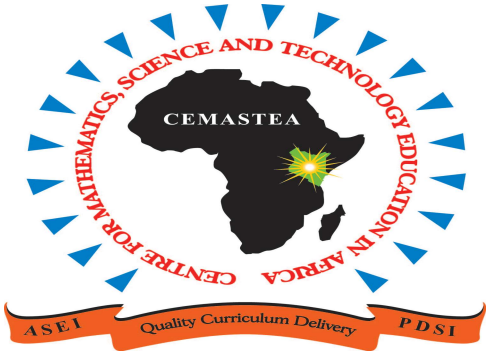
# Unit 2: Quantitative Analysis and Interpretation

Facilitators:



# Unit outcomes

By the end of the unit, you should be able to:

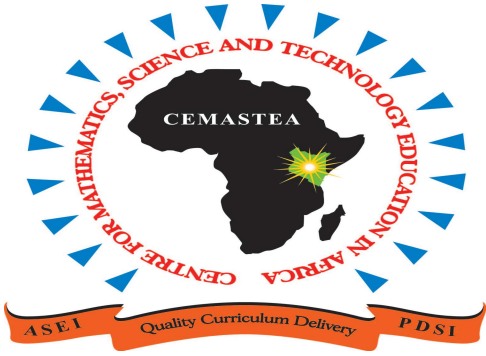
i) Appreciate the importance of correct data entry

ii) Appreciate the importance of data cleaning

iii) Carry out data quality checks

iv) Analyze statistical data

v) Interpret the outputs of the analysis



# Types of data

- There are 2 main types of data quantitative and qualitative; which are further classified into 4 categories:

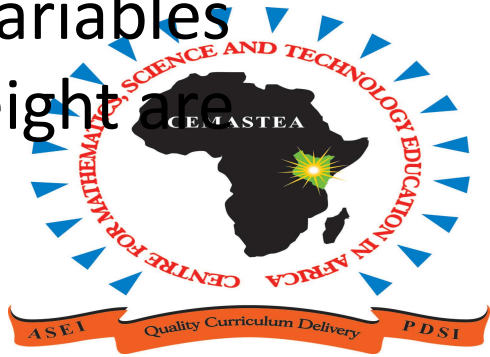
i) Quantitative data - discrete, continuous ( **interval, ratio**)

ii) Qualitative data - **nominal, ordinal**

## Types of data

a) **Interval scale** – has equal intervals between values - means that data points along the scale are equal, so the difference between data points 1 and 2 will be the same as the difference between data points 5 and 6. It can be added to or subtracted from each other, but not multiplied or divided.

**b) Ratio scale** – the scale has a true zero point. Ratio variables never fall below zero. Measures such as weight and height are examples of ratio scales.



# Types of data….

**c) Nominal scale** – describes identity without any particular order e.g. gender, marital status, blood type, colour of hair

