

WRITING METHODOLOGY OF RESEARCH

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Abstract

Methodology is key to research, and on the basis of this understanding, stressing proper understanding of it is not an overemphasis. The paper identified areas that students and some other researchers find problem in research as the 'Design of the Study' which includes population, sampling, and the techniques of determining appropriate sample of a study. Statistical Techniques of data analysis like measures of central tendency, measures of relationship were identified as some used in Educational Research. The paper made recommendations which would hopefully improve performances of students and other researchers if they are adopted.

Writing Research Methodology

The question can be asked whether or not there is anything like research methodology. Why spend time on theoretical issues in the name of methodology, while one could go straight into finding the solution to the problem facing his work either in the classroom, educational system or any other system? To this question, there is a very simple answer, namely, we are now living in a scientific age which, among other features, is characterized by the use of a system or systems in doing things.

A system is a well tried out procedure which has proved to be economical in time and space and, above all, satisfying (Nwana, 1981). Research procedure (methodology) is a sequence of activities which, when followed will enable the investigator to achieve his aim.

Purpose Of The Paper

The purpose of this paper includes:

- (i) to identify and discuss the various items covered by methodology of research;
- (ii) to examine the significance of clearly understanding these items;
- (iii) identify problems faced by students in writing research methodology; and
- (iv) making recommendations, where appropriate, for better performance.

Operational Definition Of Terms 1. Research:

- (a) this is the process of finding out the solution to a problem (Nwana, 1981).
- (b) A systematic attempt to find solutions to problems our to provide answer to questions (Veridiano, 1983).

2. Methodology

This term, as used here, simply means a well-defined sequence of activities which, when followed, will enable the research achieve his aim.

3. Research Methodology

This means following a well-defined sequence of activities to fined solutions to problems.

Design of the Study

According to Nwana (1981), design is the term used to described a number of decisions that need to be taken regarding the collection of data. The investigator needs to provide answer to the following questions.

1. Who, or what constitutes the population to be studied?
2. Will every member of the population be studied, or will sample of the population be studied?
3. How would data be collected for the study? and
4. What statistical method would be used to analyse the data?

Population Of The Study

The term population, is generally used to denote total number of large habitations of people in one geographical area, as for example, the population of Nigeria is 88 million (1991 census figures). However, Nwana (1981) says "In research and statistics the term population is used in a more specialized sense to include not just people, but also institutions and things". The term can be taken to mean all members of the target of the study as defined by the aims and objectives of the study. Exemplifying on the research meaning of the term, Nwana (1981) observed:

Thus, for a study of "Drop-outs in Lagos State (1970 - 1975)" the population consists of all pupils registered in schools in Lagos State between the period 1970 - 1975, who left school permanently without completing the course. It does not include pupils within the period 1970 - 1975 in Lagos State who left school either on completion of their courses or on transfer to other schools elsewhere.

The term population used in everyday language, usually carries with it a sense of large magnitude of human beings namely, thousands, tens of thousands, and millions. But in research, population may take various magnitudes from very few, through many, to very numerous.

When to Study the Entire Population

Ideally, it will be best to study every member of the population in an educational research project so that the findings of the study can command respect (Nwana, 1981). However, since ideal conditions are difficult to meet and still there is the desire to obtain results that are appreciable, it will be worthwhile to consider the conditions under which an investigator (researcher) should obtain the ideal, and conditions under which he should aim at the ideal (studying a sample of the population).

The conditions under which the entire population should be studied are generally as follows:

- (a) when the entire size of the population is small.
- (b) When the time available for the project is ample.
- (c) When the resources (human and material) available for the project are adequate.
- (d) When the sole objective of the study is to make a complete count of the population.

When to Study a Sample

Under the following conditions, the researcher should study only a sample of the population.

- (a) when the entire size of the population is large;
- (b) when the time available for the project is limited;
- (c) when the resources (human and material) available for the project are inadequate.

