social phenomena.

## Self-Assessment

### *Exercise 1: Multiple Choice*

Choose the correct answer:

1. The meaning of "science" in language is:
   a. Memorizing information
   b. Understanding a thing as it truly is
   c. Asking questions
   d. Collecting data
2. Which of the following definitions reflects Durkheim's perspective on science?
   a. A method based on experimentation and criticism
   b. A trait through which truth is revealed
   c. A set of interconnected and organized facts
   d. Knowledge of a thing through the senses

### *Exercise 2: Match the Columns*

| Column A | Column B |
|---|---|
| **Ibn Khaldun** | Understanding a thing as it truly is |
| **Karl Popper** | A method based on criticism and experimentation |
| **Al-Jurjani** | A trait through which the subject is fully revealed |
| **Science (language)** | The verb "ʿalima," meaning to understand or comprehend |

## Exercises on the Goals of Science

### *Exercise 3: Mark (✔) or (✘)*

1. Explanation precedes description in the research process. ( )
2. Scientific prediction does not require prior data. ( )
3. One of the goals of science is to regulate behavior and influence it. ( )
4. Science is only concerned with describing phenomena without attempting to explain them. ( )

### *Exercise 4: Short Answer*

1. **What is the difference between explanation and prediction in scientific research?**
    - Explanation clarifies the causes and reasons behind phenomena.
    - Prediction anticipates future events based on current knowledge and empirical evidence.
2. **How does science help in controlling school violence?**
    - By analyzing causes, collecting reliable data, and developing evidence-based strategies for prevention.
3. **Why is description an essential stage in any scientific study?**
    - Because it provides accurate and organized information about the phenomenon, forming the basis for analysis, interpretation, and further research.

## Exercises on the Characteristics of Science

### *Exercise 5: Correct the following statements*

1. Science depends on the personal opinions of the researcher.
2. Scientific knowledge never changes or evolves.
3. Scientific results always differ from one researcher to another.
4. Scientific hypotheses cannot be tested.

### *Exercise 6: Choose the appropriate term*

( Objectivity – Precision – Universality – Verifiability – Organization )

1. ..... means that scientific results apply to all societies.
2. ..... requires that observations and results be based on facts, free from personal impressions.
3. ..... demands the use of accurate and well-designed tools and methods.

4. ..... means that experiments can be repeated by other researchers to verify the results.

## Lecture Five: The Scientific Spirit and Scientific Thinking Skills

### Introduction

The scientific spirit constitutes the fundamental foundation of any serious research that seeks to understand reality in a systematic and objective manner. Science is not based on the mere accumulation of information, but rather on a

mode of thinking that directs this accumulation toward the construction of critical knowledge that is open to examination and verification. From this perspective, scientific thinking skills gain their significance, as they enable the researcher to engage with phenomena consciously, inquisitively, and through rational analysis.

In the social sciences, the need for such a spirit becomes even more pressing, since the researcher deals with human beings and society—domains characterized by complexity and the intertwining of values, culture, and beliefs. Possessing a scientific mindset therefore implies the ability to distance oneself from preconceived judgments, to practice objective criticism, and to cultivate intellectual curiosity that drives continuous inquiry and discovery.

Scientific thinking skills—such as careful observation, systematic questioning, and logical reasoning—are not merely technical tools. They represent intellectual and ethical values that distinguish the scientist from others. The genuine researcher does not settle for description or transmission of knowledge, but strives for a deeper understanding of the relationships between phenomena and for explaining them on the basis of evidence and rational argument, rather than opinion or impression.

Accordingly, this lecture aims to instill the scientific spirit in students and to teach them how to think critically and methodically, as well as how to employ scientific thinking tools in the study of social reality. No form of knowledge can be considered scientific unless it is grounded in precise observation, rational inquiry, and organized reasoning that leads to results open to discussion and verification.

## First: Definition of the Scientific Spirit

The scientific spirit is the defining characteristic that distinguishes the scientific researcher from others. It represents a mode of thinking and behavior grounded in objectivity, critical inquiry, and intellectual curiosity.

**Gaston Bachelard** describes the scientific spirit as an *"alert mind that refuses to accept immediate givens and reconstructs knowledge on the basis of doubt and experimentation."*[1]

**Thus, the scientific spirit can be understood as the way a scientific researcher thinks.**

[1] غاستون باشلار، ***تكوين العقل العلمي***، ص. 17.

The researcher does not accept information hastily, but verifies it and examines it carefully. According to **Gaston Bachelard**, the researcher refuses to submit to the "first given" and reconstructs knowledge on the basis of doubt and experimentation. This means that the researcher remains curious and critical, constantly asking "why?" and "how?", and does not settle for appearances or widely accepted opinions.

For example, if a researcher observes that some young people in a neighborhood avoid participating in social activities, they will not simply assume that the reason is laziness or social withdrawal. Instead, the researcher will carefully investigate the issue. They may collect data through interviews and observation, and examine social, economic, or family conditions. Through this process, the researcher might discover that the real cause lies in feelings of insecurity or a lack of opportunities rather than mere laziness. This example illustrates how the social researcher uses doubt and empirical verification to reconstruct knowledge in an objective and scientific manner.

## Second: Characteristics of the Scientific Spirit

The scientific spirit is what distinguishes the researcher from others. It is not merely a body of knowledge, but a way of thinking and behaving. This spirit manifests itself in specific qualities that enable the researcher to study phenomena with objectivity and precision, free from bias or personal emotion. These qualities constitute the core characteristics of the scientific spirit, guiding the researcher toward discovering truth and understanding reality in a critical and systematic way. Among the most important of these characteristics are the following:

### 1. Detachment (Objectivity)

Detachment refers to the researcher's ability to set aside personal inclinations, beliefs, and value judgments when studying phenomena.
In the social sciences, a researcher cannot study issues such as poverty or crime based on moral or political positions. Instead, the phenomenon must be understood as it is, within its social and cultural context.[1]

**Émile Durkheim** expressed this principle clearly when he stated: *"**The sociologist must treat social facts as things**."*[2]

To say that the researcher must be detached means that they leave behind personal preferences and beliefs while studying social phenomena. The

[1] اميل دوركايم، ***قواعد المنهج في علم الاجتماع***، 45.
[2] المرجع نفسه، ص 66.

researcher does not judge phenomena based on what they like or dislike, nor on moral or political stances, but focuses on understanding the phenomenon objectively within its specific context. For instance, when studying poverty in a particular neighborhood, the researcher cannot immediately claim that the poor are lazy or unmotivated. Rather, they must examine the economic, educational, and social conditions shaping people's lives in order to understand the causes of poverty objectively. This is precisely what Durkheim meant by treating social facts as "things": studying them with an open, methodical, and unbiased mind.

