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Review paper

An Overview of the Techniques in Adopting Appropriate Research Designs when Conducting Research Study

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ABSTRACT: This study looked at methods for choosing relevant research designs for various types of studies. The abundance of problems linked with advancement in science and social sciences led to the development of research designs, and this study is necessary to provide an explanation for all of the problems that result from this development. The need to comprehend the nature and manner of those concerns, as well as potential solutions, prompted a number of larger inquests by scholars to address those nagging issues. The necessity to connect the efforts of scientific and social sciences, as well as the tremendous insight of philosophy in problem resolution, resulted in what is now considered as research design, which allows researchers to employ proper research methods. This paper, therefore, examines some basic considerations for adopting appropriate research design and concludes that appropriate research design depends on the nature of research embarked upon by researchers and other factors such as ethics, time and budget and any method chosen has valid contribution to scientific knowledge.

Keywords: Overview**,** research design, technique, adopting

INTRODUCTION

A research design serves as a guide for achieving goals and responding to inquiries. As a result, selecting an effective design process becomes critical to meeting objectives and addressing questions. Choosing a design may be hard under this standard due to the numerous possibilities and the availability of a wide range of methods, techniques, procedures, protocols, and sampling plans. However, by developing a design that incorporates many approaches, researchers can gain more insight than if they used the most common method found in the literature or advised by a disciplinary bias. This simplifies the duty of a researcher since a proper research design provides a better range of viable responses to the subject under consideration. As this paper discussed the role of research design in research, it also demonstrated that by using an appropriate research design, the researcher is expected to understand what research design is; understand the unit analysis of the study; and also understand that planning research design entails understanding all types of research.

Concept of research design

According to Kuthari (2004), a research design is a plan that includes the structure and technique of an inquiry in order to answer research questions and control variation. The general plan that leads researchers in a study is provided by research design. This is viewed as the step-by-step approach or blueprint of what is anticipated of the researcher, beginning with the statement of the study's hypothesis and progressing to its operational implications and data analysis. The conceptual framework is the structural part of the research design, whereas the strategy of the research design focuses on the methodologies to be employed in data collection and analysis. To put it another way, research design demonstrates how the study purpose will be met and how the problem found in the research will be solved. Different approaches to research design have been proposed.

In keeping with the preceding, Trochin (2012) stated that study design is defined as:

- The plan, structure and strategy of investigation conceived so as to obtain answers to research questions.
- An outline of what the researcher will do.
- The strategy for a study as well as the plan by which the strategy is to be carried out.
- The blue print which contains the methods and procedures for the collection, measurement and analysis of data.
- The structure of research or an inquiry and 'glue' which holds all the elements of a research project together.

Biereenu-Nnabugwu (2006) defines research design as more of a formal statement, guide, plan, or blueprint on how to arrive at a solution to an identified research topic, possibly in recognition of the aforementioned principles. He goes on to say that research design allows a researcher to make important decisions about how a study will be done. As a result, research design focuses on the research process and specifies the research effort's choice, pace, and direction. We find two key ways in which study design is relevant with Biereenu-Nnabugwu (2006). On the one hand, it is useful for hypothesis testing because the research design specifies how the hypothesis will be examined, probed, or disputed. On the other hand, it is useful in dealing with practical issues. Study design comprises a broader range of concerns with practical application, with a strong emphasis on experimental research design that includes quantitative or statistical analysis. It is worth noting that not all research in political science and other social sciences must be quantitative or statistical in nature.

Evolution of research design

Horst Rittel, a German scholar who articulated the relationship between science and design, specifically the limitations of design processes based on the 19th century rational view of science, in his courses at Ulm School of Design in Germany from 1953 to 1968, could be traced back to his contributions. Through his seminal design approaches courses in cybernetics, operational analysis, and communication theory, he proposed strategies for dealing with these limits. In 1963, he founded the Design Techniques Group (DMG) and the DMG Journal thanks to his experience as a Berkeley design methods instructor. Graduates of the German Ulm School of Design popularized Horst Rittel's approach to design methodology throughout Europe and the United States in the context of their professional work and teaching, which came to be known as the "Ulm Model," in the late 1950s and early 1960s (Bryman, 2012). Similarly, following the 1962 meeting in England, several of the attendees began to publish and define an area of design study. Three "camps" appeared to arise to combine the original work in Design Method. They are Behaviourism, Reductivism, and Phenomenology.