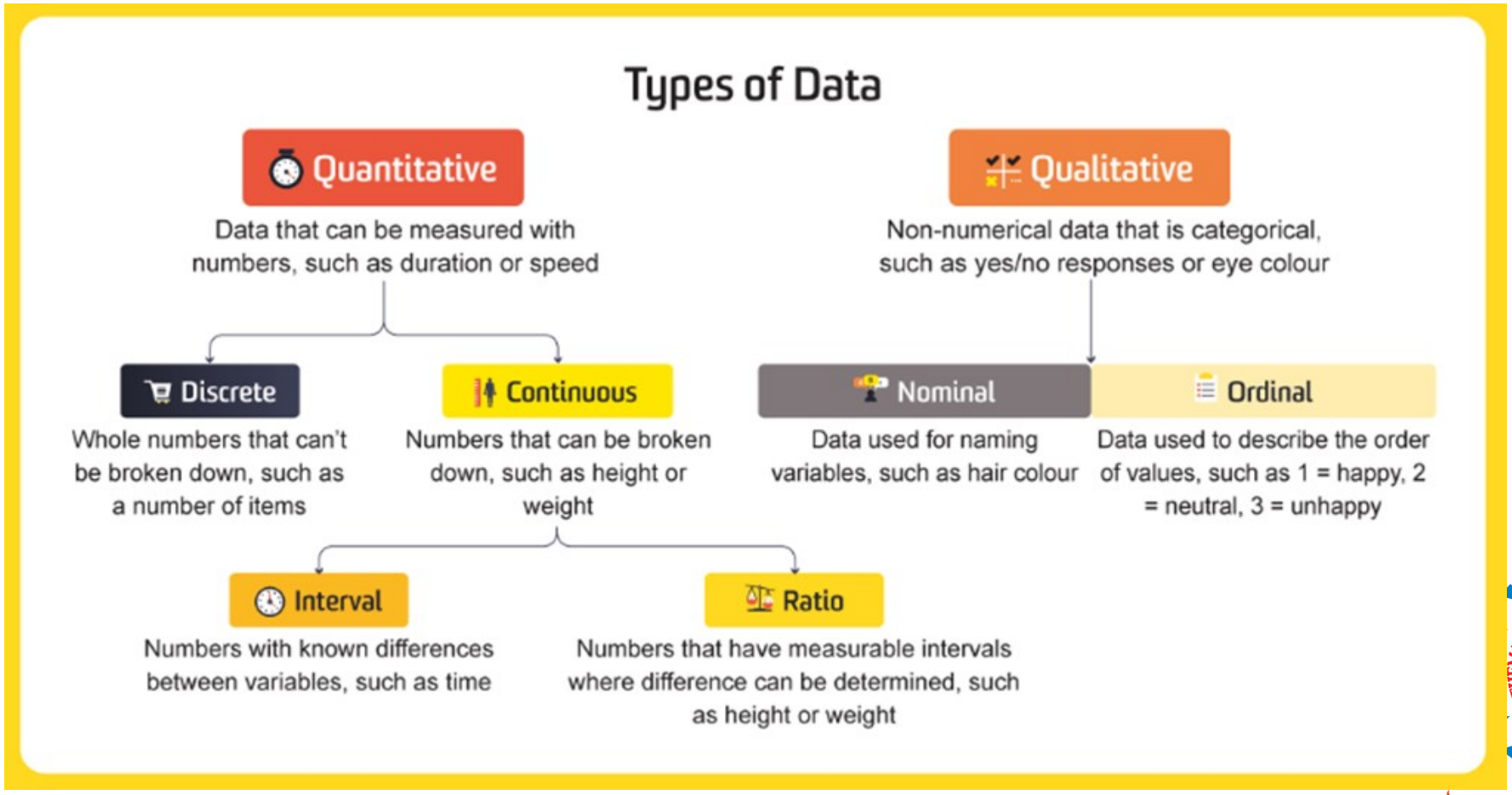
**d) Ordinal scale** – Ordinal scale data have a natural ordering. Examples of such data include:

i) primary, secondary, higher

ii) low, medium, high

iii) Strongly disagree, disagree, neutral, agree, Strongly agree

# Types of data….



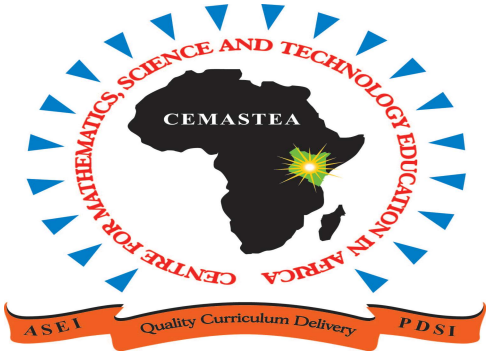

CENTRE FOR MATHEMATICS, SCIENCE AND TECHNOLOGY EDUCATION IN AFRICA
CEMASTEA
ASEI
Quality Curriculum Delivery
PDSI

# Activity 1

Consider the ***Teacher Questionnaire*** data. Calculate the mean and standard deviation of the ***Inquiry Based Learning*** item. What can you conclude about the output?

# Activity 2

- Importing data into a software (SPSS)



# Methods of the data collection applied by CEMASTEA

i. Focus group discussion
ii. Interviews
iii. Observations
iv. Questionnaires
v. Online survey

# Analysis of data collected by CEMASTEA

| Types of data | How analyzed |
|---|---|
| **Quantitative Data** | Descriptive statistics<br>**mean**, median, mode, standard deviation, and range to summarize and describe the data |
| **Qualitative data** | Frequency/thematic Analysis<br>(Thematic count) - Count the frequency of each category or response. |

# Strengths and areas of improvement

| Strengths | Areas of improvement |
|---|---|
| | Data entry |
| | Data cleaning |
| | Inferential statistics |

