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METHODOLOGY OF SCIENTIFIC RESEARCH AND ITS MODERN DIVISIONS ACCORDING TO WITHNEY, MARQUIS, GOOD AND SCATES, AND VAN DALEN

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Abstract
This research deals with an important aspect of scientific research, which is the methodology that scientific research follows, to correct the error that most researchers make who confuse methodology and methodology,the descriptive, analytical and comparative approach and the branches that these curricula include, such as the historical and experimental method and others.
The research is divided into several axes of the research methodology, which are:
1. The steps and types of thinking, which include: Evolutionary thinking, Critical thinking, Reflective and imitation thinking, Mysterious thinking, Skeptical thinking, Exaggerated thinking Think too much, Surface thinking, Causal analytical thinking, Reflexive thinking, Partial thinking, Total aggregate thinking.
2. Scientific research methods, including: Inductive study, Exploratory search.
3. Steps for collecting research material and conducting research, including: stages of collecting scientific material, research formulation and form, research formulation components, and form.
4. Defining the concept of the scientific method
5. As for the approved types of scientific research methods, they include: the experimental method, the survey method, and the historical method. Modern divisions of scientific research methods include those of: Withney, the Marquis, Good and Scates, and Van Dalen.
6. Accredited scientific research methods.
Keywords: scientific research, methodology, scientific research, descriptive method, analytical method, comparative method, Withney, Marquis, Good and Scates, Van Dalen.

Introduction

The research methodology aims to make the researcher systematic in his thinking, proposals and research, free of intellectual stagnation and oriented towards creativity, renewal, criticism and systematic and organized analysis, and avoiding making any arbitrary judgments by the researcher or falling into scientific naivety, based on the extent of his armament with scientific methodology and research methods and techniques. The approach is meant the way or the path (in the field of language), and it is defined as: the path that leads to revealing the truth in the sciences by means of a set of general rules that dominate the functioning of the mind and determine its operations until it reaches a known result.
Methodology is a branch of epistemology (1-2-3) concerned with the study of curricula or methods that allow access to scientific knowledge of things and phenomena. We can also consider that the curriculum is a stand before the subject, and we are talking in this case, for example, on the experimental approach and the medical curriculum, and the word curriculum also means resorting to analytical patterns specific to distinct scientific

branches, as for the methodology, there are those who make the concept of curriculum synonymous with the concept of methodology Is the method the methodology?

The method is that path or method that the researcher chooses from among several scientific methods and methods (curricula) in proportion to the subject of his research, in order to address his problem according to specific research steps, in order to reach solutions to it or to some results regarding it, and therefore it can be said that the methodology is more comprehensive. From the science of curricula, which is an essential part of it, it mainly appears in how to treat the subject at the level of the body and the research plan, which are two parts of the research.

As for the methodology, it is concerned with all parts and sections of scientific research, by stating its elements, conditions, and rules governing them, as well as issues related to form such as: how to document in the margin, how to document a list of references, stop signs...,

The meaning of the methodology of scientific research as a process or intellectual activity (induction and interpretation of reality), differs from the issue of logical methods, and the content of the methodology as a method of organizing and comprehensive depiction of the parts of scientific research, and the commitment to implement them stage after stage, and the methodology in its broad sense is the philosophy of scientific research and the thought followed in scientific research The purpose of introducing the student to the methodology is as a general method aimed at avoiding the mistakes that the novice researcher usually makes.

The researcher must have a clear vision of what he is looking for (defining the topic of the research, setting a methodological plan of action), and the latter is not represented in the techniques that can be followed, but rather a mental mechanism for memorizing and extrapolating the reality or the topic as a comprehensive perception of the dimensions of the research, and for this reason the researcher when he faces great difficulties that are almost To abort his research project, the reason is not due to the ineffectiveness of the techniques used, but rather to his inability to identify and follow a methodology that includes all parts of the research.

The technicality of the methodology appears in the definition of the curriculum itself, and the plan that any researcher imagines when studying a particular research topic after reading a group of references and sources, and then designs his research plan, so through that it can be said that methodology is an art from this aspect, and it is a science It studies the curricula, and the methodology contains the curriculum and the phenomena it applies as the subject matter.

As for the scientific method, the scientific method, or the scientific culture, it is a set of techniques and methods designed to examine newly discovered or observed phenomena and knowledge, or to correct and supplement old information or theories.

Although the nature and methods of the scientific method differ according to the science concerned, there are distinctive characteristics and features that distinguish scientific research and investigation from other methods of investigation and knowledge development. By examining their predictions and their accuracy for the theories that have been examined and investigated within a wide field, and a large number of experiments are often the result of collecting several integrated and coherent hypotheses, which constitute a comprehensive explanatory framework for an entire scientific field, within these theories also new hypotheses can be formed that are examined.

The main objective of any scientific research that goes beyond describing the problem or phenomenon in question to understanding and interpreting it, by recognizing its place in the overall framework of the organized relations to which it belongs, and formulating

generalizations that explain various phenomena, is one of the most important goals of science, especially those that reach a degree of comprehensiveness. It raises it to the rank of scientific laws and theories.

The interpretation of various phenomena increases its scientific value if it helps a person to predict. Forecasting here does not mean metaphysical guesswork or knowledge of the future, but it means the ability to anticipate what might happen if things go a certain way, and here expectation includes the meaning of strong possibility.

In achieving the three objectives (interpretation, prediction, and control), all sciences depend on the scientific method, because it is characterized by accuracy, objectivity, and testing the facts as a test that removes all acceptable doubt, knowing that scientific facts are not fixed, rather they are facts that have reached a high degree of truthfulness.

In this field, we must refer to a methodological issue in which the researcher differs in the theoretical aspects from the applied (experimental) researcher, as the first is not convinced of its results until all acceptable doubt is removed from it, and the degree of probability of honesty in it reaches the maximum degree, while the second is satisfied with the highest degrees The probability, if he balances between his results, takes the most of the probability of honesty, meaning that if the two discuss a certain phenomenon, and the degree of error probability in it is one in ten (1/10), the applied researcher accepts it, while the theoretical researcher does not accept it unless the degree of probability of error decreases to one percent (1%).

