# Research Methodology

## (Lecture 7)

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# Previous Lecture

- Step 5: Data Collection:

  - Primary Data

  - Secondary Data

# Outline

– Research Process

   – Step 6: Data Analysis

   – Step 7: Generalization and Interpretation

   – Step 8: Write Report

# Research Process

– Typical Steps of research process:

~~Define research problem~~

~~literature Review~~

~~Developing the objectives~~

~~Preparing the research design~~

~~Data collection~~

Data analysis

Generalization and Interpretation

Writing Report

# Data analysis

– Processing and analyzing data involves several closely related operations, which are performed with the purpose of summarizing the collected data and organizing these in a manner that they answer the research questions (objectives).

– The Data Processing operations are:

A. **Editing**: a process of examining the collected raw data to detect errors and omissions and to correct these when possible.

B. **Classification**: a process of arranging data in groups or classes on the basis of common characteristics. Depending on the nature of phenomenon involved.

# Data analysis

**B.  Classification**:

–  Classification could be <u>according to attributes</u>: here data is analyzed on the basis of common characteristics which can either be: descriptive <u>such as type, gender, age group</u> etc. or : <u>numerical</u> such as <u>speed, cost, size, etc.</u> Such classification can be either:

I.  <u>Simple classification</u>: where we consider only one attribute, and divide the <u>universe into two classes</u>—one class consisting of items possessing the given attribute and the other class consisting of items which do not possess the given attribute.

| Credit Card Usage | | |
|---|---|---|
| Yes | No | Total |
| 42 | 8 | 50 |

**B. Classification**:

II. <u>Manifold classification:</u> Here we consider two or more attributes simultaneously, and divide the data into a number of classes..

| | Credit Card Usage | | | | | |
|---|---|---|---|---|---|---|
| | Yes | | No | | Total | |
| | M | F | M | F | M | F |
| VISA | 12 | 9 | 3 | 6 | 15 | 15 |
| MasterCard | 15 | 15 | 5 | 5 | 20 | 20 |

# Data analysis

**B. Classification**:

- Classification according to class –<u>intervals</u>: is done with <u>data relating to income, age, weight, tariff, production, occupancy</u> etc. Such quantitative data are known as the <u>statistics of variables</u> and are classified on the basis of class –intervals. The number of items, which fall in a given class, is known as the <u>frequency</u> of the given class.

| Credit Card Usage | | |
|---|---|---|
| Income Range | Frequency | % |
| 1000$ - 2000$ | 10 | 30 |
| 2000$- 3000$ | 8 | 40 |
| Above 3000$ | 2 | 10 |
| Total | 20 | 100 |

# Data analysis

C. Tabulation:

– <u>Tabulation is</u> the process of summarizing raw data and displaying the same in compact form for further analysis. It is an orderly arrangement of data in columns and rows. Tabulation is essential because:

- It conserves space and reduces explanatory and descriptive statement to a minimum.
- It facilitates the process of comparison.
- It facilitates the summation of items and the detection of errors and omissions.
- It provides the basis for various statistical computations.

# Data analysis

C.  Tabulation:

## BIOSTATISTICS : GENERAL RULES FOR TABULATION

**Table Number**

Table 4.5  Population of India according to workers and non-workers by gender and location  **Title**

(Crore)  **Units**

**Column Headings/Captions**

**Row Headings/stubs**

| Location | Gender | Workers | | | Non-worker | Total |
|---|---|---|---|---|---|---|
| | | Main | Marginal | Total | | |
| Rural | Male | 17 | 3 | 20 | 18 | 38 |
| | Female | 6 | 5 | 11 | 25 | 36 |
| | Total | 23 | 8 | 31 | 43 | 74 |
| Urban | Male | 7 | 1 | 8 | 7 | 15 |
| | Female | 1 | 0 | 1 | 12 | 13 |
| | Total | 8 | 1 | 9 | 19 | 28 |
| All | Male | 24 | 4 | 28 | 25 | 53 |
| | Female | 7 | 5 | 12 | 37 | 49 |
| | Total | 31 | 9 | 40 | 62 | 102 |

**Body of the table**

Source : Census of India 2001  **Source note**

Foot note : Figures are rounded to nearest crore  **Footnote**

# Data analysis

❖ **Qualitative Data Analysis**:

– <u>Qualitative data analysis: is </u>the range of processes and procedures whereby we move from the qualitative data that have been collected into some form of explanation, understanding or interpretation of the people and situations we are investigating.

– Qualitative data analysis is usually based on an interpretative philosophy. The idea is to examine the <u>meaningful and symbolic content of qualitative data</u>

# Data analysis

❖ **Qualitative Data Analysis**:

− Terms used in Qualitative data analysis

− Deductive approach
  - Using your research questions to group the data and then look for similarities and differences
  - Used when time and resources are limited
  - Used when qualitative research is a smaller component of a larger quantitative study

1. Inductive approach
  - Used when qualitative research is a major design of the inquiry
  - Using emergent framework to group the data and then look for relationships

# Data analysis

❖ **Quantitative Data Analysis**:

– This <u>method is most suitable for</u> large well-designed and well-administered <u>surveys</u> using properly constructed and <u>worded</u> <u>questionnaire</u>.

– Data can be analyzed either <u>manually</u> or with the help of a <u>computer</u>.

– The easiest way to do this is to code it directly onto large graph paper in columns. Detailed headings can be used or question numbers can be written on each column to code information about the question.

# Data analysis

❖ **Quantitative Data Analysis**:

– In addition, if you want to carry out <u>statistical tests</u>, they must be calculated manually. However, the use of statistics depends on your expertise and the desire/need to communicate the findings in a certain way.

– If you want to analyze data using computer, you should be familiar with the appropriate program. In this area, knowledge of computer and statistics plays an important role.

