



The first lecture

Initial concepts in scientific research methodology

- The goal to be achieved:
- For the student to become familiar with the field of knowledge of scientific research methodology
- Preface
- Theoretical establishment of the terminology of "scientific research methodology"
- 1- The difference between method and methodology
- 1-1- Curriculum
- 1-2- Methodology
- 2- Scientific research
- 2-1- Search
- 2-2- Science
- 2-3- Scientific research
- Conclusion





The first lecture

Introduction:

Perhaps the most important thing that a student or seeker of knowledge needs in the search for knowledge and attainment of facts... is to distinguish between concepts and terminology so that he has complete knowledge and a sufficient balance of information that enables him to address the issues and problems that he encounters. Therefore, understanding the concepts related to "scientific research methodology" constitutes the knowledge background for the sciences produced in the future, since he encounters in his daily life many phenomena that arouse his curiosity and thinking, and make him stop wondering about the reasons for their occurrence and how to deal with them. He seeks to give logical and scientific explanations in order to reach the truth.





The theoretical foundation of the terminology of “scientific research methodology” - initial concepts -

If we analyze the title of the scale, “Scientific Research Methodology,” we notice that it consists of three (03) keywords - method - research - and science, and each word has a similar field of knowledge.

First: The difference between method and methodology

1-1: Definition of the curriculum:

Language: The word “method” means the language of the path. In its linguistic origin, it goes back to the verb (nahaj), which includes approach, approach, and method, meaning the clear path, and approach to the path, meaning he made it clear and clear also, he took it. And in the revelation: “For each of you We have made a law and a method.” And in the hadith of Al-Abbas: “The Messenger of God - may God’s prayers and peace be upon him - did not die until he left you on a clear path.” And direct the path: make it clear and clear, and it becomes a clear and clear path. And so-and-so follows the path of so-and-so, that is, he follows his path.

Terminologically: The method is defined in terms of subject matter as the path that leads to the discovery of a certain truth, and this is done through a set of rules and means that the researcher follows to reach this truth.

-From a formal standpoint, the approach is the framework in which data and information are placed, organized and dealt with according to certain rules and procedures. Etymologically, it indicates tracking, and therefore it is an effort made to achieve a specific goal, and it is also research and study. Therefore, we find it has two similar meanings among the hadith scholars, although it is possible to distinguish between them:

- A method is a path through which we reach a result, even if this path was not determined in advance in a voluntary and thought-out manner. The curriculum is a program that pre-organizes a series of operations that require completion, and also indicates some mistakes that must be avoided in order to achieve a specific result. Descartes says, “There is a set of considerations and judgments, such as:

“Thinking without a method, and thinking based on a method... I formed from it my own method through which it seems to me that I have a means of gradually





developing my knowledge and ascending it little by little to the highest point that my weak mind and the shortness of my life can allow me to reach.”

The Philosophical Dictionary provides a definition of the method as “a specific means that achieves a specific goal,” and the method is generally defined as “the correct arrangement of the mental operations that we perform in order to uncover and prove the truth.”

- The word “method” is not strange in Islamic civilization, as it appeared in the famous book of Ibn Rushd in the plural form, “Exposing the methods of evidence in the doctrines of the religion and defining what has occurred in them of deviation and misleading innovations.” So “method” here means the path and “methods.” Methods of reasoning in understanding beliefs that lead to distinguishing between correct understanding and corrupt understanding, between belief and heresy. The word “method” was also used in Islamic culture, as is the case in “Mahjul al-Balagha,” attributed to Ali bin Abi Talib, and it also means the path, the path of speech, and speech is not just a sound, but rather an expression of thought, vision, and standards of behavior.

- It is a translation of the French word *méthode* and its counterparts in European languages, and the origin of that word ultimately goes back to the Greek word *méthodos*, which is a word that Plato used to mean research, consideration, or knowledge. The word *method* did not take on its current meaning, that is, a set of general rules formulated in order to reach the truth in the sciences, until the beginning of the European Renaissance. In this period, logicians took care of the issue of method as part of the parts of logic. We see, for example, Molina and Nunez paying attention to it, and we also find a long chapter on method in Zabarella’s works on logic and among others.