It should not be lost sight of, that the scientific method depends mainly on induction, which differs from deduction and logical measurement, and this does not mean that the scientific method neglects the importance of logical measurement, but when it reaches general laws, it uses deduction and analogy to apply them to the particles, to verify their validity (that is, that The theoretical researcher begins with the particulars to derive the laws from them, while the practical researcher begins with general issues to reach the partial facts), i.e. he uses the applied interpretation, which is the investigation and interpretation of a special phenomenon from a theory, a law or a general phenomenon, and he also uses the deductive method that is to derive A law, theory, or general phenomenon from a group of special phenomena [1].

Whatever it is, the scientific method includes two interrelated processes: observation and description. If science aims to express the relationships that exist between different phenomena, then this expression is in its descriptive basis, and if this expression represents the facts related to the phenomenon, it must depend on observation, The scientific description differs from the ordinary description, in that it does not depend on linguistic rhetoric, but is essentially a quantitative description, because when the researcher measures the different aspects of one or more phenomena, this measurement is nothing but a quantitative description, based on statistical means in reducing a large group of the data is reduced to a simple set of numbers and statistical terms.

As for scientific observation, it is the observation that uses different standards, and is based on the arrangement of circumstances in an intentional and specific arrangement, so that it can be observed in an objective way. The elements that are the result of chance, and repetition remains necessary to ensure the validity of the observation, as the researcher may err as a result of chance or the intervention of subjective factors, such as errors that result from the difference in the accuracy of the senses and the subjective qualities of the researcher, such as perseverance and strength of observation, and the distinction between terms [2].

Scientific research takes a number of forms and methods according to the nature of the

research, and the name of research methods is given to those different forms and methods that must be scientific to be compatible with the scientific research, and therefore the scientific research method is the ideal method for solving the scientific problem or developing theories and explanations for natural and human phenomena, and that After experimentation and testing on the hypotheses developed by the researcher.

Whatever method the researcher follows in conducting his research, another constant factor is the scientific method of thinking that is the guide to the success of the method. The researcher must prove the validity or error of these hypotheses, then the testing process to reach a final result or results, and the researcher can use more than one of the research methods in one study, for example, a researcher in history who uses the retrospective method can basically switch to the experimental method When physical study of physical historical documents.

The term "scientific method" refers to that intellectual framework within which the researcher's mind operates, while the word "research method" means the applied steps for that intellectual framework, and this difference does not mean what these two terms are, i.e. a conflict between them. And a method, but this distinction is intended for clarification and interpretation. In any scientific study, the mental processes in the mind of the researcher take an integrated arrangement and organization that directs his practical steps. Therefore, it is preferable that each term be taken from one side of the two sides, so that the word "method" is used to refer to the applied aspect of the research steps.

To clarify this more, representation depends on imagining the existence of a problem facing two people, the first floundering and trying and making mistakes until he arrives at a solution to this problem that may be right or wrong, but in both cases he is not considered a scientific investigator, because he did not solve it according to a mental organization that can As for the second, he deals with the problem in a scientific way, that is, he proceeded to solve it with certain intellectual steps that scientists call "scientific thinking steps", the results of his research and validation.

As for the steps of the scientific method of thinking, they are almost the same as the steps of any research method, with some details that differ according to different research methods, but the intellectual method is what organizes any research method [3].

First: The steps and types of thinking

The steps of the scientific method are the feeling or feeling of a problem or question that baffles the researcher or attracts his interest, so he puts possible solutions or possible answers for it, represented in "hypotheses" or "research hypotheses", and then comes the third step, which is to test the validity of the hypotheses and reach a conclusion. Certain and these three main steps lead the researcher in the various stages of his study, as long as he has chosen the scientific method as a way to reach accurate and objective results [5].

Naturally, these main steps are interspersed with several operational steps, such as: determining the nature of the problem to be studied, collecting data that helps in choosing appropriate hypotheses, as well as data that are used to test hypotheses, reaching generalizations and using these generalizations in practice. Steps - stages - in order for its operations to become clearer, but these steps do not always proceed in the same sequence, and they are not necessarily separate intellectual stages, as there may be a lot of overlap between them. A researcher may hesitate between several of these steps, and some stages may require little effort, while others take longer, and thus the use of these steps is based on functional flexibility.

It should not be forgotten that the research methods differ in terms of their method of

testing the validity of the hypotheses, and this depends on the nature and field of the problem in question. In many cases, the research problem imposes the method used by the researcher, and the difference in the method is not only due to the nature and field of the problem, but also to the available research capabilities, chosen by the researcher.

As for thinking [7-8-9-10], it is a mental activity to try to find a solution to a situation and get to know it through its outputs and productivity. Thinking in its general sense is a mental or mental activity that differs from sensation and perception and goes beyond both to abstract ideas, and in its narrow and specific sense it is every flow or stream of thoughts, moved or provoked by a problem or issue that requires a solution, and it also leads to the study of data, flipping and examining them with the intention of verifying the Its validity and knowledge of the laws that control it and the mechanisms by which it operates [11-12-13].

Thinking is a series of invisible mental activities that the brain performs when exposed to a stimulus that is received by one or more of the five senses, in search of meaning in a situation or experience, and it is a purposeful and developmental behavior that is formed from within abilities and personal factors, and cognitive and supracognitive processes [14-15-16], and knowledge of the topic around which thinking is taking place [13], which is a complex concept consisting of three elements represented in complex cognitive processes, on top of which are problem solving, and the least complex such as understanding and application, in addition to knowledge specific to the content of the material or topic, with the availability of different preparations and personal factors, especially tendencies and tendencies [17-18].

