COURSE MODULE IN

IT 318-Quantitative Methods

Bachelor of Science in Information Technology

1st Semester S/Y 2020 – 2021

I. Cover Sheet

A.	**MODULE NUMBER**	**: 2. 9**
B.	**MODULE TITLE**	**: Descriptive Statistics: Measures of Central Tendency and Measure of Variability/Dispersion**
C.	**DURATION**	**: Two (2) weeks**
D.	**MODULE PREREQUISITE**	**: Module 2.7**
E.	**INSTRUCTOR**	**: ICHELLE F. BALUIS**

II. Module Objectives (Desired Learning Outcomes)

1. Distinguish between descriptive and inferential statistics.
2. Compute and interpret measures of central location and variability.
3. Analyze data and interpret results provided by statistical software.

III. Vocabulary List

- **Central tendency:** an estimate of the center of a distribution of values. The most usual measures of central tendency are the mean, median, mode.
- **Descriptive statistics:** statistics used to describe the basic features of the data in a study. It provides simple summaries about the sample and the measures.
- **Dispersion:** the spread of the values around the central tendency. Two common measures of dispersion are the range and standard deviation.
- **Mean:** the arithmetic average of all the individual measures. This is done by adding all the values and divide the sum by the number of values.
- **Median:** the midpoint of all the individual measures. The value found at the exact middle of the set of values.
- **Mode:** the point or region within the distribution where the largest number of individual measures congregate. The most frequently occurring value in a set of values.
- **Range:** the highest value minus the lowest value.
- **Standard Deviation:** a measure of how far the individual responses vary or deviate from the mean
- **Variance:** a statistic that describes the variability in the data for a variable. It is the spread of the scores around the mean distribution.
- **Interquartile Range:** the difference between upper and lower quartiles (Q3-Q1)

IV. Learning Plan

ACTIVITY	DURATION (HH:MM)	REMARKS*
Do Pre-Test	00:15	
Study Objective 1,2 ,3, Information Sheet 1: Measure of Central Tendency ; Information Sheet 2: Measure of Variability/Dispersion	03:00	
Do Objective 1,2, 3 and Learning Task M2.2	02:30	
Do Post-Test	00:15	

*Check if accomplished

V. Pre-test

This pre-test will try to assess your knowledge prior to the discussion of the topic.

Instructions are provided for each part of the test.

Item		
Part 1 True or False: Please evaluate the following statement if it expresses a correct thought or not. Please put a check on the column that corresponds to your answer.	**True**	**False**
1. **To compute mean via MS-Excel, we can use the built-in formula MEAN.**		
2. **The most commonly used measure of describing central tendency is Median.**		
3. **MEAN is an appropriate measure for nominal data.**		
4. **Unlike descriptive statistics, inferential statistics demands higher order of critical thinking and mathematical methods.**		
5. **Standard deviation is an appropriate measure for ordinal data.**		
6. **With this given data set: 43,23,45,43,25,56,43,25,43,67. 43 is considered as the mode.**		
7. **With this given data set: 85,87,84,83,90,88,87. 85 is considered as the median.**		
8. **The Mean of the data set: 4. The correct interpretation is: the frequently occurring value from the data set is 4.**		
9. **The simplest and easiest measure of variability is range.**		
10. **Standard deviation provides an indication of how far the individual responses vary or deviate from the Mean.**		

VI. *Information Sheet*

Information Sheet 1: Descriptive Statistics: Measures of Central Tendency

Let us start the discussion by describing first descriptive statistics and differentiate it with inferential statistics.

- ***Descriptive Statistics*** is the statistics used to describe the basic features or characteristics of the data in a study. It just provides simple summaries about the sample and the measures. The three major characteristics of the data or variable that can be described by descriptive statistics are the following:
    - *The distribution*
    - *The central tendency*
    - *The variability/dispersion*
- ***Inferential Statistics*** is the statistical analyses used to reach conclusions that extend beyond the immediate data alone. Unlike descriptive statistics, it demands higher order of critical thinking and mathematical methods. Its main purpose is to draw conclusions or judgements regarding an entire set of observation by using only a small representative of the whole set. We will discuss this further in the succeeding modules.

Going back to descriptive statistics, it was mentioned that this statistics provides simple description or summaries of the three major characteristics of the data or variable namely: distribution; central tendency; variability/dispersion. The ***distribution*** that includes frequency and percentage of sample data set was discussed in advance already in the previous module. So in this module, we will be focusing our discussion with ***central tendency*** and ***variability/dispersion***.

Further, as a researcher, we need to consider also the type of data or variable we are working in terms of level of measurement like nominal, ordinal, interval and ratio on deciding what descriptive statistics to use. If you could still remember, we discussed this in Module 1.4 on what is the difference between this type of variables in terms of level of measurement. The below list shows the recommended descriptive statistics to use for each type of data or variable in terms of level of measurement:

- **Nominal Data:** Mode, Frequencies, and Percentages
- **Ordinal Data:** Frequencies , Percentage, Median and Range
- **Interval:** Frequencies, Percentages, Mean, Median, Mode and Standard Deviation (SD)
- **Ratio:** Frequencies, Percentages, Mean, Median, Mode and Standard Deviation (SD)

Measures of Central Tendency

The measure of central tendency is an estimate of the center of a distribution of values, or in other words, it measures the location where the clustering tends to occur.

There are four important purposes of measures of central tendency:

1. It is a shorthand description of a group of quantitative data obtained from a sample;
2. It is more economical, easier and meaningful to let one figure to stand for a group than to remember all particular numbers in a group;
3. It is descriptive of a sample obtained in a particular group of observation at a particular time in a particular way;
4. It also describes indirectly, but with some accuracy, the population from which the sample is drawn.

Further, there are three most commonly used measures of the central tendency:

- **Mean:** the arithmetic average of all the individual measures wherein it is done by adding all the values and divide the sum by the number of values; the most commonly used methods of describing central tendency.
- **Median:** the midpoint of all the individual measures; the value found at the exact middle of the set of values.
- **Mode:** the point or region within the distribution where the largest number of individual measures congregate; the most frequently occurring value in a set of values.

Mean

To compute the mean, please be guided by the steps below:

- *Computation (Manual)*
  1. *Add all the values;*
  2. *Divide the sum by the number of values.*

  Consider the following interval data (test score in 40 item test of 8 students in Quantitative Methods):