## 2. Criticism

The scientific spirit does not accept established ideas as unquestionable truths; instead, it practices continuous criticism of prior knowledge and assumptions. Criticism here does not mean outright rejection, but rather the re-examination of hypotheses, methods, and results.

In sociology, **Pierre Bourdieu** exemplified this critical stance when he questioned classical concepts such as "social class" and "taste," demonstrating that taste itself is shaped by social structures rather than being a purely individual choice.[1]

This means that the researcher does not accept ideas at face value, but constantly evaluates their validity and relevance. Criticism involves verification and reassessment rather than denial. **Bourdieu's** work shows that the scientific researcher goes beyond what is familiar or taken for granted, seeking a deeper and more critical understanding of social phenomena.

## 3. Intellectual Curiosity

One of the most important characteristics of the scientific spirit is intellectual curiosity. This is the inner drive that pushes the researcher to explore the unknown and to understand phenomena in depth. The scientific researcher is not satisfied with what is obvious or familiar, but continually asks questions such as "Why does this happen?" and "How does this phenomenon take shape?"

In the social sciences, intellectual curiosity becomes evident when researchers examine new and complex phenomena such as digital violence, digital identity, or the influence of memes in social spaces. Rather than settling for superficial observations, the researcher seeks to understand the social and cultural contexts that shape these phenomena and to analyze the relationships between individuals and society.

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[1] بيير بورديو، ***التمييز: نقد اجتماعي للحكم***، ص. 67.

As **Mohamed Talbi** notes: *"The scientific mind never rests, because it is not satisfied with ready-made answers; it constantly seeks to reconstruct the world on rational foundations."*[1] This highlights that intellectual curiosity is not a fleeting interest, but a driving force that sustains continuous research, observation, and critical reflection in order to produce precise and reliable knowledge.

Thus, intellectual curiosity represents the fundamental motivation that prevents the researcher from being content with the superficial aspects of social phenomena. Instead, it drives them to explore underlying causes and internal relationships. In this sense, the researcher becomes both an observer and a critic, searching for the factors that shape phenomena and analyzing their effects on society. For example, when studying the spread of digital memes among young people, it is not enough to simply observe them or record levels of interaction. The researcher must question the social and cultural meanings embedded in these memes, how they reflect values, influence digital identity, and reshape social relations. In this way, intellectual curiosity becomes a methodological tool that enables the researcher to construct a comprehensive and nuanced understanding of social phenomena, producing knowledge that is more objective, deeper, and consistent with the true spirit of scientific inquiry.

## Third: Mechanisms for Practicing the Scientific Spirit in Research

The scientific spirit is not merely a set of individual traits possessed by the researcher; rather, it is an intellectual stance that requires these traits to be embodied through precise methodological mechanisms that ensure the production of reliable and objective knowledge. Detachment, criticism, and intellectual curiosity, if they remain at the level of abstract principles, retain a purely theoretical character. For this reason, there is a need for clear mechanisms such as scientific observation, which structures the careful monitoring of phenomena; scientific questioning, which imposes methodological doubt and continuous verification of data; and scientific reasoning, which links hypotheses and empirical evidence through sound logical foundations. These mechanisms form a bridge between the philosophical principles of the scientific spirit and the practical application of research. They transform scientific knowledge from a superficial awareness into a solid rational construction capable of explaining reality and understanding it in depth. In this section, we will focus on the practical dimensions of the scientific spirit.

### 1. Scientific Observation

#### Definition

[1] محمد الطالبي، *مقدمة في منهجية العلوم الاجتماعية*، ص. 29.

Scientific observation is a systematic and precise monitoring of a phenomenon with the aim of describing and understanding it. It differs from ordinary observation in that it is governed by methodological rules and guided by clearly defined hypotheses. Mohamed Talbi states that *"scientific observation is not a fleeting glance, but a methodological act aimed at constructing meaning from sensory data."*[1]

When we speak of scientific observation, we mean far more than casual watching or superficial attention to phenomena. It is an organized and disciplined process, subject to clear rules, whose purpose is to grasp the phenomenon as it truly is, not as it appears through immediate impressions. The fundamental difference between scientific and ordinary observation lies in the fact that scientific observation is guided by hypotheses that direct the researcher toward specific aspects of the phenomenon, preventing them from being carried away by subjective impressions or preconceived judgments.

## 2. Types of Observation

### a. Simple Observation

In this type of observation, the researcher's role is limited to the objective monitoring of the phenomenon without any intervention or influence on what is taking place. The aim is to record behaviors or events as they naturally occur, while paying close attention to details and to the general context of the phenomenon. For example, when observing youth behavior in cafés, the researcher notes how individuals interact with one another, which habits are repeated, and how conversations or activities are distributed. This method allows for an understanding of social phenomena in their natural setting, without participants feeling that observation is influencing their behavior.

### b. Participant Observation

In this approach, the researcher does not remain an external observer, but integrates into the lives of the participants in order to experience their daily practices and understand phenomena from within. This method is central to the ethnographic approach, where direct experience becomes a key means of grasping values, customs, and social meanings. For instance, when studying clothing culture in Algeria, a researcher may participate in wedding ceremonies or popular gatherings in order to observe not only what people wear, but how clothing relates to identity, social status, and local traditions. Participation

[1] محمد الطالبي، *مقدمة في منهجية العلوم الاجتماعية* ، ص 53.

provides the researcher with a deeper understanding of symbolic and cultural relationships, which is difficult to achieve through simple observation alone.[1]

### c. Structured Observation

This method relies on precise tools such as observation grids, tables, and questionnaires to systematically record behaviors and observations. It enables the researcher to analyze data with greater accuracy and to conduct comparisons between different groups or across time. For example, a researcher studying the frequency of smartphone use among young people in public spaces may use tables to record the number of interactions with phones, their duration, and the context of use. This approach combines scientific rigor with objectivity and produces data suitable for statistical or systematic analysis, thereby strengthening the reliability of scientific conclusions.

## 3. Conditions of Scientific Observation

Observation is one of the core tools of scientific research, as it represents the point of encounter between the observing subject and the observed object, between consciousness and the world. However, in order to be scientific, observation must comply with a set of methodological conditions that ensure its validity and precision. The most important of these conditions are neutrality, continuity, and accuracy.

### a. Neutrality

Neutrality does not imply the absence of the researcher's subjectivity, but rather the ability to control it. In scientific research, the researcher faces the risk of projection—that is, imposing personal beliefs and expectations onto the phenomenon. Consequently, the researcher must maintain a critical distance from the object of study, allowing facts to challenge preconceived notions rather than shaping facts to fit prior assumptions.