As for the difference between thinking and thinking skills, thinking is a total process through which you mentally process sensory inputs and translated information to form ideas, infer them or judge them, and it is a process that is not fully understood, and includes perception, previous experience, conscious processing, embracing and intuition.

As for thinking skills, they are specific mental processes that we practice and use intentionally in processing information, such as the skills of defining the problem, finding assumptions not mentioned in the text, evaluating evidence or claiming, collecting and organizing information, processing and analyzing information, comparing, categorizing, predicting, observing, and then making decisions, and it was necessary to learn directed skills. And support for the process of thinking or practice for the previous example, by learning basic skills, then advanced skills, then professional skills, until reach the required level in practice.

There are many types of thinking that overlap with each other so that hardly each type is distinguished from the others. These types include creative thinking, basic thinking, divergent thinking, lateral (wall) thinking, vertical (centered) thinking, scientific thinking, logical thinking, and critical thinking.

As for creative thinking, it is a purposeful mental activity directed by a strong desire to search for solutions or reach original results that were not previously known, through which the individual can find something familiar from something unfamiliar, or it is the ability to perceive the hidden links between things, events and phenomena and get out of them. Something new reveals the relations and links between them, and it is said that it is to bring something new, and it is characterized by comprehensiveness and complexity, as it is of the highest complex level of thinking, because it includes overlapping cognitive, emotional and ethical elements that constitute a unique state of mind.

Creative thinking [19] is the method that an individual uses to produce as many ideas as possible about the problem he is exposed to (intellectual fluency). A product that is

represented in the issuance of multiple solutions characterized by diversity and novelty, in light of a supportive atmosphere in which consistency and harmony prevail among its components, and critical thinking and specific to the recipient is linked to mental activity that requires the use of higher cognitive levels (analysis - installation - evaluation), which is a contemplative and purposeful mental activity based on arguments,reasoning to arrive at truthful judgments according to acceptable standards, i.e. the use of rational judgment to examine the situation and events in order to pass a judgment.

As for the types of thinking, the most important ones are:

A. Evolutionary thinking: It is the thought that creates and adds new life, that is, that generates successful projects**.**

B. Critical thinking: He is able to see the shortcomings, errors and defects in any existing work, even if he is not able to find suitable alternatives for what he criticizes**.**

C. Reflective and imitation thinking: It is the thought capable of absorbing what others create, even if it is not capable of creativity, renewal, addition and giving**.**

D. Mysterious thinking: It is the confused thinking that is incapable of perceiving the relationships between things and the size of everything in the subject in which he is thinking, and he is also unable to express what is going on in his mind clearly**.**

E. Skeptical thinking: It is the conspiracy thinking that doubts every action and every person, and believes that behind everything is a conspiracy, and that it is intended behind every conspiracy, and that there is no point in any action and no benefit in any attempt**.**

F. Think too much: It is the thinking that gives everything times its true size, whether it is good or bad.

G. Surface thinking: It is the thinking that is satisfied with the phenomena of things, and does not penetrate to the knowledge of their facts and their essence.

H. Causal analytical thinking: It is the careful thinking whose owner tends to search for the causes and premises of each accident, its results and the intentions of those in charge of it, and what is the appropriate position towards this accident, and what is his role in it.

I. Reflexive thinking: It is the thinking that takes the initiative to absolve himself of any responsibility for any matter that takes place and places the consequences of that on the predestination, and justifies his every action, regardless of its consequences.

J. Partial thinking: It is the thinking whose owner looks at the event truncated from its context and separated from its general general base, of which he is in fact a part.

K. Total aggregate thinking: It is the thinking that is concerned with looking at the general matters**.**

Second: Scientific research methods

A. **Inductive study:** It is also known as the deductive and inferential study, which is a study whose essence is to elicit the intent of the text to be studied through the text itself and without the need for other books that explain or explain the text.

B. **Exploratory search:** Exploratory research is a form of research that is conducted on problems that are not clearly identified. Exploratory research helps determine the best research design, method of data collection and topic identification. Critical conclusions should be drawn with great caution. Due to its basic nature, exploratory research often concludes that A tangible problem that doesn't really exist.

Exploratory research often relies on secondary research such as a review of available studies and their data or both, or depends on qualitative methods such as informal discussions, or depends on methods that are more formal through in-depth interviews, focus groups, projective methods, case studies or empirical studies**.**

The Internet allows for research methods that are more interactive in nature, for example, RSS formats effectively provide searchers with all new information, and search results in the main search engine can be sent by e-mail to researchers through services such as a news alert (Google Alerts); where comprehensive search results are tracked over long periods of time by services such as Google Trends; Websites can be created to attract comments from all over the world on any topic.

When the purpose of research is to gain knowledge of phenomena or gain a new insight in order to reach a more accurate formulation of problems or develop hypotheses, exploratory studies (also known as formative research) come in handy, and if the hypothesis occurs very generally or in particular Very, it is not possible to form a hypothesis, therefore, there is a need for exploratory research to gain experience that would be an aid factor in hypotheses related to plastic research to be more specific.

Usually the results of exploratory research are not useful in the decision-making process per se, but they can provide a clear explanation in a particular case, and although the results of qualitative research can give some indications such as "why", "how" and "time" regarding the occurrence of something, but they often cannot tell us about 'frequency of occurrence' or 'how often', and exploratory research is not generally generalized to the population at all.

Exploratory research seeks to find out how people can proceed with the preparation of the inquiry, what meanings they make clear by their actions, what issues they care about, and investigate phenomena without explicit expectations. An attempt to unveil any theory from the data itself and not from a hypothesis put forward.

Earl Babbie [20] identifies three purposes of humanities research: exploratory, descriptive, and explanatory, exploratory research is used when problems are at an initial stage, and the process of exploratory research is flexible and queries of all kinds of research questions (what, cause and method) can be addressed. Exploratory research is often used to establish formal hypotheses, and Shields and manifestation [21] link exploratory research to the theoretical framework of working hypotheses.