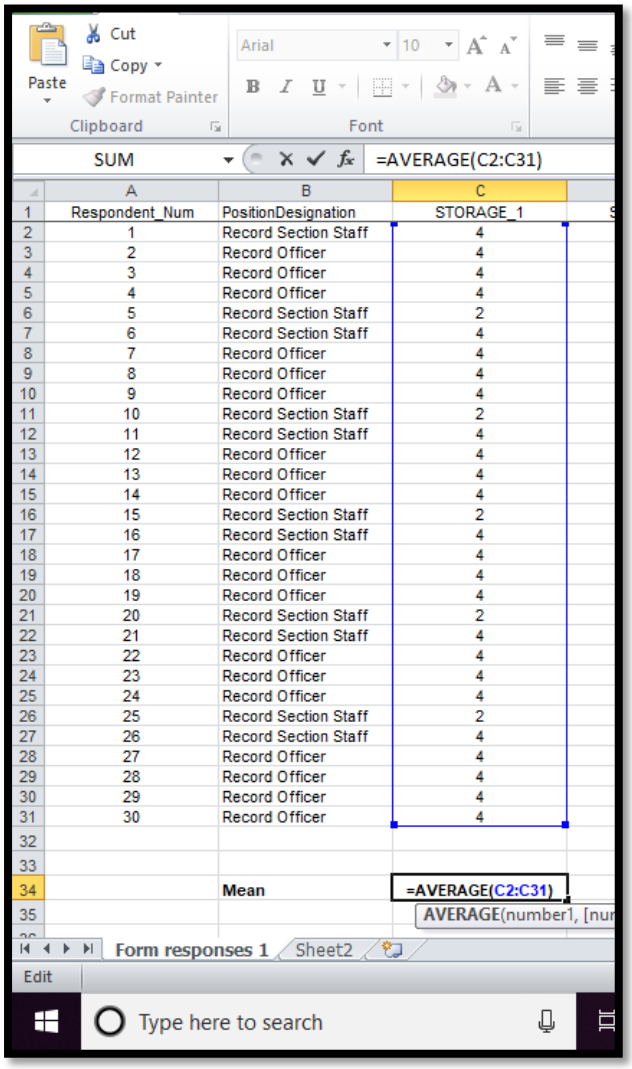
15, 20, 21, 20, 36, 15, 25, 15

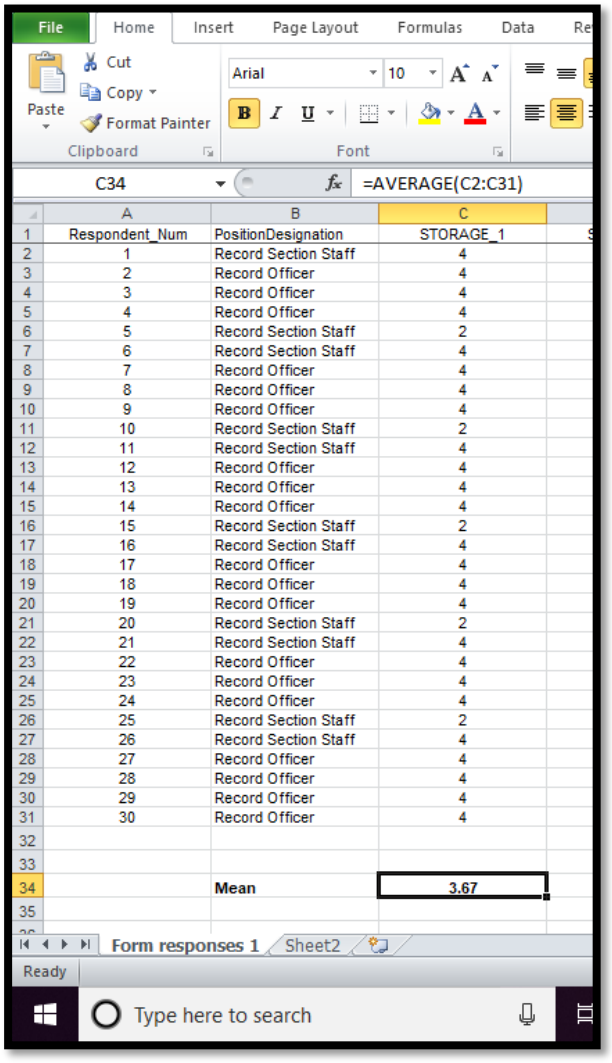
The sum of these eight values is 167, so the mean is 167/8= ***20.88***

Interpretation: On the average, the score of a student in 40 item test in Quantitative Methods is ***20.88***

- *Computation (Excel)*
  1. *Select the cell where you want the computed mean to be displayed.*
  2. *On the selected cell, create a formula (this time we will be using a built-in formula for computation of mean, the AVERAGE). Below is the sample formula:*
     =AVERAGE(C2:C31)

     This means that the computation of mean will start from the data from cell C2 to C31. You can simply highlight the cells that contains the data or values instead of manually inputting the cell range.
  3. *Once the formula is already complete, press Enter key. The mean value will be displayed afterwards. Please see sample that follows:*





The mean value is ***3.67****. How are we going to interpret it? Please take note that STORAGE_1 variable is measured via the scaling* ***1-Not Efficient, 2-Less Efficient, 3-Efficient, 4-Very Efficient.*** So where does 3.67 belong? Our solution is to consider this variable as interval type of variable. When we say interval type of variable, there should be an equal spacing between the scale. How are we going to do it?

1. Subtract the lowest scale from highest scale (4-1).
2. Divide the difference with the number of scaling (3/4).
3. The quotient will now serve as the interval between the scales (0.75)
4. Starting from the lowest scale, add the computed interval up to the highest scale. See sample below:

	Lower limit	Upper limit
3.24 - 4.00	2.50 + 0.75	3.24 + 0.75
2.50 - 3.24	1.75 + 0.75	2.49 + 0.75
1.75 - 2.49	1.0 + 0.75	1.74 + 0.75
1.0 -1.74	start with 1.0	start with 1.74

Having that interval we can say that the following range falls to the following descriptive rating:

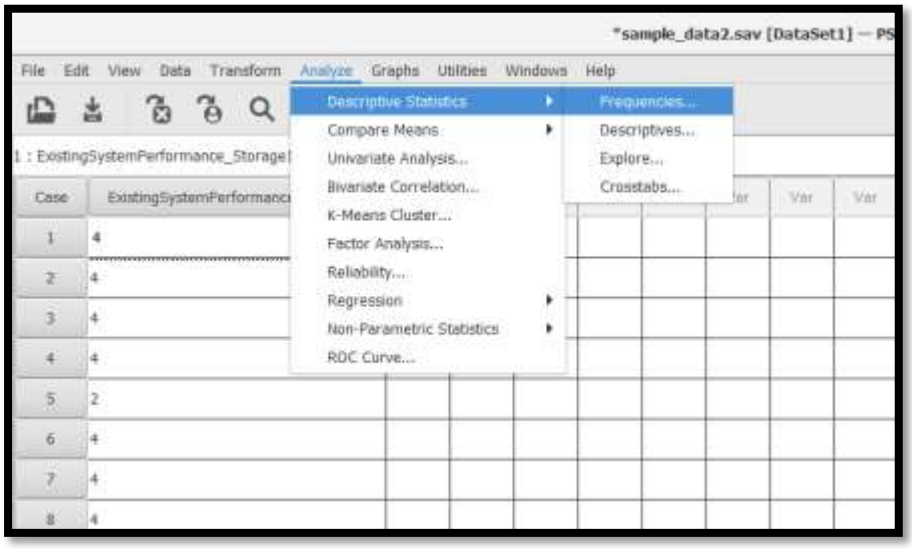
	Descriptive Rating
3.24 - 4.00	Very Efficient
2.50 - 3.24	Efficient
1.75 - 2.49	Less Efficient
1.0 -1.74	Not Efficient

*The computed mean earlier was **3.67**. It lies in what descriptive rating? Can you now interpret the mean we computed earlier?*

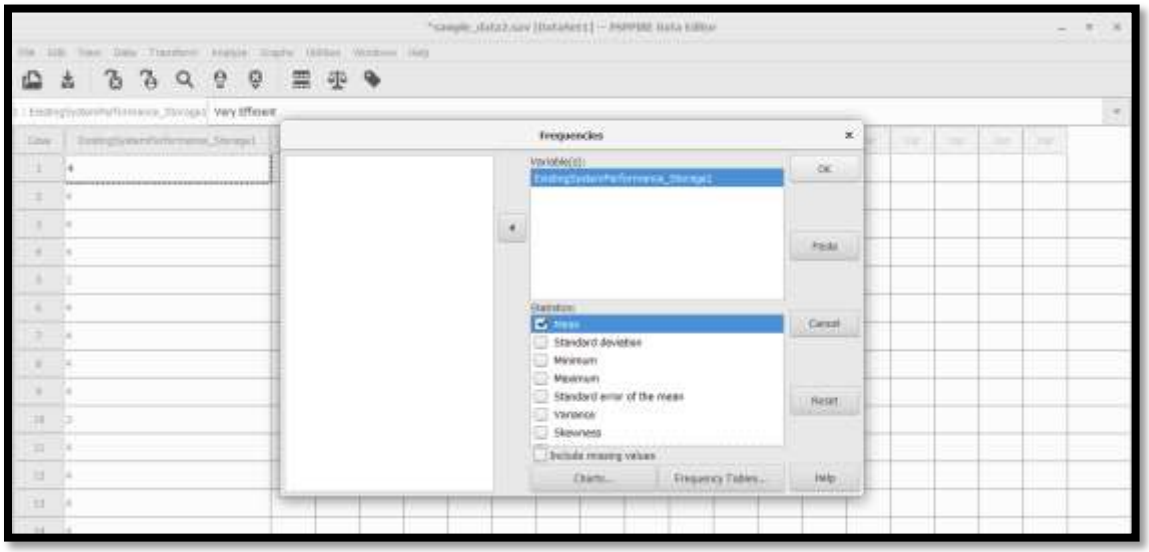
***Interpretation:** On the average, the 30 respondents evaluated the system as **Very Efficient(3.67)** in terms of allowing documents to be backed up on a regular basis to safeguard against loss of information (this pertains to STORAGE_1).*

