Hypothesis: the essential tool for research

Source: Singh (2006), Kothari (1985) and Dawson (2002)

As I mentioned it earlier that 'hypothesis' is one of the fundamental tools for research in any kind of investigation.

In fact, it is the second step to follow in any kind of research process.

The hypothesis is a tentative solution of a problem. The research activities are planned to verify the hypothesis .

It is very essential for a research worker to understand the meaning and nature of hypothesis.

The researcher always plan or formulate a hypothesis in the beginning of the problem.

MEANING OF HYPOTHESIS:

The word hypothesis is made up of two Greek roots which would roughly mean some sort of 'sub-statements' if they are sense translated in English.

Technically speaking, it is the presumptive statement of a proposition, which the investigation seeks to prove.

At the start of an investigation the hypothesis is a stimulus to critical thoughts which offers insights into the confusion of any phenomenon.

At the end, it comes to prominence as the proposition to be accepted or rejected in the light of the findings.

Thus, the word hypothesis consists of two words: Hypo + thesis = where, ‘Hypo’ means tentative or subject to the verification and ‘Thesis’ means statement about solution of a problem.

The word meaning of the term hypothesis is ‘a tentative statement about the solution of the problem’.

Hypothesis offers a solution of the problem that is to be verified empirically and based on some rationale.

Another meaning of the word hypothesis which is composed of two words: ‘Hypo’ means composition of two or more variables which is to be verified.

‘Thesis’ means position of these variables in the specific frame of reference.

This is the operational meaning of the term hypothesis.

Hypothesis is the composition of some variables which have some specific position or role of the variables i.e. to be verified empirically.

It is a proposition about the factual and conceptual' elements.

Hypothesis is called a leap into the dark. It is a brilliant guess about the solution of a problem.

A tentative generalization or theory formulated about the character of a phenomenon under observation are called hypothesis.

It is a statement temporarily accepted as true in the light of what is known at the time about the phenomenon.

It is the basis for planning and action- in the research for new truth.

There are more than ten definitions that are available in the literature.

However, the one that has more logical strength is given by George, J. Mouly who defines it as , "Hypothesis is an assumption or proposition whose testability is to be tested on the basis of the computability of its implications with empirical evidence with previous knowledge."

If one goes through all the definitions available in the literature, one comes across the following terms: assumption, postulate and hypothesis.

It is, therefore, important to take up these terms and explain each of these in order to make things clear regarding the term 'hypothesis'.

(a)Assumption: Assumption means taking things for granted so that the situation is simplified for logical procedure.

Assumptions are not grounded in logical activities as the postulates are.

They merely facilitate the progress of an agreement for a partial simplification by introducing restrictive conditions.

For example, the formulas of Statistics and measurement are based on number of assumptions.

Assumption means restrictive conditions before the argument can become valid.

Assumptions are made on the basis of logical insight and their truthfulness can be observed on the basis of data or evidences.

The postulates are the basis and form the original point of an argument whereas assumptions are a matter of choice.

(b)Postulate: Postulates are the working beliefs of most scientific activity.

The mathematician begins by postulating a system of numbers which range from 0 to 9 and can do permutation and combination only thereafter.

Similarly 'Hull's Theory of Reinforcement' (1943) is based on eight postulates of behavior of an organism.

For many people, God or Spirit is a postulate of the good life or godly life.

Postulates are not proven; they are simply accepted at their face value so that their basic work for the discovery of other facts of nature can begin.

(c)Hypothesis: A hypothesis is different from both of these. It is the presumptive statement of a proposition which the investigator seeks to prove.

It is a condensed generalization. This generalization requires a knowledge of principles of things or essential characteristics which pertain to entire class of phenomena.

The theory, when stated as a testable proposition formally and subjected to empirical or experimental verification, is known as hypothesis.

An assumption is the assumed solution of a major problem. It may or may not be true. The natural sciences and mathematics are based on postulates.

The statistics is based on some assumptions which are considered approximate science. The assumptions are helpful in conducting a research work in behavioral sciences.