Despite this, skeptics have doubts about the usefulness and necessity of exploratory research in cases where a prior analysis can be done instead [22].

Third:Steps to collect research material and conduct research

Research is often conducted using the hourglass model structure of research, and the hourglass model begins with a broad range of research topics, then focuses on the information needed through a "project method" (just like the neck of an hourglass). Then the research expands with discussion and results. The main steps in conducting research are [24]:

- Determine the research problem
- Review of the written on the topic
- Determine the purpose of the research
- Define specific research questions and hypotheses
- Data collection
- Analyzing and interpreting data

- Submitting research reports and evaluations

The steps for conducting research are:

A. The importance of collecting scientific material:

The collection of scientific material is more important than planning for research and preparing sources. Among the manifestations of this importance are:

- Because it is the basis upon which the research topic is based.
- The two steps of planning and preparing the sources are intended to collect the material.
- It takes a long time, and painstaking effort.
- It has a strong impact on the subject of the research and the desired results from it.

B. Stages of collecting scientific material:

The collection of scientific material goes through two stages:

- Preparatory collection for writing the scientific article.
- Synthesis of scientific material.

The first stage: the preparatory assembly: At this stage, reference is made to the sources he recorded in the list of sources, taking into account the arrangement and classification of the sources according to the nature of his research.

Among the most important works in this phase are the following:

- Read the sources.
- The researcher should bring up the great effort and long time in the reading process.
- The researcher should make his reading organized, comprehensive, and in-depth.
- The researcher should take into account when reading the following matters:
  - Not to read when he is mentally and physically tired.
  - To organize reading times.
  - Not to read at inappropriate times.
  - To be skilled in evaluating the sources that are in his hands.
  - Referring to and benefiting from the indexes and indexes of the source.
  - Not to read anything that is not related to the research topic.
  - Record the title of the information with the title of the source and the part number and page.

The second stage: the codification of the scientific material: This stage begins after the completion of the previous stage, and the researcher returns to each source accompanied by the titles of the issues with the part and page number.

Types of Blogging: Blogging is of three types:

- The first type: literal transmission.
- The second type: abbreviation.
- The third type: summary.

When writing one of the three types, the researcher must take into account the following matters:

- When abbreviating it, he must put in the place of the omitted sentences dots (.....) to indicate that there is something omitted in the text.
- Differentiating between what he transmits literally, what he transmits in text, and what he summarizes; He does not mention anything about what is transmitted in the text, and he mentions the word (abbreviation) for what is brief, and the word (summarization) for what is summarized.
- To put what was quoted verbatim in brackets, and put the word (see:) in what summarizes it or what it abbreviates.
- Not to transmit only a text of one idea in the place of transmission, and to use only one side of the card.

- To put a title for each idea, and write it in the middle of the card at the top. Then write down the title of the item under which the material written on the card falls, preferably short, such as: B1/F2.
- The title of the source, the author, the part and page number, and the edition (if the researcher used more than one source) should be written at the end of the quoted text.
- The researcher should allocate a card for each source he benefited from in his research, in which he records the information of that source.
- Putting numbers for multiple cards for one idea.
- Leaving a place for comment, explanation or criticism, and specifying it clearly so that it does not mix with the quoted text.
- The researcher should not hesitate to write down thoughts and ideas related to his research; because it's quick to drop.
- The researcher does not move to another source until he finishes the source in his hands.
- The researcher distributes the material he collected from the source on the vocabulary of the plan.
- The researcher chooses, in writing the material, one of the two systems for writing the scientific material, namely: the card system and the file system.
- After completing all the sources, the researcher reviews the material he has collected under each element of the plan, evaluates it, and arranges it in proportion to the subject of that element.

C. Research wording and format:

Definition of drafting language: (Formulate the thing) on a straight example, as is done in making jewelry and pots of gold and silver, and he formulated the word from the word he took it out and built it in a specific form.

Definition of wording idiomatically: Research formulation is the presentation of the research material after discussion and analysis, taking into account language, literature, method and form.

There are three stages of research formulation:

The first stage: careful reading, and contemplation of the written scientific article.

The second stage: writing the draft, which is the initial writing of the research.

The third stage: the final writing, which is called bleaching, and includes printing.

D. Research formulation components:

- Language: It includes style and etiquette.
- The shape.
- Research Methodology.
- The language

Among the things that the researcher should consider in the language of the research are the following:

- Eloquence, clarity, and non-conformity.
- Avoid sensationalism, rhetoric, imagination, and emotion.
- Avoid sarcasm and sarcasm.
- Adherence to the rules of grammar, spelling and rhetoric.
- Avoid prolongation and digression.
- Avoid expressions of self-praise, arrogance, and self-admiration.
- Reducing the use of the first person pronoun, such as: I, we, I see, we see, my opinion, I said.
- Avoid statements of definitive assertiveness, and express humility and politeness.
- Avoid mentioning names in the place of criticism if there is no scientific need.

- Forming what needs to be formed.

E. the shape:

- Taking into account the font size and type for the text of the paper and the footnote.
- Take into account the font sizes and types of titles.
- Distinguish between paragraphs.
- Distinguishing the font of verses and hadiths from the rest of the fonts used in the research.
- Take into account the space of the margins and footnotes.
- Avoid writing on headline pages.
- Writing on one side of the paper.
- Paying attention to the search title page and its external appearance.
- Use of colors and means of illustration when needed.

Fourth: Defining the concept of the scientific method

Civilizational development and the prosperity of human societies are closely related to the use of sound and appropriate scientific methods that contribute to the progress and prosperity of small and large peoples. There is no doubt that this logical fact remains the first criterion for the development and progress of human society, because the adoption of correct scientific methods and methods, and placing the right man in A suitable job is one of the main factors that certainly leads to economic prosperity and good organization, and gives the individual the superior ability to face circumstances and control the course of events.

