
STANDARDIZED RESEARCH: THE IMPERATIVE OF RESEARCH HYPOTHESIS

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ABSTRACT

It is generally believed that Research Hypothesis poses a great challenge to student researchers especially those in the Arts or humanities. This paper is an attempt to present in simple and easily understandable terms what research hypothesis is all about. The paper also looks at the classification of research hypothesis, the need for research hypothesis and also the paper looks at a brief guide in research hypothesis formation. The paper sees Research Hypothesis as a veritable research tool for doing highly rated researches that meets the ethical standards for research works.

INTRODUCTION

Research hypothesis, the preoccupation of this paper is very important in research although it is optimally required when conducting research based on the nature of the research work. According to Lapin (1980:243) in research we make decision based on two complimentary assumptions regarding the true nature of a population. For instance – Rural women better acquire literacy through the Igbo language than through English. Adults who are yet exposed to western education acquire literacy easier in the Nwagu, Aneke Syllabary than through the Roman alphabet. Children acquire second languages faster than adults. Women are better cooks than men. Students taught phonetics by women learn faster than when taught by men. Students taught mathematics by men learn faster than when taught by women teachers. According to Lapin (1980) these assumption are generally referred to as hypotheses. The observation of these test samples is viewed as a test. Thus, the procedures for making such decision fall into an area of statistical inference called hypothesis testing. Research hypothesis, could be said to be a wild guess but also informed on an issue. According to Ugwuja (2004) it is a suggestion that has been put forward without being based on any prior knowledge or based on any empirical data. As laymen, in everyday life we hypothesize without being conscious of it. For instance one may hypothesize inductively that since the cloud in darkening run it must rain today, but in most cases it does not follow. In everyday hypothesis which Ali (2004) observes and based on mere observations giving rise to generalizations with limited value because they are not based on verifiable data. Daily we make inductive hypothesis because it is an intrinsic nature of man to try and predict what will happen next or what will happen on the future.

What is Research Hypothesis?

As already noted hypothesis could be a guess on any particular issue. Ugwuja (2004: 37) quotes Spiegel (1970) who defines hypothesis as:

An intelligent guess of the answer to an identified problem it is a hoax. If in an idea, suggestion that has been put forward, as a basis for making further explanations or further reasoning.

Ali (1996:27). In his own submission defines hypothesis as a statement giving insight of what the researcher expects to be the outcome of his study with regard to the variables contained and investigated in the statement of the problem. Furthermore, Ali (1996) explains that hypothesis serves to explain certain observed or observable events, behaviours, phenomena, or predictions with regard to how they occur. Hypothesis according to Ali (1996) is not a proof on its own but an evidence for supporting or reflecting ones preconceived view now presented as a statement, tested as found acceptable or acceptable as was stated. Therefore, we can say that they aim of a hypothesis is not to prove but to test whether it should be accepted or otherwise rejected it and this is done through empirical research. Osuala (2007) defines hypothesis as a tentative generalization whose tenability is to be tested. Coming to Nworgu (2006) he defines as a conjectural proposition, an informed or intelligent guess, about the solution to a problem. It is an assumption or proposition whose veracity and validity are yet to be established. Uzoagulu (1998) states that hypothesis are intelligent guesses regarding some pertinent variables. From the online resources – a research hypothesis is the statement created by researchers when they speculate upon the outcome of a research or experiment (www.experiment-resources.com/research-hypothesis). Also from the above online source, research hypotheses are the specific testable predictions made about the independent and dependent variables in the study. Again, a hypothesis is a logical supposition, a reasonable guess, an educated conjecture which provides a tentative explanation for a phenomenon under investigation (www.accessexcellence.org).

Furthermore, according to the Wikipedia online Encyclopedia, a hypothesis is a proposed explanation for an observable. A hypothesis requires more work by a researcher in order to either confirm or disapprove it, the encyclopedia asserts. Research hypothesis according to Siegel (1956:7) is the production derived from the theory under test. Sidhu (2010) gave a more detailed and varying definitions of hypothesis as follows: A hypothesis is a statement temporarily accepted as true in the input of what is at a time known about a phenomenon, and it is employed as a basis for action in the service for truth. A hypothesis is a tentative assumption drawn from knowledge and theory which is used as a guide in the investigation of other facts and theories that are yet unknown. It is a guess, supposition or tentative inference as to the existence of some fact, condition or relationship relative to some phenomenon which serves to explain such facts as already are known to exist in a given area of research and to find the research for new truth. A hypothesis states what we are looking for and also looks forward. It is a proposition which can be put to test to determine its validity it may move to be correct or incorrect. It is tentative supposition or provisional success which seems to explain the situation under observation. A hypothesis is a tentative generalization the validity of which remains to be seen. In its most elementary stage the hypothesis may be any hunch, guess, imaginative idea which becomes the basis for further investigation. Sidhu (2010:62) includes by saying that a hypothesis is therefore a shrewd and intelligent guess, a supposition, inferences, hunch, provisional statement or tentative generalization as to the existence of some fact, conclusion or relationship relative to some phenomenon which serves to explain already known facts in a given area of research for new