A careful assessment of the limitations enumerated above will reveal that the most prominent is the fact that students and other researchers never seem to have adequate resources to carry out the projects the way they like it, and to the extent they would have hoped to do. They usually do not have enough money to pay for long field trips, buy materials, hire helping hands and pay respondents. On account of these compounding conditions, most student studies are compelled to make use of samples rather than the whole population.

Sample

A sample is a limited number of elements selected from a population to be representative of that population (Sax, 1979). The idea of sampling is to obtain a part of the population from which information of the entire population can be inferred. To be useful the

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If one can observe all instances of a population, one can with confidence base conclusions about the population on these observations (perfect induction). On the other hand, if one observes only some instances of a population, then one can do no more than infer that these observations will be true of the population as a whole (imperfect induction). This is the concept of sampling which involves taking a portion of the population, making observations on this smaller group, and then generalising the findings to the large population.

Ary, et al (1972) further observe "Sampling is indispensable to the researcher. Usually, the time, money, and effort involved do not permit a researcher to study all possible members of a population'. Furthermore, it is generally not necessary to study all possible cases to understand the phenomenon under consideration. Sampling comes to our aid by enabling us to study a portion of the population rather than the entire population.

Sampling Methods

There are various types of sampling (methods of obtaining samples) which include simple random sampling, systematic selection, stratified random sampling, cluster sampling, stratified cluster sampling.

Simple Random Sampling

This is the procedure in which random selection is used in picking samples from beginning to the end. With the population defined, the next thing to do is to list the elements of the population by assigning random numbers to them (Veridiano, 1983). All that one cares to know is that they are all elements. Their characteristics do not matter. This method is preferable with small population because it can be very costly with very large populations.

According to Sax (1979), a sample is selected randomly when every member of the population has an equal, non-zero chance of being included in the sample. This means that no population element has been either deliberately or inadvertently omitted or excluded from the sample except by chance.

Systematic Sampling

This is a system of sampling devised, ensuring that there is no bias in selecting sample membership. According to Veridiano (1983), an example of this is stopping every vehicle that passes on the hour to ask questions on the subject of study.

Stratified Random Sampling

This refers to a method or practice in which the population is divided into two or more subgroups known to possess special features relating to the phenomenon being studied. An example could be simple by grouping the Ramat Polytechnic staff population into senior, intermediate, and junior staff and taking appropriate samples from each of the groups it is called 'stratified' because the entire population has been separated into sections known as strata with each stratum having specific characteristics of interest to the investigator.

Cluster Sampling

Cluster Sampling is adopted where there is a strong reason to believe that the population is already clustered. An example is a study of households in Maiduguri metropolis which will make one go to Bullumkutu ward, Ngomari Ward, Tashan Baga, Gwange ward, among others, and within each of these wards (Clusters) the households are studied.

Stratified Cluster Sampling

In this consideration, the stratification is in terms of clusters, and not elements. For example, one who is interested in carrying out a study of local government councils in Borno State as clusters may stratify them into rich and poor local government areas of the state. Another stratification method could be large and small local government areas.

Here sampling is done with some or certain characteristics represented in the selection.

Size of the Sample

If the researcher has been compelled by circumstances beyond his control to decide on using samples rather than the entire population, the next decision for him is the size of his sample. Nwana (1981) says: "There is no fixed and inviolate rule regarding the size of

Four simple principles which, if operated jointly, can guide the decision on the size of the sample include:

- (1) the larger a sample becomes, the more representative of the population it becomes and so the more reliable and valid the results based on it will become.
- (2) The larger the sample, the more expensive the data collection will be. No matter what the data collection technique (interview, questionnaire, observation, measurement and documentary study) distances have to be covered, time spent, equipment purchased and items consumed. By this principle, the researcher who has problems of raising adequate funds for his project should aim, not at the higher sample percentage (and run the risk of obtaining lower quality data), but at the lower sample percentages (whose collection he can finance).
- (3) A well selected random sample though small, does yield results whose amount of error can be reliably estimated through statistical techniques, and so can be useful, if not more useful, than those of larger samples whose members were not properly randomly selected. By this principle the researcher is advised to exercise a great deal of patience and effort in planning and choosing the members of his sample as well as in the choice of data collecting instruments. If this is done, what seemed to have been lost through studying a low percentage of the population can be regained through higher precision of data collection. Randomization and stratification play a vital role in research design in this regard.
- (4) Some phenomena exhibit a wide degree of variability in the population while others exhibit rather limited degree of variability. Where the phenomenon is known to be quite variable, a higher rather than lower percentage sample of the population will need to be drawn. If, however, the phenomenon is known to exhibit little variability, a low sample percentage drawn from the population will give reasonable reliable and valid results.