There have been many definitions about the concept of “methodology”. There is a definition that says, that the curriculum “is a set of rules that are established for the purpose of reaching the scientific truth,” meaning that it is “the method or plan that the researcher follows in his study of the problem to discover the truth related to the topic or problem of the research.” The word "method" linguistically means a method, doing or learning a certain thing according to some principles in an orderly, coordinated and organized manner and the curriculum in its technical and idiomatic sense means "the shortest and safest way to reach the desired goal."

“Method” is defined idiomatically as “the art of correct organization of a series of numerous ideas, but in order to reveal a truth in the sciences when we are ignorant of them by means of a set of general rules that control the functioning of the researcher’s mind and determine his operations until they are accepted, or in order to prove them to others, when we know it."

This last definition is considered to prove the definitions in defining the concept of the scientific method. In this regard, we must point out that the word method is derived from the Latin language, and for Plato it meant the meanings of “research, consideration and knowledge”, and it did not take its current meaning until the beginning of the seventeenth century., where it came to mean: "a set of general rules formulated in order to arrive at the truth in science."

Of course, there is the modern scientific method, which aims to expand the scope of knowledge and identify the unknown aspects of science, and sometimes it is called "scientific theory", and this means formulating theories and enriching the existing thought, opinions and relationships, so that the picture becomes clear in the mind of the researcher. To understand the truth and the nature of the things that we observe and there is no explanation for it, the purpose of using the scientific method is to understand and reveal the original scientific truth.

There is a second type of scientific method, which is the "Applied Scientific Method", that is, the application of scientific theory and the use of the studied method or process to solve any problem faced by human society,new inventions or additions to new fields of knowledge.

If Western countries are developed and advanced in their industries and work systems that are flexible and logical, the credit is due to the interdependence and close cooperation between thinkers in universities and scientific research institutes and between officials in administrative institutions and ministries looking to benefit from the theories of scientists, and rely on them to improve social conditions, and replace inventions The new scientific replaces the outdated inventions that are no longer compatible with the spirit of the age. This is one of the scientific methods used by countries eager to benefit from the scientific output of their thinkers, in order to introduce dynamism, new blood and appropriate changes to contemporary social life.

Research methods can be classified according to the procedural method into:

- Descriptive method
- survey method
- Case study method
- Experimental method
- The historical method
- The philosophical method

The appearance of man on earth was linked to an attempt to know naturalness, and since then man has begun to experiment and test materials to find out what is good and suitable for him. A number of elements, to know this feature found in the flint stone without the rest of the elements, the witness in this is that the use of observation and then the process of experimentation began at an early stage in human history and the experimental method went through many stages.

Fifth: Types of scientific methods

The word “methodology” is derived from the approach, which means taking a specific path, and therefore the word “methodology” means the way and the way, and therefore it is often said that research methods are synonymous with research methods.

The translation of the word “curriculum” in English (curriculum) is of Greek origin and means research, consideration or knowledge, and its etymological meaning denotes the method or method that leads to the desired purpose.

The approach is determined by the nature of the research or study topic and objectives that were previously identified, and it can be said that they are subject - as we mentioned earlier to external conditions rather than voluntary ones. We have, or in order to prove a fact that others do not know, and from this point of view, there are two approaches to the approaches in terms of different goals, one of which reveals the truth and is called the analysis or invention approach, and the second is called the classification approach.

Some also acknowledge that the most used approach is the one that is based on deciding the characteristics of a particular phenomenon or a situation that is predominantly identifiable, and depends on collecting, analyzing, interpreting, and extracting its significance.

In fact, the classification of curricula usually depends on a criterion in order to avoid confusion and confusion, and the divisions between the classifiers for any subject, and the classifications for a single subject, and this applies to research methods, and if we look at research methods in terms of the type of mental processes that guide or go on their basis,

we find that There are three.

Research methods in the human sciences are classified according to the types of research into theoretical approaches, and those methods are basically rational, and depend on description and deduction, and can be worked in all sciences, including the theoretical part of applied sciences, and their goal is to satisfy the researcher's need for knowledge or to clarify ambiguity surrounding the phenomenon in question, and the theoretical approach does not address the applied fields based on its results in general.

There is no single scientific method that can be relied upon to reveal the truth, because the methods of science differ according to the different topics studied by each researcher, meaning that each topic for study requires a certain type of scientific method appropriate to it, there is pure research, and there is research that focuses on methods, as well as There is applied research and research that complements another research, and the difference in the treated topics leads to the different means used in the search for scientific truth.

In the social sciences, it is difficult to obtain accurate scientific measures that embody the reality of social values, individual behavior and personal aspirations. However, it is easy to use the method of induction, reflection and analysis to find out the motives of human behavior and instincts. So, the means differ according to the nature of the research carried out by the researcher.

But the difference in goals and means does not necessarily mean that the natural sciences are separated from the social sciences, and that there are no common factors between these two fields of knowledge. Using various scientific methods The researcher may arrive at discovering a new science by using modern methods to treat other phenomena.

In any case, the classification of curricula, usually depends on a criterion in order to avoid confusion and confusion, and usually the divisions between classifiers for any subject, and classifications vary for a single subject, and this saying applies to research methods, if we look at research methods in terms of the type of mental processes that guide them, or based on it.

If we want to classify research methods based on the method of procedure, and the most important means used by the researcher, we find that there is the experimental method, which depends on conducting experiments under certain conditions, and the research method, which depends on collecting data in the field by multiple means and methods, and includes the scouting, descriptive and analytical study and the case study method. It focuses on studying the case of a specific unit, whether an individual or a social unit, and is linked to special tests and standards and the historical approach that relies on documents and various cultural remnants. It should not be forgotten that with the diversity of research methods, they are generally subject to the scientific method in terms of the steps referred to previously.

Sixth: Accredited scientific research methods

Before we address the most important scientific research methods adopted in the preparation of postgraduate research, we refer to a different problem among researchers, and it is the subject of disagreement among some researchers, and it is the problem of the difference between the method and method, where what is a method for some is a method for others, and what is A style for some is a method for others.