(1) Behaviourism interpreted Design Methods as a way to describe human behaviour in relation to the built environment. Its clinical approach tended to rely on human behaviour processes (taxonomic activities).
(2) Reductivism broke Design Methods down into small constituent parts. This scientific approach tended to rely on rationalism and objectified processes such as epistemological activities.
(3) Phenomenology approached design methods from an experiential approach (human experience and perception).

The Design Research Society was created in 1967 by several of the attendees from the 1962 Conference on Design Methods. The Society's mission is to encourage "the study of and research into the process of creating in all its many domains." It is an interdisciplinary organization with many professions represented, but all are united in their belief in the benefits of research design (Bryman, 2012).

Basic research designs

In this segment it will suffice to consider some explanations of the concept of research design by some scholars. Igwe (2002) writes that research design is a blue print that leads the researcher to plausible answers to research problems by enabling the researcher to determine how much of the observed variance of the dependent variable can be attributed to the independent variable; and how much can be attributed to other substantive variables, that is, extrinsic effects, and the research design itself, that is, intrinsic effects. While, for Aniche (2009) "a research design is a plan or structure of any aspect of the research procedure" but for Tuckman (1972), research design as "a term used to describe a number of decisions which used to be taken regarding the collection of data before ever data are collected". Consequently, Obasi (1999a) identifies two major types of research design, viz, Survey Research Design and Experimental Design.

Survey research design

This is further subdivided into Descriptive Research and Historical Research; Descriptive Research, according to Obasi (1999b), "is aimed to present a picture of a situation as it naturally occurs." It can be used to justify current

practice, make judgments, and develop theories, whereas Historical Research is concerned with the determination, evaluation, and explanation of past events, primarily for the purpose of gaining a better and clearer understanding of the present and making a reliable prediction of the future.

Experimental research design

The first way is the conventional experiment, which involves manipulating quantifiable, independent variables to obtain statistically analysable data. In general, scientific measurement is based on intervals or ratios (Kothari, 2004). Most people believe that when we talk about' scientific research methods,' we mean that it meets all of the standards of 'real science.' As a result, the researcher is either accepting or rejecting the null hypothesis (Patton, 1990). The outcomes of this research approach are analysed and used for hypothesis testing, with statistics providing a clear and unambiguous picture. This is one of the most difficult research methods, requiring meticulous design and a significant investment, particularly for larger trials. Another issue with this research method, particularly when real-life organisms are involved, is that removing anything from its native environment might have a significant impact on its behaviour. It is frequently said that experimental research is 'too' accurate in some disciplines of research, as well as the greatest waste on time and resources, and is frequently impossible to execute in some fields due to ethical considerations. Different research methodologies must be used in various disciplines of study that do not always have the luxury of defining and quantifiable variables. These should strive to meet all standards of repeatability and falsifiability, while this is not always possible.

Types of research

Research is a systematic inquiry used to describe, explain, predict or control some observed phenomenon - the research topic. Research can be classified into four main forms based on the specific purpose:

Basic research

This research is descriptive in nature and is used to understand and explain a phenomenon. This type of research is often conducted for the sake of increasing and advancing a knowledge base.

Applied research

The purpose of this research is to provide information that can be used and applied in an effort to help people understand and control their environment. This type of research is more prescriptive in nature and seeks to offer potential solutions to problems.

Evaluation research

The purpose of evaluation research is to examine the processes and outcomes associated with a particular solution to a problem. The research may be formative in that it attempts to improve the intervention or solution or it may be summative and attempt to evaluate the effectiveness of solution or programme.

Action research

This research is often conducted within a programme, organization or community and the researchers are involved in gathering data and studying themselves.