The hypothesis is based on some earlier theory and some rationale whereas postulates are taken as granted true. Therefore, a scientific research process has to be based on some hypotheses or other.

Hypotheses are often confused with observations. These terms refer to quite different things.

An observation refers to what is there to observe….that is to what is seen. From observation researcher may infer.

When the researcher is in position to infer something on the basis of the observation of a subject matter, s/he can go on making the general hypothesis about the subject matter.

Sometimes, the general hypothesis made by the researcher might not lead to any further stage of development in the research, the researcher has to go back to the stage of observation.

After a careful observation and considering some more variables, s/he can make some specific hypothesis.

Thus, there are some differences between specific and general hypothesis. Specific hypothesis requires fewer observations for testing than the general hypothesis.

NATURE OF HYPOTHESIS

The following are the main features of a hypothesis:

1.It is conceptual in nature. Some kind of conceptual elements in the framework are involved in a hypothesis.

2.It is a verbal statement in a declarative form. It is a verbal expression of ideas and concepts, it is not merely an idea but is also available in the verbal form, though the idea is in itself is enough for empirical verification.

3.It has some empirical referent. A hypothesis contains some empirical referent. It indicates the tentative relationship between two or more variables.

4.It has a forward or future reference. A hypothesis is future oriented. It relates to the future verification and not to the past facts and information.

5.It is the pivot of a scientific research. All the research activities are designed for its verification.

FUNCTIONS OF HYPOTHESIS

The following are the main functions of hypothesis in the research process suggested by McAshan (1979):

1.It is a temporary solution of a problem concerning with some truth which enables an investigator to start his research work.

2.It offers a basis in establishing the specificity what to study and may provide possible solutions to the problem.

3.Each hypothesis may lead to formulate another hypothesis.

4.A preliminary hypothesis may take the shape of a final hypothesis.

5.Each hypothesis provides the investigator with definite statement which may be objectively tested and accepted or rejected.

IMPORTANCE OF A HYPOTHESIS

1.Hypothesis as the Investigator's "Eyes": Good (1963) thinks that by guiding the investigator in further investigation it serves as the investigator's "Eyes" in seeking answers to tentatively adopted generalization.

2.It focuses on research: Without it, research is unfocussed and remains like a random empirical wandering. It serves as necessary link between theory and the investigation.

3.It places clear and specific goals: A well thought out hypothesis is that which places clear and specific goals before the researcher and provides him/her with a basis for selecting sample and research procedure to meet these goals.

4.It links things together: "It serves the important function of linking together the related facts and information and organizing them into whole."– Good (1963)

5.It prevents blind research: "The use of hypothesis prevents a blind search or research and saves the researchers from gathering of masses of data which may later prove irrelevant to the study."– Young (1965).

Kinds of Hypothesis:

Hypotheses vary in form and some extent and in some cases the form is determined by the function of hypotheses in different contexts.

Thus a working hypothesis is described as the best guess or statement derivable from known or available evidence.

The amount of evidence and the certainty or quality that can be determined will bring different forms of hypotheses, such as specific or general.

In other cases, the type of statistical treatment generates a need for a particular form of hypothesis.

In either case, there are some set forms of hypothesis and they can be explained as follows:

(a)**Question form of Hypotheses**: Some writers assert that a hypothesis may be stated as a question, however, there is no general consensus on this view.

At best, it represents the simplest level of empirical observation. In fact, it fails to fit most definitions of hypothesis.

It is included here for two reasons: the first one is very simply that it frequently appears in the lists.

The second reason is that question may or may not qualify as a hypothesis.

There are cases of simple investigation and search which can be adequately implemented without raising a question, and thus there is no need to dichotomize hypothesis forms into acceptable/reject-able categories of 'question forms'.

The following example of a question is used to illustrate the various hypothesis forms:

H: Is there a significant interaction effect of schedule of reinforcement and extroversion on learning outcomes?

(b)Declarative Statement: A hypothesis may be developed as a declarative statement which provides an anticipated relationship between variables.

