Types of Quantitative Data

Let's look together at the process that leads to quantitative data analysis, assuming that there are two fundamental concepts necessary to understand data: variables and levels of measurement.

The variables are is any characteristic, number, or quantity that can be measured or counted and they can be independent, that stand on their own and cannot change in relation to other variables (e.g. age, ethnic group, gender); or dependent, which are categories that depend on other factors such as the incidence of waterborne diseases.

The levels of measurement, instead, are levels within which to read the data for appropriate analysis. There are four levels of measurement: nominal (they are names), ordinal (they are rates), interval (they are numbers), and ratio (they are positive numbers). At a basic level, there are two types of quantitative analysis: descriptive and inferential.

Descriptive Analysis

Descriptive analysis is the analysis of a set of data that helps you describe and summarize the data in a meaningful way, making patterns emerge. There are three categories of descriptive statistics.

The first is the frequency measures, which show the number of occurrences of a particular value or values in a data set and can be analyzed using two tools: frequency table, which is a visual representation of the frequency of values in a data set for a group; or cross tabulation tables, which help analyze the frequency of responses according to multiple variables.

The second category are central tendency measures, which calculate the central value of data sets through the mean, median, and mode. They are among the most common ways to analyze frequencies, because they help identify a single value around which a group of data is organized.

The third category are measures of variability, which indicate the spread or variation of values in a data set; they also indicate whether responses are very different from each other on the scale of possible responses, or whether they are clustered in one area.

There are two ways to see variability in the data set: through the range, which is the difference between the lowest and highest value in a data set; or with the standard deviation, which measures how much the responses deviate from the mean. A high standard deviation means that the values in the data set differ a lot from the mean. A low standard deviation means that the values are close to the mean. A zero standard deviation means that all values are equal.

Inferential Analysis

This analysis allows you to use the data to make statistical generalizations about the populations from which the data were drawn. In general, descriptive statistics may be sufficient to meet your analysis needs, but you may also need to know more, such as whether the patterns you see in your sample may be true for the larger population. In this case, we talk about inferential statistics, which are only possible when you have a good random sample that generates high-quality data.

Inferential analysis can help you to compare the significance of the differences between the groups;

to determine if the differences that exist between the subgroups are large enough to be important and examine the significance of the differences between the variables to determine correlation and, potentially, causation. They also help you understand if your activities have contributed to the changes you are seeing.

Now that you have a better idea of how quantitative data analysis works, let-find out what mistakes you might run into while conducting this type of analysis.

Control groups and type of errors

Before moving on to see how qualitative data analysis is structured and works, it is good to dwell on quantitative analysis for a bit longer, to explore the issue of control groups and possible errors that can be made.

Counterfactuals and control groups

One strategy usually used in impact evaluation is to use counterfactuals and control groups. These are evaluations designed to understand the cause-and-effect relationship between your project and the outcomes you see. The control group is a group of people who are not involved in or affected by your project and the counterfactual measures what happens to them. During analysis and interpretation, you compare the results of your project sample to the control group in an attempt to prove causality. Because this strategy requires a lot of planning, one of the problems it runs into is that not all projects have the resources and capacity to design a rigorous impact analysis that includes control groups.

Type of errors

There are two general types of quantitative analysis errors you will be able to encounter: type I error, occurs when someone concludes that the project had an effect on the target population when it did not. This phenomenon is called a false positive. This type of error becomes problematic if you are planning to expand your project on a large and expensive scale. To avoid Type I errors, you should plan for a smaller margin of error and a higher confidence level when selecting the sample from which to collect data.

However, be careful not to set your requirements too high, because it can lead you to type II errors, in which you fail to recognize important factors that make a difference to your population or project implementation. type II errors occur when someone concludes that the project did not have an effect on the target population when in fact it did. It is exactly the opposite of the type I error and is also called a false negative.

Introduction to Qualitative Analysis

There are two methods of data analysis: quantitative and qualitative. In previous module we have explored the first method in depth, now let's go over how the second works.

Qualitative analysis is often called "content analysis" and consists of working with all the notes gathered from the interviews and focus group discussions to identify what key themes emerge. This method requires multiple reviews of the data (the content) to make it more manageable and reliable, through the generation of themes that are then used for analysis. The advantage of conducting qualitative data reviews using a participatory process is that involving multiple stakeholders increases the quality of the data review and reduces the risk of bias by including multiple perspectives.

Organizing Raw Data

To begin a qualitative analysis, you start by organizing the raw data, which can take many forms, from interview recordings to focus group documents. After organizing the data you can begin the analysis process which consists of: coding data, a code is a category label that identifies an event, opinion or idea. The coding process helps reduce the large amount of qualitative data into manageable units.

To do this, first read all of the transcripts at least once to get a sense of the entire package and take notes on the themes you see emerging. Next, reread the transcripts and add codes based on the themes you have identified. The codes should be descriptive enough for people to understand the meaning, but not so long that they become difficult to manage. While doing this, pay attention to the difference between deductive coding, which is an approach in which codes are developed first (often derived from PMP indicators) and applied to the data during the review; and inductive coding, in which codes are developed as the data are reviewed, using specific words used by the participants themselves. This type of coding creates codes based on themes that emerge from participants' experiences. Actually, it's recommended to use both methods, because deductive coding helps you organize your codes and your analysis, while inductive coding helps you identify new ideas.

The second step in conducting a quantitative analysis is to index the data. This consists of labeling the content of the transcripts using the codes from the previous step, and organizing them into an index. You often use indexing to match the relevant concepts and citations to the codes you have identified, and to find the different concepts and citations related to the codes in your transcripts more quickly.

The final step is to frame the data (framework approach), that is, to put the qualitative data you are working with into a form that can be understood, organizing it according to the categories that are useful to you. The structure of the matrix will differ depending on the type of data collection you are doing. Using a matrix helps you visualize and interpret qualitative data, allowing you to arrive to meaningful conclusions. The qualitative analysis matrix is also a valuable tool to support your conclusions when showing them to stakeholders.

Use a Participatory Approach

It should be noted that qualitative analysis is more flexible than quantitative analysis. In fact, you can use and modify the process described above to fit your context and analysis needs.But remember, no matter what type of process you decide to use, you will need to incorporate a wide variety of perspectives into your analysis. Many experts recommend doing the analysis as a participatory workshop in which you involve multiple stakeholders. But remember, no matter what type of process you decide to use, you will need to incorporate a wide variety of perspectives into your analysis. Most experts recommend conducting the analysis in the form of a participatory workshop in which a variety of stakeholders are involved.

If you are interested in knowing more about project writing and evaluation, and would like to have the assistance of professionals, you can email us at ssr@signis.net. At SIGNIS Services Rome we are experts in the sector and have been involved in project writing for the creation and development of communications projects all over the world for decades.

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