Factors to consider in adopting an appropriate research design

There are several important elements to consider when selecting an acceptable study design. Once the research question has been developed, the researcher must select the right research approach to answer the question. The methodology used is usually determined by the sort of research question. The reliability and validity of the results are determined by the study approach and design used. Choosing the appropriate type among the several study methodologies may be difficult. There are numerous aspects to consider. The study topics, ethics, budget, and time are all important concerns in any research design. This happens before looking at the necessary data and researching the appropriate procedures for the specific scientific area. Every experimental design involves compromises and generalizations, which the researcher must attempt to minimize while remaining realistic. Experiments in 'pure' sciences, such as chemistry or astrophysics, are relatively simple to define and are usually strictly quantitative. There may be a wide range of methodologies to pick from in biology, psychology, and social sciences, and a researcher must justify their choice. Although somewhat arbitrary, the easiest way to compare the various strategies is in terms of 'strength' (Rea and Paker, 2014).

Quantitative and qualitative designs

A research problem can be approached in two ways: quantitatively or qualitatively. Quantitative approaches are used to investigate the relationship between variables, with the primary purpose of quantitatively

analysing and representing that relationship through statistical analysis. This is the most prevalent research strategy employed in scientific research challenges. When the purpose of the research topic is to analyse, explain, and characterize a phenomenon, qualitative approaches are used. These methods are commonly employed in social science research problems and are frequently used to explore ideas, beliefs, human behaviours, and other research topics that do not entail analysing the relationship between variables. Once the main method to the research problem has been established, there are numerous research designs for each sort of approach that can be examined (Creswell, 2013).

Choosing a design

Table 1 lists and summarizes the most often used research designs. Other research books may use other terms for similar types of study. The study designs listed in this article, however, are very typical in terms of their application and nomenclature.

Mixed research designs

A mixed research design includes both a quantitative and a qualitative design. If the study involves both quantitative and qualitative designs to answer the problem statement, mixed designs are the ideal solution. Mixed design studies demand substantially more time and money, as well as the researcher developing experience in both qualitative and quantitative analysis methodologies. Numbers, counts, and even descriptive statistics can be used in qualitative research. The use of numbers does not imply that the study must be quantitative or mixed methods.

Opinion based research methods

Opinion-based research approaches, which often involve planning an experiment and gathering quantitative data, are another sort of study design. The measurements for this sort of research are frequently arbitrary, following the ordinal or interval type. In this method, questionnaires are employed, which is an efficient way of quantifying data from a sample group and testing emotions or preferences. Where budget is an issue, this method is incredibly inexpensive and simple, and it adds a scale to opinion and feeling. Although these statistics are arbitrary, they do provide a directional manner of evaluating intensity. Another method of conducting this research is to quantify behaviour, with researchers frequently attaching a 'numerical scale' to the type or intensity of behaviour. Because there is no alternative way to define the variables, this experiment approach must be utilized everywhere emotions or behaviours are measured. Though not as strong as experimental designs, the procedures and outcomes can be repeated and refuted.

Observational research methods

A variety of study techniques are included in observational research, where the goal is to observe a phenomenon without significantly influencing it. The observational research techniques that deviate the most from the accepted scientific method include case studies and other forms of observational research. Many scientists consider this kind of research to be "quasi experimental," yet this is typically an erroneous judgment. Ordinal or nominal scales of measurement are frequently used in observational research. Observational research frequently doesn't have a well stated research problem, and issues can come up as the study is being conducted. In order to examine a group of people without changing their behaviours, observation is widely employed in the social sciences, behavioural studies, and anthropology. Despite the experiment's inability to be repeated or refuted, it nonetheless provides novel insights and advances human understanding. Case studies frequently serve as a stepping stone to more exacting techniques because they get around the issue of an organism's behaviours being affected by the experiment environment. When there is a concern with ethics, observational research techniques are helpful.