For example, there is more variability of heights among an entire primary school than among ten years old population. There is less variability among the opinion of parents regarding fees in educational institutions (greater consensus) than there is in their opinion regarding co-education, comprehensive education or the use of English language as a medium of instruction.

When these four principles have been taken together, the researcher can arrive at a decision regarding how large his sample can be, and can defend such a decision.

Also on sample representativeness, Borg & Gall in Adukwu (1998) assert that for population, up to 1000, 20 per cent; up to 5,000, 10 per cent; and up to 10,000, 5 per cent, were appropriate samples for an educational research.

Similarly, Nwana (1981) observed that there are certain non-definitive practices among social research workers that the beginner can adopt. One such practice suggests that if the population is a few hundreds, a 40% or more sample will suffice; if many hundreds, a 20% sample will do; if a few thousands, a 10% sample will do; and if several thousands, a 5% or less sample will be representative of the population..

Data Collection

Data collection refers to obtaining relevant information regarding the major ideas of the hypothesis or hypotheses of the study for purpose of demonstrating whether they are true or not. Nwana (1981) observes that data should not be collected just for purposes of it, but that each data collected bears direct relationship with the problem under study.

Educational data may be obtained through a variety of techniques which are:

- (a) Interview of persons.
- (b) Filling out questionnaires by persons.
- (c) Observation of things and people.
- (d) Measurement of things and people.

Test Statistics

This refers to the statistical method or methods a researcher would use to analyse data collected. Analysis of data refers to those techniques whereby the investigator extracts from the data information that was not apparently there before, and which would enable a summary description of the subject studies.

The analysis of educational data has borrowed a lot of techniques from statistics (Nwana, 1981). Some of the statistical techniques used in testing educational data include:

- (a) percentage,
- (b) Transformations,
- (c) Measures of central tendency,
- (d) Measures of variability,
- (e) Measures of relationship.

The choice of the test statistics will be determined by the nature of the study.

Problems of Writing Research Methodology by Students

Students, and some teachers to some extent, face varying problems in writing research methodology well. Broadly these are in the area of design of the study. This is a term used to describe a number of decisions which need to be taken regarding collection of data before ever data is collected. The problems include inability to understand:

- (a) meaning of population in research;
- (b) when to study the entire population and when a percentage of the population should be studied;
- (c) sample and relationship between sample and population;
- (d) data collection tools and when to use either of the tools appropriately, and
- (e) appropriate test statistics for a particular study.

Recommendations

Solutions to the problems identified above have been discussed, hopefully appreciably by the paper, and in addition the following recommendations are made:

- (1) Teachers of research methods in various schools where students are expected to write research projects should be specialists in research methods.
- (2) Seminars should be organised regularly for students and lecturers for them to be current on all issues of research.
- (3) Also, institutions should endeavour to sponsor their lecturers to seminars outside their locations, and knowledge and ideas gained from such sponsorships would definitely contribute to education of participants in research studies in such institutions.
- (4) Our libraries are, to some extent, devoid of modern books generally, and particularly in research methods. It will be appreciated, and knowledge enhanced, if modern books in the various areas of study are acquired for the library.

Conclusion

Research methodology is an important, if not the most important, aspect of any research study. This is because it is the design of the study which gives the entire direction of the study as it takes care of items like population, sample of the study, how data would be collected for the study, and the technique of statistics for analysing data.

An area of study, important as it is, deserves to be given adequate attention in handling research studies and practice.

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