- *Computation (PSPP)*

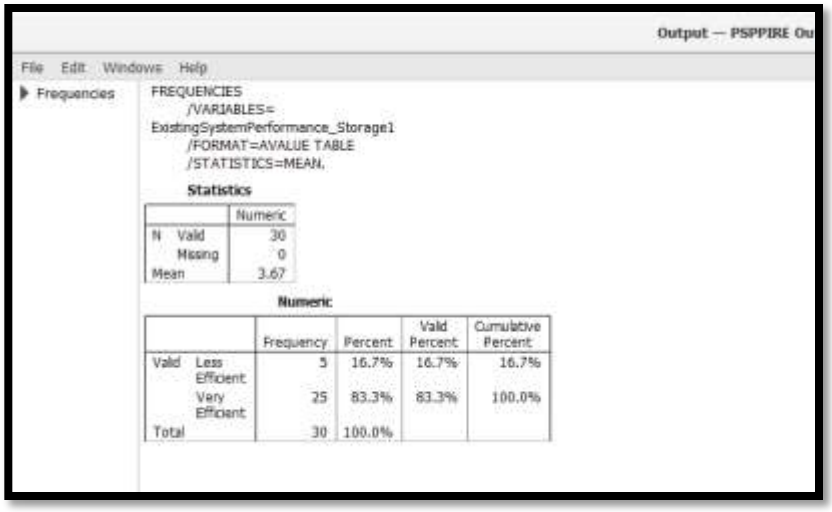
1. *Suppose data are already encoded in the data view. You may now click **Analyze>Descriptive Statistics>Frequencies.***



2. *Select the variable.*
3. *Under **Statistics**, select/check **Mean.** Then click **OK**.*



4. ***Output Viewer*** *will now display the computed mean.*



Median

To compute or determine the median, please be guided with the following steps:

- *Computation (Manual)*
  1. *Arrange the data set either in ascending or descending order.*
  2. *Locate the score in the center of the sample. The rough median is the midpoint wherein it lies 50% above and below it.*

     Consider the following interval data (test score in 40 item test of 8 students in Quantitative Methods):

15, 20, 21, 20, 36, 15, 25, 15

Arranged dataset:

*15, 15, 15, **20, 20**, 21, 25, 36*

*There are eight scores and score number 4 and 5 represent the halfway point. Since both of these scores are 20, **the median is 20**.*

***Interpretation:** At least one-half or 4 out of 8 students got the scores of 20 and above.*

****if the two middle scores had different values, you find the value midway between them to determine the median.*

*15, 15, 15, **20, 21**, 23, 25, 36*

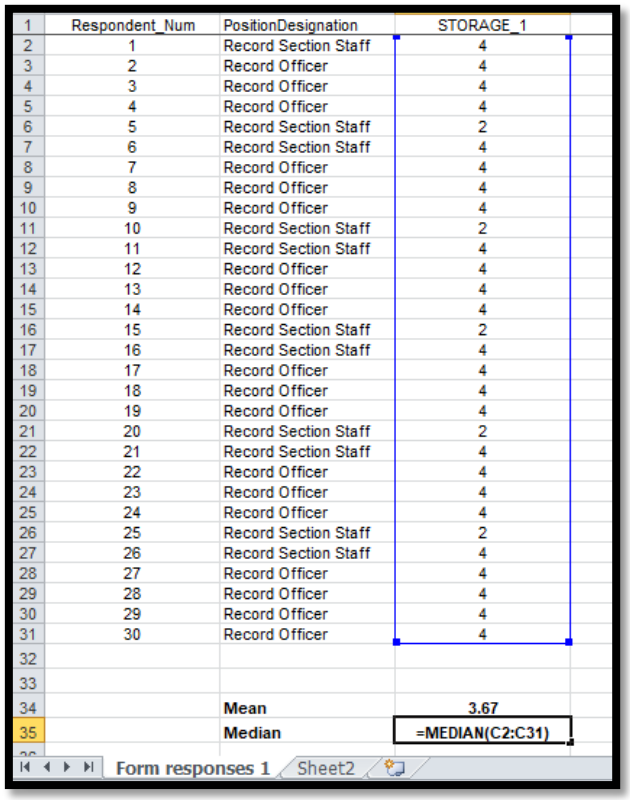
*To find the median: (20+21)/2= **20.5***

- *Computation (Excel)*

1. *Select the cell where you want the computed median to be displayed.*
2. *On the selected cell, create a formula (this time we will be using a built-in formula for computation of median, the MEDIAN). Below is the sample formula:*

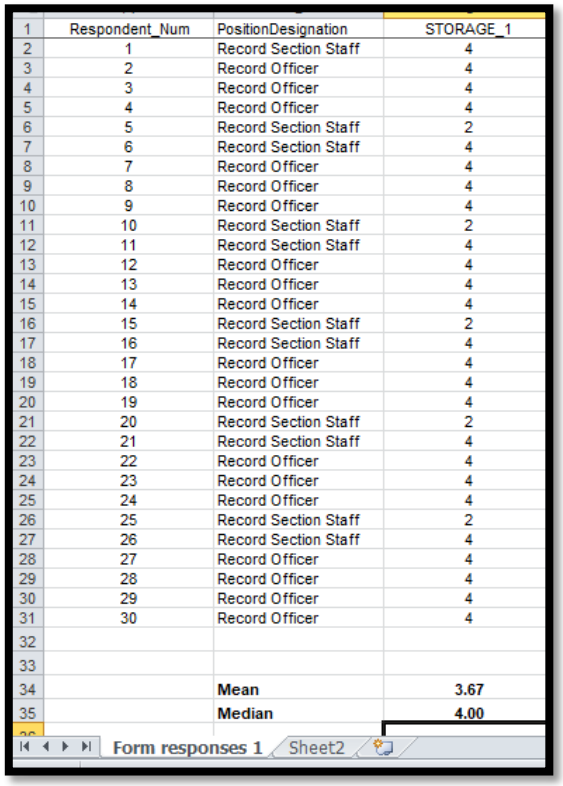
   =MEDIAN(C2:C31)

   This means that the computation of median will start from the data from cell C2 to C31. You can simply highlight the cells that contain the data or values instead of manually inputting the cell range.
3. *Once the formula is already complete, press Enter key. The median value will be displayed afterwards. Please see sample that follows:*



	Respondent_Num	PositionDesignation	STORAGE_1
2	1	Record Section Staff	4
3	2	Record Officer	4
4	3	Record Officer	4
5	4	Record Officer	4
6	5	Record Section Staff	2
7	6	Record Section Staff	4
8	7	Record Officer	4
9	8	Record Officer	4
10	9	Record Officer	4
11	10	Record Section Staff	2
12	11	Record Section Staff	4
13	12	Record Officer	4
14	13	Record Officer	4
15	14	Record Officer	4
16	15	Record Section Staff	2
17	16	Record Section Staff	4
18	17	Record Officer	4
19	18	Record Officer	4
20	19	Record Officer	4
21	20	Record Section Staff	2
22	21	Record Section Staff	4
23	22	Record Officer	4
24	23	Record Officer	4
25	24	Record Officer	4
26	25	Record Section Staff	2
27	26	Record Section Staff	4
28	27	Record Officer	4
29	28	Record Officer	4
30	29	Record Officer	4
31	30	Record Officer	4
32			
33			
34		Mean	3.67
35		Median	=MEDIAN(C2:C31)

