Lectures in the course:
Scientific Research Methodology,
First Year, Common Core, Social Sciences.
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The development of the scientific method and the foundations of thinking in its construction until the present era took several centuries in human history. Ancient civilizations are considered the first to establish this type of research and thinking in an abstract and practical manner.

Later, the Greeks' efforts to establish the foundations of abstract research revealed the contribution of Arab Muslims when they used observation and experimentation as tools of scientific research. Thus, they were the first to approach experimentation in investigating and searching for facts, which contributed to remarkable scientific progress. When the modern era, or what is known as the Renaissance, began, European countries transferred the Arab intellectual and scientific heritage and further developed it at the hands of several scholars such as John Stuart Mill, Claude and Francis Bacon, Rene Descartes, and others. So, what are the stages of development of scientific research methods in different eras?.

1- History of the scientific research method in ancient times: The ancient eras are the time periods in which the ancient Egyptians, Greeks, Babylonians, Romans, Mesopotamians, Indians, and Chinese civilizations lived. During that era, their thinking was characterized by taking a practical and applied approach in order to achieve utilitarian interests and goals. The ancient Egyptians excelled, for example, in engineering, arithmetic, mummification, medicine, agriculture, and astronomy. They invented surveying to restore the necessary and correct boundaries after the annual periodic flooding of the Nile River.

They recorded much of their science and knowledge on plant leaves such as papyrus and used stones to write in hieroglyphics to record their science and knowledge.

The famous historian Herodotus transmitted and recorded the research conducted by the kings of Egypt on the state's economy, which included population and wealth. As for ancient Greek civilization, it relied on contemplation and the abstract view of the mind. Thus, Greek philosophy expressed the spirit of the ancient era and the nature of the society in which it lived. Thus, they achieved remarkable progress in the foundations of research. Aristotle established several rules regarding research methods and the foundations of thinking, including the standard method and deduction. Despite Aristotle's attempt to integrate experimentation and observation within his rules, the contemplative nature was Dominating his thinking. The Greeks relied on the discoveries of the ancient Egyptians and Babylonians in their scientific construction, and then branched out into several fields such as medicine, astronomy, physics, engineering, and geography to arrive at new scientific facts, in addition to their interest in studying ethics and literature. The scientific research method is a fundamental pillar of human knowledge in all its fields. The importance of the scientific research method stems from the fact that nations have realized that their greatness and superiority are due to the scientific and intellectual capabilities of their people. The scientific research method has evolved throughout human history.

In the ancient eras in which the ancient Egyptians, Babylonians, Greeks, and Romans lived, the thinking direction of the ancient Egyptians was scientific and applied, as they excelled in mummification, planning, engineering, medicine, astronomy, and agriculture. The ancient Egyptians also established a scientific civilization in pharmacology and chemistry. The historian Jabin says about it, "The Egyptians were a mine from which the ancients drew the drugs and their descriptions mentioned in the works of Dioscorides, Pliny, and others.The ancient Greeks were interested in

the scientific research method, as they relied on contemplation and abstract rational reasoning. Aristotle established the foundations of the deductive and syllogistic method in scientific thinking. He also recognized induction, and his thinking was predominantly contemplative. The Greeks also relied in their scientific construction on previous discoveries recorded by the Egyptians and Babylonians. Among their most prominent scholars in this field were Pythagoras in geography, mathematics, and philosophy (c. 600 BC); Democritus, who proposed the theory of atomic repulsion to explain the composition of matter (c. 400 BC); and Ptolemy, who formulated the first adequate theory of planetary motion in the second century AD. Aristotle (born c. 384 BC, died c. 322 BC) represented a fundamental turning point in the history of constructing the scientific method, as he established the foundations of the first stable and precise scientific method, formal logic. It is the instrument that protects the mind from error. It was so named because, from the perspective of this science, the validity or falsity of inferences is based on the form of syllogism and deduction from the four forms discussed in logic, not on its substance, the propositions that constitute logical syllogisms. However, this does not mean that Aristotle was not interested in the realistic possibility of these inferences being realized and their validity being confirmed in reality. Thus, Aristotle is the instrument of science and the tool for research and correct knowledge. The Romans are considered the heirs of Greek knowledge, and their contribution focused more on scientific practice than on their follow-up. They were lawmakers and engineers rather than contemplative thinkers.

2- History of Scientific Research Methods in the Middle Ages: A/ The Contribution of Muslims: In the Middle Ages, during which Islamic civilization flourished and the Renaissance period in Europe, which extended from approximately the eighth century until the sixteenth century AD, Muslims benefited during this period from the previous sciences of the ancient Egyptians, Greeks, Romans and Greeks. Islamic civilization is considered the link between ancient civilizations such as the Egyptians, Greeks, Romans and Greeks and

those who came after them in the modern Renaissance era. They did not only transfer a civilization before them, but they added to it sciences and arts that were distinguished by scientific originality. Islamic thought transcended the formal boundaries of Aristotle's logic, meaning that the Arabs opposed the standard method and went beyond its limits to consider observation and experimentation as a source of scientific research. The Arabs also followed innovative methods in their scientific production in research, as they relied on induction, observation, scientific experimentation, and the use of measuring tools to reach scientific results. Many Muslim scholars excelled in the field of scientific research, such as Al-Hasan Ibn Al-Haytham, Jabir Ibn Hayyan, Al-Khwarizmi, Al-Biruni, Ibn Sina, and others. The brilliance of Arab scholars in this field has been witnessed by many.