Pierre Bourdieu, in *Le métier de sociologue*, emphasizes that neutrality can only be achieved through what he calls *epistemological reflexivity*: the researcher's awareness of the conditions under which knowledge is produced and a critical examination of their own position within the scientific and social field. This means that the researcher is not expected to be "objective" in a mechanical sense, but rather critically aware of their own concepts and assumptions.[2]

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[1] انظر: كليفورد غيرتز، ***تأويل الثقافات***، ترجمة فايز الصياغ، مركز دراسات الوحدة العربية، بيروت، 2009، ص. 18.

[2] Pierre Bourdieu, Chamboredon, J.-C., & Passeron, J.-C. ***Le métier de sociologue***. Paris: Mouton, 1973, p.45.

Neutrality here is not a psychological attitude, but an epistemological practice aimed at minimizing the influence of subjectivity on empirical data.

For example, in a field study of religious rituals, the researcher must refrain from issuing value judgments about whether practices are "correct" or "incorrect." Instead, these practices should be understood within their symbolic and social framework.

### b. Continuity

Continuity is both a temporal and cognitive requirement. A phenomenon cannot be fully understood through a single moment of observation, but through repeated and varied observations over time. This process allows the researcher to detect subtle transformations that may remain invisible in isolated observations.

As Bruno Latour argues, scientific knowledge is not constructed from a single moment of fascination, but from the accumulation of observations that enable the stabilization of a phenomenon within an extended temporal context. Continuity transforms the researcher from a "witness of a moment" into a "reader of a trajectory."[1]

In this sense, continuity means that the researcher does not rely on a single observation, because social phenomena evolve over time. Genuine understanding emerges not from brief encounters, but from sustained observation that reveals patterns of stability and change. As Latour suggests, knowledge develops through cumulative observations rather than isolated impressions. Therefore, a researcher studying school deviance cannot rely on a single visit to a school, but must observe interactions over different periods in order to identify recurring patterns or transformations. Time thus becomes not merely a background variable, but an analytical tool for understanding social dynamics and uncovering deeper meanings.

### c. Accuracy

Accuracy constitutes the core of the scientific method. It ensures that observation is not a matter of impression or literary description, but a faithful recording of facts as they occur. Accuracy requires the researcher to document what is seen and heard without distortion or premature interpretation.

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[1] Bruno Latour, ***Science in Action: How to Follow Scientists and Engineers Through Society***. Harvard University Press, 1987, p.89.

Karl Popper emphasizes that *"the value of scientific observation does not lie in its quantity, but in its verifiability and reproducibility."* Accuracy is therefore a fundamental condition of scientific observation, as it is the only guarantee that results can be re-examined and verified by other researchers. Science is grounded not in intuition or impression, but in precise data that can be measured, reviewed, and tested.[1]

This requires the careful specification of the spatial and temporal framework of observation, as well as the accurate description of all contextual conditions without addition or omission. Every element of context—location, time, social atmosphere, seating arrangements, or the nature of the setting—may carry analytical significance.

For example, when observing a group of young people interacting in a café, it is insufficient to describe the scene in general terms such as "the atmosphere was friendly" or "a political discussion took place." The researcher must precisely record the number of participants, their approximate ages, seating arrangements, topics of conversation, duration of interaction, and the nature of discourse—formal, ironic, or argumentative—without imposing prior interpretations or value judgments. Raw data constitute the primary material of scientific analysis, and any slippage in recording or premature interpretation distorts the social reality as it is actually lived.

In this sense, accuracy is not merely a technical requirement, but an epistemological stance reflecting the researcher's respect for the object of study. It expresses an awareness that imprecise description betrays reality, and that negligence in observation ultimately distorts the deep structure of the social phenomenon the researcher seeks to understand.

## 4. Scientific Questioning

Scientific questioning is one of the cornerstones of the scientific method. It reflects the researcher's awareness of the necessity to examine ideas critically and to avoid accepting any form of knowledge without rigorous testing. It can be defined through a set of perspectives that highlight its epistemological and methodological dimensions.

Karl Popper defines scientific questioning as *"the ability to subject every scientific hypothesis to the possibility of falsification."* In this sense, questioning is not merely criticism, but a methodological mechanism that keeps knowledge

[1] Karl Popper, ***The Logic of Scientific Discovery***, p.62

open to correction and revision. It protects science from stagnation and from turning into a closed doctrine.[1]

By this, Popper means that science is not based on the search for absolute certainty, but on testing hypotheses in ways that may prove them wrong if they fail to correspond to reality. The true scientist, in Popper's view, does not seek to confirm that they are right, but rather to test how well their ideas withstand empirical evidence. In other words, a hypothesis is scientific only if it is falsifiable, meaning that it must allow the possibility of being refuted by experience instead of shielding itself from criticism. This is the essence of scientific questioning in Popper's philosophy: every theory remains provisional until stronger evidence appears to refute or revise it.

For example, a researcher may collect data from different types of families: those whose members use the internet extensively and others whose use is limited. Through interviews or questionnaires, the researcher measures levels of emotional bonding and communication within the family. If the results show that some families with high internet use remain cohesive and emotionally strong, this indicates that the original hypothesis is not absolute and may be partially incorrect. Here, Popper's principle is fulfilled: the hypothesis has been tested and shown to be falsifiable. Instead of assuming in advance that "social media destroys the family," the researcher subjected this claim to open empirical examination.

Thus, scientific questioning in the social sciences means that the researcher does not adopt preconceived positions or personal impressions, but formulates hypotheses that are open to verification and refutation. This preserves the scientific character of social research and prevents it from turning into mere opinion or ideological stance.

Gaston Bachelard also views scientific questioning as *"a rupture with ready-made knowledge."* It represents a moment of intellectual vigilance that pushes the researcher to move beyond everyday self-evidences and to reconstruct concepts on rational foundations. Questioning here is a cognitive act that liberates thought from the authority of habit.[2]

René Descartes defines it as *"methodical doubt that leads to certainty grounded in reason."* Questioning, in this sense, is not negative skepticism, but a pathway

[1] Popper, ***The Logic of Scientific Discovery***, p. 33

[2] غاستون باشلار، *تكوين العقل العلمي*، ص. 45

to truth through dismantling inherited beliefs and re-examining them with strict logical rigor.[1]

In the same context, Thomas Kuhn links scientific questioning to the structure of scientific revolutions. He sees it as *"the capacity to challenge dominant paradigms when they fail to explain phenomena."* For Kuhn, questioning is a collective critical act that opens the way for paradigm shifts, that is, for the emergence of new scientific frameworks.[2]

Through these definitions, scientific questioning emerges as the core of the research process, combining doubt, reason, criticism, and renewal. It is what gives science its vitality and keeps it an open-ended project driven by continuous inquiry and discovery.