Form responses 1 | Sheet2

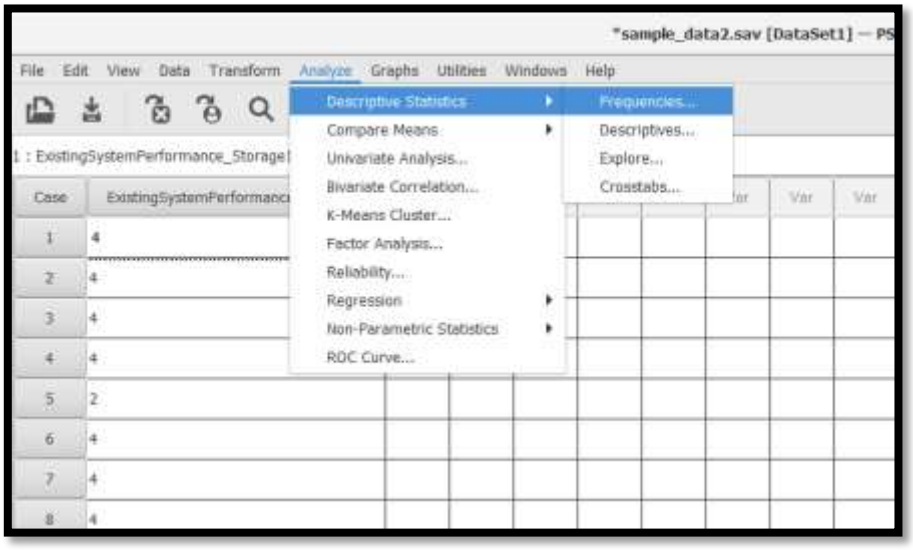


	Respondent_Num	PositionDesignation	STORAGE_1
2	1	Record Section Staff	4
3	2	Record Officer	4
4	3	Record Officer	4
5	4	Record Officer	4
6	5	Record Section Staff	2
7	6	Record Section Staff	4
8	7	Record Officer	4
9	8	Record Officer	4
10	9	Record Officer	4
11	10	Record Section Staff	2
12	11	Record Section Staff	4
13	12	Record Officer	4
14	13	Record Officer	4
15	14	Record Officer	4
16	15	Record Section Staff	2
17	16	Record Section Staff	4
18	17	Record Officer	4
19	18	Record Officer	4
20	19	Record Officer	4
21	20	Record Section Staff	2
22	21	Record Section Staff	4
23	22	Record Officer	4
24	23	Record Officer	4
25	24	Record Officer	4
26	25	Record Section Staff	2
27	26	Record Section Staff	4
28	27	Record Officer	4
29	28	Record Officer	4
30	29	Record Officer	4
31	30	Record Officer	4
32			
33			
34		Mean	3.67
35		Median	4.00

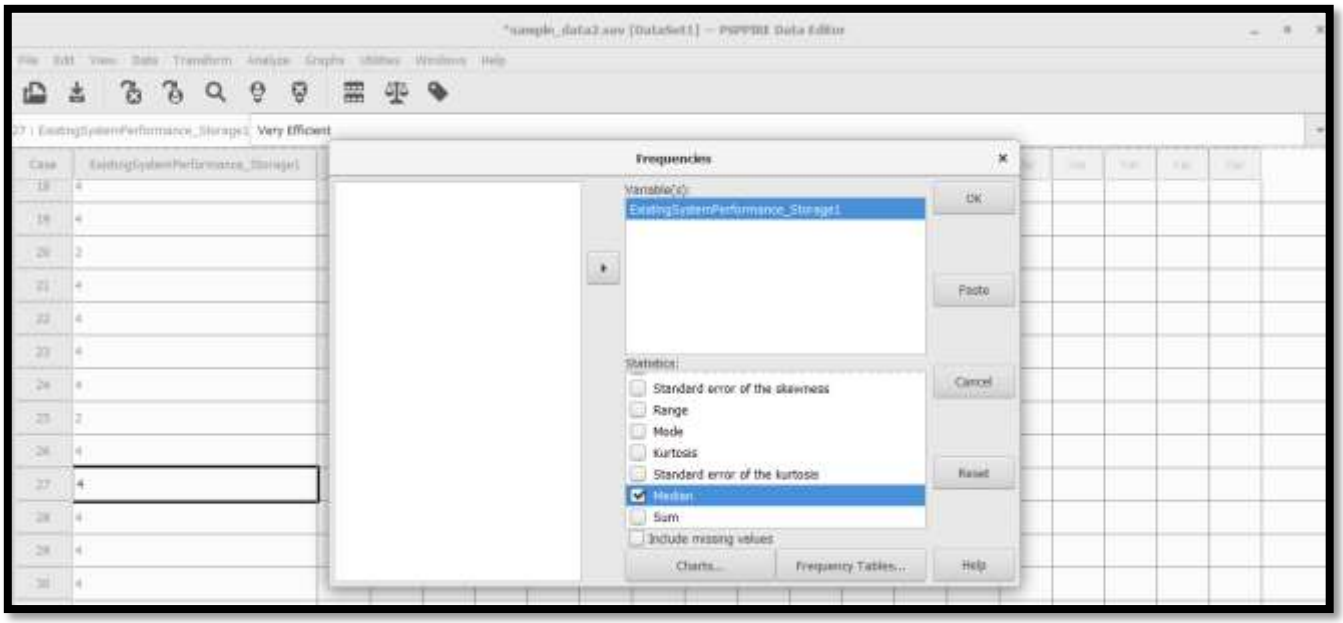
Form responses 1 | Sheet2

- *Computation (PSPP)*

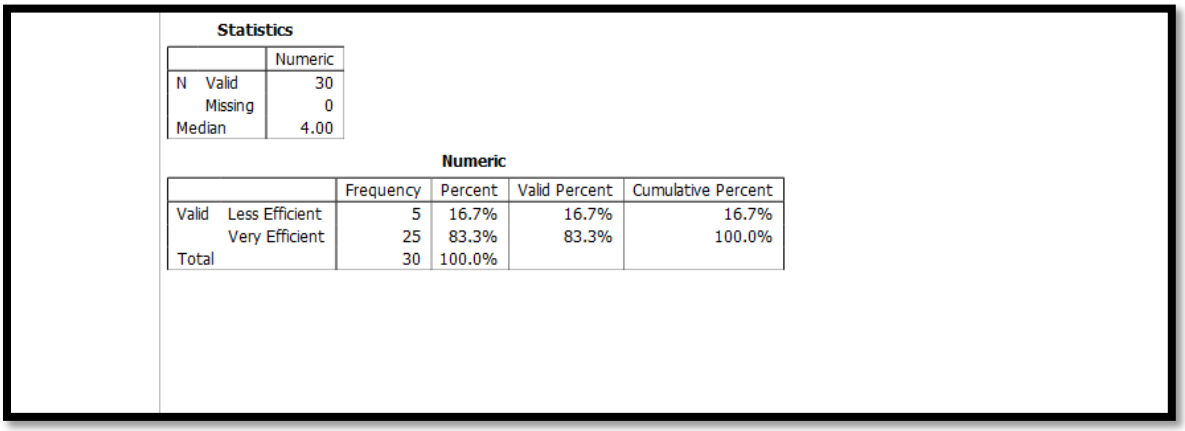
1. *Suppose data are already encoded in the data view. You may now click* ***Analyze>Descriptive Statistics>Frequencies.***



2. *Select the variable.*
3. *Under* ***Statistics****, select/check* ***Median.*** *Then click* ***OK****.*



4. ***Output Viewer*** *will now display the computed median.*



Statistics

		Numeric
N	Valid	30
	Missing	0
Median		4.00

Numeric

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less Efficient	5	16.7%	16.7%	16.7%
	Very Efficient	25	83.3%	83.3%	100.0%
Total		30	100.0%		