truth on the basis of empirical evidence. The hypothesis is put to test for its tenability and for determining its validity.

Types of Research Hypothesis

Basically, there are Null and Alternative Hypotheses. Following Lapin (1980) model, let us explain these hypotheses with the possible effectiveness of using Nwagu Aneke syllabary for teaching rural populace in a mass literacy campaign which in the hypothesis. Here we have two hypotheses:

1. There is no difference in the effectiveness of using Nwagu Aneke Syllabary in rural literacy campaign syllabary in rural literacy campaign and using the Roman alphabet.
2. Nwagu Aneke syllabary is not effective in teaching the rural populace in mass literacy campaign than the Roman alphabet.

The Nwagu Aneke Syllabary will only be classified as effective if it produces more literates from the rural populace. From the above hypothesis, the first one is customarily referred to as the null hypothesis while the second is the alternative hypothesis.

Lapin (1980) states that the null and alternative hypotheses are opposites, when one is true the other is false.

Ugwuja (2004:37) also identifies the broad types of hypothesis.

1. The Null Hypothesis designated by H_0
2. The alternative hypothesis designated by H_1

Stating that we either accept or reject the null hypothesis H_0 if H_0 is accepted then H_1 is untruly rejected. If we reject H_0 then we are saying that there is a statistically significant difference between H_0 and H_1 . Otherwise, they are not statistically significantly different.

In other words the null hypothesis is set up with the hope of either being rejected or accepted. If it is rejected the alternative H_1 becomes the truth and therefore accepted. If, however, the null hypothesis H_0 is accepted, then the alternative is not true and therefore consequently rejected. Ali (1996) identifies inductive hypothesis as against deductive hypothesis. Inductive hypothesis has earlier been mentioned. Coming to deductive hypothesis Ali (1996:29) explained deductive hypothesis thus:

Deductive hypothesis are testable in terms of collecting and analyzing relevant data to support or reject them scientific approach are usually used for doing this.

Ali (1996:29) further classified the deductive hypothesis into Null Hypothesis and alternative hypothesis and observes that alternative hypothesis states that there is a statistically significant difference or relationship between two variables (Black colour absorbs heat differently than white colour) or between individuals of one variable when compared against the second variable (Female Student perform better in phonetics than their male counterparts.) He further observes that there are two forms of alternative hypothesis – directional or one – tailed test of significance. Add to types of hypothesis Nworgu (1991:61)

identifies the statistical hypothesis with null hypothesis and alternative hypothesis as sub classes. He further explains that the null hypothesis, denoted by H_0 implies that "no difference", "no effect" or "no relationship" exists. On the alternative Nworgu (1991) opines that an alternative hypothesis denoted by H_1 is a hypothesis which specifies any of the possible conditions will hold if the null hypothesis does not hold. Nworgu further states that when a null hypothesis is "rejected" or "not confirmed"; then the alternative is upheld or confirmed the alternatives, he also observes are of two kinds non-directional and directional alternative hypothesis.

Sidhu (2010:67) identifies four forms of a hypothesis can assume:

- 1. Null form:** No significant difference will be found between two groups, hence the statement assumes that the two groups will be tested and found to be equal.
- 2. Prediction form:** It is chosen because it allows the researcher to state principles which he actually expects to emerge from the experiment.
- 3. Declarative form:** It generally states a relationship between variables concerned.
- 4. Question form:** The hypothesis is stated as a probing question.