## 5. Asking Questions

The scientific question constitutes the starting point of any systematic research. It determines the direction of the study, its objectives, and the tools for data collection and analysis. According to Keith F. Punch in *Introduction to Social Research: Quantitative and Qualitative Approaches*, a scientific question must be clear, specific, and researchable. Any ambiguity in the question leads to weak results and difficulties in interpretation.

**Illustrative example:**

The general question *"Why are young people deviant?"* is imprecise, as it does not specify the type of deviance, the target group, or the social context. In contrast, a well-formulated scientific question would be: *"What social, cultural, and economic factors contribute to the deviant behavior of certain groups of youth in major cities?"*[3]

**This question is clear and specific, as it identifies:**

1. The target group: youth in major cities.
2. The research phenomenon: social deviance.
3. Potential factors: social, cultural, and economic.
4. Researchability: data can be collected using quantitative or qualitative methods to examine these factors.

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[1] رونيه ديكارت، *تأملات في الفلسفة الأولى*، ص. 12

[2] Kuhn, ***The Structure of Scientific Revolutions***, University of Chicago Press, 1962, p. 65

[3] K. F Punch, ***Introduction to Social Research: Quantitative and Qualitative Approaches***. Sage Publications, 2014,p39.

According to John W. Creswell in *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, a well-formulated research question guides the researcher in designing the methodology, selecting tools, and determining the type of data to be collected, whether through questionnaires, interviews, field observations, or secondary sources.[1]

Moreover, Paul Lazarsfeld emphasizes that the formulation of the scientific question precisely defines the scope of the research. This reduces the risk of deviation from the research objective and increases the reliability and replicability of the results.[2]

### 5.1. Characteristics of a Good Scientific Question

1. **Clarity and precision:** It leaves no room for ambiguity and clearly defines the phenomenon, the target group, and the context.
2. **Researchability:** It allows for the collection of concrete data to examine relationships or effects.
3. **Focus on relationships or factors:** It links phenomena to the variables that influence them.
4. **Feasibility:** The researcher can realistically conduct the study within available resources and constraints.
5. **Originality and knowledge contribution:** It offers an added value to
6. existing knowledge or a deeper understanding of the phenomenon.

## Summary

The lecture emphasizes the scientific spirit as foundational for understanding reality methodically. Science is about guiding knowledge accumulation into critical, testable insights. In social sciences, the scientific spirit enables detachment, critique, and curiosity, fostering deep understanding of complex phenomena.

Core skills include precise observation, methodological accountability, and logical reasoning, which are intellectual and ethical values enabling researchers to produce reliable scientific knowledge.

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[1] Creswell, J. W. ***Research Design: Qualitative, Quantitative, and Mixed Methods Approaches***. Sage Publications, 2014,pp. 42–44.

[2] Lazarsfeld, P. F.. ***The Logical and Mathematical Foundations of Social Research***. Free Press, 1972,pp. 15–18.

## Self-Assessment

**Comprehension Questions:**

1. Define the scientific spirit and list its three main characteristics.
2. Distinguish between scientific observation and ordinary observation.
3. Explain the meaning and importance of detachment in social research.
4. What is methodical skepticism, and why is it necessary?

**Applied Questions:**

5. Given university students working part-time struggle with study-life balance, how would you use:

a) Observation
b) Inductive reasoning
c) Scientific accountability
…to analyze the relationship between work and study?
6. How would you apply intellectual curiosity in a field study on social media effects? Give an example.
7. How can participant observation help understand cultural values in local rituals?

**Analytical and Critical Questions:**
8. Discuss how objectivity affects social research results, with an example.
9. Explain the role of critique in advancing scientific knowledge, with a social science example.
10. Why is scientific reasoning essential? Distinguish between induction and deduction.

**Cumulative and Critical Thinking Questions:**
11. Observing a recurring social phenomenon, how would you apply scientific thinking to produce valid conclusions?
12. Identify a common social phenomenon in your environment. Formulate a scientific question specifying:

- Target group
- Phenomenon
- Possible variables
- Feasibility of data collection

# Lecture 6: The Evolution of Science and Explanatory Models

**Introduction**

In its earliest stages, science did not exist in the modern sense. Early thinkers, from Thales to Aristotle, did not clearly distinguish between philosophy and science. Their investigation of natural and human phenomena relied primarily on rational and logical reasoning rather than systematic observation or experimentation.

Over time, human thought underwent fundamental transformations. Knowledge evolved from contemplative reasoning to empirical inquiry, and explanations of phenomena shifted from relying on absolutes to grounding them in observable laws.

This transformation was not merely technical but **epistemological**, meaning it concerned the very nature of knowledge and the ways we understand and interpret the world. It was about how humans construct and validate knowledge, not just about accumulating facts.

Studying the evolution of science and explanatory models highlights that science is not a fixed structure. Instead, it is a dynamic historical process, shaped by intellectual, cultural, and social contexts. Scientific knowledge evolves in response to new questions, methods, and discoveries, reflecting the changing nature of human understanding.

## I. From Philosophy to Science – The Beginnings of Scientific Thought

### 1. The Philosophical-Reflective Stage

The philosophical-reflective stage represents the foundational period in which scientific thinking began to take shape. In this historical context, there was no clear distinction between philosopher and scientist, as knowledge was understood as a comprehensive intellectual activity aimed at explaining the universe, nature, and existence as a whole. The main epistemological question was directed toward understanding the general order of the world rather than studying individual phenomena in isolation. Thus, science was part of philosophy and subject to its logic and intellectual tools.

Thinking during this stage relied on **reason** as the highest source of knowledge. The prevailing belief was that reason, if used logically, could access the truth of things without the need for sensory experience or empirical testing. For this reason, formal logic and deductive reasoning were employed as the main methods of producing knowledge, moving from generally accepted principles to specific conclusions. This approach made knowledge appear certain and stable because it was based on intellectual principles that were neither questioned nor tested.