Mode

To compute or determine the mode, please be guided with the following steps:

- *Computation (Manual)*
  1. *Arrange the data set either in ascending or descending order.*
  2. *Identify the most occurring value from the data set.*
     Consider the following interval data (test score in 40 item test of 8 students in Quantitative Methods):

     15, 20, 21, 20, 36, 15, 25, 15

     Arranged dataset:
     ***15, 15, 15**, 20, 20, 21, 25, 36*

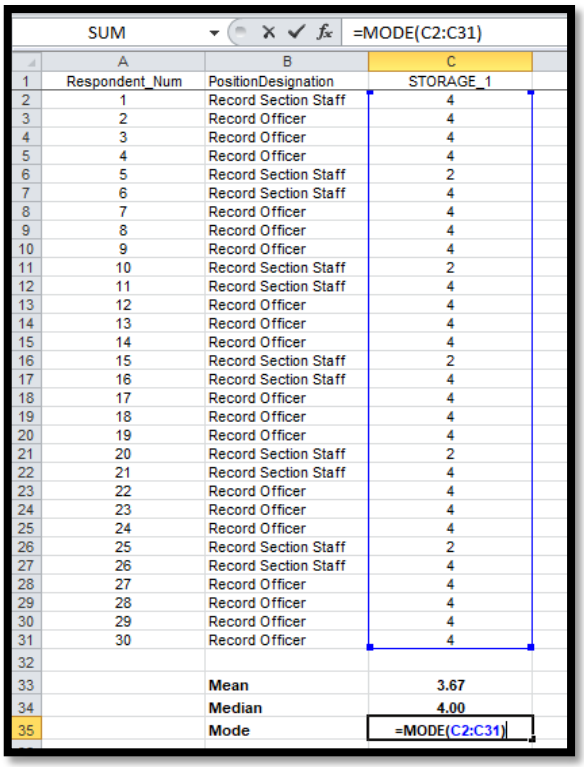
     Since 15 occurs three times, the most number of occurrence therefore 15 is the mode from the given data set.

     Interpretation: *Most of the students in Quantitative Methods got the score of 15.*
     *** There are cases wherein the distribution is bimodal(two modes), trimodal(three modes), multimodal or uni-modal. But there also cases wherein there is no mode.*

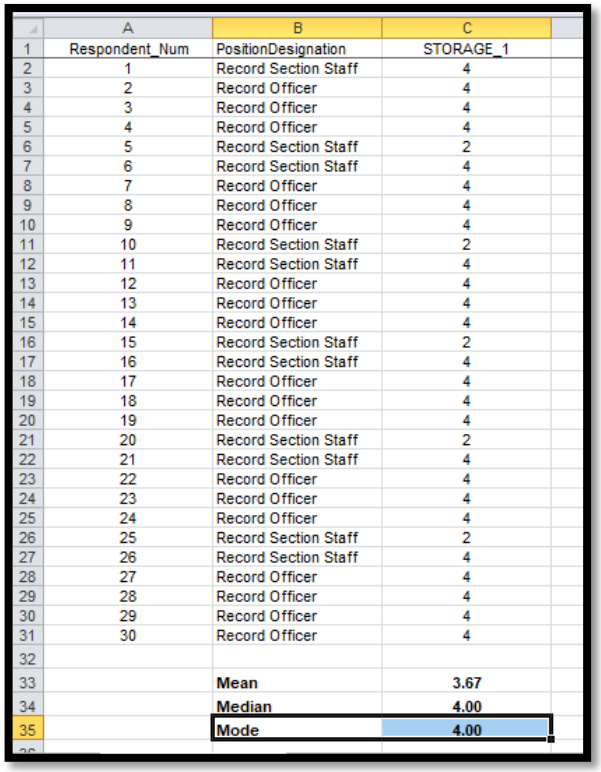
- *Computation (Excel)*
  1. *Select the cell where you want the computed mode to be displayed.*
  2. *On the selected cell, create a formula (this time we will be using a built-in formula for computation of mode, the MODE). Below is the sample formula:*
     =MODE(C2:C31)

This means that the computation of mode will start from the data from cell C2 to C31. You can simply highlight the cells that contain the data or values instead of manually inputting the cell range.

3. *Once the formula is already complete, press Enter key. The mode value will be displayed afterwards. Please see sample that follows:*

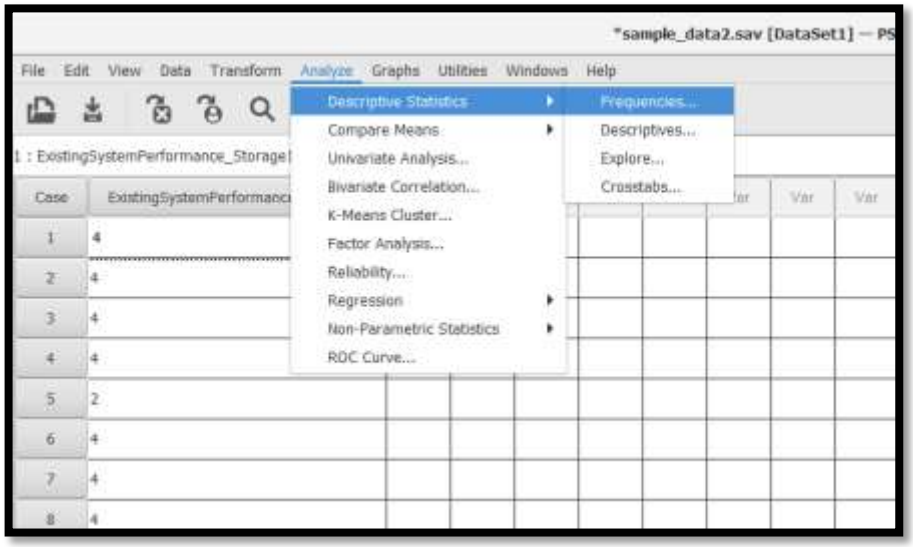


	A	B	C
1	Respondent_Num	PositionDesignation	STORAGE_1
2	1	Record Section Staff	4
3	2	Record Officer	4
4	3	Record Officer	4
5	4	Record Officer	4
6	5	Record Section Staff	2
7	6	Record Section Staff	4
8	7	Record Officer	4
9	8	Record Officer	4
10	9	Record Officer	4
11	10	Record Section Staff	2
12	11	Record Section Staff	4
13	12	Record Officer	4
14	13	Record Officer	4
15	14	Record Officer	4
16	15	Record Section Staff	2
17	16	Record Section Staff	4
18	17	Record Officer	4
19	18	Record Officer	4
20	19	Record Officer	4
21	20	Record Section Staff	2
22	21	Record Section Staff	4
23	22	Record Officer	4
24	23	Record Officer	4
25	24	Record Officer	4
26	25	Record Section Staff	2
27	26	Record Section Staff	4
28	27	Record Officer	4
29	28	Record Officer	4
30	29	Record Officer	4
31	30	Record Officer	4
32			
33		**Mean**	**3.67**
34		**Median**	**4.00**
35		**Mode**	=MODE(C2:C31)

