

COURSE NAME

RESEARCH  
METHODOLOGY  
CSC 4195  
(UNDERGRADUATE)

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## CHAPTER I

### RESEARCH APPROACH

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# WHAT IS RESEARCH?

## ❑ Some Definition of Research:

- Research is a careful investigation for new facts in any branch of knowledge
- Research is a systematic effort to gain new knowledge
- According to Clifford Woody research comprises
  - Defining and redefining problems
  - Formulating hypothesis or suggested solutions
  - Collecting, organizing and evaluating data
  - Making deductions and reaching conclusions;
  - and at last, carefully testing the conclusions to determine whether they fit the formulating hypothesis.



Source: Varghese (2022)

## WHY DO WE DO RESEARCH?

- ❑ **Research expands your knowledge base:** The process of research opens new opportunities for learning and growth.
- ❑ **Research gives you the latest information:** Research encourages you to find the most recent information available. Staying updated prevents you from falling behind
- ❑ **Research helps you know what you're up against:** In business, you'll have competition. Researching your competitors and what they're up to helps you formulate your plans and strategies. In other types of research, like medicine, your research might identify diseases, classify symptoms, and come up with ways to tackle them.
- ❑ **Research builds your credibility:** Doing research gives you a solid foundation on which you can build your ideas and opinions. You can speak with confidence about what you know is accurate.
- ❑ **Research introduces you to new ideas:** The more you research, the more viewpoints you'll come across.
- ❑ **Research helps with problem-solving**
- ❑ **Research helps you reach people**
- ❑ **Research encourages curiosity**
- ❑ ....

## RESEARCH PROCESS

1. Formulating the research problem
2. Extensive literature survey
3. Developing the hypothesis
4. Preparing the research design
5. Determining sample design
6. Collecting the data
7. Execution of the project
8. Analysis of data
9. Hypothesis testing
10. Generalizations and interpretation
11. Preparation of the report or presentation of the results ,i.e., formal write-up of conclusions reached.

## RESEARCH TOPIC VS. RESEARCH QUESTION

- ❑ You will often begin by selecting a **research topic**, then defining a **research question** within this topic to investigate. What's the difference?
- *African Americans and the Civil War* may be a **broad topic** that interests you, but this is not yet a question you can attempt to answer.
- *How did African American participation in the Union and Confederate armies change during the course of the war?* is one example of a **research question** you might create from the previous topic.
- ❑ **A research question must also not be too narrow.**
- *How were African Americans participating in the Civil War in eastern Kentucky in June of 1864?*

## TYPES OF RESEARCH: DESCRIPTIVE RESEARCH

- ❑ Descriptive research includes surveys and fact-finding enquiries of different kinds.
- ❑ *Descriptive research asks “what?” It describes something*
- ❑ The main characteristic of this method is that the researcher has no control over the variables; he can only report what has happened or what is happening.
- ❑ The methods of research utilized in descriptive research are survey methods of all kinds, including comparative and correlation methods.
- ❑ Descriptive Research Question Example:
  - *What are the facts?*
  - *How has the Amsterdam housing market changed over the past 20 years?*
  - *Do customers of company X prefer product X or product Y?*
  - *What are the most popular online news sources among under-18s?*
  - *How prevalent is disease A in population B?*

## TYPES OF RESEARCH: ANALYTICAL RESEARCH

- ❑ The researcher has to use facts or information already available and analyze these to make a critical evaluation of the material.
- ❑ *Analytical research asks “why?” We try to find out how something came to be.*
- ❑ Analytical Research Question Example:
  - Why does this happen?

Descriptive Research Questions	Analytical Research Questions
<i>How many disabled people face Social Isolation?</i>	<i>What causes social isolation in disabled people?</i>
<i>What is the unemployment rate for disabled people?</i>	<i>Why do disabled people have a harder time finding work?</i>

## TYPES OF RESEARCH: **APPLIED RESEARCH**

- ❑ Aims at finding a solution for an immediate specific problem facing a society or an industrial or a business organization.
- ❑ Action research (is a type of applied research) helps businesses find practical solutions to problems by guiding them.
- ❑ Applied Research Question Example:
  - *Is irradiation of beef healthy for consumers?*
  - *Is genetically modified food hurting health?*
  - *Is violence in the media and in video games damaging children's mental health?*
  - *What effect does fast food have on overall health?*
  - *How can social anxiety be overcome?*
  - *How does tobacco use in various forms affect humans?*
  - *How can bullying be prevented in elementary schools?*
  - *Should pilots be armed?*
  - *Is current technology use for children helpful or harmful?*

Source: Hasson (2022);  
Indeed Editorial Team (2022)

