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Mode:

Mode is that score in a group which has highest frequencies. For example, look at the following scores:
5, 4, 3, 4, 6, 1, 5, 3, 6.

In them,

Frequency of 5 is 2

Frequency of 4 is 3

Frequency of 3 is 2

Frequency of 6 is 2

And

frequency of 7 is 1.

So the mode of these scores will be 4 because its frequency is highest.

As such, mode can be defined as follows: *"Mode is that score of a group whose frequency is highest among the group's scores."*

Characteristics of Mode:

1. Mode of any given scores of a group can be easily found out, including the abnormal scores.
2. Mode of scores of a group can be found out by graph also. It is that point, the height of which in the frequency curve is tallest.
3. When the value of scores of a group are too high or too low as compared to other scores in the group, even in that situation, mode is not affected.
4. Mode is more useful for qualitative analysis of scores of a group.

Limitations of Mode:

1. When no score is not mode, then two or more scores with high difference come under the category of mode; in such a situation mode is meaningless.
2. Mode is a guessed central tendency, so it is less useful for statistical calculations.

Utility and Importance of Mode in the Field of Education:

Though mode is less reliable than other central tendencies mean or median, yet there are such situations in the field of education when it is used.

1. When central tendency of a group is to be guessed, then mode is used.
2. When maximum likes or achievements of a group are to be found out, then mode is used.
3. When the most talked about value of a group is to be found out, this central tendency is used.
4. When running short of time for calculation of mean or median, then mode is easily found out for help.
5. When hypothesis have to be constructed in the field of educational research, then sometimes mode is used.

Methods of Calculating Mode from Unclassified Scores:

The simplest method to find out mode is to arrange the scores in ascending order from minimum to maximum and then look for the frequencies of scores. The score with highest number of frequencies is the mode.

Example:

10 students got the following scores in an examination of 50 marks. Find out their mode.

41, 11, 17, 18, 8, 17, 24, 37, 18, 17.

Calculation:

On arranging the scores in rank order,

Scores = 8, 11, 17, 17, 17, 18, 18,, 24, 37, 40.

Mode = 17

Note:

Sometimes it may occur that the frequencies of two or more scores are equal, in such a case, the following are the rules for calculating mode:

Case 1. When the frequencies of two nearby scores in a group are equal, the average of these two scores is their mode.

For example:

17, 17, 8, 11, 17, 19, 19, 24, 19, 37.

Calculation:

On arranging the scores in rank order,

8, 11, 17, 17, 17, 19, 19, 19, 24, 37.

$$Mo = (17+ 19) / 2$$

$$Mo = 36 / 2$$

Mo = 18

Case 2. When two scores with highest and equal number of frequency in a group are not near to one another then both are considered to be the modes. Such groups are called **Bi-modal** groups.

For example:

24, 24, 24, 18, 8, 17, 19, 17, 26, 11, 17.

Calculation:

On arranging the scores in rank order,

8, 11, 17, 17, 17, 18, 19, 24, 24, 24, 26.

Mode, Mo= 17 and 24.

Case 3. When there are equal frequencies for several or all scores, then there does not arise any question to calculate mode for the group.

For example:

11, 11, 11, 16, 16, 16, 17, 17, 17, 19, 19, 19, 23, 23, 23, 24, 24, 24.

There is no mode in it.

Calculating Mode of Classified Scores:

When the number of students is high and arranging the scores in rank order is difficult with possibility of error, in such a situation, the frequency distribution table is prepared to calculate the mode. It also has two methods, one for the calculation of guessed mode and other for net mode.

Method of Calculating Guessed Mode:

For calculation of guessed mode, we first prepare the frequency distribution table. Then the mid point of the class with highest number of frequencies is found out. This mid point is the guessed mode of that group.