Further he observes that there are two forms of the alternative hypothesis – directional or one-tailed test of significance. It is called directional hypothesis or one-tailed test of significance because the hypothesis tells one not only that there is a difference but also the direction of the difference of. A is better than B, C is higher than D, Y who are taught by C perform better than Y who are not taught by C perform better than are taught by C perform better than Y who are not taught by C. Hence, directional hypothesis will tell you that A is better than B, C is better than D, Y taught by C is better than Y not taught by C. The second form of alternative hypothesis is the non-directional hypothesis or the two-tailed test of significance. This accepts or indicates there exist a level of difference or relationship exists but does not indicate in which direction. For instances, A and B are not equal, land D are not equal. There is a difference in the performance of Y taught by C and the performance of Y not taught by C. Again, there is a difference in the performance of students taught by female teachers and students not taught by female students. Ali (1996) gives us a better distinction between directional and non-directional and null hypotheses. Following his guide, we shall formulate hypotheses on the performance of students in phonetics.

Directional

Secondary school students who are taught Oral English by female teachers perform better in school certificate examinations than their counterparts taught by male teachers.

Non Directional

There is significant difference in the Oral English performance of secondary students in school certificate examinations taught by female students and their counterparts taught by male teachers.

Null

There is no significant difference in school certificate Oral English performance between secondary students taught by female teachers and their counterparts taught by male teachers. The null hypothesis in a way forecloses testing in other words you do not test null hypothesis. Ali (1996) states that testing null hypothesis is not preferred rather alternative directional hypothesis are preferred because according to him, null hypothesis can never be proved. Osuala (2007:61) in explaining null hypothesis opines that there is no true difference between two population means and that the difference found between sample means is, therefore, accidental and unimportant. According to Gall, Gall and Borg (2007), the null hypothesis states that no difference will be found between the descriptive statistics compared in one's research. Siegel (1956) captures the relationship between null hypothesis and alternative hypotheses. The null hypothesis states no difference; it is formulated for the express purpose of being rejected. It is rejected the alternative hypothesis may be accepted. The alternative hypothesis is the operational statement of the experimenter's research hypothesis.

Testing a Research Hypothesis

There are two types of tests for the hypothesis as Identified by Osuala (2007:61). They are the two-tailed and one –tailed tests of significance. He notes that using either of the tests depends on the way in which the null hypothesis is formulated. If the hypothesis states that there is no significant difference between a sample and a population mean, without any further qualification, then a two tailed test is appropriate to use. Whereas, if the hypothesis states that the sample mean does not differ from the population mean in some specified direction, then a one-tailed test is right one to use. Some errors can be committed when testing a hypothesis. According Osuala (2007) in testing hypothesis two types of wrong inferences can be drawn and must be reckoned with by the investigator. These errors are namely Type 1 and Type 11 errors are made when the researcher rejects a null hypothesis by making a difference significant, although no true difference exists. Type 11 errors are made when a researcher accepts a null hypothesis by making a difference not significant when a true significance actually exists.

Importance of Research Hypothesis

It is obvious that the importance of research hypothesis can no be under estimated. Sidhu (2000:62) outlines the importance of research hypothesis thus: It provides direction for research. It sensitizes the investigator to certain aspects of the situation which are relevant from the standpoint of the problem at hand. It is a guide to the thinking process of discovery. It focuses the research. It sensitizes the individual to facts and conditions that might otherwise be overlooked. It places clear and specific goals before us. It serves the function of linking together related facts and information and organizing them into one comprehensive whole. It enables the investigator to understand with greater clarity his problem and its ramification as well as data which bear on it. It serves as framework for drawing conclusions. Ali (1996) observes that hypothesis derive or arise from research problems or research questions. Hence, there is an interrelationship between research

questions and hypothesis, hence, hypothesis and research question are necessary and so are included in a research study mainly because they serve two different but complimentary purposes. Osuala (2007:35) describes the hypothesis as the core of the study that guides the researcher in planning the course of the enquiry, and in choosing the kinds of data needed, and also in deciding the proper statistical treatment and also in examining the results of the study. In his own contributions Osuala (2007:57) says research should proceed from hypothesis because hypothesis serves as powerful beacon that lights the path for the research worker. He listed the advantages of research hypothesis as follows: Hypothesis gives direction to the research to the research and prevents the review of irrelevant literature or the collection of useless or excessive data. It sensitizes the researcher to certain aspects of the situation which are relevant. Hypotheses are not ends to themselves but rather one means by which the investigator can understand with greater clarity his problem and its ramifications.