For example, there are those who consider that the descriptive method differs from the historical method and the case study method, while there are those who believe that the case study method and the survey method are two methods of the descriptive method, researchers in the methodology of scientific research to this day.

There is no single scientific method that can be relied upon to reveal the truth, because the methods of science differ according to the topics studied by each researcher, meaning that each topic for study requires a certain type of scientific method appropriate to it, and in any case, the classification of the curricula, usually depends on a standard In order to avoid confusion and confusion, the divisions usually differ between classifiers for any subject, and the classifications for a single subject vary, and this saying applies to research methods.

If we look at the research methods in terms of the type of mental processes they direct, or are based on.

If we want to classify the research methods based on the procedure method, and the most important means used by the researcher, we find that there are:

A. Experimental method: It is based on conducting experiments under certain conditions.

B. **The survey approach:**which depends on collecting data in the field by multiple means and methods, and includes the scouting, descriptive and analytical study, and the case study approach.

C. **The historical method:** It depends on the process of recovering what was in the past, to verify the course of events and to analyze the forces and problems that shaped the data of the present. If we want to classify the curricula according to quantity and quality, then we have two curricula:

- The quantitative method
- qualitative method

If we prefer to classify scientific research methods according to classification according to modernity or traditionalism, then we have two types:

- The traditional method
- modern curriculum

Branch out from each of them several other sub-curricula.

It should not be forgotten that with the diversity of research methods, they are generally subject to the scientific method in terms of the steps referred to previously, and writers and researchers differ regarding the classification of scientific research methods, some add methods and delete others methods or disagree about their names.

The following figure shows the network of classification of scientific research methods [25], which proceeds according to the following:

Operation type:	1. The inductive or deductive approach 2. Inductive Approach 3. Guiding Approach
Procedure method:	1. Experimental Approach 2. The survey descriptive approach 3. Historical Method
Quantity and quality:	1. Quantitative Approach 2. Qualitative method
modernity and traditional:	1. The traditional approach 2. Modern Curriculum

7.Modern divisions of scientific research methods

Some scholars have also prepared lists to divide scientific research methods according to certain rules, such as the following classification**:**

There are several recent divisions and classifications [26-27], including the Withney division, the Marquis division, the Good and Scates division, and the Van Dalen division**:**

A. The Hutney Division (1950)

Hutney links the various mental processes needed to think about a particular topic and research methods, and sees that if there is a phenomenon, problem, or situation that calls for study and research, then we should start by describing the phenomenon as it is and trying to explain it in the light of the available data, and then we should go back to what it was He has to see the phenomenon in the past in order to know its trends, and to try to explain it in the light of past facts and events**.**

Sometimes the researcher tries to test a theory and subject it to criticism, so he uses experimentation based on controlling the various variables, in addition to the previous mental processes that participated in trying to understand the phenomenon, and the higher mental processes should participate in order to reach deeper and more general philosophical generalizations.

In addition to this, Hutney sees that the various mental processes deal with groups, relationships, and social systems, or focus on the areas of creative thinking that result in composing a poem, a play, a musical piece...etc.

On the basis of these mental processes, Hutney puts his classification of research methods, and this classification includes the following methods and patterns:

- **The descriptive approach:** which aims to collect facts and data about a particular phenomenon or situation with an attempt to adequately explain these facts, and my identity warns against limiting the collection of data merely to the desire for all the data, without trying to analyze and interpret it to extract its implications, as is the case in some reports. Statistics carried out by university students.

Hoytney believes that such reports are not considered practical research in the correct sense, as they lack accurate analysis. As for descriptive research, its goals should not be limited to mere collection of facts, but should be directed to classifying data and facts and analyzing them in a precise and sufficient analysis, and then reaching generalizations about the situation or the phenomenon is the subject of the study.

Hutney classifies descriptive research into five types or categories, and this classification is not subject to rules, but is subject to factors affecting the research such as the spatial domain, the human domain and the tools of all data, and descriptive research includes the following five patterns:

- Scan search
- Long-term description
- Case Study Research
- Customer and Activity Analysis
- Desktop and Documentary Research

The historical method: It depends on historical phenomena after their occurrence and makes use of the past in understanding and interpreting the present. Then the second stage begins, and then the researcher tries to classify these facts and mentally combine them.

- **Experimental method:** It is the one who uses the experiment to measure the effect of the different variables. We have already defined the experiment as an intentional observation under the control resulting from the control.

- **Philosophical style of research:**Hutney believes that the philosophical direction is necessary for research, and its importance appears in two main steps, one when defining the main objectives of the research and the other when reaching the stage of generalization, and he sees that the generalizations are the deeper and more general and comprehensive the more significant and the greatest benefit, and also sees that Scientific and philosophical research are inseparable. Scientific facts can be taken as a basis for philosophical theories

that can therefore be subject to scientific research.

- Predictive style of research: It focuses on all research that aims to predict what might happen in the future for a particular phenomenon, and Hutney does not limit the predictive style to experimental research, any research is considered a prediction if it aims to predict future facts, and he hits many examples of historical research that supports have his point of view.

- The sociological style: It aims to study the society, its phenomena, its pattern, and the existing relationships between its members. This type of research deals with the fields examined by the sociologist.

- Creative style: This type of research aims to study the various factors that govern the creative creation process in science, art and literature, and evaluate the foundations on which these creative processes are based. He believes that this type of research is of special importance because creative processes often arise as a result of a special need you feel the group.

B. The Marquis Division (1950)

Marquis sees the main social research methods as:

- The anthropological approach (field observation): This approach has been advanced in social anthropology and is based mainly on field observation. The researcher chooses a tribe or community for the study, and then begins examining library sources, and interviews missionaries and travelers returning from that community to take some data that is useful to him in His studies, and the researcher personally goes to the field and relies on one or more informants to provide him with the information he needs. At the same time, he makes direct observations of individuals' customs, traditions, beliefs and aspects of their activities and writes down his observations without bias, indicating the interactions of different cultural elements and the factors that lead to cultural changes.