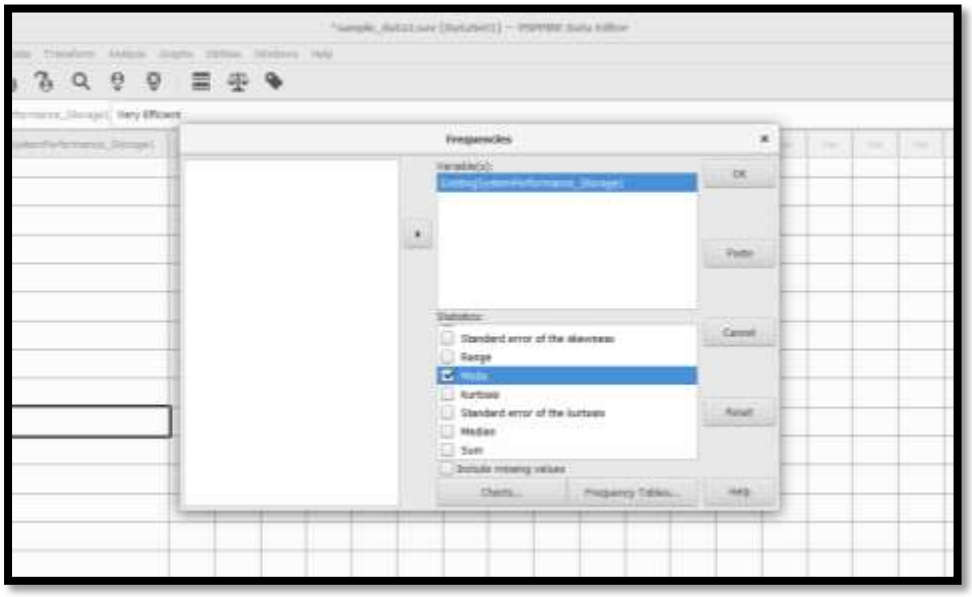


	A	B	C
1	Respondent_Num	PositionDesignation	STORAGE_1
2	1	Record Section Staff	4
3	2	Record Officer	4
4	3	Record Officer	4
5	4	Record Officer	4
6	5	Record Section Staff	2
7	6	Record Section Staff	4
8	7	Record Officer	4
9	8	Record Officer	4
10	9	Record Officer	4
11	10	Record Section Staff	2
12	11	Record Section Staff	4
13	12	Record Officer	4
14	13	Record Officer	4
15	14	Record Officer	4
16	15	Record Section Staff	2
17	16	Record Section Staff	4
18	17	Record Officer	4
19	18	Record Officer	4
20	19	Record Officer	4
21	20	Record Section Staff	2
22	21	Record Section Staff	4
23	22	Record Officer	4
24	23	Record Officer	4
25	24	Record Officer	4
26	25	Record Section Staff	2
27	26	Record Section Staff	4
28	27	Record Officer	4
29	28	Record Officer	4
30	29	Record Officer	4
31	30	Record Officer	4
32			
33		**Mean**	**3.67**
34		**Median**	**4.00**
35		**Mode**	**4.00**

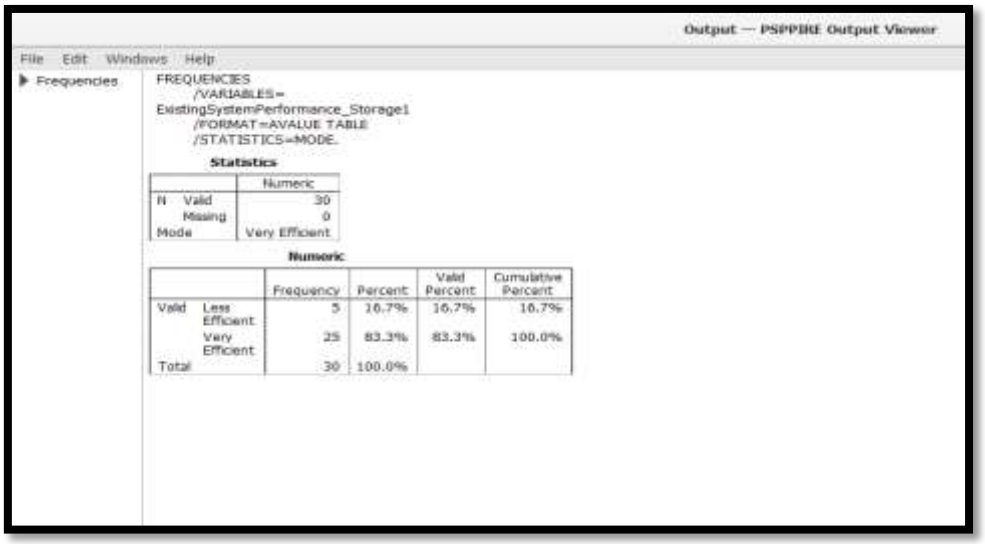
- *Computation (PSPP)*
  1. *Suppose data are already encoded in the data view. You may now click* ***Analyze>Descriptive Statistics>Frequencies.***



2. *Select the variable.*
3. *Under **Statistics**, select/check **Mode.** Then click **OK**.*



4. ***Output Viewer** will now display the computed mode.*



Information Sheet 2: Measure of Variability/Dispersion

We're now done with measure of central tendency, now let's take a look at this time the measure of variability.

Measures of Variability are also known as measure of spread or dispersion. Measures of Variability gives a picture of how the data are scattered or spread. This also describes the mass of the data.

Why measure of variability? ***This is because, measure of central tendency has some limitation which measure of variability can overcome****. Measure of central tendency gives us one set of important information when it comes to describing our variables, however they don't tell us the whole story.*

Let's take a look at sample data set below (test scores of 12 students from School 1 and School 2):

Case No.	School 1	School 2
1	45	60
2	50	65
3	55	65
4	60	70
5	65	70
6	70	70
7	70	70
8	75	70
9	80	70
10	85	75
11	90	75
12	95	80
Mean	***70***	***70***
Median	***70***	***70***

As you can see, the Mean and Median score for both schools are equal at 70. This could lead us to a conclusion that both have equal pattern of achievement. However, if we will look at the data more closely there is clearly more going on that. While measures of central tendency are the same, they arrived at it in different ways. Take a look again at the data set. In School 1, there is quite a spread of values ranging from 45 to 95, considering 45 is the lowest test score and 95 is the highest test score in the data set. In School 2, all student seem to have scores that are close together, 60 being the lowest score and 80 as the highest with six students who got 70. If on the basis of central tendency, we concluded that achievement in both schools is similar, we will miss out some important distinction between the two data sets. That is why aside from measures

central tendency we also need measures of variability if we are to give a good description of our variables.

There are three recommended ways on determining the spread or variability with in the data set:

- *Range*
- *Interquartile range*
- *Standard deviation*

Let us discuss them one by one in the following sections.

A. *Range*

It is the simplest and easiest measure of variability. It is simply the difference between highest and lowest score.
Take a look again at this data set:

Case No.	**School 1**	**School 2**
1	45	60
2	50	65
3	55	65
4	60	70
5	65	70
6	70	70
7	70	70
8	75	70
9	80	70
10	85	75
11	90	75
12	95	80
Mean	***70***	***70***
Median	***70***	***70***

For School 1: highest score=95
Lowest score=45
Range=highest score-lowest score
=95-45
Range=50

For School 2: highest score=80
Lowest score=60
Range=highest score-lowest score
=80-60
Range=20

This captures the distinction between the two data sets.
Interpretation: *scores of student from School 1 are more widely spread with a range of 50 than the scores of students from School 2 with a range of 20.*

***however, range as a measure of variability has its disadvantages. It does not measure the spread of the majority of values in a data set. It only*

measures the spread between highest and lowest values. As a result, other measures a required in order to give a better picture of the data spread.

B. *Interquartile range*

This measure is another type of range used as a measure of spread or variability. The difference between upper (first) and lower (third) quartiles (Q3-Q1) which is called the interquartile range also indicates the dispersion of data sets.

The interquartile range is calculated by first ordering the sample or data set from low to high and then dividing it to four quarters.

See sample below (arranged already from highest to lowest):

Case No.	School 1	School 2
1	45	60
2	50	65
3	55	65
4	60	70
5	65	70
6	70	70
7	70	70
8	75	70
9	80	70
10	85	75
11	90	75
12	95	80
Mean	***70***	***70***
Median	***70***	***70***

After that, we need to calculate the first and third quartile. As indicated in the bold line, the first quartile (Q1) lies in between 55 and 60 for School 1. To calculate the first quartile (Q1), get the mean of 55 and 60. This will result to ***57.5****. Then we will calculate also the third quartile (Q3). As indicated again in the bold line, the third quartile (Q3) lies between 80 and 85 for School 1. To calculate the third quartile (Q3), get the mean of 80 and 85. This will result to* ***82.5****.*

Having the first quartile (Q1) and third quartile (Q3) value, we can now compute the interquartile range:

For School 1

Interquartile Range= Q3- Q1;

=82.5-57.5

Interquartile Range= 25

Can you now try computing the interquartile range on your own? You can try to compute the interquartile range of School 2 data set.