C. I.	f
90-99	2
80-89	5
70-79	8
60-69	9
50-59	12
40-49	4
30-39	5
20-29	3
10-19	2

Calculation:

Look at the frequency distribution table carefully. The highest frequency of scores is in the class 50-59.

$$\text{Guessed Mode} = (50+59) / 2$$

$$Mo = 109 / 2$$

$$Mo = 54.5$$

Method of Calculating Accurate Mode:

To calculate accurate mode, the following formula is used:

$$Mo = 3Md - 2M$$

We shall complete the above table to calculate the mode:

Frequency Distribution Table

C. I.	f	cf	d	f.d
90-99	2	50	+4	+8
80-89	5	48	+3	+15
70-79	8	43	+2	+16
60-69	9	35	+1	+9
50-59	12	26	0 (AM)	0
40-49	4	14	-1	-4
30-39	5	10	-2	-10
20-29	3	5	-3	-9
10-19	2	2	-4	-8
CI=10	N=50			$\Sigma f.d=17$

Mean,

$$M = A.M. + (\Sigma f.d / N) \times CI$$

$$A.M. = (50+59)/2 = 54.50, \Sigma f.d = 17, N = 50, CI = 10.$$

$$M = 54.50 + (17 / 50) \times 10$$

$$M = 54.50 + (0.34) \times 10$$

$$M = 54.50 + 3.4$$

$$M = 57.90$$

Median,

$$Md = L + \{(N/2 - Fb) / f\} \times Ci$$

$$L = 49.5, N/2 = 50/2 = 25, f = 12, Fb = 14, Ci = 10.$$

$$Md = L + \{(N/2 - Fb) / f\} \times Ci$$

$$Md = 49.5 + \{(25 - 14) / 12\} \times 10$$

$$Md = 49.5 + (11/12) \times 10$$

$$Md = 49.5 + 9.17$$

$$Md = 58.67$$

Mode,

$$Mo = 3Md - 2M$$

$$Mo = 3 \times 58.67 - 2 \times 57.90$$

$$Mo = 176.01 - 115.80$$

$$Mo = 60.21$$

Note:

1. Guessed mode from this frequency distribution was calculated at 54.5, and the accurate mode was calculated at 60.21. Though there is a little difference among the two, yet this difference is sufficient to cause different decisions. As far as possible, we should calculate the accurate mode.
2. When distribution makes almost normal probability curve, then there is a little difference among mean, median and mode. In the above example, mean is 57.9, median is 58.67 and mode is 60.21. There is only a little difference among them.
3. There are separate formulae too for calculation of mode by which mode can be calculated without calculating mean and median.

First Formula:

$$Mo=L+\{(f_1-f_0) / (2f_1-f_0-f_1)\} \times Ci$$

Second Formula:

$$Mo=L+(f_2 / f_0+f_2) \times Ci$$

Where,

L=Accurate lower limit of mode class

f_0 =Frequency of earlier class to mode class

f_1 =Frequency of mode class

f_2 =Frequency of following class to mode class

Example:

C. I.	f
90-99	2
80-89	5
70-79	8
60-69	9
50-59	12
40-49	4
30-39	5
20-29	3
10-19	2
CI=10	N=50

Look at above table, for the frequency distribution table. In it,
 $L=49.5$, $f_0=4$, $f_1=12$, $f_2=9$

Using first formula:

$$Mo = L + \left\{ \frac{(f_1 - f_0)}{(2f_1 - f_0 - f_2)} \right\} \times Ci$$

$$Mo = 49.5 + \left\{ \frac{(12 - 4)}{(2 \times 12 - 4 - 9)} \right\} \times 10$$

$$Mo = 49.5 + (8/11) \times 10$$

$$Mo = 49.5 + 80/11$$

$$Mo = 49.5 + 7.27$$

$$Mo = 56.77$$

Using second formula:

$$Mo = L + \left(\frac{f_2}{f_0 + f_2} \right) \times Ci$$

$$Mo = 49.5 + \left(\frac{9}{4 + 9} \right) \times 10$$

$$Mo = 49.5 + (90/13)$$

$$Mo = 49.5 + 6.92$$

$$Mo = 56.42$$

Reference:

1. Garrett, H.E., Statistics in Psychology and Education, 12th Indian ed., Paragon International Publishers, 5, Ansari Road, Daryaganj, New Delhi - 110002.
2. Mangal, S.K., Statistics in Psychology and Education, 2nd ed., Published by Asoke K. Ghosh, Prentice-Hall of India Private Limited, M-97, New Delhi - 110001.
3. Lal, R.B. and Joshi, S.C., Educational Measurement and Evaluation, 7th ed., Published by Vinay Rakheja % R. Lall Book Depot, Meerut - 250001.

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