2.2 – Characteristics of Data

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Part 1: Population vs. Sample

Data are any collection of numbers, characters, images, or other items that provide information about something.

The entire group of individuals that we want information about is called the population.

A census is an attempt to gather information about every individual member of the population. Problems with census—costs; time needed to complete; sometimes testing can destroy items.

A sample is a part of the population that we actually examine in order to gather information.

Note: It usually isn't practical to collect data from the entire population; instead you should take a representative sample and study it.

Example 1: Determine the population of each of the following questions

a) Whom will you plan to vote for in the next Ontario election

All legal voters in Ontario

b) What is your favourite brand of hockey stick?

All hockey players

c) Do women prefer to wear ordinary glasses or contact lenses?

All women who where glasses and/or contacts

Once you have identified the population, you need to decide how you will obtain your data. If the population is small, it may be possible to survey the entire group (census). For larger populations, you need to use appropriate sampling technique.

We will discuss different sampling techniques next lesson.

Part 2: Types of Studies

Cross Sectional:

a study that considers individuals from different groups at the same time

(specific time frame, range of people)

Longitudinal:

a study that considers individuals over a long period of time.

(extended period, small group of people)

Example 2:

For the thesis question:

How do the opinions about the cafeteria change among students from Grade 9 to Grade 12?

a) How could you conduct a cross---sectional study?

Ask students from each grade about their opinions of the cafeteria

b) How could you conduct a longitudinal study?

Interview a selection of grade 9 students and then return to ask them again each year

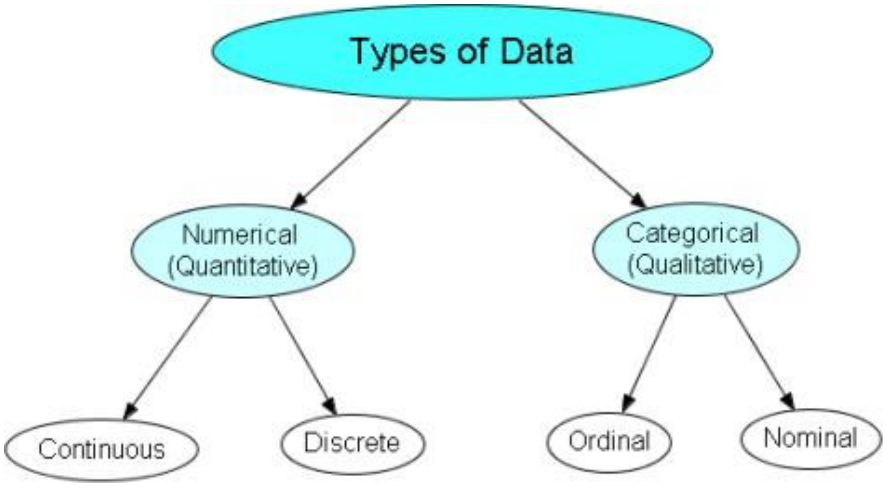
c) Which study would be more time efficient?

Cross---sectional study would be more practical; especially since you won't go to this school next year.

d) Re---write the thesis question to reflect a cross---sectional study

How do the opinions about the cafeteria among a random sample of students in Grades 9 and 12 differ?

Part 3: Types of Variables



Quantitative/Numeric Variable: A quantitative variable that takes numerical values for which it makes sense to find an average. These variables can be either continuous or discrete

Qualitative/Categorical Variable: A variable that places an individual into one of several groups or categories (also known as qualitative variables). Categorical variables may have categories that are naturally ordered (ordinal variables) or have no natural order (nominal variables).

Example 3: Identify whether each of the following questions measures a qualitative or quantitative variable.

a) How tall are you?

QUANTITATIVE

b) What conference are the Leafs in?

QUALITATIVE

c) What colour is your hair?

QUALITATIVE

d) How many students are in this class?

QUANTITATIVE

e) What is your favourite school subject?

QUALITATIVE

Part 4: Types of Quantitative Variables

Continuous Variable: A numeric variable that can have an infinite number of values in a given interval. Measurable with all real numbers.

Examples: temperature, height, weight, speed

Discrete Variable: A numeric variable that can take on only a finite number of values within a given range. (usually measured with integer values only)

Examples: number of dogs, number of goals scored, number of siblings

Example 4: Classify each quantitative variable as either continuous or discrete

a) Temperature outside

CONTINUOUS

b) Number of goals scored by Crosby

DISCRETE

c) Number of songs on your IPod

DISCRETE

d) Speed of Zdeno Chara's slapshot (108.8 mph) https://www.youtube.com/watch?v=vZssDq7lJus

CONTINUOUS