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SELECTION OF A QUANTITATIVE RESEARCH DESIGN: A DELICATE TASK

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ABSTRACT

On an exhilarating journey of a research study and with potential process to step in, one can be assured of a long ride through literature to pick up an appropriate research design. This can look like one of the delicate tasks one might have, even though generations have gone through the similar procedure. The accepted opinion is that the more choice, the better; and in the midst of very best kinds, the human ability to deal with, and the aspiration for selection is limitless. Having more choices is necessarily motivating than having fewer. This might also come to terms with the researcher's visualization to make the study more valid and reliable compared to the preceding body of evidences. Better said, than done, it is easy to say that one can or will do something, but is much more difficult to actually do it. It appears, then, that one will face uncertainty and complexity on research journey. As with any activity, a little forethought opens up to down-to-earth chances for accomplishment. When choice is essential, with divine patience, the researcher has to explore various types of research designs.

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INTRODUCTION

What is research?

Anderson (1998) had to say, research is a dynamic activity that travels a long and winding trail from start to finish. It is not a single event; rather the act of doing research is a process. Wellington (2000) had to express, research can involve asking people questions, listening and observing and evaluating resources, schemes, programmes and teaching methods. It can also be messy, frustrating and unpredictable.

What is research design?

Napolean Hill had to recommend, "Plan your work and work your plan". Invariably, an architect prepares a blue print before he approves a construction. Similarly, a researcher has also to set up a plan for a scientific study. This blue print is referred to as the research design. The research design also consists of planned sequence of the entire research process and a series of guidelines to keep one in right path. Essentially, the entire research process is within the conceptual structure of research design. In actual fact, the research designs create the groundwork for the total research effort. It facilitates the chosen task with less trouble and in an organized mode.

Merits of good research design: A good research design provides the following merits to a research study findings:

Objectivity: The result obtained by the research ought to be objective. The quality of being objective means absence of bias, judgment or prejudice. Here, judgment is based on observable phenomena and uninfluenced by emotions or personal prejudices. It is a capacity to assess situations or circumstances sensibly and to draw sound conclusions. Conclusions are based on measurable assessments, supported by additional evidence. When research employs the objectivity concept in its measurement practices, two researchers usually come up with same overall result.

Reliability: In all languages, we apply the word reliable to indicate something is dependable and will perform as expected every time. Reliability is the quality of being trustworthy. It is the degree to which the result of a measurement is accurate

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again and again. A research design is appropriate if it is capable of generating an accurate representation of what is actually 'out there' in world. A test will be reliable when it gives the same repeated result under the similar conditions. If the similar research is carried out again in a similar setting it must give similar result and therefore need to be easily repeatable.

Validity*:* The concept of validity was formulated by Kelly (1927) that a test is valid if it measures what it claims to measure. The Latin meaning of the word "valid" is strong. The strength or validity of a result or a piece of information is whether it can be trusted or believed. Validity is the extent to which a conclusion or measurement is well-founded and corresponds accurately to the world. The validity of a measurement tool is considered to be the degree to which the tool measures what it claims to measure; in this case, the validity is an equivalent to accuracy.

Representativeness: Research is representative if the research sample that is being observed reflects the characteristics of the wider population. Whether a sample is representative thus depends on who is being studied.

Generalization: Generalization means external validity, a marvelous extension of knowledge and findings obtained from a research sample to the population at large. It is a generalized interpretation from a particular observation. The information collected from a specific sample is applied to the large group. In the choice of a study design for an effectiveness research, the clinical condition under study, the setting of the study and the target population must be considered to enhance the external validity of the study.

Criteria of selecting a suitable research design: The reliability and validity of the results depend upon proper selection of the research approach and design. A researcher has to think about several factors pertaining to a suitable study design. It is equally important that one be familiar with key essentials that must be well thought-out while choosing a suitable design. The foremost action is to learn the facts pertaining to the chosen area of research. They are (a) knowledge on the nature of the topic to be explored (b) accessibility to previous evidences and body of knowledge (c) opportunity and access to respondents (d) ease of getting necessary and adequate data (f) availability of manpower, money and time (g) availability of sample if the study involves use of participants (h) extent of organizational support (i) capability, familiarity, skill, technical perceptive and personal situation of the researcher (j) variables that are controllable and uncontrollable including internal and external variables. There are other factors that will also direct the choices about study design. They are (k) number of variables one can collect and interpret (l) number of data collection sessions and a break between sessions needed during the whole study and (m) ethical criteria and behaviours to be valued.