But the clear attempt in the Renaissance was made by Ramus, and in the nineteenth century the decisive step was taken to form the curriculum. In his book “The New Organon,” Bacon formulated the rules of the experimental method very clearly. Ronnie Descartes tried to establish four (04) basic rules for the method, provided that he makes a firm and firm decision to always respect them:

1- The first rule: I do not accept anything as true unless I intuitively know that it is so, that is, I carefully avoid rushing to judgment and making prejudgments. And I add to my judgments only what comes before my mind with the utmost clarity and distinction, as it is impossible for me to doubt it.





2- The second rule: I divide each of the difficulties that I will review into as many parts as possible, and according to what is required by the necessity of solving it in the optimal manner.

3- The third rule: It is to guide my thoughts in an orderly manner, by starting with the simplest and easiest topics to know in order to move gradually to more complex knowledge, and even to assume an arrangement between topics that are not, by nature, subject to any arrangement among them.

4- The fourth rule: I do a complete accounting of all cases and comprehensive reviews so that I make sure that I have not forgotten anything.

- He also tried to discover the method that leads to the good use of the mind and the search for truth in the sciences. He put it into rules that are:

1- The first rule: The goal of studies must be to guide the mind in a way that makes it issue convincing and true judgments about all the issues it faces.

2- The second rule: We should only be concerned with topics that our mind seems capable of knowing with certainty and about which there is no doubt.

3- The third rule: We must not search in the subject that we will study on what others have said about it, or on our guesses about it, but we must search in it for what we can see clearly and intuitively, or what we conclude with certainty, and this is the only means that will lead us to knowledge.

4- The fourth rule: The method is necessary in the search for truth.

5- The fifth rule: The entire approach lies in organizing and arranging the topics that the mind addresses in order to reach some truths. To apply this approach, we must return the confusing and ambiguous issues to simpler issues, then move to intuitive knowledge of these simple issues to gradually reach knowledge of other issues.

6- The sixth rule: To distinguish between the simplest and most complex things and to carry out this research regularly, we must recognize in every series of topics, or in every group of facts from which we have deduced other facts, the simpler thing and how other things move away from it or approach it. This or that extent.

7- The seventh rule: In order for the work to be completed, the mind must examine, in a continuous and uninterrupted movement, all the topics related to the goal it wants to achieve, and then summarize them in a systematic and sufficient statistical process.

8- The eighth rule: If our mind encounters an issue that it cannot fully understand, we must stop at that point, not examine subsequent issues, and avoid making futile efforts.





- As for the scientific method, it can be defined as “a coordinated analysis and organization of the principles and mental and experimental processes that necessarily guide scientific research, or what constitutes the structure of the special sciences.” The scientific method in this sense uses an extremely important methodological tool, which is the analysis, of the set of principles and foundations from which it proceeds. Any scientific research, provided that this analysis is characterized by logical characteristics such as consistency and necessity. The analysis does not stop at familiarity with these principles, but rather searches for the simplest and most necessary among them and eliminates the repeated or derivative ones from other principles. The analysis also extends to the group of mental and experimental processes. We conduct A set of logical and mathematical deduction and reasoning operations based on the data available to us. In conducting these, we return to a set of derivation rules of a logical-mathematical nature. We also resort to experimentation when judging a set of derived results as true or false based on their correspondence with reality.
- The scientific method can take on a general character when it refers to a set of general rules according to which all sciences operate. There can be specific approaches that vary depending on the sciences and the logical structure of each science. In all cases, we aim to obtain scientific knowledge, which is the asset of true science.
- So, the method is rules imposed on thought without negatively affecting its essence, and the Port-Royal group defines it as “the art of arranging and properly organizing a group of ideas to reveal or prove the truth.”
- The National Center for Textual and Lexical Resources believes that the multiplicity of curricula is due to the multiplicity of sciences, which are as follows:

Table No. (01) shows the multiplicity of curriculum concepts according to the multiplicity of sciences, according to the National Center for Textual and Lexical Resources

In mathematics	It is the rational steps applied to numbers, as we find in the arithmetic method, the differential or infinitesimal calculus method, and the changes calculation method...
in philosophy	it is the rational steps directed to discovering and proving the truth, and in this sense there are the deductive, dialectical, inductive, abstract, analytical, demonstrative, intuitive, and phenomenological approaches...





In experimental sciences	it is the procedures used in research that require the use of observation, classification, hypothesis, and verification through scientific experiments appropriate to the various sciences. We can talk about the method based on similarity, which depends on generalizing the use of a specific method in several fields, and the statistical method, which relies
In astronomy	it is an imaging procedure aimed at measuring the optical density of stars.
In botany	it is the procedure that enables the classification of plant species
In economics	it is the steps that are used in researching the subject of the economic situation and evaluating needs...
In history	it is the steps that are used in researching the subject of historical events, and it is a historical critical approach that applies the principles of historical interpretation to documents in order to verify their authenticity and evaluate their credibility.
in psychology	it is the steps that are used in researching the subject of psychological facts, and it relates to the analytical method and the psychoanalytic method that allows knowledge of the subconscious and the introspective approach...
In sociology	it is the steps that are used in researching the subject of social facts, and we can talk about the method of opinion polls. The approach of concomitant changes, the approach that studies specific issues in a large number of societies (a broad scope approach), and the approach that focuses on studying one society (a limited scope approach)...
In pedagogy	it is the set of steps consisting of principles and rules that can facilitate the gradual learning of a particular educational subject...
In linguistics	the curriculum in the field of language teaching consists of several rational methodological steps based on a set of linguistic, psychological, and pedagogical principles that are consistent with each other.

So, according to modern educational trends, the curriculum is: “the sum of educational experiences intended and planned by the educational institution to bring about comprehensive growth for students in all aspects.”

It is “the path leading to the discovery of the truth in the sciences, through a group of general sciences. It dominates the course of the mind and determines its operations until it reaches a known result.”

It is also a set of principles, rules and guidelines that the researcher must follow from the beginning of his research to the end in order to reveal the general, essential and necessary relationships to which the phenomena subject of the study are subject.





1-2: Definition of methodology

Methodology is equivalent in the French language to *Méthodologie*, which is composed of two words: *Méthode*, which means method, and *Logie*, which means science. Therefore, methodology is the science that is concerned with studying methods, and it is more comprehensive than method. In scientific research, we use the concept of methodology if we rely on a group of methods within the framework of methodological integration, and we use the method if we rely on a single scientific method.

- As for the researcher Angers Morris, he defined methodology as the sum of methods and techniques that guide the preparation of research and guide the scientific method, that is, it is the study of the methods and techniques used in the human sciences.

It can be defined as a set of procedures and mechanisms known among scientists that can be used for observation, detection, and investigation in acquiring knowledge and arriving at facts. The primary purpose of the methodology is to try to understand matters and relationships in the environment in which humans live in order to arrive at theories and laws that govern and run the universe.

- It is the path that links the problems of reality and the perception of researchers and scientists.

- A set of tools that a researcher uses to provide proof, evidence, and arguments to confirm the validity or incorrectness of a particular hypothesis or theory.

-The methodology teaches a person how to use his intellectual abilities and mental abilities in the best way to reach a specific result with the least effort and the shortest possible method.

- The term methodology was used for the first time by the philosopher Immanuel Kant when he divided logic into two parts:

1- The doctrine of principles: which examines the correct conditions and methods for obtaining knowledge, and the science of methods, which is concerned with determining the general form of each science and determining the method by which any science is formed and composed.

2- It can be said that methodology is the method followed by the mind in treating or studying a topic or issue in order to reach specific scientific results that can be proven and to convince others.





