# Basic Concepts of Quantitative Research
Part I

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- The sociological research can be supported by statistical tools to make the research scientific.

- In this power point presentation I will discuss some important basic concepts that can facilitate us in social research.

- The power point is by no way a replacement to text book reading. It is only a means to help students develop a basic understanding of the content. Students must read relevant texts and practice for complete understanding of subject matter.
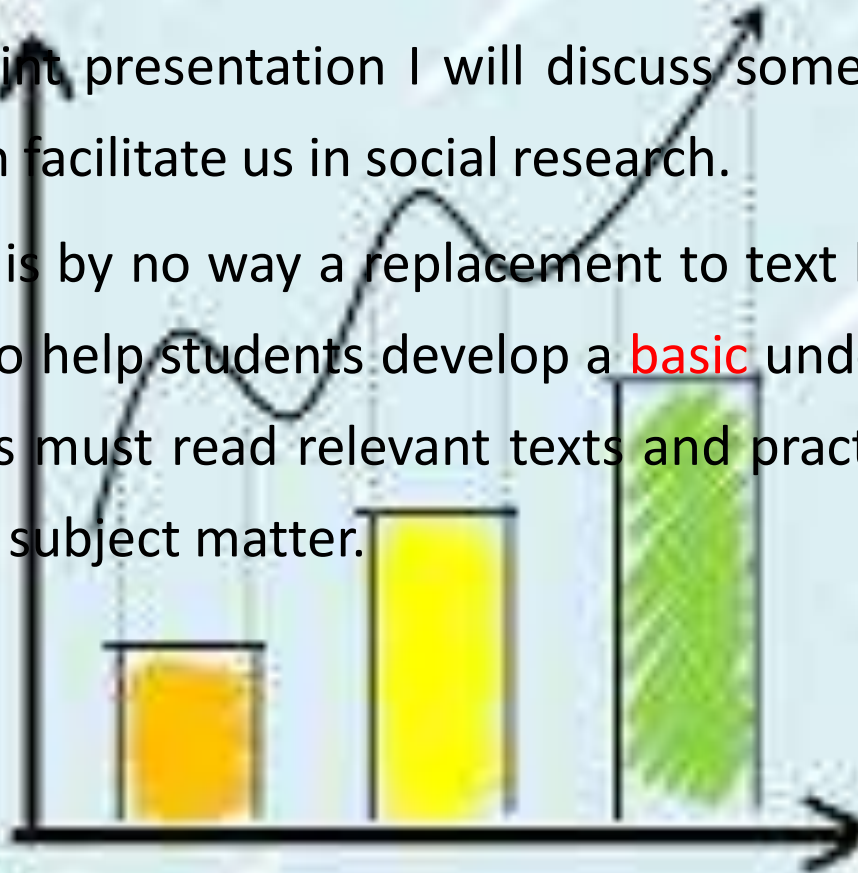
MEAN, MEDIAN, AND MODE

Every data set has a center of the data and spread of the data. Mean, Median and Mode and mid range help calculate the center of the data whereas range is a crude method to analyze spread of data.

MEAN

- OFTEN CALLED 'AVERAGE'
- It is the arithmetic average
- To find the mean of data set: Sum of data divided by total number of piece in data set.
- 4,3,10,2,1
- Mean= **4+3+10+2+1** = **20** = 4
-                          5   5
- **Try one : 12, 10,45,1,15,6**
- **Mean???**

Median

- It is the middle value in the data set.
- Always organize the data in increasing order to find the median
- One large value can skew the mean but median can give better observation of data.
- In case of odd number of data set median is the middle value
- 11,7,9,8,10
- After organizing data in increasing order :
- 7, 8,9,10,11. Median is 9
- Formula can also be used: (Number of data+1) /2 = the position of number that is the median

MEDIAN

- In case of even number of data set, median is calculated by
- Identifying two middle integers in data set
- ❖ 5,4,6,7,1,2.
- ❖ Two middle integers are 6 and 7
- ❖ Next Step: Find the average of the two middle integers i.e. (6+7)/ 2 = 6.5
- Median is 6.5
- Try one: 41,87,54,65,12,4,10
  10,12,56,52,1,20

What is the median for two data set given above????

MODE

- It is the number that appears most number of time in data set.
- 1,2,2,2,5,5,8,9,7 Mode= 2
- 110,12,12,54,54,65,64,89,89
- ❖In this case there are 3 modes : 12,54,89.
- 1,2,3,4 . Mode of this data set is none as no integers repeats itself.
- Try one: 12,45,54,85,21,65,84,12,45.
- Mode???

Range

- It is the measure of spread of data.
- It is the difference between the highest and the lowest value in data set.
- Large spread of data indicates the probability of large difference between individual scores and the calculated mean is not true representative of the data.
- It is useful for closely clustered data.
- The data set should be arranged in ascending order to calculate range.
- Range is assumed to be four times standard deviation.

How to calculate Range

For example the experiments involves weighing the weight of children15 years old.

30,28,25,32,36,40

Step 1: Arrange the values in ascending order.

25,28,30,32.36,40

Step 2: Subtract the highest value from the lowest value:

40-25

Range is 15 kg.

Note: There can be outliers that limit the function of range.

It the weight of one of the child was 78kg this far away from general data value and thus will not give clear picture of mean.

Try one 45,41,56,40,54,56,65,71

Range???

Quartile and Inter Quartile Range

- Quartiles divide the data into four quarters.
- As median breaks the data into half quartile breaks the data into quarters.
- It is the mark from which the data is to be cut.
- It is used to observe the position of the value as compared to entire data. It is like a cut off for a group
- It is a measure of variance.
- It divides the data into lower quartile, median and upper quartile.
- First quartile Q1: the lowest 25% of numbers
- Second quartile Q2 : between 25.1% and 50% (up to the median)
- Third quartile Q3: 51% to 75% (above the median)
- Fourth quartile Q4: the highest 25% of numbers
- Inter quartile Range (IQR)= Q3-Q1

How to calculate quartile

- Arrange the data set in increasing order
- Find the median of the data set.
- 1,2,3,4,5,6,
- Median = 3.5
- First half : 1,2,3
- Find the median of first half : 2
- Second Half:4,5,6
- Median of second half = 5
- ^^In odd number of data set do not include the median while dividing the data in fiirst half and second half.
- Q1= 2
- Q2= 3.5
- Q3=5

Bibliography

- Melinda Miller Holt & Stephen M. Scariano (2009) Mean, Median and Mode from a Decision Perspective, Journal of StatisticsEducation, 17:3, DOI: [10.1080/10691898.2009.11889533](10.1080/10691898.2009.11889533)

- https://www.lboro.ac.uk/media/wwwlboroacuk/content/mlsc/downloads/mean_median_mode.pdf

- https://www.academia.edu/35827812/STATISTICAL_METHODS_FOR_THE_SOCIAL_SCIENCES accessed on 20th April 2020.