Nature of research design

When a researcher has completed the stage of developing research questions and hypotheses, the next step that lies ahead of him is to create a design for the inquiry. There are various stages of operation processes involved in research. A research design is a study plan or an outline of the structure and approach used for a specific enquiry. In order to answer the study questions and hypotheses while also limiting the variance among the variables, the design must be formulated in this fashion. A research design must give the reader the following information as a summary of the entire study: who did what, where it was done, and what the subjects of the investigation are. How was it completed? What is the study's methodology, what results did the control get, and what tools were used to conduct the investigation? An investigator selects a research plan that he believes is appropriate for the situation at hand. Inadequate or poor designs lead to a flawed research activity. A number of fundamental questions must be addressed at the outset when developing a research study. Theological structure of the study inquiry on which the Political Scientist is

Table 1: Types of research designs

Quantitative Designs		Qualitative Designs	
Design	***Focus***	***Design***	***Focus***
Correlational	Explore the relationship between two or more variables through a correlational analysis. The intent is to determine if and to what degree the variables are related. It does not imply one causes the other.	**Case Study And Historical**	Intent is to study and understand a single situation, which could be a leader, a classroom, a process, programme, activity. Collect a variety of material in a specific and bounded time period. This is also used for historical studies, when collecting historical data to understand and learn from the past.
Causal Comparative	Compare two groups with the intent of understanding the reasons or causes for the two groups being different.	**Narrative**	Describe the lives of individual(s) to get meaning from them.
Experimental	Test an idea, treatment, programme to see if it makes a difference. There is a control group and a test group. 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 treatment. There is a pre and post-test for both groups in a traditional experimental design.	**Grounded Theory**	The focus is to develop an understanding of a phenomenon or situation in order to be able to develop a theory/model for items such as factors, a form of interaction, or a process.
Quasi-experimental	It is the same as experiment in that there is a control and test group. However, current groups are used as is rather than randomly assigning people to the two groups. Both groups receive the pre and post- test in a traditional design.	**Phenomenology**	Studies a human experience at an experiential level such as understanding what it means for a woman to lose a child. It is about understanding the essence or meaning of the experience.

Source: Centre for Innovation in Research and Teaching-Grand Canyon University, Arizona (2012).

working. It is the investigation's plan, organization, and technique designed to find answers to researcher questions or problems (Kerlinger, 1986). Thus, research design provides a framework for data collection and analysis based on the researcher's priorities (Bryman, 2001). According to Hakin (2000), "research design is formed at the point where theoretical or policy discussions raise issues that are translated into practical research projects and research programs that provide solutions to these concerns." The researcher employs this technique to notice a behavior that may be interesting, puzzling, overlooked, or difficult to grasp, and then speculates on its possible causes. Naturally, the researcher's training and culture aid in the development of a number of possible answers, but it is the responsibility of all scientists to challenge the majority of explanations for phenomena in their field. Subjecting these explanations to rigorous testing and study is part of their training. The research aims to develop new understanding about the phenomena as well as to apply, test, and enhance ideas to explain its occurrence and operation. Like any scientist, a political scientist must choose between a variety of research methods and strategies when selecting how to study a topic. Which research methodology will offer the best test of the research hypothesis or the greatest solutions to the research questions is the crucial question. In actuality, a number of techniques, including observation, interviewing, and surveys, may be combined. The application of such a mix of methodologies may yield supplementary information that can support the conclusions. Triangulation is the term for this approach of cross-checking data by employing various research techniques (Burham, et al (2004). Making the distinction between qualitative and quantitative research is a further factor in study design. Qualitative research is extremely appealing since it entails gathering detailed information from a limited number of cases. Examples include a thorough examination of a revolution's case study, in-depth interviews with international officials or political figures, or participant observation of a fresh social movement. The focus on in-depth information in qualitative research comes at the expense of the ability to generalize about the phenomenon as a whole. A revolution that has been thoroughly examined cannot be assumed to be representative of other revolutions since it may be wholly unrepresentative. This is also true for participant observation studies or focus groups; statistical analysis would be required to offer data from which generalizations about all such events might be established. This analysis might be based on a survey of all revolutions, or more likely on a random sample of revolutions. According to Omachonu (2017), disciplines that heavily rely on rich, verbal, interpretative qualitative descriptions

