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Measures of Central Tendency

Meaning and Definition of Central Tendencies:

The tendencies which are used to briefly express the central tendency of a group are called central tendencies. The central tendency of a group are the representative scores of that group; most of the scores are on either side of these, some are a little less and some are a little more than these. Thus, these scores are such which represent all scores of that group and demonstrate the features of that whole group.

We can define it in the following words: *The central tendency is that representative score of a whole group around which most of the scores in the group are centred.*

Use and Significance of Central Tendencies:

They are used in the field of education for the following purposes

1. To understand the total ability of a group in brief.
2. To find out the central tendency of scores of a group, that is, its common level.
3. To compare the scores of the students of a group.
4. To compare the scores of two or more groups.
5. Its use is very helpful in certain circumstances in the field of research.

Limitations of Central Tendencies:

1. When there is much difference among the scores of a group; for example: 17, 05, 94, 18, 17, 42, 18, 04, 18, 11; then, the scores of the group cannot be comprehended by these properly.
2. They acquaint us with the relative position of a student in a particular group, but not his actual position.

Types of Central Tendencies:

The central tendencies are of three types :

1. Mean,
2. Median,
3. Mode.

Mean:

What is average in arithmetic is Mean in statistics. It clarifies the central tendency of the scores of a group and represents all its scores. The most important feature of this is that the total of the deviations on either side (less and more scores than it) is zero.

Example-

Suppose, in an examination of 50 marks, the scores of 5 students are as follows: 15, 37, 23, 28 and 17.

Calculation:

$$\text{Mean} = (15+37+23+28+17) / 5$$

$$\text{Mean} = 120 / 5$$

$$\text{Mean} = 24$$

Their deviation on keeping the scores in ascending order

Scores	Average Value	Deviation	Total of Deviation
37		+13	
28		+4	
	24		0
23		-1	
17		-7	
15		-9	

Thus, mean can be defined as follows: *Mean is the average value of scores of a group, the deviation of the scores on its both sides is equal.*

Characteristics of Mean:

1. Mean is the average value of scores, it can be easily calculated using mathematical methods.
2. Mean is such a central tendency, the deviation on either side of which is equal.
3. Mean is very sensitive, change in any obtained score of the group can change it, so it is considered to be the real representative of scores of any group.
4. Mean is more reliable than other central tendencies median and mode.

Limitations of Mean:

1. Mean represents the scores of a group only when the distribution of scores is normal.
2. Mean represents the scores of a group only in the condition when the scores are homogenous.
3. It can be used only in that condition when the data are given on interval scale or in the form of scores.
4. In case the value of some scores of a group is too high or too low, the mean does not represent the group correctly.

Utility and Importance of Mean in the Field of Education:

Mean is used the most in the field of education. It is chiefly used:

1. When midpoint of scores of a group is to be known.
- 2- When the scores of a group are to be evaluated according to their value.
- 3- When the scores of two or more groups are to be compared.
- 4- When deviation and coefficient of correlation of the scores have to be calculated.
- 5- When it is needed in educational researches.

Calculating Mean of Unclassified Scores:

You are acquainted with the method of calculating average. The same method is used to calculate mean.

In statistics, the following is the formula : **(Mean) $M = \text{sum of } x / N = \Sigma x / N$**

Where M is the symbol of Mean, indicates total, x indicates scores and N is the number of students.

Example:

The marks obtained by ten students in an examination of 50 marks are 23, 15, 8, 30, 31, 21, 19, 24, 26 and 33 respectively. Find out its mean.

$$\text{Mean} = \Sigma x / N$$

$$\text{Mean} = (23+15+8+30+31+21+19+24+26+33) / 10$$

$$\text{Mean} = 230 / 10$$

$$\text{Mean} = 23$$

Calculating Mean of Classified Scores:

1. Calculating Mean using Long (General) Method:

In a frequency distribution where all the frequencies are greater than one, the mean is calculated by the formula: **Mean = $\Sigma fx / N$**

Where x represents the mid point of the class interval, f its respective frequency, and N the total of all frequencies.

Example:

C. I.	f	x	fx	Solution: Mean = $\Sigma fx / N$ Mean = 2230 / 50 Mean = 44.6
65-69	1	67	67	
60-64	3	62	186	
55-59	4	57	228	
50-54	7	52	364	
45-49	9	47	423	
40-44	11	42	462	
35-39	8	37	296	
30-34	4	32	128	
25-29	2	27	54	
20-24	1	22	22	
	N=50		$\Sigma fx=2230$	

2. Calculating Mean using Short Method:

Mean for the grouped data can be computed easily with the help of the following formula:

$$M = AM + (\Sigma fd / N) \times i$$

where: M = Mean, AM = Assumed Mean, i = Class Interval, N = Total Frequency

f = Respective frequency of the mid-values of the class intervals

d = Deviation from assumed mean class interval

Example: Assumed mean (A)= 42.

C. I.	f	x	d	Solution:
65-69	1	67	+5	$M = AM + (\Sigma fd / N) \times i$ $AM = 42, N = 50, i = 5, \Sigma fd = 26.$ $M = 42 + (26 / 50) \times 5$ $M = 42 + 2.6$ $M = 44.6$
60-64	3	62	+4	
55-59	4	57	+3	
50-54	7	52	+2	
45-49	9	47	+1	
40-44	11	42	0	
35-39	8	37	-1	
30-34	4	32	-2	
25-29	2	27	-3	
20-24	1	22	-4	
	N=50		$\Sigma fd = 26$	

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