Originating or Formulating Research Hypothesis

To arrive at testable hypothesis the researcher must have statement of the problem that is sound, clear, and precise and which contains two variables being investigated. Also, there is the need to document through extensive literature, other related hypothesis to determine any trends, patterns, agreements, disagreements, directions of these hypotheses already tested. Ali (1996:28), however, observes that the researcher should bear in mind while formulating his hypothesis that determination from literature reviews is just a guide since the study may not necessarily be identical or similar to the previous studies referred to. Ali (1996) further observes that a hypothesis must have the quality of clarity stating that once a hypothesis is not clearly formulated, it may lead to varying interpretation in data collection and analysis. For instance consider the hypothesis- Eating leads to overweight. Is it eating what class of food that leads to overweight at what quantity and at what rate and time and for what class of eaters, is it for men, women, or children and of what age?

Ali (1996) suggests that in formulating one's hypothesis for research project, there is the need to include two major considerations, these are the test or condition which will provide the data or the basis for comparisons as well as the confidence level at which the hypothesis will be tested. Osuala (2007:34) observes that the hypothesis may or may not be included in a depending on the nature of the problem. They should be used if statistical testing is to be used; stating that these hypotheses may be presented in the form of questions, hence, research questions in answering the relationship between the variables.

In formulating hypotheses, Lapin (1980) notes that the null hypothesis corresponds to the assumption that no change occurs which accounts for the adjective null. Osuala (1996) also opines that in theory a research may have one major hypothesis but in practice it may have some subsidiary hypotheses which bring out the essence of the work with each dealing with a particular problem. These hypotheses come under test as data of the study is being analyzed. Hence, Osuala (1996) encourages the researcher to state each hypothesis separately in order to anticipate the type of analysis required. Furthermore, hypotheses are

normally cast in the form of statements though sometimes, it can appear as a question. Failure to use a hypothesis should not be counted as weakness on the part of the researcher or “a sign of lack of scientific weakness” as Osuala (1996) puts it. The researcher can formulate his research hypothesis based on past experience, review of literature or pilot. Also, Nworgu (1991) asserts that experience; literature, theory, and previous findings are good sources or inspiration for formulating good and quality hypothesis. On the qualities of hypotheses, Nworgu(1991:64) observes that a good hypothesis should be testable, make a statement of an expected relationship between two or more variables and should be plausible based on what is constant with reason, current knowledge and also not ambiguous.

Osuala (2007:57) outlines the qualities of a good research hypothesis thus: A good hypothesis must be based already existing data. A good hypothesis must explain already existing data in simpler terms. A good hypothesis must be testable A good hypothesis must be derived from the problem stated. A good hypothesis must be able to exhaust the problems under investigation. The formulation and use of appropriate hypothesis is very crucial and fundamental to the success or otherwise of any research undertaking. It is pertinent to note that the use of hypothesis may subtly lead the researcher to neglecting or ignoring some important aspects of the findings from his data which are not covered by the hypotheses. Sidhu (2000) summarized the sources of good hypotheses as general culture, scientific theory, personal experience, and analogies. Furthermore, Sidhu (2000) observes that the characteristics of a good hypothesis as follow: A good hypothesis is in agreement with observed facts. A good hypothesis does not conflict with any law of nature which is known to be true. A good hypothesis is an expert. It is stated in a scientific and research language and is not an ordinary statement. A good hypothesis is stated in the simplest possible terms. It also permits the application of deductive reasoning. It is designed in such a way that its test will provide an answer to the original problem which forms the primary purpose of the investigation and it must be stated in the final form easily in the experiment before any attempt at verification is made. It is always at the onset of the research. In framing the hypothesis, the researcher must not currently know the outcome of a test. Researchers weighing up alternative hypothesis, may take into consideration, testability, simplicity, scope, the apparent application of the hypothesis to the multiple cases of the phenomena, fruitfulness, the prospect that a hypothesis may explain further phenomena in future, conservation, the degree of ‘fit’ with existing recognized knowledge systems.(www.wikipediaencyclopedia)

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CONCLUSION

A hypothesis guides and directs the researcher in his study. And we have noted that it derives from the research problems and research questions. Also in some cases we may or may not have research question and hypothesis at the same time depending on the kind of research being undertaken. A hypothesis can be accepted or rejected. If it fails to meet the test of its validity it could be modified or rejected. The confirmation of a hypothesis is temporary. It can be rejected later when subjected to further studies or when further evidence emerges. A hypothesis if confirmed can later become a principle or law. And we can say that hypothesis is a theory in the making. Sound theories come up when many hypotheses have been tried out, modified or modified with scientific facts. It is worth noting that persistence, alertness, critical mind and reasoning are essentials on the part of the researcher in formulating appropriate research hypothesis.

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