**Introduction :**

In the realm of research and data analysis, the concepts of sample and sampling are fundamental to the process of drawing insights from larger populations. Understanding these concepts is crucial for the validity and reliability of research findings. A 'sample' refers to a subset of individuals or observations selected from a broader population, while 'sampling' denotes the process through which this subset is chosen. the concepts of sample and sampling are integral to the design and execution of research. A well-defined sample, chosen through rigorous sampling techniques, enhances the credibility of research findings and fosters a deeper understanding of the population being studied. By ensuring that samples are representative, researchers can draw more reliable conclusions that contribute to the body of knowledge in their respective fields.

**Concept of Sample**: A sample is a subset of individuals or units selected from a larger population for the purpose of a research study. The aim is to draw conclusions or make inferences about the entire population based on observations made from the sample.

**Example of Sample**: Imagine a researcher wants to study the level of job satisfaction among employees in a large company with 5,000 workers. Instead of surveying all 5,000 employees (the population), the researcher selects 300 employees as a sample. The data collected from these 300 employees can provide insights into the overall job satisfaction in the company.

Different Scholars have defined sample from different aspects. These are given below:

"A sample as the name implies is the smaller representation of a larger whole" Goode and Hatt

According to P.V. Young "A statistical sample is a miniature picture or cross-section of the entire group or aggregate from which the sample is taken."

According to William J. Goode and Patk Hutt, “A sample, as the name implies is a smaller representation of a large whole”

Therefore, A sample is a condensed, controllable representation of a larger group. It is a subgroup of people with traits from a wider population. When the population size is too large for the test to include all potential participants or observations, samples are utilized in statistical testing.

**Concept of Sampling :** Sampling refers to the process of selecting a sample from a population. It involves using various techniques to ensure that the sample is representative of the population, reducing bias and enhancing the accuracy of the findings.

**Example of Sampling:** In the same company, if the researcher uses random sampling, they might randomly select 300 employees from the company's employee database, ensuring every employee has an equal chance of being selected. If they use stratified sampling, they might divide the employees into groups based on departments (e.g., marketing, finance, HR) and then select a proportional number of employees from each department to ensure representation across different areas.

Different Scholars have defined sampling from different aspects. These are given below:

According to S.P. Gupta and M.P. Gupta, “ Sampling is only a tool which help to know the characteristics of the Universe or population by examining only a small Part of it”

G.R. Adams and J.D. Schvaneveld said in their book Understanding Research Methods (1985), “sampling is a process where by one makes estimates or generalization about a population based on information contained in a portion(a sample) of the entire population”.

According to Parten, "Sampling method is the process or method of drawing a definite number of individuals, cases or observations from a particular universe, selecting part of a total group for investigation."

Therefore we can say that sampling is taking any portion of a population or universe, representative of that population or universe.

**Enumerate The different methods of sampling in research :** There are two main category of sampling method. These are :

**1.Probability sampling** : **\*simple random sampling \* Systematic sampling \*Stratified sampling \*Cluster sampling \*Multi -Stage sampling**

**2.Non- probability sampling:\* convenience sampling \* Purposive sampling \* Accidental sampling \* Quota sampling \* Snowball sampling**

1. **Probability sampling :** Selection of sample from population based on probability theory is called probability sampling. That is, the sampling process in which each unit included in the whole has an equal chance and probability of being selected as a sample or included in the sample is called probability sampling. Here every unit carries special importance. Through probability sampling, the researcher can compare the data obtained with the help of the sample and the results of the population. The key to probability sampling is random selection.

**\*Simple random sampling :** A **simple random sample** is a randomly selected subset of a population. In this sampling method, each member of the population has an exactly equal chance of being selected.

This method is the most straightforward of all **the**[**probability sampling methods**](https://www.scribbr.com/methodology/sampling-methods/#probability-sampling), since it only involves a single random selection and requires little advance knowledge about the population. Because it uses randomization, any research performed on this sample should have high internal and external validity, and be at a lower risk for [research biases](https://www.scribbr.com/faq-category/research-bias/) like [sampling bias](https://www.scribbr.com/research-bias/sampling-bias/) and [selection bias](https://www.scribbr.com/research-bias/selection-bias/).

Example : Suppose we want to select a simple random sample of 200 students from a school. Here, we can assign a number to every student in the school database from 1 to 500 and use a random number generator to select a sample of 200 numbers.

