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**16|SCI01|041**

**PCS: RESEARCH DESIGN**

**ASSIGNMENT**

**QUESTION**

Kindly read the materials I supplied on research design and any other that better explains the topic and submit a summary of not less than 1000 words on the topic. Ensure that the following issues are covered in your reading and sub-topics

1. What is a research design?
2. What are the important functions of research design?
3. What are the issues to consider when designing research?
4. The theory of causality and the research design
5. What are the various types of research designs
6. Show the differences between quantitative and qualitative study designs  
   • Common study designs in quantitative research and when to use them  
   • Common study design in qualitative research and when to use them  
   • The strengths and weaknesses of different study designs

**WHAT IS A RESEARCH DESIGN?**

The research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring you will effectively address the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data. It is the framework of research methods and techniques chosen by a researcher. The design allows researchers to hone in on research methods that are suitable for the subject matter and set up their studies up for success. Research design specifies objectives, data collection and analysis methods, time, costs, responsibility, probable outcomes and actions.

**The function of a research design is to ensure that the evidence obtained enables you to effectively address the research problem logically and as unambiguously as possible**. In a social sciences research, obtaining information relevant to the research problem generally entails specifying the type of evidence needed to test a theory, to evaluate a program, or to accurately describe and assess meaning related to an observable phenomenon. Also, a research design helps in exploring new fact and truth (about world, technology) learning the relationships that occur between the various phenomena (market, internal) creating theoretical knowledge (then used for innovation and creation of new products).

Unfortunately, many of the challenges we face in research design comes from choosing a topic, to finding study participant etc. Here are some of the insight of research challenges;

1. **CHOOSING A TOPIC:**

Your research topic is the foundation on which everything else rest, so it’s crucial to choose correctly. It is important for researcher to choose the right topic for their project. You can’t do anything else until you figure out the basic focus of your topic. In choosing a good and effective research topic you must consider the following:

* Develop a doable topic: Determine what resources you have available time, money, people and choose a topic that you can do justice.
* Find a theoretical basis to support your topic: The key is having an overarching theoretical context for your results.
* Make sure the topic holds your interest: You’ll be spending at least a year on a research project, so it has to be compelling enough that you’ll go the distance.

1. **FINDING RESEARCH PARTICIPANT**

Once you have your team together, it’s time to conduct your study, and that means finding participants.

* **Leverage the power of a network:** this aims at reaching a target group. With the snowball sampling technique, targeting a particular group, locating advocates within that social network and then asking them to recommend others who might be willing to participate in the study.

1. **DEALING WITH YOUR DATA:**

When you’ve completed your study, the final challenge is knowing how to make sense of the data you’ve collected. In dealing with data you have gathered;

* **Take advantage of technology:** The key thing in qualitative research is looking for patterns, and that’s where having a software program is vital.
* **Account for biases:** In a quantitative study, the researcher needs to address the biases of the individuals completing the survey before the results can be generalized to a larger population. Whereas qualitative work requires researchers to discuss how their bias or interpretation may have played into their conclusions.
* **Let the data drive your presentation:** The data should drive how you present what you’re doing. It’s your job to organize it around the research questions.

Causality is a genetic connection of phenomena through which one thing (the cause) under certain conditions gives rise to, causes something else (the effect). The essence of causality is the generation and determination of one phenomenon by another. Causal research also called ‘Explanatory Research’ is the investigation of cause-and-effect relationships. To determine causality, it is important to observe variation in the variable assumed to cause the change in the other variable(s) and then measure the changes in the other variable(s). In research design, causality is a necessary condition for inference because it stands as a core of enlightenment. It observes the difference between the cause and the effect.

Causality cannot be detected by statistical analysis, thus, we observe that smokers are more likely than non-smokers to suffer from lung cancer. Does smoking thus cause lung cancer? Some researchers have carried out some experiments to illustrate the relationship in causality. For example;

**QUASI EXPERIMENTS**

If events are randomized and if they have effects, then the observed effects must be cause by the randomized event. Unfortunately, that’s not true, Even randomized events have a positive probability to be correlated with a variable that may influence the independent variable. Only infinitely often repeated quasi experiments would undoubtedly allow detecting causal effects.

**MATCHING**

Matching reduces the sample size to include only pairs of observations which are identical in all relevant respects but the treatment. This allows isolating the treatment effect. Unfortunately, we typically do not know what the correct model is. This does not allow us to perfectly isolate the treatment effect. More importantly, all data are noisy and matching procedures often do not eliminate noise. Therefore, the observed effect is the treatment effect plus noise. Even if the treatment effect is estimated rather than measures, bias from the correlation of noise and the treatment persists.

A researcher must have a clear understanding of the various types of research design to select which model to implement for a study. Like research itself, the design of your study can be broadly classified into quantitative and qualitative.