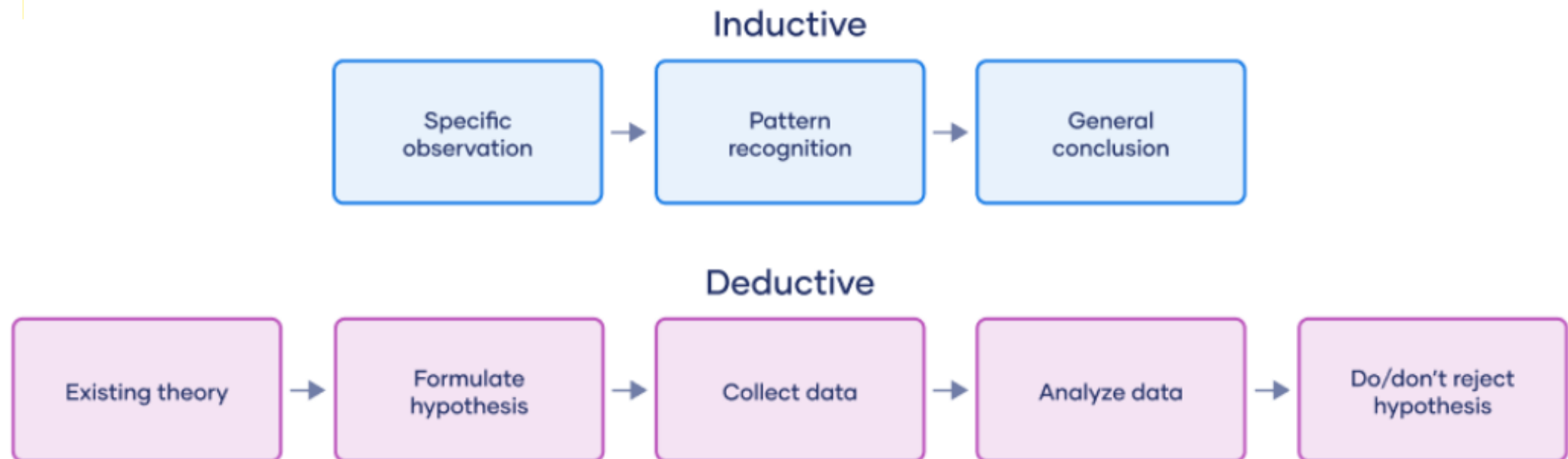


## TYPES OF RESEARCH: FUNDAMENTAL RESEARCH

- ❑ Fundamental (to basic or pure) research is a type of investigation focused on improving the understanding of a particular phenomenon.
- ❑ This type of research examines data to find the unknown and fulfill a sense of curiosity.
- ❑ Usually, these involve "how," "what" and "why" questions to explain occurrences.
- ❑ Fundamental Research is:
  - *A study on the origination of cryptocurrency.*
  - *A study looking to see if gender stereotypes lead to depression*
  - *A study accessing whether stress levels make people more aggressive*

## TYPES OF RESEARCH: INDUCTIVE & DEDUCTIVE REASONING

- Inductive reasoning is a bottom-up approach (from the specific to the general), while deductive reasoning is top-down approach (from general to specific)
- Inductive reasoning aims at developing a theory while deductive reasoning aims at testing an existing theory.



# TYPES OF RESEARCH: **INDUCTIVE REASONING APPROACH**

## Observation

1. A low-cost airline flight is delayed
2. Elephants depend on water to exist

## Observe a pattern

1. Another 20 flights from low-cost airlines are delayed
2. All observed animals depend on water to exist

## Develop a theory or general (preliminary) conclusion

1. Low-cost airlines always have delays
2. All biological life depends on water to exist

## TYPES OF RESEARCH: DEDUCTIVE REASONING APPROACH

**Start with an existing theory (and create a problem statement)**

1. All Low-cost airlines always have delays
2. All biological life depends on water to exist

**Formulate a falsifiable hypothesis based on existing theory**

1. If passengers fly with a low-cost airline, then they will always experience delays
2. All land mammals depend on water to exist

**Collect data to test the hypothesis**

1. Collect flight data of low-cost airlines
2. Study all land mammal species to see if they depend on water

**Analyze and test the data**

1. 5 out of 100 flights of low-cost airlines are not delayed
2. All land mammal species depend on water

**Decide whether you can reject the null hypothesis**

1. 5 out of 100 flights of low-cost airlines are not delayed = reject hypothesis
2. All land mammal species depend on water = support hypothesis