**\*Systematic sampling :** In the systematic sampling method, the items are selected from the target population by selecting the random selection point and selecting the other methods after a fixed sample interval. It is calculated by dividing the total population size by the desired population size.

**Example:** Let's say the total number of students in a class room is 80. The researcher wants to select a sample of 8 students. In this case first a list with serial numbers of 80 students has to be prepared and class range will be 10. In this case, if the first sample unit taken by random selection is 19, then the 29th, 39th, 49th etc. units will be included in the sample in every 10 members according to the class interval. If a list of 8 people is prepared in this way, it will be systematic sampling.

**\*Stratified sampling :** A stratified sampling method is considered when the elements of the population are not homogeneous or possess different characteristics. In a stratified sampling method, the total population is divided into smaller groups to complete the sampling process. The small group is formed based on a few characteristics in the population. After separating the population into a smaller group, the statisticians randomly select the sample.

**\*Cluster sampling :** the clustered sampling method, the cluster or group of people are formed from the population set. The group has similar significatory characteristics. Also, they have an equal chance of being a part of the sample. This method uses simple random sampling for the cluster of population.

**Example:** An educational institution has ten branches across the country with almost the number of students. If we want to collect some data regarding facilities and other things, we can’t travel to every unit to collect the required data. Hence, we can use random sampling to select three or four branches as clusters.

**\*Multi-Stage Sampling:** The sampling method in which the sample is selected by following several stages is called multi-stage sampling. In this method the sample is selected once in the first step and then the sample is selected again in the second step.

**For example**, suppose a sample of 1,500 couples is to be selected to carry out a study on the use of family planning materials in Bangladesh. In this case, in the first step, 30 villages from 6 districts of 6 districts should be selected through random selection. Finally, a sample of 1,500 couples is to be selected with 50 couples per village.

**2.Non- probability sampling :** The non-probability sampling method is a technique in which the researcher selects the sample based on subjective judgment rather than the random selection. In this method, not all the members of the population have a chance to participate in the study.

**\*Convenience sampling :** In a convenience sampling method, the samples are selected from the population directly because they are conveniently available for the researcher. The samples are easy to select, and the researcher did not choose the sample that outlines the entire population.

**Example:** In researching customer support services in a particular region, we ask your few customers to complete a survey on the products after the purchase. This is a convenient way to collect data. Still, as we only surveyed customers taking the same product. At the same time, the sample is not representative of all the customers in that area.

**\*Purposive sampling :** In purposive sampling, the samples are selected only based on the researcher’s knowledge. As their knowledge is instrumental in creating the samples, there are the chances of obtaining highly accurate answers with a minimum marginal error. It is also known as judgmental sampling or authoritative sampling.  
**Example :** 11 out of 30 trained players of Bangladesh cricket team is possible through this sampling in the selection process and it will give accurate results..

**\*Accidental sampling :** The method in which a researcher does not collect the sample according to any particular rule but instead selects the sample by including whoever is immediately available in the sample is called random sampling. The process continues until a certain volume is reached.

**\*Quota sampling :** In the quota sampling method, the researcher forms a sample that involves the individuals to represent the population based on specific traits or qualities. The researcher chooses the sample subsets that bring the useful collection of data that generalizes the entire population.

**Example :** There are one crore people in Dhaka city, who can be categorized on the basis of characteristics such as rich-poor, educated-uneducated etc. As a result, different types of people can be sampled from different quotas.

**\*Snowball sampling :** Snowball sampling is also known as a chain-referral sampling technique. In this method, the samples have traits that are difficult to find. So, each identified member of a population is asked to find the other sampling units. Those sampling units also belong to the same targeted population.

**Conclusion :**

In conclusion, a sample is a subset of a population that is used to represent the characteristics of the entire population. Sampling is essential in research and data analysis to make inferences about a population based on a smaller group of individuals. There are different types of sampling, such as probability sampling, non-probability sampling, and others, each with its own advantages and disadvantages. Choosing the right sampling method depends on the research question, budget, and resources is important. Furthermore, the sample size plays a crucial role in the accuracy and generalizability of the findings. This article has provided a comprehensive overview of the definition, types, formula, and examples of sampling. By understanding the different types of sampling and the formulas used to calculate sample size, researchers and analysts can make more informed decisions when conducting research and data unit of analysis.