Subject: Research Techniques in HR.

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Course: MBA (1.5years)

Q no1:

Ans: **Scientific Method of Research**

The scientific method was first outlined by Sir Francis Bacon (1561-1626) to provide logical, rational problem solving across many scientific fields.

The basic steps of the scientific method are: 1) make an observation that describes a problem, 2) create a hypothesis, 3) test the hypothesis, and 4) draw conclusions and refine the hypothesis.

The major precepts of the scientific method employed by all scientific disciplines are verifiability, predictability and fairness.

The [scientific method](https://www.thoughtco.com/steps-of-the-scientific-method-p2-606045) is a series of steps followed by scientific investigators to answer specific questions about the natural world. It involves making observations, formulating [a hypothesis](https://www.thoughtco.com/what-is-a-hypothesis-609092), and conducting [scientific experiments](https://www.thoughtco.com/what-is-an-experiment-607970). Scientific inquiry starts with an observation followed by the formulation of a question about what has been observed. The [steps of the scientific method](https://www.thoughtco.com/steps-of-the-scientific-method-p2-606045) are as follows:

* Observation
* Question
* Hypothesis
* Experiment
* Results
* Conclusion

**Observation:**

The first step of the scientific method involves making an observation about something that interests you. This is very important if you are doing a [science project](https://www.thoughtco.com/biology-science-fair-project-ideas-373329) because you want your project to be focused on something that will hold your attention. Your observation can be on anything from talent management to organization behavior, as long as it is something you really want to know more about.​ This is where you come up with the idea for your project.

**Question:**

Once you've made your observation, you must formulate a question about what you have observed. Your question should tell what it is that you are trying to discover or accomplish in your experiment. When stating your question you should be as specific as possible.​ For example, if you are doing a [project on talent](https://www.thoughtco.com/plant-project-ideas-373334) management, you may want to know how talent management interacts with organization performance.

**Hypothesis:**

The hypothesis is a key component of the scientific process. A hypothesis is an idea that is suggested as an explanation for a natural event, a particular experience, or a specific condition that can be tested through definable experimentation. It states the purpose of your experiment, the variables used, and the predicted outcome of your experiment. It is important to note that a hypothesis must be testable. That means that you should be able to test your [hypothesis through experimentation](https://www.thoughtco.com/elements-of-a-good-hypothesis-609096).​

**Experiment:**

Once you’ve developed a hypothesis, you must design and conduct an experiment that will test it. You should develop a procedure that states very clearly how you plan to conduct your experiment. It is important that you include and identify a [controlled variable](https://www.thoughtco.com/controlled-variable-definition-609094) or dependent variable in your procedure. Controls allow us to test a single variable in an experiment because they are unchanged. We can then make observations and comparisons between our controls and our [independent variables](https://www.thoughtco.com/definition-of-independent-variable-605238) (things that change in the experiment) to develop an accurate conclusion.​

**Results:**

The results are where you report what happened in the experiment. That includes detailing all [observations](https://www.thoughtco.com/direct-observation-definition-3026532) and data made during your experiment. Most people find it easier to visualize the data by charting or graphing the information.​

Conclusion

The final step of the scientific method is developing a conclusion. This is where all of the results from the experiment are analyzed and a determination is reached about the hypothesis. Did the experiment support or reject your hypothesis? If your hypothesis is support great. If not, repeat the experiment or think of ways to improve your procedure.

**Scientific method apply in research**

The scientific method is applied broadly in science, across many different fields. Many empirical sciences, especially the social sciences, use mathematical tools borrowed from probability theory and statistics, together with outgrowths of these, such as decision theory, game theory, utility theory, and operations research. Philosophers of science have addressed general methodological problems, such as the nature of scientific explanation and the justification of induction.

The scientific method is critical to the development of scientific theories, which explain empirical (experiential) laws in a scientifically rational manner. In a typical application of the scientific method, a researcher develops a hypothesis, tests it through various means, and then modifies the hypothesis on the basis of the outcome of the tests and experiments. The modified hypothesis is then retested, further modified, and tested again, until it becomes consistent with observed phenomena and testing outcomes. In this way, hypotheses serve as tools by which scientists gather data. From that data and the many different scientific investigations undertaken to explore hypotheses, scientists are able to develop broad general explanations, or scientific theories.