– The most common <u>software is SPSS</u> for windows. However, data input can be long and laborious process, and if data is entered incorrectly, it will influence the final results.

# Research Process

– Typical Steps of research process:

~~Define research problem~~

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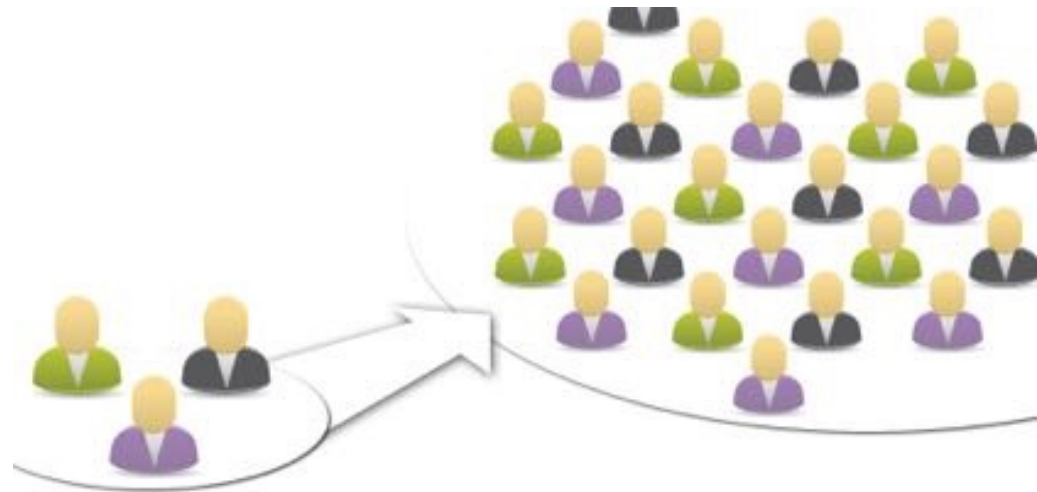~~Data analysis~~

Generalization and Interpretation

Writing Report

# Generalization & Interpretation

- The real value of research lies in its ability to arrive at certain <u>generalizations</u>.

- If a hypothesis is tested and upheld several times, it may be possible for the researcher <u>to arrive at a generalization</u>, i.e., to <u>build a theory</u>

# Generalization & Interpretation

– If the researcher had <u>no hypothesis to start with</u>, he might seek to explain his findings on the <u>basis of some theory</u>. It is **<u>known as interpretation</u>**

– Then, an explanation (interpretation) should be sought to indicate why, how, and when a certain condition or criterion happens. This step is highly dependent on the research field as well as the researcher's work.

# Research Process

– Typical Steps of research process:

Define research problem

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Generalization and Interpretation

Writing Report

# Writing Report

- Writing the report is the last, and for many, the most difficult step of the research process.

- The report informs the world what you have done, what you have discovered and what conclusions you have drawn from your findings.

- The report should be written in an academic style. Language should be formal and not journalistic.
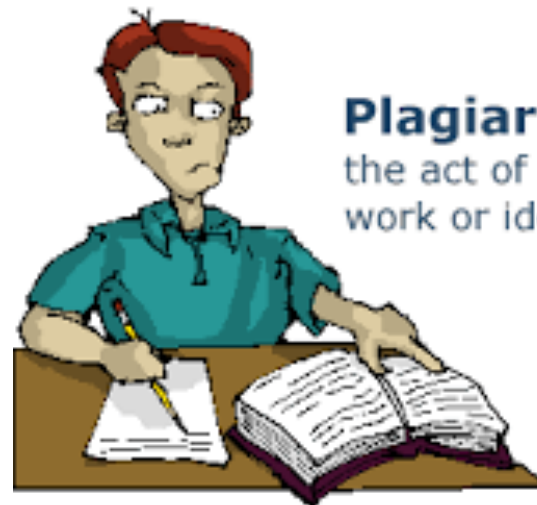
# Writing Report

❖ **What is a scientific paper?**

– A scientific paper has been defined as "a written and published report describing original research results."

– To write a scientific paper, you generally will have to use a certain format and style depending on the requirements dictated.

– An accurate, terse, and lucid presentation of the information at hand is a work of beauty and excitement in its ability to convey maximum information in minimum space and reader time.

# Writing Report

❖ **What is a scientific paper?**



The first page of a typical article from *Plant Physiology*. (See text for more information about each section)

# Writing Report

❖ **What is a Plagiarism?**

– A Plagiarism occurs when a researcher (student or professional), with intent to deceive or with reckless disregard for proper scholarly procedures, presents any information, ideas or phrasing of another as if they were his/her own and/or does not give appropriate credit to the original source.



**Plagiarism:**
the act of presenting another's work or ideas as your own.

# Writing Report

## Copy and Paste

### Original

A Guide for College Success

Here are some expert suggestions for students beginning college. Students should never be afraid to seek help, whether from professors, tutors, or classmates. Professors in college have specific hours, called office hours, set aside each week when they are free to be visited by students. Professors love when students come to their office hours to discuss things about class. Never be afraid to talk to a professor!

### Plagiarized

A Guide for College Success

Below are some excellent suggestions for students beginning college. Students should know there is help on campus. Students should never be afraid to seek help, whether from professors, tutors, or classmates. Professors in college have specific hours, called office hours, set aside each week when they are free to be visited by students. In fact, Professors love when students come to their office hours to discuss things about class. Never be afraid to talk to a professor!

# Writing Report

❖ **What is a Plagiarism?**

– Three simple conventions are presented for when you must provide a reference:

1. If you use someone else's ideas, you should cite the source.

2. If the way in which you are using the source is unclear, make it clear.

3. If you received specific help from someone in writing the paper, acknowledge it.

# Questions & Answers