INTRODUCTION TO RESEARCH METHOD

- **Definition Of Research**

  Research = study (significant of 'study') = investigation = inquiry.

  Inquiry (to raise question) – reflects the concept of research.

  1. **Curiosity** = wanting to know (have a problem/question).
  2. **Collecting data** = raw information/data – before analyzing).
  3. **Analyzing the data** = make the information more meaningful).
  4. **Conclusion** (answer to the question).

- **Basic Terms:**

  - ☆ **Knowledge** = collection of what you know.
  - ☆ **Science** = when the knowledge is well-organized. We can find some theories / important components in science. Science can be developed that depends on people conduct research or not.
  - ☆ **Theory** = a statement of cause and effect relationship between factors/variables.
  - ☆ **Behavioral Science** = medical, education.
  - ☆ **To study** = effort to learn.
  - ☆ **To learn** = from not knowing into knowing.
  - ☆ **PTK (Penelitian Tindakan Kelas) = CAR (Classroom Action Research).** In this case, a teacher will do something different what usually done.
  - ☆ **Long life** = kehidupan yang panjang.
  - ☆ **Life Long** = sepanjang hayat.
  - ☆ **College Education** = berpendidikan tinggi.
  - ☆ **College of Education** = FIP

- **Ultimate goals/final goals/ideal goals in conducting research:**

  1. **Generating Theory** / Theory-Generation / Producing Theory (**Qualitative**)
  2. **Verifying Theory** / Theory-Verification (**Quantitative**)

     Providing evidence that:

     Support (stonger) } theory

     Not support (weaker) }

- **Comparison of Quantitative and Qualitative Research.**

	Quantitative (product)	Qualitative (process)
	Need numerical data to analyze by using statistics, more meaningful	No need of numerical data
Purpose	To study relationships, cause and effect	To examine a phenomenon in rich detail
Design (how we are going to conduct a research)	Develop prior to study	Evolves (it can be modified/changed) during study
Approach (philosophical for collecting data)	Deductive (theory to data), test theory	Inductive (data to theory), generates theory
Tools/Instruments	Uses standardized instruments (i.e. test)	Uses face to face interaction (authentic assessment / judgment process)
Samples	Uses large samples	Uses authentic assessment. No need of samples because qualitative approach is not interested in the population
Analysis	Statistical analysis of numeric data in the form of numbers	Narrative description and interpretation
Questions	Using what questions	Using how and why questions
Collecting data	Using questionnaire	Using interview (in-depth study)
Hypothesis	Theory → hypothesis → data (start with theory)	Collecting data → hypothesis → theory (start with data)

Do you know?

TOEFL is a brand name that belongs to a company "Educational Testing Service (ETS)" in Princeton, New Jersey, United States. It is not a generic term, the generic term for TOEFL is **"ENGLISH PROFICIENCY TEST".**

- **Kinds of TOEFL:**
  1. **Paper and International TOEFL (Paper-Pencil)**. It is used as TOEFL's predictor. It means that by joining paper-pencil test we can predict whether we can continue our study abroad, especially in US.
  2. **Institutional Testing Program TOEFL (ITP TOEFL).** It is conducted in an institution, university, etc. we can order the test from IIEF in Kuningan, Jakarta. It spends U$20 -U$25/U$30
  3. **Computer Based Test TOEFL (CBT TOEFL)**. It maybe ordered from Malaysia, but it is not online.
  4. **Internet Based TOEFL (iBT TOEFL).** It is available in Indonesia, online, and we can get our score in a week.

The results of paper-pencil test, CBT TOEFL, and iBT TOEFL can be used for 2 years, and it costs U$100 – U$150. The use of these 3 kinds of TOEFL is to apply to all university in English speaking countries.

- **Typical Stages in Research:**
  1. **Formulating the research questions.**
     - ☆ **The answers are:**
       a. **Not available yet.**
       b. **New** - you can't get it without collecting and analyzing the data.
       c. **Significant** - useful for other people / able to contribute to the body of knowledge.
       d. **Feasible** – it can be investigated.