**Q no2:**

**Ans: Hypotheses:**

A hypothesis states your predictions about what your research will find. It is a tentative answer to your research question that has not yet been tested. For some research projects, you might have to write several hypotheses that address different aspects of your research question.

In science, a hypothesis is an idea or explanation that you then test through study and experimentation. Outside science, a theory or guess can also be called a hypothesis.

A hypothesis is an assumption, an idea that is proposed for the sake of argument so that it can be tested to see if it might be true.

In the scientific method, the hypothesis is constructed before any applicable research has been done, apart from a basic background review. You ask a question, read up on what has been studied before, and then form a hypothesis.

A hypothesis is usually tentative; it's an assumption or suggestion made strictly for the objective of being tested.

### Variables in hypotheses

In experimental and correlation research, hypotheses propose a relationship between two or more variables. An independent variable is something the researcher changes or controls. A dependent variable is something the researcher observes and measures.

## Developing a hypothesis

### 1. Ask a question

Writing a hypothesis begins with a research question that you want to answer. The question should be focused, specific, and researchable within the constraints of your project.

Do students who attend more lectures get better exam results?

**2. Do some preliminary research**

Your initial answer to the question should be based on what is already known about the topic. Look for theories and previous studies to help you form educated assumptions about what your research will find.

At this stage, you might construct a conceptual framework to identify which variables you will study and what you think the relationships are between them.

### 3. Formulate your hypothesis

Now you should have some idea of what you expect to find. Write your initial answer to the question in a clear, concise sentence.

Attending more lectures leads to better exam results.

### 4. Refine your hypothesis

You need to make sure your hypothesis is specific and testable. There are various ways of phrasing a hypothesis, but all the terms you use should have clear definitions, and the hypothesis should contain:

* The relevant variables
* The specific group being studied
* The predicted outcome of the experiment or analysis

### 5. Phrase your hypothesis in three ways

To identify the variables, you can write a simple prediction in if…then form. The first part of the sentence states the independent variable and the second part states the dependent variable.

If a first-year student starts attending more lectures, then their exam scores will improve.

In academic research, hypotheses are more commonly phrased in terms of correlations or effects, where you directly state the predicted relationship between variables.

The number of lectures attended by first-year students has a positive effect on their exam scores.

If you are comparing two groups, the hypothesis can state what difference you expect to find between them.

First-year students who attended most lectures will have better exam scores than those who attended few lectures.

### 6. Write a null hypothesis

If your research involves statistical hypothesis testing, you will also have to write a null hypothesis. The null hypothesis is the default position that there is no association between the variables. The null hypothesis is written as H0, while the alternative hypothesis is H1 or Ha.

H0: The number of lectures attended by first-year students has no effect on their final exam scores.

H1: The number of lectures attended by first-year students has a positive effect on their final exam scores.

## How to Formulate an Hypothesis

A testable hypothesis is not a simple statement. It is a complicated statement that needs to offer a clear introduction to a scientific experiment, its intentions, and the possible outcomes. However, there are some important things to consider when building hypothesis.

1. State the problem that you are trying to solve.
	* Make sure that the hypothesis clearly defines the topic and the focus of the experiment.
2. Try to write the hypothesis as an if-then statement.
	* Follow this template: If a specific action is taken, then a certain outcome is expected.
3. Define the variables
	* In scientific experiments, a hypothesis proposes and examines the relationship between an independent variable and a dependent variable. The effect on the dependent variable (the idea being tested) depends on or is determined by what happens when you change the independent variable (the factor being changed). For example, let us take a look at this hypothesis:

You should not ignore the importance of the above steps. The validity of your experiment and its results rely on a strong testable hypothesis. Developing a strong testable hypothesis has few advantages, it compels us to think intensely and specifically about the outcomes of a study. It enables us to understand the implication of the question and the different variables involved in the study. It helps us to make precise predictions based on prior research. Hence, forming a hypothesis would be of great value to the research.