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Samples and Surveys

Unit 12 Lesson 5

Students will be able to:

Understand the concept of sampling and survey and compute for a sample size of a population

Key Vocabulary:

- Data
- Sample
- Population
- Sampling method
- Quantitative
- Qualitative



Sample and Survey

The **population** is the totality of object, individuals, or reaction with common observable characteristics. Examples are total number of students studying in a public high school, Number of viewers of a certain show, number of registered voters and many more

Sample and Survey

The **sampling method** is a method of getting a small representative from a given population.

The **sample** is an infinite number of objects chosen from the population using sampling method. This is use to make inferences as reflection of the whole population where it drawn.

Data

Qualitative Data are categorical data, which take the form of categories or attributes. Examples of this data are gender (male or female), color and status of person (single, married etc.). When the data is numeric, we call this quantitative, which can be discrete or continuous data.

Quantitative Data or numerical data are obtained from measurements. Examples are test scores, age, weight, height, temperature, IQ and other measurable quantities.

Sample Problem 1. Identify whether the following data is qualitative or quantitative.

1. Scores in the exam.

Quantitative

2. Height of the students.

Quantitative

3. Educational attainment.

Qualitative

4. Civil Status.

Qualitative

Methods of Collecting Data

The direct interview method. This is the method of person-person exchange between the interviewer and the interviewee.

The indirect questionnaire method. In this method written responses are given to prepared questions. A questionnaire is a list of study, that can be mailed or hand carried.

Methods of Collecting Data

The registration method. This method of gathering information is enforced by certain laws. Examples are registration of birth, deaths, motor vehicle, marriages and licenses.

The observation method. In this method the investigator observes the behavior of persons or organizations and their outcomes. The methods makes possible the recording and behavior at the appropriate time and place.

Methods of Collecting Data

The experiment method. This method is used when the objective is to determine the cause and effect relationship of certain phenomena under controlled conditions. Science research usually uses the experiment method.

Sample Problem 2. Select the appropriate method of collecting data for the following problem.

6. Performance of a bank.

Indirect Interview

7. Activity of a virus newly discovered.

Experiment Method

8. Documentary in the attitude of a person with mental disorder.

Observation Method

Planning the Study

1. Make an estimation of the number of items in the population.
2. Assess resources such as the time and money factors which are available to pursue the research.
3. Determine the sample size by the use of Slovin's Formula.

$$n = \frac{N}{1 + Ne^2}$$

Where

N = the population

n = the sample of the population

e = margin of error

Sampling Technique

Simple random - A random sample from whole population. Examples are lottery and raffle.

Advantages: Highly representative if all subjects participate; the ideal.

Disadvantages: Not possible without complete list of population members; potentially uneconomical to achieve; can be disruptive to isolate members from a group; time-scale may be too long, data/sample could change.

Sampling Technique

Stratified random – A Random sample from identifiable groups (strata), subgroups, etc. Can be use for city wide survey.

Advantages: Can ensure that specific groups are represented, even proportionally, in the sample(s) (e.g., by gender), by selecting individuals from strata list.

Disadvantages: More complex, requires greater effort than simple random; strata must be carefully defined.

Sampling Technique

Cluster - Random samples of successive clusters of subjects (e.g., by institution) until small groups are chosen as units. Can be use for nationwide survey.

Advantages: Possible to select randomly when no single list of population members exists, but local lists do; data collected on groups may avoid introduction of confounding by isolating members.

Disadvantages: Clusters in a level must be equivalent and some natural ones are not for essential characteristics (e.g., geographic: numbers equal, but unemployment rates differ).

Sampling Technique

Purposive - Hand-pick subjects on the basis of specific characteristics. Advantages: Ensures balance of group sizes when multiple groups are to be selected.

Disadvantages: Samples are not easily defensible as being representative of populations due to potential subjectivity of researcher.

Sampling Technique

Quota -Select individuals as they come to fill a quota by characteristics proportional to populations.

Advantages: Ensures selection of adequate numbers of subjects with appropriate characteristics.

Disadvantages: Not possible to prove that the sample is representative of designated population.

Sampling Technique

Convenient - Either asking for volunteers, or the consequence of not all those selected finally participating, or a set of subjects who just happen to be available.

Advantages: Inexpensive way of ensuring sufficient numbers of a study.

Disadvantages: Can be highly unrepresentative.

Sample Problem 3. Select the most appropriate sampling methods for the following method.

9. Number of students to enter a certain course.

Quota Sampling

10. Female students in a certain public school.

Stratified Random Sampling

11. Regular costumer in a salon

Purposive

Sample Problem 4. Calculate the sample size of the population below.

10. A researcher wants to know the average income of the families living in Town A which has 2500 residents. Calculate the sample size the researcher will need if a 5% margin of error is allowed.

Given: $N = 2500$, $e = 0.05$

Solution:

$$n = \frac{2500}{1 + 2500(0.05)^2} = 344.8 \approx 345 \text{ families}$$

Sample Problem 4. Calculate the sample size of the population below.

11. Suppose a researcher wants to determine the average income of the families in town B having a population of 3,000 families, distributed in five clusters. The population of each cluster as follows: Cluster 1- 800, cluster 2- 400, cluster 3 - 500, cluster 4 - 600 and cluster 5 - 700.

Solution:

$$n = \frac{3000}{1 + 3000(0.05)^2} = 353$$

Sample Problem 4. Calculate the sample size of the population below.

Solution:

$$n = \frac{3000}{1 + 3000(0.05)^2} = 353$$

Cluster	Population	Percentage	N
1	800	27%	0.27(353) = 95
2	400	13%	0.13(353) = 46
3	500	17%	0.17(353) = 60
4	600	20%	0.20(353) = 71
5	700	23%	0.23(353) = 81
Total	3000	100%	353