How much now is the computed interquartile range for School 2 dataset?

Is the spread of data higher or lower than that of data set from School 1?

You may write now your interpretation here.

Interpretation:

_____

***however a disadvantage of this method is that it only uses a small amount of information that could be used as we are only looking at two values, the first quartile and third quartile, when calculating the range.*

C. *Standard Deviation (SD)*

This measure provides an indication of how far the individual responses vary or deviate from the mean. This tell the researchers how spread out the responses are- are they concentrated around the mean or scattered far and wide.

Unlike other measures of variability, standard deviation uses all the information that we have because it takes all values into account rather than just two. Further, it is the measure of the extent to which the values in the data set clusters around the mean. It is related to a value called ***variance*** *which you might also encounter. In fact, the standard deviation is equal to the square root of variance. The variance is the sum of squared deviation of the observations from their mean divided by the number of observation minus one. You need not worry too much about that, but what this basically means is that the variance is calculated by looking at the extent to which each observation differs from the mean.*

How are we going to compute the standard deviation for the following data set? Please be guided by the steps that follow:

Case No.	School 1	School 2
1	45	60
2	50	65
3	55	65
4	60	70
5	65	70
6	70	70
7	70	70
8	75	70

9	80	70
10	85	75
11	90	75
12	95	80
Mean	***70***	***70***
Median	***70***	***70***

- *Computation (Manual)*
    1. *Solve for the Mean.*
    2. *Find out the deviation of each score from the Mean. (Score-Mean)*
    3. *Get the square of each deviation. $(Score-Mean)^2$*
    4. *Add the squares of the deviations in step 3.*
    5. *Divide the sum of the squares of deviation by n-1.(n is the no. of samples)*
    6. *Extract the square root of the result of step 5.*

Please see sample below:

Case No.	**School 1**	**Step 2: Score-Mean**	**Step 3: $(Score-Mean)^2$**
1	45	-25	625
2	50	-20	400
3	55	-15	225
4	60	-10	100
5	65	-5	25
6	70	0	0
7	70	0	0
8	75	5	25
9	80	10	100
10	85	15	225
11	90	20	400
12	95	25	625
Mean	***70***		**Sum=2750**
Median	***70***		

Step 1: Solve for the Mean.

Mean is already computed as shown in the table above.

Step 2: Find out the deviation of each score from the Mean.

This is done as shown in the third column from the table above.

Step 3: Get the square of each deviation.

This is done also as shown in the fourth column from the table above.

Step 4: Add the squares of the deviations in step 3.

*As shown in the table, the computed sum of squares of deviation is **2750**.*

Step 5: Divide the sum of the squares of deviation by n-1*(the number of sample from the given data set is **12**)*

*2750/(12-1)= **250***

250 now is considered as the **variance

Step 6: Extract the square root of the result of step 5.

$$SD=\sqrt{250}$$

SD=15.81

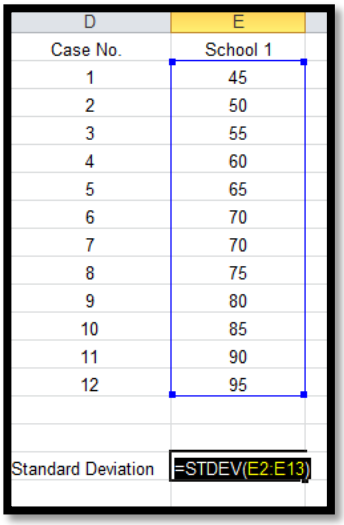
15.81 is the computed standard deviation of scores from School 1.

- *Computation (Excel)*
  1. *Select the cell where you want the computed Standard Deviation to be displayed.*
  2. *On the selected cell, create a formula (this time we will be using a built-in formula for computation of standard deviation, the STDEV). Below is the sample formula:*

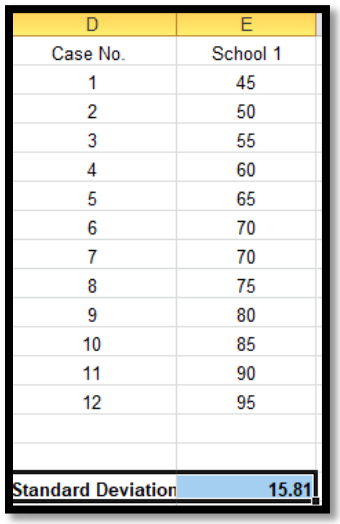
     =STDEV(E2:E13)

     This means that the computation of SD will start from the data in cell E2 to E13. You can simply highlight the cells that contain the data or values instead of manually inputting the cell range.

  3. *Once the formula is already complete, press Enter key. The SD value will be displayed afterwards. Please see sample that follows:*



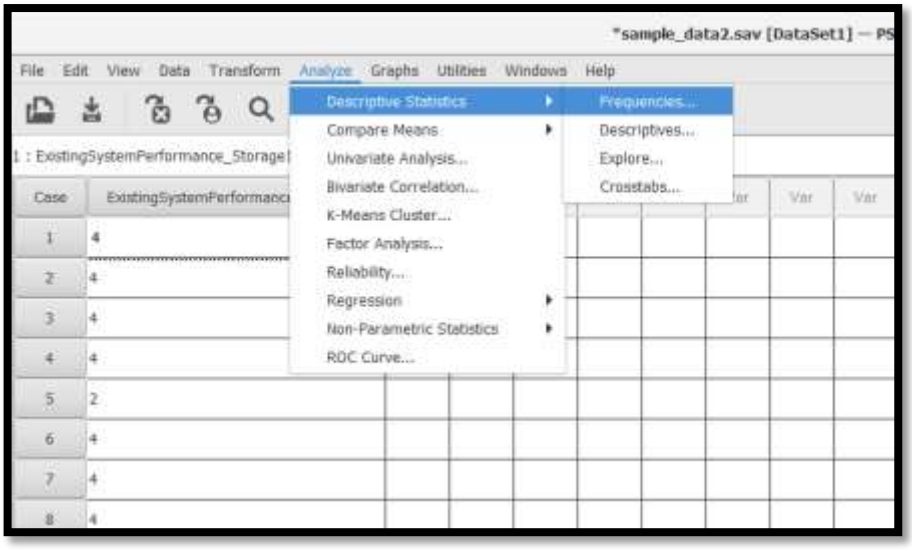
D	E
Case No.	School 1
1	45
2	50
3	55
4	60
5	65
6	70
7	70
8	75
9	80
10	85
11	90
12	95
Standard Deviation	=STDEV(E2:E13)



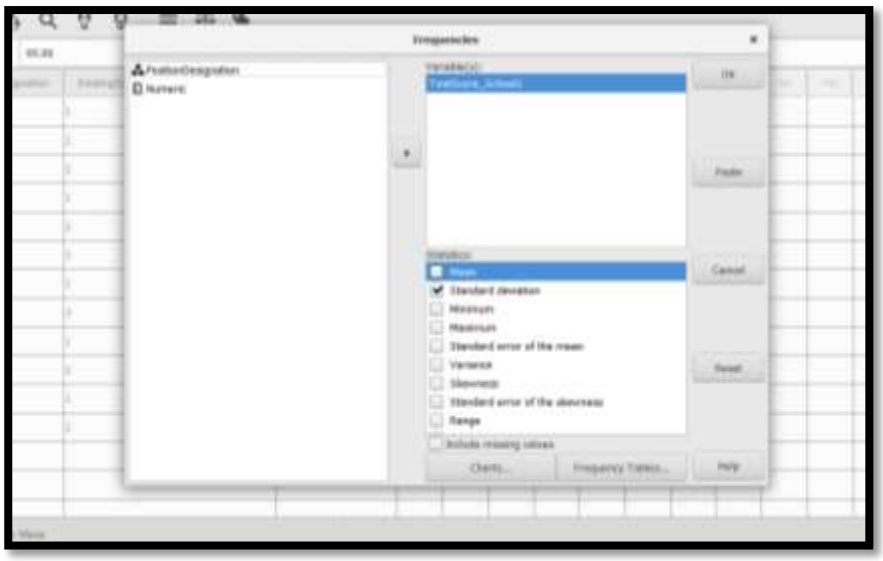
D	E
Case No.	School 1
1	45
2	50
3	55
4	60
5	65
6	70
7	70
8	75
9	80
10	85
11	90
12	95
Standard Deviation	15.81