At this stage, the goal of science was not to discover the laws governing phenomena but to search for their first causes and ultimate purposes. Phenomena were explained through the question "why," not "how." In its old sense, scientific knowledge was teleological and explanatory, aiming to uncover the fundamental reason why things are as they are. This teleological perspective is evident in Greek philosophy, especially in Aristotle, who linked scientific knowledge to the understanding of the four causes: material, formal, efficient, and final.[1]

Aristotle represents the clearest example of this stage. He presented a comprehensive conception of science based on reason and logic and rejected reliance on experience as an uncertain source of knowledge. In explaining natural phenomena, he started from the nature of things rather than their actual observation. For example, in explaining the fall of objects, he claimed that heavier bodies fall faster than lighter ones because heaviness is part of their nature, and each object seeks its natural place. This explanation aligns with the theoretical structure but is not based on measurement or experiment.[2]

This example reflects the nature of scientific thinking during the reflective stage: knowledge was not tested or revised but accepted as long as it was consistent with general logical reasoning. Many Aristotelian concepts remained unchallenged for centuries because they were philosophically and logically protected. Gaston Bachelard pointed out that reason, when detached from experience, can become an obstacle to the progress of knowledge, as intellectual certainty may prevent questioning and inquiry.[3]

Nevertheless, this stage cannot be considered negative or worthless. It laid the conceptual foundations of science, emphasizing reason, logic, and systematic investigation in explaining the world. It also contributed to building central concepts such as cause, substance, and order, which would later be reused in modern science in an empirical form. Alexander Koyré asserts that modern science did not emerge from a total break with philosophy but developed from within it.[4]

For this reason, Aristotle defined science as “knowledge of the first causes of things,” summarizing the spirit of the philosophical-reflective stage, which linked knowledge to reason and the search for general principles. From here begins the story of a major transformation, raising a new question that would change the course of human knowledge: **Is reason alone sufficient to**

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[1] انظر: أرسطو، **السماء والعالم**، ترجمة إسحاق بن حنين، دار الآفاق الجديدة، بيروت، 1980، ص 112.

[2] أرسطو، **الأورغانون**، ترجمة إسحاق بن حنين، دار الفكر العربي، 1997، ص 64.

[3] انظر: غاستون باشلار، **تكوين العقل العلمي**، ص 21.

[4] انظر: ألكسندر كويريه، **من العالم المغلق إلى الكون اللامتناهي**، ترجمة يوسف حلاق، دار التنوير، بيروت، 2009، ص 18.

**understand nature, or is experience an indispensable condition for the existence of science?**

## 2. The Scientific Revolution of the 17th Century

The 17th-century Scientific Revolution represents a profound epistemological break from the long-dominant philosophical-reflective thinking. During this century, science began to free itself from the authority of scholastic philosophy and the dominance of ancient texts, especially Aristotelian works, moving toward a new mode of thinking based on **experiment, observation, and measurement**.

- **Francis Bacon**:

One of the pioneers of this transformation, he sharply criticized the Aristotelian deductive method as sterile and incapable of producing new knowledge. He advocated the **inductive method**, which begins with particular observations of facts and gradually progresses toward generalizations and universal laws. According to him, true knowledge can only be achieved through organized experience, as reason alone is prone to illusions and biases, which he called "idols." He linked knowledge to mastery over nature, emphasizing that science is not merely theoretical but a practical tool to improve human life.[1]

- **Galileo Galilei**:

Represented a decisive step toward precise experimental science. He combined sensory observation with mathematics, considering nature as written in a

[1] انظر: فرنسيس بيكون، **الأورغانون الجديد**، ترجمة أحمد الشامي، دار المعارف، القاهرة، 1980، ص 45.

mathematical language that can only be understood through measurement and quantitative formulation. Galileo relied on **directed experiments**, designed to test specific hypotheses, and rejected appeals to ancient authority if they contradicted experimental results. This approach led to conflicts with prevailing thought but established a fundamental principle of modern science: the **priority of empirical reality over theoretical tradition**.[1]

- **Isaac Newton**:

Completed the scientific transformation by providing a comprehensive explanatory model of nature. Newton unified terrestrial and celestial phenomena within a single system of mathematical laws, particularly the law of universal gravitation and the laws of motion. In his view, the universe follows a strict causal order, and objects move according to precise mechanical relationships that can be predicted mathematically. The world was no longer understood as a purposeful entity striving toward ends but as a system of objects governed by fixed laws.[2]

These transformations gave rise to the **mechanical or classical model of science**, which views the universe as a vast machine operating according to precise laws, enabling explanation, prediction, and control of phenomena. Scientific explanation became causal and mathematical, and questions of purpose receded in favor of questions about laws and relationships. This model became the foundation of modern physics and later influenced other sciences.[3]

Thus, the 17th century represents not merely a technical advancement in research tools but a radical transformation in the very way of thinking. Science shifted from contemplative reasoning to organized experimentation, from seeking first causes to discovering laws, and from natural philosophy to modern science as we know it.

## From the Mechanical Model to the Biological Model

At the beginning of the 19th century, the limits of the mechanical model, which had dominated scientific thinking since the 17th century, began to appear. This model proved effective in explaining simple physical phenomena but faced real

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[1] انظر: غاليليو غاليلي، **حوار حول النظامين الرئيسيين للعالم**، ترجمة إسماعيل مظهر، الهيئة المصرية العامة للكتاب، القاهرة، 2011، ص 72.

[2] انظر: إسحاق نيوتن، المبادئ الرياضية للفلسفة الطبيعية، ترجمة محمد بن شريف، المركز القومي للترجمة، القاهرة، 2016، ص 98.

[3] كويريه ألكسندر، ***من العالم المغلق إلى الكون اللامتناهي***، ص 64.

difficulties when applied to living and social phenomena. Living organisms do not operate solely according to rigid mechanical causal relations, and society is not a machine that can be disassembled into independent parts without losing its meaning.

In response to these challenges, the **biological or organic model** emerged. This model likens the social organism to a living being. According to this perspective, society consists of interconnected parts, each performing a specific function, and the whole cannot be understood without understanding the relationships between these parts. Society is seen as a dynamic entity, growing and changing, with its parts mutually influencing each other, much like a living organism.

This shift was not a complete break from the mechanical model but rather an internal evolution. The biological model retained the idea of scientific law but expanded its meaning to include laws of development, integration, and function. Laws no longer meant fixed mechanical motion but dynamic regularities governing the growth of living and social phenomena. The development of biology, especially through studies of evolution and function, reinforced this organic view of reality.[1]

Within this intellectual context, modern social sciences emerged. These sciences were influenced by the success of natural sciences in discovering laws but faced the particularity of their subject—humans and society. They thus sought to develop methodological tools that combine observation and interpretation while considering the historical, symbolic, and organizational dimensions of social phenomena. The goal was no longer mere control of phenomena but understanding them within their holistic context.

**Auguste Comte** stands out as one of the key founders of this approach. He advocated for establishing the science of society on positivist scientific foundations, arguing that social phenomena are subject to discoverable laws through experience and observation, just like natural phenomena. At the same time, he emphasized the specificity of these laws because they relate to the organization and historical development of society. According to Comte, society has its own laws, which are discovered scientifically rather than deduced rationally.[2]

**Émile Durkheim** represents the clearest methodological application of the biological model in sociology. He treated social phenomena as realities in their

[1] Herbert Spencer, ***The Principles of Sociology***. Vol. 1–3. New York: D. Appleton and Company, 1896,p41.