# Reflection

**What would be the most suitable data analysis for the data collected by CEMASTEA?**

# ACTIVITY 3

- Data cleaning with sample data

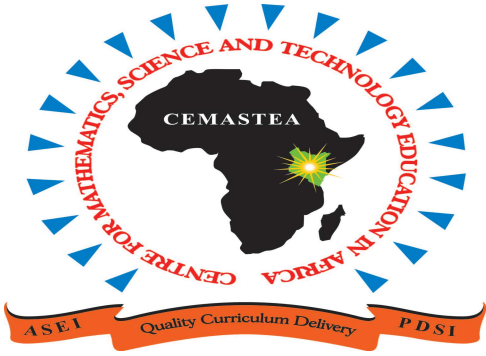
# Softwares that can be used for data analysis

i) Examples of open source softwares for data analysis

R, PSPP, JASP, MS Excel, etc

ii) Examples of proprietary softwares for data analysis

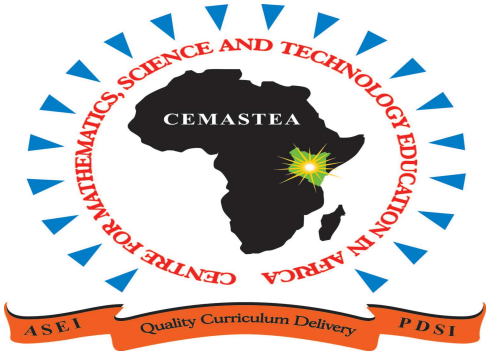
STATA, SPSS, Mathematica, S, etc



# Parametric Analysis

**Tests for normality**

- Q-Q plots
- Box plots
- Kurtosis
- Skewness
- Shapiro-Wilk test
- Kolmogorov-Smirnov test
- Histogram



# ACTIVITY 3

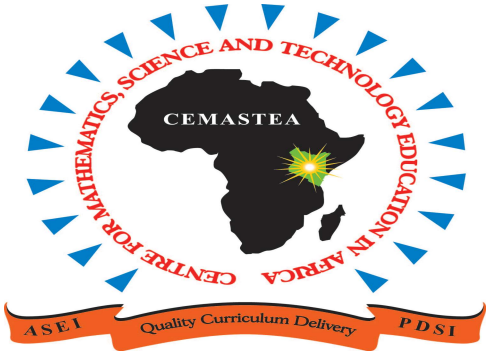
Using SPSS software, conduct the tests below on the Teacher Questionnaire data provided.

## a) One-sample T-test

- This is a statistical test conducted on sample data to determine how different its mean is from a set standard score (specific value)

Hypothesis

$H_0$: $\mu$ = specific value  $H_1$: $\mu \neq$ specific value



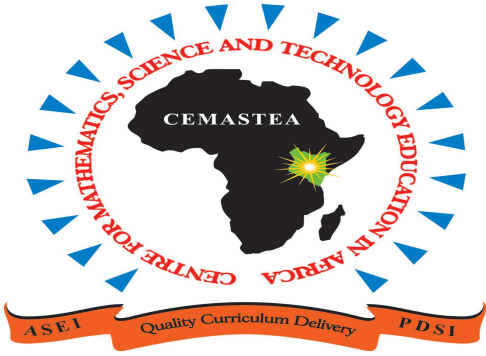
# ACTIVITY 3….

## b) Independent T-test

- This is a statistical test used to compare means of two independent (unrelated) groups to determine whether there is any significant difference.

Hypothesis

$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$



# ACTIVITY 3….

## c) Paired sample t-test

- This is a statistical test which compares the means of two measurements taken from the same individual before and after an intervention or treatment has been administered (pre- and post- test scores)

# ACTIVITY 3….

## d) One way ANOVA

- This is a statistical test used to compare means of more than two groups to determine whether there is any significant difference.

Hypothesis

$H_0$: $\mu_1 = \mu_2 = \mu_3$ $H_1$: $\mu_1 \neq \mu_2 \neq \mu_3$

# ACTIVITY 3….

## e) Regression

Linear regressions

# Non-parametric statistics

## Chi-square test of independence

- This is a statistical test used to test for association between two or more groups for categorical data to determine their independence.

Hypothesis

- $H_0$: No association  $H_1$: There is an association