The anticipation of a difference between variables would imply that the hypothesis developer has examined existing evidences very carefully and they have led him/her to believe that differences may be anticipated as a process of additional evidences.

The following is an example of this form of hypothesis-

H : There is significant interaction effect of schedule of reinforcement and extroversion on learning outcomes.

It is merely a declaration of the independent variables effect on the criterion variable.

(c)Directional Hypothesis: A hypothesis may be directional which connects an expected direction in the relationship.

The above hypothesis has been written in directional statement form as follows:

H : Extrovert learns better through intermittent schedule of reinforcement whereas introvert learns through continuous schedule of reinforcement.

The hypothesis developer of this type appears more certain of his/her anticipated evidence than would be the case if s/he had used either of the previous examples.

If seeking a tenable hypothesis is the general interest of the researcher, this kind of hypothesis is less safe than the others because it reveals two possible conditions. These conditions are matter of degree. The first condition is that the problem of seeking relationship between variables is so obvious that additional evidence is hardly needed.

The second condition derives because researcher has examined the variables very thoroughly and the available evidence supports the statement of a particular anticipated outcomes.

An example of the obviously safe hypothesis would be 'hypothesis' that high intelligence students learn better than low intelligent students.

The above hypothesis is in the directional statement form but it requires evidence for the relationship of these two variables reinforcement and personality.

(d) Non-Directional Hypothesis: A hypothesis may be stated in the null form which is an assertion that no relationship or no difference exists amongst the variables.

This form null hypothesis is a statistical hypothesis which is testable within the framework of probability theory.

It is also a non-directional form of hypothesis. The following are the examples of null form of hypothesis:

H0 : There is no significant interaction effect of schedule of reinforcement and extroversion on learning outcomes.

H0 : There is no significant relationship between intelligence and achievement of students.

In recent time, the trend is to employ or develop null hypotheses in the research work for education and psychology.

A null hypothesis is accepted tentatively to state that on the basis of the evidence that is tested, it could be the case that there is no difference in the approach to the problem.

If the null hypothesis is rejected, there is a difference but we do not know the alternative or the differences.

In this form of hypothesis, researcher does not have to anticipate or give the rationale for the declaration of the result.

Secondly, it does not make researcher biased or prejudiced. S/he can be objective about the expected outcomes of the research findings.

Actually this is a statistical hypothesis which is self explanatory-null hypothesis means zero hypothesis. A statistical hypothesis must be testable within the framework of probability theory.
A researcher does not have to do anything in developing such form of hypothesis. In order to accommodate the object of the inquiry for extracting this information, a null hypothesis is an appropriate form.

CHARACTERISTICS OF A GOOD HYPOTHESIS

A good hypothesis must have the following ingredients:

1.A good hypothesis is in agreement with the observed facts, meaning a good hypothesis does not conflict with any law of nature which is known to be true.

3.A good hypothesis is stated in the simplest possible term.

4.A good hypothesis permits of the application of deductive reasoning.

5.A good hypothesis shows very clear verbalization. It is different from what is generally called hunch.

6.A good hypothesis ensures that the methods of verification are under control of the investigator.

7.A good hypothesis guarantees that available tools and techniques will be effectively used for the purpose of verification.

8.A good hypothesis takes into account the different types controls which are to be exercised for the purpose of verification.

9.A good hypothesis ensures that the sample is readily approachable.

10.A good hypothesis indicates clearly the role of different variables involved in the study.

11.A good hypothesis maintains a very apparent distinction with what is called theory law, facts, assumption and postulate.

ROLE OF HYPOTHESIS

The hypothesis is the basis of any scientific investigation either in social sciences or pure science.

It is the of the axel of any research process. All the research activities are oriented towards the verification of the hypotheses.

Apart from this role it also has a significant role in the formulation of theory, principles and laws.

It is also known as tentative theory, and after the verification it takes the shape of final theory.

A theory emerges from a new hypotheses, and this is then subjected to verification, after the verification it becomes a new theory in its field of studies. In building up the theories, this cyclic process continues.

That’s all ☺