## TYPES OF RESEARCH: QUANTITATIVE RESEARCH

- ❑ Quantitative research is based on the measurement of quantity or amount.
- ❑ Quantitative Research Question Example:
  - *How regularly do high school teachers go abroad for a holiday?*
  - *What is the difference in the daily calorie intake between men and women in London?*
  - *What is the relationship between job satisfaction and salary amongst London residents?*
- ❑ Quantitative research question Example No. 1:
  - **Research topic:** *Physical exercise and heart diseases.*
  - **Research objective:** *To determine the relationship between physical exercise and heart diseases.*
  - **Research question:** *How does an increase in physical exercise result in a decrease in potential heart diseases?*

## TYPES OF RESEARCH: QUANTITATIVE RESEARCH

### ❑ Quantitative research question Example No. 2:

- **Research topic:** *Nurse's attitude and recovery speed of a patient.*
- **Research objective:** *To determine relationship between a nurse's attitude and speed of recovery of a patient.*
- **Research question:** *How does a nurse's attitude towards her patient affect the speed of his recovery?*

### ❑ Quantitative research question Example No. 3:

- **Research topic:** *Relation between different Smoking patterns and lung diseases.*
- **Research objective:** *To determine the relationship between an individual's smoking patterns and lung diseases.*
- **Research question:** *What is the relationship between smoking patterns as individuals and lung diseases?*

## TYPES OF RESEARCH: QUANTITATIVE RESEARCH

### ❑ Quantitative research question Example No. 4:

- **Research topic:** *Social media tools and students' grades.*
- **Research objective:** *To explore the relationship between social media tools and a student's grades.*
- **Research question:** *What is the relationship between social media usage patterns of students and their grades?*

### ❑ Quantitative research question Example No. 5:

- **Research topic:** *Employee rewards and organizational performance.*
- **Research objective:** *To understand the relationship between employee rewards and organizational performance.*
- **Quantitative Research Question examples:** *what are the effects of employee rewards on the overall performance of the organization?*

## TYPES OF RESEARCH: QUALITATIVE RESEARCH

- ❑ Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind.
- ❑ Qualitative Research Question Example:
  - *What reasons contribute directly to the rising rate of high school student dropouts?*
  - *Why do people still smoke even after knowing its disadvantages to health?*
  - *How do social media tools affect a student's grades in his academic years?*



## RESEARCH DESIGN



*Source: 2003-2022 Shutterstock, Inc.*

- Attempts to explain phenomena by collecting and analysing numerical data
- Tells you if there is a “difference” but not necessarily why
- Data collected are always numerical and analysed using statistical methods
- Randomisation to reduce subjective bias
- If there are no numbers involved, its not quantitative

## QUANTITATIVE DATA SOURCES

### □ Data sources include

- Surveys where there are a large number of respondents (i.e., where you have used a Likert scale)
- Observations (counts of numbers and/or coding data into numbers)
- Secondary data (e.g., government data, historical data)

### □ Analysis techniques include hypothesis testing, correlations and cluster analysis

How satisfied are you with \*

	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
Purchase	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Company Overall	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Source: 2016-2022 WPForms, LLC

The task of grouping a set of objects in such a way that objects in the same group (called a cluster) are more similar (in some sense) to each other than to those in other groups (clusters)

## QUALITATIVE RESEARCH

- *Qualitative Research involves finding out what people think, and how they feel or what they say they think and how they say they feel. This kind of information is subjective. It involves feelings and impressions, rather than numbers'*

*Bellenger, Bernhardt and Goldstucker, Qualitative Research in Marketing, American Marketing Association*

- Qualitative research is multimethod in focus, involving an interpretative, naturalistic approach to its subject matter.
- Qualitative Researchers study “things” (people and their thoughts) in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them.



Source: The Australian Consortium for Social and Political Research Incorporated (ACSPRI)

# QUANTITATIVE **VS.** QUALITATIVE RESEARCH

## Qualitative Designs

*Can also be mixed-methods*

- Deals with descriptions/words
- Data can be observed but not measured
- Small sample size
- Colors, textures, smells, tastes, appearance, beauty, etc.
- Subjective/Interpretive data analysis

## Quantitative Designs

- Deals with numbers
- Data which can be measured
- Large sample size
- Length, height, area, volume, weight, speed, time, temperature, humidity, sound levels, cost, members, ages, etc.
- Statistical data analysis

- No better way than qualitative research to understand in-depth the motivations and feelings of consumers
- Qualitative research can improve the efficiency and effectiveness of quantitative research

## QUANTITATIVE VS. QUALITATIVE RESEARCH



Example: Freshman Class

Example: Freshman Class

- \* friendly demeanors
- \* civic minded
- \* environmentalists
- \* positive school spirit

- \* 672 students
- \* 394 girls, 278 boys
- \* 68% on honor roll
- \* 150 students accelerated in mathematics