- *Computation (PSPP)*

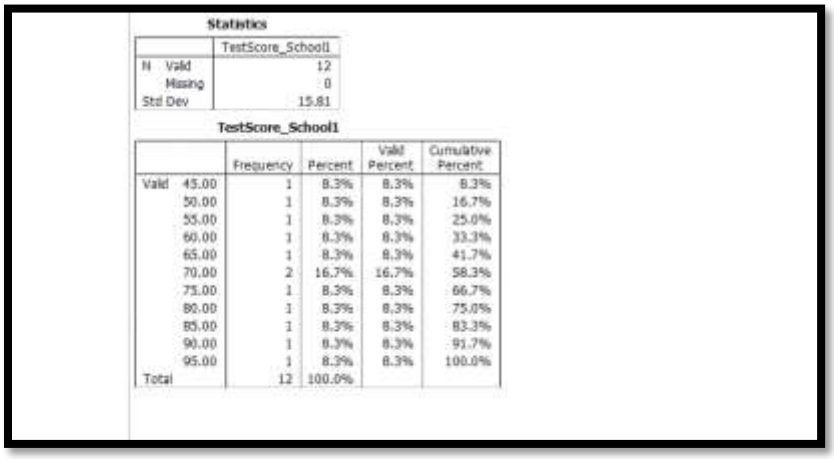
1. *Suppose data are already encoded in the data view. You may now click* ***Analyze>Descriptive Statistics>Frequencies.***



2. *Select the variable.*
3. *Under* ***Statistics****, select/check* ***Mode.*** *Then click* ***OK****.*



4. ***Output Viewer*** *will now display the computed SD.*



Statistics

		TestScore_School1
N	Valid	12
	Missing	0
Std Dev		15.81

TestScore_School1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	45.00	1	8.3%	8.3%	8.3%
	50.00	1	8.3%	8.3%	16.7%
	55.00	1	8.3%	8.3%	25.0%
	60.00	1	8.3%	8.3%	33.3%
	65.00	1	8.3%	8.3%	41.7%
	70.00	2	16.7%	16.7%	58.3%
	75.00	1	8.3%	8.3%	66.7%
	80.00	1	8.3%	8.3%	75.0%
	85.00	1	8.3%	8.3%	83.3%
	90.00	1	8.3%	8.3%	91.7%
	95.00	1	8.3%	8.3%	100.0%
Total		12	100.0%		

*The computed SD is **15.81**. The result is consistent from manual computation to excel and PSPP considering that the same data set was used.*

Based from the SD result, how will you compose your interpretation?

Interpretation: _____

For further practice of the knowledge gained from this module, you can use the data set from School 2 to compute the interquartile range and standard deviation using manual computation, via Excel or PSPP.

****I hope you have enjoyed reading the discussion. How did you find the things you learned about data preparation and data presentation? Can you now organize data out of the survey questionnaire responses collected? If you are now ready, you may proceed answering LEARNING TASK M2.2*

References:

Daniel Muijs.2010. Doing Quantitative Research in Education with SPSS. Retrieved from https://dl.uswr.ac.ir/bitstream/Hannan/132194/1/076194382X.Sage.Publications.Ltd.Doing.Quantitative.Research.in.Education.with.SPSS.May.2004.pdf

William Trochim et.al. 2016. Research Methods: The Essential Knowledge Base. Cengage Learning

Beth M. Schwartz et.al. *2015. An Easy Guide to Research Design and SPSS. SAGE Publications, inc.*

VII. *Assignment/Activities*

LEARNING TASK M2.2

Objective: *This learning task intends to achieve objective 1, 2 and 3 of this module.*

Instruction: *Please carefully read the instruction below :*

1. Access the sample questionnaire response data set from this URL: https://drive.google.com/file/d/10XMscPFeMfCxgEzXu_9vDY3VcBZsCdWp/view?usp=sharing
2. With the given data set compute the following:
   a. Mean
   b. Median
   c. Mode
   d. Standard Deviation

   For the following variables:
   ExistingSystemPerformance_Storage_ST1
   ExistingSystemPerformance_Storage_ST2
   ExistingSystemPerformance_Storage_ST3
   ExistingSystemPerformance_Storage_ST4
   ExistingSystemPerformance_Storage_ST5

   ExistingSystemPerformance_Organization_O1
   ExistingSystemPerformance_Organization_O2
   ExistingSystemPerformance_Organization_O3
   ExistingSystemPerformance_Organization_O4

   ExistingSystemPerformance_Security_SE1
   ExistingSystemPerformance_Security_SE2
   ExistingSystemPerformance_Security_SE3
   ExistingSystemPerformance_Security_SE4
   ExistingSystemPerformance_Security_SE5

3. Accomplish step 2 by using either MS Excel, SPSS or PSPP whichever is preferable and available as your statistical tool.
4. With the computed values for mean, median, mode and standard deviation, compose a comprehensive and appropriate interpretation.
5. This will be accomplished by group (prelim project group).

Submission Method: Submission of the learning task will be either of the following depending on your level of technology.

- High Level: Output file will be submitted via CSPC LeOns
- Middle Level: : Output file will be submitted via CSPC LeOns or printed output that will be collected on designated place and time.
- Low Level: Printed output that will be collected on designated place and time.

Evaluation Criteria:
Please refer to the following score distribution.

1. *Computed Mean, Median, Mode and Standard Deviation (5 points for each correct computed value; 0 for incorrect computed value)*
2. *Interpretation(5 points for each comprehensive and appropriate interpretation; 2 pts for each non-comprehensive and inappropriate interpretation)*

VIII. *Post-test*

This post-test will try to assess your knowledge after the discussion of the topic. Instructions are provided for each part of the test.

Item		
Part 1 True or False: Please evaluate the following statement if it expresses a correct thought or not. Please put a check on the column that corresponds to your answer.	**True**	**False**
1. **To compute mean via MS-Excel, we can use the built-in formula MEAN.**		
2. **The most commonly used measure of describing central tendency is Median.**		
3. **MEAN is an appropriate measure for nominal data.**		
4. **Unlike descriptive statistics, inferential statistics demands higher order of critical thinking and mathematical methods.**		
5. **Standard deviation is an appropriate measure for ordinal data.**		
6. **With this given data set: 43,23,45,43,25,56,43,25,43,67. 43 is considered as the mode.**		
7. **With this given data set: 85,87,84,83,90,88,87. 85 is considered as the median.**		
8. **The Mean of the data set: 4. The correct interpretation is: the frequently occurring value from the data set is 4.**		
9. **The simplest and easiest measure of variability is range.**		
10. **Standard deviation provides an indication of how far the individual responses vary or deviate from the Mean.**		

****please answer this post-test so that you will be able to determine if there is a significant difference on your score compared to your pre-test.*

Submission of your post-test will be either of the following based on your level of technology:

High Level: online text submission via CSPC LeOns

Middle Level: online text submission via CSPC LeOnS or written/printed output that will be collected on designated place and time

Low Level: Written/printed output that will be collected on designated place and time.

IX. Answer Sheet (For The Faculty Only)