[2] أوجست كونت، **دروس في الفلسفة الوضعية**، ترجمة نبيل أبو صعب، دار الفرقد للطباعة والنشر والتوزيع، 2020، ص 87.

own right, existing independently of individuals and exerting a coercive force on them. In his study of suicide, Durkheim rejected explanations based solely on individual psychological or biological factors, showing instead that suicide rates are linked to the degree of social integration or disintegration. Thus, suicide becomes an indicator of the state of society as a whole, not merely an isolated individual act.[1]

This transition from the mechanical to the biological model reflects growing awareness of the specificity and complexity of social phenomena. Society is not understood as a static machine but as a living system influenced by interactions among its parts. From this perspective, the foundations of sociology and the human sciences crystallized: they search for laws, but these are flexible, historical, and functional, differing in nature from the laws of physics and mechanics.

## The Structural and Interpretive Models

### 1. The Structural Model

At the beginning of the 20th century, social sciences underwent a radical transformation with the rise of **structuralism** as a reaction against organic and historical interpretations that had dominated the 19th and early 20th centuries. Researchers observed that explaining society solely as a living organism (the biological model) or relying only on historical development could not account for the symbolic complexities of culture and social practices. Structuralists therefore focused on the study of deep, invisible structures that determine thought and behavior, asserting that social phenomena are not the result of random individual choices but of an internal, coherent system of relationships and rules.

**Claude Lévi-Strauss** is the most prominent representative of this approach in anthropology. He viewed culture as operating like a language, consisting of symbols and relationships that create a system enabling the production of meaning. Customs, rituals, kinship patterns, and myths are not isolated behaviors or events but surface manifestations of an underlying mental structure governing society. The aim of anthropology, in his view, is not merely to collect facts or describe customs but to uncover this mental structure that generates meaning and organizes social relationships. As Lévi-Strauss put it: *"The aim of anthropology is not to describe customs, but to uncover the mental structure that generates them."*[2]

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[1] إميل دوركايم، **الانتحار**، ص 54.

[2] **كلود ليفي شتراوس، مقالات في الأناسة** ، ترجمة حسن قبيسي، دار الطليعة، بيروت، 2008، ص 21.

Structuralism emphasizes the relationships between elements within a cultural system rather than the elements themselves. For example, in studying myths or kinship patterns, the focus is on the rules and patterns governing events and relationships, not on individual occurrences. This approach allows understanding of the hidden rules producing social meaning and reveals how culture operates internally as a coherent system, despite the apparent diversity of phenomena.

In this sense, structuralism represents a qualitative shift in scientific and social thought, shifting focus from surface descriptions or functions to understanding the internal structure of symbolic systems. It also prompted a rethinking of the concept of the individual in society: individuals are not independent units producing social behavior but part of a structural network that determines the possibilities of their thinking and action.

Structuralism also contributed new analytical tools, such as analyzing language, myths, symbols, and social relationships, emphasizing the identification of stable patterns controlling the production of meaning. This approach paved the way for later interpretive models in the human and social sciences, focusing on understanding the meaning of phenomena through symbolic structures rather than merely describing the phenomena themselves.

In short, the structural model marks a central epistemic shift, seeking not only observable phenomena but also the hidden rules that organize societies and produce meaning, making it a powerful tool for understanding the symbolic complexity of culture and human society.

## 2. The Interpretive Model (Verstehen) – Max Weber

At the beginning of the 20th century, **Max Weber** introduced an approach distinct from both structural and organic models, establishing the **interpretive or Verstehen model** in sociology. This model focuses on social action and its subjective meanings, that is, how individuals give meaning to their actions and how this shapes social phenomena. Weber argued that understanding social phenomena cannot rely solely on general laws but requires grasping the meaning that actors attach to their actions. As he explained in *Economy and Society*:

*"Social phenomena can only be explained through understanding the subjective meanings of social action, in addition to analyzing external factors affecting that action."*[1]

[1] ماكس فيبر، ***الاقتصاد والمجتمع***،ترجمة محمد التركي، مراجعة فضل الله العميري، المنظمة العربية للترجمة، بيروت، 2015، ص 112.

For example, in studying modern capitalism, Weber argued that it is not enough to examine economic or technical aspects; one must understand the religious and ethical values accompanying it. In *The Protestant Ethic and the Spirit of Capitalism*, he demonstrated how Protestant values—such as diligence, discipline, and saving—helped shape the spirit of modern capitalism. These values encouraged organized work, perseverance, and effort rather than luxury or leisure.[1]

From this perspective, meaningful individual action becomes the focus of social analysis. The individual is not merely a statistical unit or a mechanical component of society but a conscious actor contributing to the formation of social phenomena. The interpretive model thus combines objective analysis of social phenomena with understanding the subjective meanings actors carry within their cultural and social context. It represents a crucial stage in the development of social sciences, linking tangible social reality with the subjective meaning of action, offering tools to understand complex social phenomena beyond rigid mechanical or purely structural explanations.

## The Epistemic Revolution and the Critical Model

### 1. The Epistemological Shift

By the mid-20th century, there was a fundamental epistemological shift in understanding the development of science. **Thomas Samuel Kuhn** criticized the traditional view of science as a gradual, cumulative accumulation of knowledge. In his influential work, *The Structure of Scientific Revolutions*, Kuhn introduced the concept that:

*"Scientific progress does not occur simply through the accumulation of facts but through successive epistemic revolutions that change the intellectual framework itself, replacing the old 'paradigm' with a new one."*

According to this view, the development of science is not merely additive but a historical process with periods of stability within a theoretical framework—called **normal science**—followed by crises when new phenomena cannot be explained under the old framework. This leads to a scientific revolution, replacing the old paradigm with a completely new one.

Kuhn defines a **paradigm** as a set of beliefs, rules, and practices shared by a community of scientists that determines what constitutes legitimate problems and methods of solving them. Within this framework, scientists operate under normal science, addressing phenomena according to the standards and questions

[1] ماكس فيبر، ***الأخلاق البروتستانتية وروح الرأسمالية*** ، ترجمة محمد التركي، المنظمة العربية للترجمة، بيروت، 2015، ص. 87.

set by the prevailing paradigm. However, when anomalies accumulate—cases that cannot be explained or resolved within the current model—a radical shift in scientific perception becomes inevitable, triggering a scientific revolution that reshapes our understanding of the world. Kuhn emphasizes that: *"The history of science is a series of revolutions that change the image of the world."*[1]

Thus, scientific progress is measured not just by the quantity of knowledge but by qualitative transformations in the structure of science itself: moving from one paradigm to another, dealing with phenomena in fundamentally new ways. This perspective forms a cornerstone of modern philosophy of science, linking historical context to the cognitive framework guiding methodological and theoretical priorities.