☆ **The researchers have:**

a. Interest.

b. Knowledge.

c. Skills.

2. **Reviewing literature related to the topic/relevant to the study.**

☆ **Sources:**

a. Primary Sources (1st hand)

- The writers are researchers.
- Journals, articles, research report.

b. Secondary Sources

- The writers are not researchers.
- Book.

☆ **Steps:**

a. Selecting materials.

b. Read (understanding the content).

c. Evaluate whether the material (content)is useful for your study.

d. Use it to support your argument in the background.

3. **Designing the research.**
4. **Collecting the data.**
5. **Analyzing the data.**
6. **Interpreting the findings and stating conclusions.**
7. **Reporting results.**

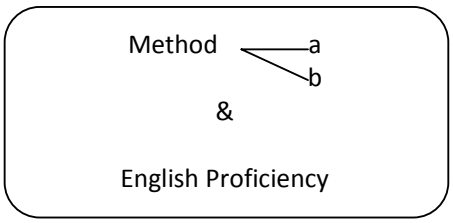
◆ **Quantitative Research.**

It is hard to conduct, except for shorter effect.

☆ **Experimental Research**, it is intended to establish cause and effect relationship.

The basic principles of experimental research:

1. manipulate the independent variable,
2. (and) see their effect on the dependent values,
3. (after all) other variables are controlled.



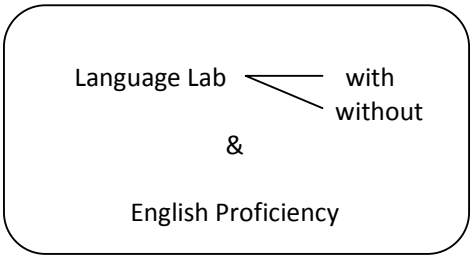
- To manipulate = to change/make the variables vary/different.
- To control = to prevent the other variables from, (also) affecting the dependent variables; to make the other variables from (also) affecting the dependent variables

☆ **Non Experimental Research**

It is easier to conduct but our claim is weak since we cannot control other variables.

1. Ex-post facto Research

Ex-post facto means "after the fact". It is not easy to conduct.



2. **Classroom Action Research (CAR).** It is not hard to conduct.
   - ✓ Feasible
   - ✓ Does not need to control other variables
   - ✓ Solve practical problem in the class by using a certain technique which is different from the usual one through **four stages:**
     a. **Planning** = making a certain technique of teaching.
     b. **Implementing** = using technique to teach.
     c. **Observing** = making note about what happen in class, looking at the effect.
     d. **Reflecting/Evaluating/Looking back** (criteria of success) = looking back to the effect whether the students can really increased as expected, whether you have been successful.

   If we are not success in the first research, we can modify the method by **"cycle".**

3. Correlational Research

It is intended to know the relationship between variables so that they can predict one variable to another. Basic principle of correlational research is **"knowing one, can predict another".** In positive correlation, the principle is "high on one, high on the other", while in negative correlation is "high on one, low on the other".

Students' achievement in English
&
Students' achievement in Mathematic

The diagram above shows that students' achievement in English & Mathematics is influenced by the 3rd factor, IQ.

English Achievement
&
G.P.A

(*positive correlation)*

Frequency of watching TV
&
School Achievement

(*negative correlation)*

4. Survey Research/Descriptive Research

It is intended to describe the existing phenomena. It is not intended to establish cause and effect relationship.

3rd grade
is better than
2nd grade

1. Experimental
2. Ex-post facto

} It is intended to establish cause and effect relationship.

3. Descriptive → It is not intended to establish cause and effect relationship.

Descriptive → Correlational Research
Survey Research

- **Qualitative Research**

  It is conducted by interviewing to reflect the process.

  - ☆ **Basic principles:**
    1. Interview to reflect the process, but the problem is they maybe do not aware to the process.
    2. Observation.