Marquis believes that this method has some shortcomings because it does not complete the steps of the scientific method. Scientific research is carried out in six main steps:

- Problem formulation.
- Reviewing information through the library or through people.
- To make a preliminary observation of the facts under study.
- Imposing assumptions.
- Verifying the validity of hypotheses in order to reach scientific laws and theories.
- Benefit from theories in the field of application.

However, the anthropological approach as previously presented achieves the first three steps without reaching the stage of imposing hypotheses, and Marquis believes that this may be due to the lack of the right type of data necessary to choose the hypotheses, and to achieve this end the researcher should visit several tribes or visit a tribe One several times in a period of more than several years, or entrust other field researchers to collect the required data in a controlled manner.

Case study approach: Marquis believes that individual case studies provide another model for a widely used research method in psychiatry, clinical psychology, and social work. The third and sixth steps of the scientific method, i.e. doing preliminary observation and making use of theories in the field of application with less interest in developing scientific theories.

According to Marquis, the case study method, although in its general form does not provide the perfect model for science, it would be more important to science if comparable data could be obtained between different individuals.

- The philosophical approach: It pays great attention to the fourth step, which is the

formulation of hypotheses with the intention of arriving at theoretical generalizations. The defect of this approach is that its concepts and results are difficult to measure directly by observation, because it is based mainly on tribal considerations rather than being extracted from the empirical study, and Herbert Spencer relied on this approach, In his theory of social evolution.

- **The historical method:** It is one of the methods of social science, because observation in the past has the same status in science as observation in the present, and history above all is the selection of past events, the compilation and interpretation of them, and therefore it may seem that it is an example of the third step in the scientific method - that is, the step of observation Preliminary - However, Marquis believes that we would be closer to the truth if we consider the historical method located in the sixth step, that is, the application of scientific theory to the events of the past.
- **Social survey:** Marquis faults the permissible that it is not a fruitful source of new hypotheses. The tragedy of many surveys that are very expensive is directing a little thought towards the theory on which the formulation of hypotheses is based, and he believes that it is possible to benefit from surveys in issuing generalizations, and Marquis believes that social surveys can To perform a great service for science if it focuses its attention on the step of imposing the hypotheses and then trying to verify their validity.
- **The experimental method:** It is the most distinctive method for science, and it is an example of the fifth step that aims to verify the validity of the hypotheses. Marquis believes that the use of the experimental method in the social sciences is still limited, except for psychology, where the interest in the method increased so that it overshadowed the importance of other necessary stages of science.

C. The Good and Scates Division (1954)

- The historical method
- Descriptive method
- Descriptive survey method
- Experimental method
- Case study and clinical studies approach
- Growth, development and genetics studies curriculum

From here we arrive at the major and original scientific research methods, which are:

- The deductive method.
- Experimental method.
- The dialectical method.
- The historical method.

Criticism of previous divisions:

These classifications and divisions define the types of scientific research methods, but they did not convince most scholars and methodologists who agreed on dividing and defining the types of original and basic scientific research methods, which are the four major methods represented in:

- The historical method
- Experimental method
- The deductive method
- The dialectical method

D. Van Dalen classification (1997)

Descriptive research includes [28]:

- Causal research, correlational research, and evolutionary studies.
- empirical research.

- Historical research.

Curricula are mainly dealt with and researched, within their basic reformist meaning, that is, the path leading to revealing the truth in sciences, and they are studied according to their differences in different sciences. However, it can be attributed to three major approaches [29]:

- Deductive or Deductive Approach: In it, the mind connects the premises and results, and between things and their causes on the basis of logic and mental contemplation. It begins with the universals to reach the particulars.
- Inductive method: It represents the opposite of its predecessor, as it begins with the particles to reach general laws, and it relies on verification by systematic observation subject to experimentation and control of various variables.
- Retrospective approach: It depends on the process of recovering what was in the past in order to verify the course of events, and to analyze the forces and problems that have shaped the present [29].
- However, it can be traced back to three approaches:
- Deductive or Mathematical Approach: It is the approach of mathematical or abstract sciences, in which we proceed from principle to issues that necessarily result from it, without resorting to experiment.
- Experimental method: It is the method of the natural sciences, and it includes observation and experiment together, and it is the one in which we start from particles or uncertain principles and proceed from them until we reach general results, refugees at every step to the experiment in order to ensure the validity of the conclusion.
- Historical Approach: It is the method used in historical and moral sciences, in which we retrieve the past according to the traces it left, whatever the type of these traces [29].

E. The researcher settled on the following scientific methods:

- **Descriptive research method**: It is considered one of the main approaches used in human and social research and depends on the study of reality or phenomenon, as it exists in the field, and is concerned with describing it accurately, and expressing it qualitatively or quantitatively.The following methods are included in the descriptive research method**:**
- **Survey Methodology**: It is considered one of the basic methods in descriptive research, and the survey depends on the collection of data and current facts about a specific situation, from a relatively large number of cases at a specific time as well. It is defined as an organized collection of data related to a particular place during a certain period of time, and the primary function of survey studies is to collect information that can then be analyzed and interpreted and then draw conclusions from it. The previous forms of survey studies were associated with direct contact with the sources that possess the information that the researcher wants**.**
- **Historical research method:** It depends on describing and recording past facts and activities, studying and analyzing documents and various events, and finding appropriate and logical explanations for them on accurate scientific grounds, in order to reach results that represent logical facts and generalizations that help in understanding that past, and based on that understanding in building facts for the present as well as reaching rules for prediction, in the future.