## 2. The Critical Model

The **critical model** emerged in the mid-20th century with the **Frankfurt School**, a critical intellectual movement combining Marxism, psychoanalysis, and critique of modern rationality. Prominent figures include **Max Horkheimer, Theodor Adorno, and Herbert Marcuse**. These thinkers rejected the prevailing notion of scientific neutrality in social sciences, arguing that scientific knowledge is neither objective nor detached from social and political reality; it is inherently entangled in the social relations and economic and political structures that produce it.

The critical approach focuses on **instrumental reason**, a type of thinking oriented toward means and control rather than understanding and human liberation. Critical theorists argued that modern rationality, born in the Enlightenment, became a tool of domination rather than emancipation, particularly evident in the development of science and technology in modern capitalist societies. In this view, science is not neutral but part of the logic of controlling nature and humans, reflecting power relations in society itself.[2]

The seminal work embodying this vision is *Dialectic of Enlightenment* by Horkheimer and Adorno, which demonstrates how the Enlightenment project, originally aimed at freeing humanity from superstition and ignorance, ultimately became a mechanism of domination and control through instrumental reason, emphasizing efficiency, calculation, and mastery over nature and humans.

In this model, all knowledge is historically conditioned; there is no neutral knowledge independent of social and political structures. Scientific thought is itself a product of history and power relations, intertwined with the interests of

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[1] توماس كون، ***بنية الثورات العلمية***، ترجمة شوقي جلال، المجلس الوطني للثقافة والفنون والآداب، الكويت، 1993، ص. 135

[2] Bourdieu, ***The Logic of Practice***, Stanford University Press, 1990, **pp. 52–53**

dominant classes and authorities. Therefore, the critical model seeks not only to interpret reality but to change it, revealing hidden mechanisms of social and epistemic domination while aiming to control and guide society according to the interests of power structures.

## 3. The Structural-Constructivist Model

**Pierre Bourdieu** proposed an evolutionary sociological model known as the **Structural-Constructivist Model**, combining structuralism, which focuses on social structures, with social action, highlighting individuals' ability to reproduce these structures through daily practices. This approach overcomes the traditional dichotomy between structural explanation, which views individuals as mere products of structures, and individualist explanation, which places responsibility solely on individuals. Bourdieu shows that social actors and structural frameworks interact dialectically.

In this framework, **habitus** becomes a central theoretical concept. Habitus is a system of socially acquired dispositions, shaped by an individual's history within specific social contexts, and developed through socialization and institutions such as family, school, and society. Habitus is not rigid but generative, producing practices that in turn reproduce social structures in new and varied ways. Individuals act based on their prior dispositions while simultaneously reproducing social structures. This illustrates Bourdieu's integration of **structure** and **agency**, each shaping the other.[1]

Bourdieu's *The Logic of Practice* systematically presents this model. He explains how habitus mediates between social structures and individual behaviors, showing that social practice is not mechanical rule-following but a product of the interplay between historically acquired dispositions and the context of action. Habitus draws its power from accumulated social experiences, shaping an individual's understanding of and engagement with the world.[2]

The structural-constructivist model explains social phenomena difficult to address using purely structural or individualist perspectives, such as the reproduction of class inequalities, variations in cultural taste, and shared symbolic systems within social groups. In Arabic sociology literature, this model is recognized as central, with habitus serving as a bridge between structure and practice. Understanding social action requires examining this

[1] Bourdieu, ***The Logic of Practice***, Stanford University Press, 1990, **pp. 52–53**
[2] Ibid,p52.

system of socially produced dispositions that reproduces structures through daily behaviors.[1]

Thus, the Structural-Constructivist Model offers a comprehensive view of the reciprocal relationship between social structures and individual practices, emphasizing that individuals are not mere products of structures but actors who actively reproduce them through everyday practices.

## 2- The Postmodern Model

**Postmodernism** is a critical philosophical and epistemological movement that emerged in the late 20th century. It rejects the idea of a single, overarching truth and a universal reason capable of providing a unified explanation of reality. Postmodern thinkers argue that human knowledge is not the product of a single analytical mechanism that can explain all phenomena; rather, knowledge consists of multiple, competing epistemic contexts.

In this framework, the French philosopher **Jean-François Lyotard**, in his book *The Postmodern Condition: A Report on Knowledge*, provides a central perspective on the state of knowledge in the postmodern era. Lyotard argues that what were known as **grand narratives**—such as the progressive narrative of reason and Enlightenment or the developmental narrative of history—no longer possess absolute legitimacy as foundations for understanding reality and knowledge. Instead of these overarching narratives that dominated the interpretation of the world, Lyotard proposes that contemporary knowledge is based on **multiple small narratives (micronarratives)**, i.e., various interpretations of reality produced by different social and cultural groups in specific contexts. This epistemological shift shows that science itself is not outside other discourses but is a discourse within a network of competing discourses.[2]

In Lyotard's view, science no longer holds absolute authority in interpreting truth, because contemporary social conditions—including technological development, information flow, and transformations in knowledge structures—have eroded the foundations supporting grand narratives. It has become necessary to recognize that all knowledge is contextually situated within specific social and cultural frameworks and produced through multiple knowledge lines differing according to communities, interests, and perspectives. This gives rise to **epistemological relativity**, a hallmark of postmodern thought, highlighting

[1] صلاح الدين لعريني، **مفهوم الهابيتوس عند بيير بورديو**. مجلة العلوم الاجتماعية، العدد 8، 2014، ص 69.

[2] Lyotard, ***The Postmodern Condition***, University of Minnesota Press, 1984, pp. 37–38

that knowledge is not the product of a unified "universal reason" but the result of diverse discursive and experiential practices.[1]

This perspective has clearly influenced how scientific and social knowledge is interpreted. Instead of viewing science as the sole arbiter of truth, it is considered one of multiple knowledge discourses interacting with other forms of knowledge, such as **local knowledge** (produced within small communities or cultures and not reducible to a single scientific logic), **citizen science** (expanding knowledge production to non-traditional contributions from civil society beyond academic institutions), and **digital knowledge** (shaped through information networks and digital interaction among knowledge users). These developments reflect the multiplicity of discourses and sources of knowledge in the contemporary epistemic environment.