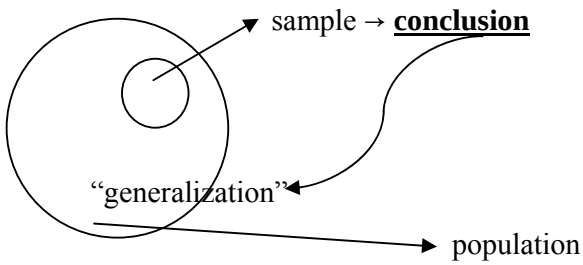
- **Variable** = anything that can change/vary/be different. There are 3 **kinds of variables** that depend on how they are treated.
  1. **Independent Variable** = a variable that affects other variables, or a variable that is treated as the **"cause"** of other variables. Age and gender always belong to IV, never DV since age and gender can never change.
  2. **Dependent Variable** = a variable that is affected by the independent variables, or a variable that is treated as the **"effect"** of other variables.
  3. **Other variables** = variables which can also affect the dependent variables, but are not included in the present research study. Other variables can be **age, gender, teacher, and material.**

Method (IV) & English Proficiency (DV)	Motivation (IV) & School Achievement (DV)	GPA (DV) & School Achievement (IV)

- **Data Collection**

  - ☆ **Quantitative Approach**

    "Generalization" means applying the conclusion drawn from the sample to the population. The sample must represent the population so that we can convince that make use of random sampling technique can guarantee that it really represents the population.



Steps in collecting data:

1. Define/state the population.
2. Select sample randomly. Sample has to be selected since we cannot study all the population. Sample must represent the population. That's why, **random** means everybody in population must have equal chance to be selected as a sample. Here are **techniques of selecting samples,** but the suitable technique will be relied on the characteristics of the population:

   a. Simple Random Sampling

   It is conducted if the population is homogeneous (having the same quality). We just pick the sample randomly without any system. i.e: we want to take 100 students out of 1000. So, we just take the numbers randomly.

   b. Systematic Random Sampling

   It is also conducted if the population is homogeneous (having the same quality). We have to decide the interval before picking the sample. i.e: we want to take 100 students out of 1000. So, what we should do are:

   - Decide the interval → $\frac{1000}{100} = 10$
   - Take the first number = i.e "21"
   - Take the rest numbers based on the interval = "31", "41", "51",….
   - Continue taking numbers until getting 100 students.

   c. Stratified Random Sampling

   It is conducted if the population consist of levels/strata.

   i.e: - students of the 1st year
   - students of the 2nd year
   - students of the 3rd year
   - students of the 4th year

   If the numbers of students are not the same, we have to do it proportionally.

1st	2nd	3rd	4th	
80	75	70	65	= 290

   required students = 50, so:

1^{st} $= \frac{80}{290} \times 50 = 13.7 \rightarrow 14$

2^{nd} $= \frac{75}{290} \times 50 = 12.9 \rightarrow 13$

3^{rd} $= \frac{70}{290} \times 50 = 12.0 \rightarrow 12$

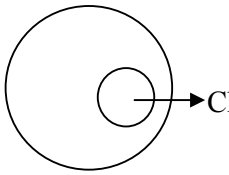
4^{th} $= \frac{65}{290} \times 50 = 11.2 \rightarrow 11$

TOTAL…….50 students.

It means that the number is decimal, we should round it up/round it down.

d. Cluster Random Sampling

It is conducted if the population consists of groups.



If we used this technique, sometimes we will find *sampling error* (error indicated by a different in term of mean), not exactly the same.

e. Multi-stage Random Sampling

It is conducted if the population is complex. This technique will go through several stages.

i.e: we want to collect data from the students in east java. In this case, we have to follow several steps: select the city → select the school → select the students.

In quantitative approach, we will finish collecting data if we have collected all the data from the sample.

☆ **Qualitative Approach**

Steps in collecting data:

1. **Point of data saturation/data redundancy**. If we come to data redundancy, it means that we have collected information from different sources, but the results are the same, again…, and again…
2. **Snowballing sample,** start from one person who tells about another.