rather than on numerical, quantitative, and statistical research methodologies and designs are the fundamental roots of qualitative research approaches. They include sociology, anthropology, history, psychology, and other related fields. However, surveys are costly and frequently only yield a little amount of data. Specific statistical expertise is also needed for survey data analysis. Therefore, the optimum method is one that the researcher is capable of doing and that offers the strongest evidence for testing the study hypotheses. The procedures required to gather the necessary data will be expertly guided by the study questions and hypotheses. Therefore, according to Ackoff (1953), the optimal study design is "the best method that could be used where there is no practical limitation." The aforementioned observation supports the significance of the research topic and hypotheses in the research design as well as the researcher's application of the conversant technique in the research design that provides the likelihood of the best outcome. The choice of a research strategy, whether it be a sample survey, comparative analysis, a case study, or participant observation, is yet another crucial aspect of research design. However, the political scientist must think about what is the most appropriate and logical structure for the research project that is about to begin. Being obliged to use an unsuitable study design would be devastating, regardless of the practical considerations. It is unlikely that a content examination of party documents, for instance, would reveal much about why people joined the party. The best evidence would come from speaking with party members, especially those who had recently joined. According to Ackoff (1953) and Agbeja (2006), it is crucial to employ several data collection techniques so that survey data can be supplemented by observations and in-depth interviews to ensure that the information is accurate and that individuals actually behave as they claim to.

Steps adopted in research design

However, the first function is equally crucial. The researcher must generate research questions, convert them into hypotheses, and organize these in a logical and consistent manner to build a theoretical framework for the investigation. It will be necessary to define key ideas. The goal is to create a logical and transparent structure for the study project. Furthermore, there are a number of practical concerns that must be taken into account while deciding on a study plan. It is quite rare for a researcher to have the luxury of selecting the optimum research design. Typically, the researcher has limited funding and time to conduct the research (Agbeja, 2006). The researcher's research expertise and skills are a crucial practical issue when selecting a research design. Because voting behaviour and opinion polls are essential aspects of the behavioural approach, it is logical for a behavioural political scientist trained in statistical analysis to construct study objectives and research designs conducive to survey research. Similarly, an economist may use mathematical models to evaluate and illuminate research difficulties, but an anthropological may choose participant observation and a historian may be drawn to a project based on documentation analysis. Political science, as a 'junction' discipline, is not identified with a specific research method, hence its practitioners employ a wide range of methods and research strategies. This makes research design even more crucial as a guide for selecting relevant research methods.

Benefits of appropriate research design

Thus, the overall study strategy serves as the framework for the research studies. It includes formulating research questions, defining essential concepts, and establishing hypotheses. Key terms to specify in a project to explain why individuals are drawn to political parties include the party itself and the concept of membership. Pilot interviews could be conducted to develop hypotheses about why people joined the party, such as whether they were drawn in by its policies, literature, friendships with party members, social events, frustration with government failures, or specific incidents that galvanized them into political activity. Thus, research design describes the type of evidence required to answer the research question, test hypotheses, and evaluate concerns that may develop during the investigation. It establishes the research procedures and techniques to be applied. It explains how the study will be conducted and carried out. It should do it in a way that persuades a skeptical audience that the researcher used an adequate approach and provided convincing results. The choice of research design is thus inextricably tied to decisions regarding the best means to collect the evidence required to test the hypothesis and answer the research questions.

Conclusion

In an ideal world, experimental research methods would be employed for all types of study, meeting all falsifiability and generalization requirements. However, because ethics, time, and funding are important considerations to consider when conducting research, any experimental design must make concessions. Adopting an appropriate research design gives a viable choice for achieving research objectives and answering research questions. Though selecting a research design may by complicated because of variegated methods, techniques, procedures, protocols, and sampling plans, but the use of diverse methodologies in research helps to achieve greater insight than following most frequent methods

encountered in the literature. As long as a researcher recognizes and evaluates flaws in the design when choosing from different research methods, any of the scientific research methods are valid contributors to scientific knowledge.

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