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- Thinkers and interested parties have agreed in their definition of methodology as the logical study of the rules and methods of scientific research and their procedural formulation that facilitates their use. They are:

1- A tool for thought, reasoning, and theorizing: It is an important tool for increasing knowledge, continuing progress, and helping the student develop his abilities to understand information and data and know the concepts, foundations, and methods on which any scientific research is based.

2- A work and application tool: It provides the researcher with experiences that enable him to read critically and analytically the works he examines, evaluate their results, and judge their importance and use in the applied field and work.

3- A planning and management tool: It provides workers (especially in intellectual fields) with techniques that help them deal with the issues and problems they face.

4- An art and creativity tool: It includes methods, methods, instructions, and scientific and artistic tools.

Therefore, methodology, according to the Encyclopædia Britannica, is defined as “a general term for the various processes upon which any science is based, and it is used in studying the phenomenon occurring in its field of specialization, and this confirms the unity of the scientific method as a method of thinking and research, which is relied upon in Obtaining honest, consistent and comprehensive scientific knowledge about the phenomenon, and hence the scientific method is an indispensable necessity for research..

Second: Scientific research

2-1: Definition of research

Linguistically: It is the source of the past tense verb search, which means to request, search, investigate, follow, ask, investigate, try, discover, and thus the linguistic meaning of search is to request, search, and investigate a fact or a matter.





It is known in the Arabic language in Lisan al-Arab, meaning discover, ask, track, investigate, investigate, or make an effort to reach something.

- And in the Holy Qur'an, it says, "So God sent a crow searching the earth to show him how to hide his brother's body. He said, 'Oh, my woe, I am unable to be like this crow and hide my brother's body,' so he became one of those who regret it." It came in the sense of searching and striving in it and learning about its truth, and asking and investigating.

Technically: it means seeking the truth, investigating it, and spreading it among the people. It also indicates diligent search and continuous examination. - It is the study that leads to tracking and deepening knowledge of a specific topic for the purpose of revealing the truth and reaching an acceptable result in a specific field of science in accordance with methodological rules.

- It is a means of organized and precise inquiry and investigation carried out by the researcher for the purpose of discovering new information or relationships in addition to developing, correcting or verifying the information that already exists, provided that in this careful examination and inquiry the steps of the scientific method are followed...

- The precise and organized scientific study of a specific phenomenon using the scientific method to arrive at facts that can be used and verified.

Research is the systematic examination of the material of any subject in order to add the resulting information to human or personal knowledge.

- It is the work that is done to solve or attempt to solve an existing problem with a material reality.

2-1-1: Levels of research: There are three levels of research:

1- Short research: Its aim is to train the student on the use of sources and references, and how to collect, arrange and summarize information for the purpose of developing the student's knowledge. Generally, the number of its pages ranges between 20-40 pages (such as standards research and training reports).

2- Intermediate research: It is the beginning of scientific research, and is considered a means of mastering the information obtained throughout the student's academic period, as the student will realize the truth of the sciences he has studied and received in order to choose a specific field to expand upon by completing a memorandum at the end of the study in this field, and it includes The intermediate research is the same as what is required of the short research, except that it is added to the analysis of the content and drawing conclusions and prospects that can be added to the research, and that it fulfills the





methodological conditions and in general the number of its pages is between 40-80 pages or a little more in graduation memoir research, and not Master's research can exceed 250 pages.

3- Long research: such as doctoral dissertation research, which is comprehensive research that requires distinction, modernity, and originality, and it is documentation of independent scientific work. It is considered a scientific contribution in the field of specialization, and in general the number of pages is large and not specific. But in general, it is estimated at approximately 300-500 pages, and the size of the thesis varies from one researcher to another depending on the nature of the research topic and the approved study methodology.

Therefore, research is a means of study through which a solution to a specific problem can be reached, through a comprehensive and precise investigation of all verifiable evidence and evidence, in order to add the resulting information to human knowledge or personal knowledge.