Quantitative research designs: The purpose of a quantitative research design is to meet specific objectives of a research study. It ensures by and large, the accessibility to right type of data and adequate sample size to answer the research questions with statistical significance. Quantitative application centres on numbers to establish relationship between variables scientifically. The reactions, practices and performance of a sample are expressed by quantitative responses (numbers). After that, the numbers are submitted to statistical analysis. The four types primarily speak about the scope for the control of the variables in a research study. The two major categories of quantitative research designs are non experimental and experimental. The non experimental designs are descriptive, analytical and correlational. The three major types of experimental designs are true experimental, quasi experimental designs and pre-experimental.

Non experimental designs

Descriptive designs: The descriptive and analytical designs (subjects in general measured one time) explain information and characteristics of what is being studied. The descriptive designs take in the cross-sectional and longitudinal.

Analytical designs: The analytical designs are retrospective (backward-looking) prospective (likely to happen in the future).

Correlational design: As a general rule, a correlational study is quantitative research. It measures two or more pertinent variables in the same sample and assess a relationship between or among them. It means one group of subjects but two or more variables. The correlational analysis establishes the pattern of scores (co-vary) among the variables and to what degree these variables are interrelated. This means, whether an increase or decrease in one variable corresponds to an increases or decrease in the other variable. While correlational research suggests a relationship between variables, it does not prove that one variable causes a change in another variable.

Experimental research designs: Experimental studies determine the effect of a specific intervention on the outcome. By introducing a specific intervention/treatment to one group and withholding it from another, experimental studies make causal inferences with respect to an independent variable on a dependent variable. By this means, researchers manipulate an independent variable after assigning experimental units to intervention/treatment conditions, as well as holds conditions stable. As well, in an experimental condition, intervention/ treatment is present, and in control or comparison condition the intervention/treatment is absent. Also, the researcher compares obtained scores of both groups. Conclusively, the researcher declares that the independent variable caused some differences in the dependent variable and the experiment also has internal validity. For that reason, when a research question seeks the causes of a relation between variables, use an experimental design. The experimental research designs are further classified into true experimental, quasi experimental and pre-experimental.

True experimental designs: True experimental design tests an intervention/ treatment or a program and observes the difference it makes in intervention group. A control group and a test group are readily available. Individuals are randomly assigned to the two groups. One group gets the treatment (test group) and the other group (control group) does not get the intervention/treatment. True experimental design takes account of three most important features. They are manipulation of the independent variables by the researchers, random assignments of subjects to the groups and the controlled observations. True experimental designs encompass pre-test post-test control group design, post-test only control group design, Solomon four groups design, factorial design, randomized block design and cross over design.

Quasi-experimental designs: Quasi-experiments are in use when there are independent variables that cannot be assigned at random. It means a researcher investigates causal relationships among variables with no random assignment to experimental group. There is a control and test group; existing groups are used as they are and both groups receive both pre and post-test or post-test only. Quasi-experimental designs are very powerful, particularly in settings where true experiments are not feasible. The group of quasi-experimental designs are nonrandomized (non-equivalent) control group design, time series design (interrupted time series design), time series non-equivalent control group design, time series with multiple institution of treatment, time series with intensified treatment, and times series with withdrawn and reinstituted treatment.

Pre-experimental designs: The two common types of pre-experimental research designs are one shot case study and one group pre-test/post-test design.

Article summary:

A sketch for answering a research question and testing the hypothesis is referred to as research design. On the base of research problem and objectives that have been stated, the researcher chooses the research design. Therefore the methodology that will be selected must naturally suit to the nature of research problem. For that reason, the appropriate choice of research approach and design results in the trustworthiness and strength of findings. In conclusion, objectivity, reliability, validity, representativeness and generalizability are fundamental to evaluating the usefulness of research designs.

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