- **Data Analysis**

☆ **Quantitative Approach →uses statistical analysis.**

1. **To know "individual & group performance".**

$$\text{Mean} = \overline{X} = \frac{\sum X}{N}$$

2. **To know whether the population is homogeneous (deals with homogeneity & heterogeneity)**

Standard deviation = $x - \bar{x}$

- $\bar{x}$ → Means, represent group performance
- $-$ → "different"
- x → Represents individual performance

So, standard deviation means the differences among the individual –the average of individual performance.

$$\text{Standard deviation} = S = \sqrt{\frac{(\sum X - \overline{X})^2}{N}}$$

$$\text{Variance} = S^2 = \frac{(\sum X - \overline{X})^2}{N}$$

☆ **Qualitative Approach**

1. Summarizing the answer.
2. Make a list of different answers.

- **Measurement**, a process of converting information / data into numbers. We can do it by giving a test. If we want to get information without using test to measure the

ability of the students, we can use the so called **"rating scale"** → excellent, good, fair, and poor. But, it has to be converted in the form of number.

SCALES OF MEASUREMENT

1. **NOMINAL** → contain 1 piece of information. It means that one is **different from** the other (i.e. if we talk about gender, of course "a man" is **different from** "a woman". We cannot say that "a man" is better than "a woman".).
2. **ORDINAL** → contain 2 pieces of information. It means that not only one is **different from** the other, but also one is **better than** the other. (i.e. if we talk about motivation, of course it will be different among others, but we can also say that one's motivation is better than the other's.
3. **INTERVAL** → contain 3 pieces of information. *Pearson Product Moment* can be used when the data is interval. It means that we can say:
   a. One is **different from** the other.
   b. One is **better than** the other.
   c. The difference between one's and the other's is the same.
   (i.e. if we talk about reading test score as I mentioned below, we can say that:
   a. One who gets score 5 is **different from** one who gets score 4.
   b. One who gets score 5 is **better than** one who gets score 4.
   c. **The difference between score 5 and score 4 is relative the same.**

Question 1→ score 1

Question 2→ score 2

Question 3→ score 3

Question 4→ score 4

Question 5→ score 5

4. **RATIO** → contain 4 pieces of information. It contains **the so called absolute zero**. (i.e. weight, height, volume, time)

- **Descriptive Statistics and Inferential Statistics**
  - ☆ **Descriptive Statistics** is used when we **do not want to make "generalization".** It means that we are not interested in making generalization.
  - ☆ **Inferential Statistics** is used when we **want to make "generalization"**. Since it is interested in making generalization, **hypothesis testing** is important.

- **Descriptive Statistics**
  - ☆ **Measures / Indicators of Central Tendency**
    1. **Mean** = the average of all scores. It is the most sensitive and useful measures of central tendency because it involves all the scores in the mean. Mean indicates **group performance**.

       $$\text{Mean} = \overline{X} = \frac{\sum X}{N}$$

    2. **Median** = the middle score. It is a score that divides the score in the equal have.
    3. **Mode** = the most frequently occurring score.

  - ☆ **Measures of Variability** (variability means differences, heterogeneity)
    1. **Range** → the highest score – the lowest score.
    2. **Variance** } they are most sensitive measures of variability
    3. **Standard Deviation** } since it involves all the scores.

       Standard deviation = $x - \bar{x}$

       - $\bar{x}$ → Means, represent group performance
       - "−" → "different"
       - x → Represents individual performance

       So, standard deviation means the differences among the individual –the average of individual performance.

$$\text{Standard deviation} = S = \sqrt{\frac{(\sum X - \bar{X})^2}{N}}$$

$$\text{Variance} \quad = S^2 = \frac{(\sum X - \bar{X})^2}{N}$$

Do you know? There are two kinds of formulae:

1. **Concept Formulae** (manual) → time consuming.
2. **Computitionist Formulae**