2-2: Definition of science:

Linguistically: it means perceiving something as it really is, or as it is, with certainty, which is certainty and knowledge.

Technically: It is the collection of facts, facts, theories, and research methods that abound in scientific literature...

Science is a branch of knowledge or study, especially those related to coordinating and consolidating facts, principles, and methods through experiments and hypotheses.

It is the coordinated knowledge that emerges from observation, study and experimentation, which is carried out for the purpose of determining the nature, foundations and origins of what is being studied...

Conant viewed science as something moving, dynamic, and a continuous human activity that does not know stability or stagnation, which encourages self-discovery and problem solving.

- It is described as a purely human activity that results from a person's endeavor to learn about himself, others, or the phenomena surrounding him, relying on methods and tools to achieve knowledge, which vary in accuracy and error. The same definition goes to researcher Angers Morris, who defines the word science as "An activity whose goal is production using its own means."





- Most of the definitions revolve around the fact that science is a part of knowledge that includes facts, principles, laws, theories, fixed, coordinated and classified information, and reliable scientific methods and approaches to knowing and discovering the truth conclusively and with certainty. In general, we find that all definitions of science emerge from the fact that:

1- Science is awareness and knowledge.

2- Science arises as a result of studies and experiments.

- An interconnected group of perceptions, opinions, and ideas resulting from observation, experience, and research. Abdel Basset Muhammad Al-Sayyid defines it as coordinated knowledge, which is a systematic process for linking knowledge and extending its scope. It focuses on the truth and uses the scientific method.

- It is an attempt to discover the tangible world and to know the interconnected and coordinated relationships of facts, because isolated facts do not establish science, and therefore the connection between them and each other must be discovered, and thus it is considered an accumulation of coordinated knowledge.

Therefore, science is the in-depth description of phenomena, phases, or phases governed by general laws, by following an appropriate and reliable approach, which aims to provide a scientific explanation for them and how they occur and their causes, so that it includes the largest number of similar phenomena.

2-3: Definition of scientific research:

Language: Scientific research consists of two words: research and science.

Research: It is systematic investigation and investigation.

Science: It is the set of rules and principles that explain some phenomena.

Technically: It is a method or strategy for organized and precise inquiry and investigation carried out by the researcher for the purpose of discovering new information or relationships, in addition to developing or correcting existing information.

This examination must be followed by careful investigation, the steps of the scientific method, and the selection of the method and tools necessary for collecting and researching data and information.

- It is a means of study through which a solution to a specific problem can be reached, through a comprehensive and careful investigation of all verifiable evidence and evidence that is related to this specific problem.

-It is an attempt to discover knowledge, explore it, develop it, examine it, and investigate it with careful investigation and deep criticism, then present it in a





complete presentation with intelligence and awareness. In order to walk in the ranks of global civilization, and contribute to it as a full, living human being.

- The researcher always seeks in scientific research to achieve one of the things that Shams al-Din al-Babyli talked about, which is:

- 1- To create something new
- 2- To clarify an ambiguous matter
- 4- To arrange a disruptive study
- 5- Or gathers the pieces of a scattered sea
- 6- Or correct an incorrect message

- There are two basic requirements for scientific research:

1- Originality: This means scientific behavior in all stages of research.

2- Innovation: It is working on a new addition or new discovery that no one has made before, and this is done through extensive reading and intelligence...

- If these two conditions are met in a research, it is extremely important, but if one element is present, it is of a degree of quality, but if both conditions are absent together, it is not an important scientific research.

Therefore, scientific research is all organized and precisely designed procedures in order to obtain all types of classified knowledge, deal with it objectively and comprehensively, and develop it in a way that is commensurate with developments...





Conclusion

From the above, we conclude that the standard of scientific research methodology represents the foundation and solid base for students and those searching for facts, and the way to solve the daily problems they encounter during their academic path, if the principles of careful and organized investigation are relied upon.