Thus, the postmodern model provides a new reading of knowledge: it detaches knowledge from singular dominance and links it to multiple discourses and social contexts. Instead of searching for "absolute truth," this model seeks to understand knowledge as a set of discursive practices that produce meaning within diverse social, cultural, and technological spaces, and whose vision is neither totalizing nor definitive but open to multiplicity and difference.

| Model | Time Period | Method of Knowledge | Role of the Individual | Role of Structure / Context | Key Thinkers / Examples |
|---|---|---|---|---|---|
| **Philosophical-Reflective** | Before 17th century | Rational interpretation, logical reasoning | Limited; knowledge based on individual reason | Unclear; nature is the focus of analysis | Aristotle |
| **Mechanical / Empirical Model** | 17th century | Experimentation and observation, inductive method | Active in observation and experimentation | Nature measurable through mathematical laws | Bacon, Galileo, Newton |
| **Biological / Organic Model** | 19th century | Experimentation and observation with focus on living and social phenomena | Individual as part of the system | Society or organism develops with interrelated parts | Auguste Comte, Émile Durkheim |
| **Structural Model** | Early 20th century | Analysis of deep and symbolic structures | Individual limited by structures | Culture and social system organize behavior | Claude Lévi-Strauss |
| **Interpretive /** | Early | Understanding | Central actor in | Structure | Max Weber |

[1] Ibid,pp 58-59.

| | | | | | |
|---|---|---|---|---|---|
| **Verstehen Model** | 20th century | the subjective meaning of social actions | creating meaning | important but focus on individual action | |
| **Structural-Constructivist Model** | Mid 20th century | Combining structural analysis with everyday practices | Actor reproduces and transforms structures | Structure and agency in a dialectical relationship | Pierre Bourdieu |
| **Critical Model** | Mid 20th century | Interpretation of reality with critique of social and political structures | Individual part of structure but capable of critique | Social and political structures determine conditions of knowledge | Horkheimer, Adorno, Marcuse |
| **Postmodern Model** | Late 20th century | Analysis of multiple narratives and knowledge | Individual part of multiple discourses | Knowledge situated in diverse social, cultural, and technological contexts | Jean-François Lyotard |

**The diagram illustrates the logical sequence of intellectual development from Philosophical-Reflective thought to Postmodernism**

**Summary:**

From this lecture, we can conclude that science was not, since its inception, an independent or neutral form of knowledge. Rather, it was an extension of philosophy and rational reflection in explaining natural and human phenomena. Early philosophers such as Thales and Aristotle did not distinguish between philosophical and scientific thinking, as inquiry relied primarily on reason and logic without direct empirical verification.

With the development of human thought, knowledge underwent a fundamental transformation from philosophical contemplation to experimental thinking based on careful observation and practical verification. This shift was not only technical but also epistemological, as it changed the way we think about the world and the nature of knowledge itself, emphasizing the derivation of general laws from phenomena and their objective interpretation.

From this perspective, science is not a fixed structure or final given; it is a historical and dynamic process that evolves with changing intellectual, cultural, and social contexts. Therefore, studying the development of sciences and

explanatory models is not limited to understanding scientific content alone; it also helps in understanding how scientific reasoning is formed and in developing critical and methodological thinking to address complex phenomena.

**Self-Assessment Questions**

**I. Multiple Choice Questions**

1. Which of the following models focuses on rational analysis and contemplative interpretation rather than experience?
   a) Mechanical Model
   b) Philosophical-Reflective Model
   c) Structural Model
   d) Critical Model
2. Which of the following thinkers is directly associated with the Biological/Organic Model in social sciences?
   a) Aristotle
   b) Auguste Comte
   c) Pierre Bourdieu
   d) Jean-François Lyotard
3. Which statement reflects the Postmodern Model?
   a) Science has absolute legitimacy
   b) Knowledge can only accumulate
   c) Knowledge is multiple, and different discourses compete
   d) Individuals are completely constrained by social structures

**II. True/False Questions**

1. Max Weber's Verstehen (Interpretive) Model focuses solely on general laws to understand social phenomena.
2. In the Structural-Constructivist Model, the individual is not an actor but merely follows social structures.
3. The Frankfurt School (Critical Model) considers scientific knowledge to be involved in social and political structures.
4. The Mechanical Model relied on experience and observation to find general laws of nature.

**III. Short-Answer/Analytical Questions**

1. What is the main difference between the Structural Model and the Interpretive Model in explaining social phenomena?
2. How does Pierre Bourdieu explain the relationship between habitus and daily practice in the Structural-Constructivist Model?

3. Why did Lyotard reject the idea of Grand Narratives in the Postmodern Model, and how does this explain the multiplicity of knowledge?

## IV. Applied Questions

1. Choose a contemporary social phenomenon (e.g., social media, online learning, or youth protests) and explain it:
    - According to the Structural Model
    - According to the Interpretive/Verstehen Model
    - According to the Postmodern Model
2. Compare the Critical Model and the Structural-Constructivist Model in their ability to change social reality rather than just explain it.

**General Summary:**

Through the study of this course, we can conclude that epistemology represents the philosophical and methodological foundation for understanding the nature of scientific knowledge. It explains how knowledge is produced, the criteria for its validity, and how it differs from other forms of knowledge. Epistemology does not merely clarify what we know, but focuses on how we know it, and the principles and methods that ensure knowledge is accurate and reliable. This enables researchers to distinguish between knowledge based on reflection or belief and scientific knowledge grounded in observation and experimentation.

This understanding highlights the relationship between epistemology and the philosophy of science, as the latter studies the principles governing the production of scientific knowledge, defines its limits, and determines methods of verification. Scientific standards such as objectivity, impartiality, critique, careful observation, methodological accountability, and logical reasoning serve as tools to ensure that knowledge is genuinely scientific, verifiable, and reproducible, rather than mere opinion or personal belief.

Accordingly, the importance of a scientific mindset in the researcher becomes evident. It represents the internal drive that combines intellectual curiosity, critical thinking, and objectivity, enabling the researcher to approach social and natural phenomena with systematic analysis. Scientific thinking skills, such as organized observation, participation, inductive and deductive reasoning, allow the researcher to transform raw data into precise logical conclusions, facilitating the understanding of relationships among various phenomena.

Moreover, the course demonstrates that understanding different types of knowledge, their characteristics, objectives, and sources, is essential for constructing sound scientific concepts and ensures that researchers can handle information carefully and analytically. Studying the development of sciences

and explanatory models reveals that science is not a fixed structure, but a historical and evolving process that changes with intellectual and cultural contexts and is always subject to continuous critical reassessment.

Through this progression, students can realize that scientific knowledge is not merely acquired information but a dynamic process requiring epistemological awareness, adherence to scientific standards, and meticulous methodological practice to ensure objectivity and accuracy in analysis and understanding. Consequently, this study equips researchers with the ability to produce robust scientific knowledge, analyze phenomena in depth, and understand social and natural reality in a comprehensive and systematic manner.

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