**QUALITATIVE RESEARCH DESIGN:** Qualitative research determines relationships between collected data and observations based on mathematical calculations. Theories related to a naturally existing phenomenon can be proved or disproved using statistical methods. Researchers rely on qualitative research design methods that conclude “why” a particular theory exists along with “what” respondents have to say about it.

**QUANTITATIVE RESEARCH DESIGN: Quantitative research** is for cases where statistical conclusions to collect actionable insights are essential. Numbers provide a better perspective to make critical business decisions. Quantitative research design methods are necessary for the growth of any organization. Insights drawn from hard numerical data and analysis prove to be highly effective when making decisions related to the future of the business.

You can further breakdown the types of research into categories:

**DESCRIPTIVE RESEARCH DESIGN:** In a descriptive design, a researcher is solely interested in describing the situation or case under their research study. It is a theory-based design method which is created by gathering, analysing, and presenting collected data. This allows a researcher to provide insights into the why and how of research. Descriptive design helps others better understand the need for the research.

**EXPERIMENTAL RESEARCH DESIGN: Experimental design** establishes a relationship between the cause and effect of a situation. It is a causal design where one observes the impact caused by the independent variable on the dependent variable. It is a highly practical research design method as it contributes to solving a problem at hand. The independent variables are manipulated to monitor the change it has on the dependent variable. It is often used in social sciences to observe human behaviour by analysing two groups. Researchers can have participants change their actions and study how the people around them react to gain a better understanding of social psychology.

**CORRELATIONAL RESEARCH DESIGN: Correlational research** is a non-experimental research design technique that helps researchers establish a relationship between two closely connected variables. This type of research requires two different groups. There is no assumption while evaluating a relationship between two different variables, and statistical analysis techniques calculate the relationship between them.

**DIAGNOSTIC RESEARCH DESIGN: I**n diagnostic design, the researcher is looking to evaluate the underlying cause of a specific topic or phenomenon. This method helps one learn more about the factors that create troublesome situations. These research has three part of the research; Inception of the issue; diagnosis of the issue and solution of the issue.

**EXPLANATORY RESEARCH DESIGN:** Explanatory design uses a researcher’s ideas and thoughts on a subject to further explore their theories. The research explains unexplored aspects of a subject and details about what, how, and why of research questions.

The basic difference between these two research designs is that qualitative research identifies concepts while quantitative research collect numeric data. i.e. quantitative data can be counted, measured, and expressed using numbers. Qualitative data is descriptive and conceptual. Qualitative data can be categorized based on traits and characteristics.

In qualitative research, study design are used when we don’t know what to expect, to define the problem or develop an approach to the problem. Study designs are conclusive in its purpose, as it tries to quantify a problem and understand how prevalent it is by looking for projectable results to a larger population. For this type of study we collect data through; Surveys, audits, click-streams. It’s also used to go deeper into issues of interest and explore nuances related to the problem at hand. Common data collection methods used in qualitative research are: Focus groups, Dyads, in-depth interviews etc. Also, qualitative research method are used for exploring ideas, designs, or processes which do not require concrete hypotheses or structured, statistically valid feedback. I have found that qualitative methods are particularly useful for serendipitous discovery, and often provide more in-depth insights while quantitative research designs are either descriptive i.e. subjects usually measured once or experimental i.e. subjects measured before and after a treatment. A descriptive study establishes only associations between variables. An experiment establishes causality. You can use quantitative research methods such as A/B testing for validating or choosing a design based on user satisfaction scores, perceived usability measures or task performance. You will find the insight will be more superficial, but the data is statistically valid and can be generalised to the entire user population. The weaknesses of a quantitative research method reveals what and to what extent but often fails to answer more on why and how. This method involves limited number of quants supply and also involves complex disciplines which are hard to master. This type of research requires the model performance to be monitored on constant basis in order to ensure its compliance with the original hypotheses.

Quantitative research method is based on its capacity to give rich information about the respondents, provide in-depth information on individual cases. Also,quantitative research method has proven to be beneficial providing an allowance on the formulation of statistically sound. Again, method is called to be appropriate when there is a need of systematic and standardised comparisons.

Qualitative research method is focused on exploring the issues, understanding the actual problem and enabling oneself to answer all the questions. Qualitative can be beneficial in method majorly focuses on small groups which ultimately do not require more expenses when compared to quantitative research, On the emergence of new developed information and findings, the revision, direction and framework of the data can be done easily quickly. But the weaknesses of a quantitative research method are that data are collected for a small group, due to which assumptions cannot be made beyond the small group of people. Also in this research method, it becomes difficult to demonstrate, maintain and assess the rigidity of the data and the collection of statistical data is not easy and cannot be done solely by using this method.