  The historical research method is also called the retrieval method, and it is in which you retrieve the past according to the traces it left, whatever the type of these traces, that shaped the present [29].
- **The experimental method [29]:**It is considered one of the closest approaches to the correct and objective scientific method in searching for, discovering, interpreting,

predicting and controlling the truth. Experimentation, in its broad general sense, is an activity practiced by a person in new situations that his previous experiences do not help him to act in. For example, when a person faces a new problem for which he does not know a solution, he tries and errs or suffers until he finds a solution for it. As for experimentation as a means to search for the truth, it is It differs in its content and components.

The most important characteristic of experimental research is assuming a certain hypothesis and changing the circumstances in a special way, with a specific intent, and then observing and analyzing the results. The purpose of conducting experiments is mainly to test the validity of scientific hypotheses, and to know the causal and functional relationships between the interacting and overlapping factors in the situation.

- **Analytical and Comparative Method:** Although the comparative approach is an independent approach in itself, most comparative studies cannot be carried out without relying on other supporting approaches, such as the analytical approach and the comparative analytical approach, indicating the comparison's dependence on analytical data, and it can depend on the historical method of comparison or the method Experimental, as some have argued that the comparative method is a quasi-experimental method, which tests both the fixed elements and the variable elements of a phenomenon in more than one society or time.

The following approaches are included in the analytical and comparative approach:

- **Analytical approach (content analysis study):** Content analysis studies are done without direct contact, where the researcher is satisfied with selecting a number of documents related to the subject of his research, such as records, documents, sources, references and other materials that contain the information that the researcher is looking for. After the researcher chooses the documents he wants to study, he begins the process of study and analysis, focusing on the information clearly contained in the document. The study of content analysis is to identify the research problem and its hypotheses and to prove the validity of these hypotheses about choosing a sample and analyzing it until reaching results. content analysis study.
- **Case study approach:** It is based on the selection of a specific case to be studied by the researcher, and the study of this case in an extensive manner deals with all the variables associated with it, and addresses them with full description and analysis. The case study can be used as a means of collecting data and information in a descriptive study, and its results can also be generalized to similar cases, provided that the case is representative of the community to be judged.
- **Applied approach:** Applied research is often exploratory because there is a need for flexibility in the problem-solving methodology, as well as there are often data limitations and a need to make decisions within a short period, and qualitative research methods such as case studies or Field research in exploratory research. Applied research depends on field or laboratory experiments and studying their results to ensure that they can be applied in reality, and they can be called experimental approaches as well.
- **The deductive or deductive approach:** Deduction is the inference that moves from the whole to the part or from the general to the particular.One of the criticisms directed at the deductive approach is that the results that are reached do not go beyond the limits of the two premises. If the researcher begins with an incorrect premise, he will surely end up with an incorrect conclusion. Because of the criticisms directed at the methods of deduction and induction about their accuracy, it was necessary to mix the two methods

to reach science and accurate knowledge, and this new method was called the modern scientific method.

- **The inductive approach:** It is the process of observing phenomena and collecting data about them in order to arrive at general principles and overall relationships. The scholars of modern European civilization have used the inductive approach to achieve their civilizational progress, and Muslims have used it in the past, as Ibn al-Haytham and other Muslim scholars used it in their writings. In the inductive approach, the researcher moves from the part to the whole or from the particular to the general, where he begins to identify the particles and then generalizes the results to the whole. The inductive evidence includes scientific conclusion based on observation, and scientific conclusion based on experiment with the modern concept of observation and experiment.
- **The retrospective approach:** It is the transferable method in research, and it is the third general research method, after the logical, rational, deductive and inductive experimental methods. Manuscripts and cultural and intellectual heritage.This approach is based on documenting the attribution of the text to its author, and history researchers rely mainly on this approach in analyzing the details and various historical data that were retrieved from what was in the past to verify the course of events, and to analyze the forces and problems that shaped the present, to come up with results that clarify how to formulate the current era. The retrospective approach depends on the comparative sources between the different texts and their analysis.
- **The comparative studies approach:** It is the comparison between two or more phenomena, and this is done by knowing the similarities and differences, and it is a mental process that is done by identifying the similarities and the differences between two or more phenomena, through which we can obtain more accurate knowledge, by which we distinguish the subject of the study or the incident in the field of comparison and classification. , and this incident can be a qualitative, analyzable, or a quantitative way to convert it into a calculable quantity. The status of the phenomenon in society, and the judgment here is related to the use of elements of similarity or contrast between the two studied phenomena or between the stages of development of a phenomenon.

Conclusion

- After presenting this important topic, which deals with an important aspect of scientific research, the research has dealt with several axes of the research methodology, which including: the steps and types of thinking, scientific research methods, steps for collecting research material and conducting research, defining the concept of the scientific method, as for the approved types of scientific research methods, accredited scientific research methods.
- The researcher reviewed recent divisions and classifications, including the divisions of Withney, the division of Marquis, the division of Good and Scates, and the division of Van Dalen, and he concluded, from them, to results that lay down a purely scientific framework for scientific research methods based on specific basic rules.
- The researcher settled on the following scientific methods:Descriptive research method, and Analytical and Comparative method, the two basic approaches in human sciences research.
- Descriptive research method: It is considered one of the main approaches used in human and social research and depends on the study of reality or phenomenon, as it exists in the field, and is concerned with describing it accurately, and expressing it qualitatively

or quantitatively,the following methods are included in the descriptive research method:survey Methodology, historical research method, the experimental method.

- Analytical and Comparative Method: although the comparative approach is an independent approach in itself, most comparative studies cannot be carried out without relying on other supporting approaches, such as the analytical approach and the comparative analytical approach, indicating the comparison's dependence on analytical data, and it can depend on the historical method of comparison or the method Experimental, as some have argued that the comparative method is a quasi-experimental method, which tests both the fixed elements and the variable elements of a phenomenon in more than one society or time.
- The following approaches are included in the analytical and comparative approach:analytical approach (content analysis study), case study approach, applied approach, the deductive or deductive approach, the inductive approach, the retrospective approach, the comparative studies approach.

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