*Source: Madison County Schools*

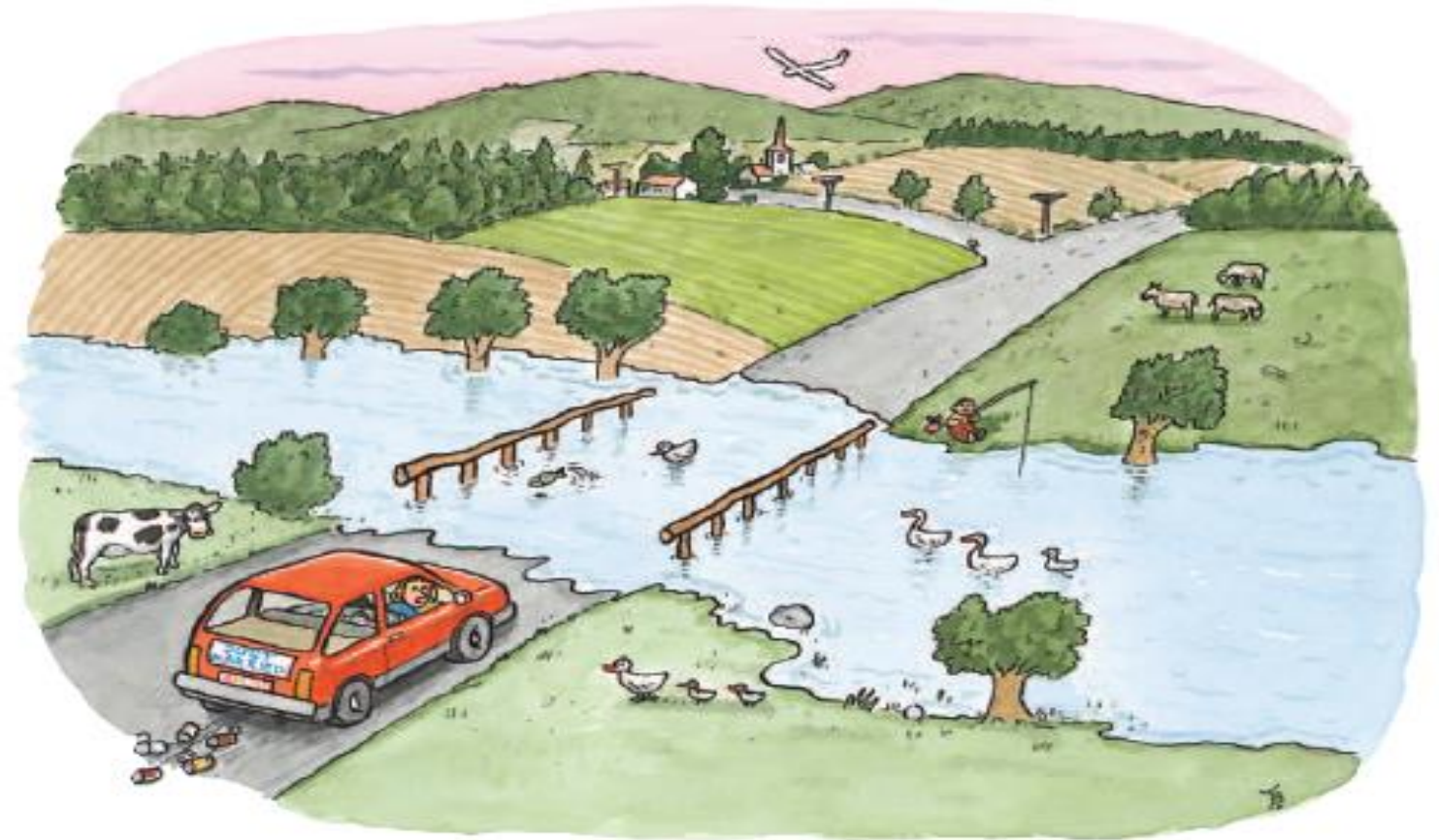
## QUANTITATIVE VS. QUALITATIVE RESEARCH

Make one qualitative observation about the picture above.

Explain why this is a qualitative observation.

Make one quantitative observation about the picture above.

Explain why this is a quantitative observation.



Source: Madison County Schools



## QUANTITATIVE **VS.** QUALITATIVE RESEARCH

Make one qualitative observation about the picture above.

Explain why this is a qualitative observation.

Make one quantitative observation about the picture above.

Explain why this is a quantitative observation.



Source: Madison County Schools

# QUANTITATIVE **VS.** QUALITATIVE RESEARCH

## Quantitative Designs

- Experiment
- Survey
- Program evaluation
- Secondary data

*Can also be mixed-methods*

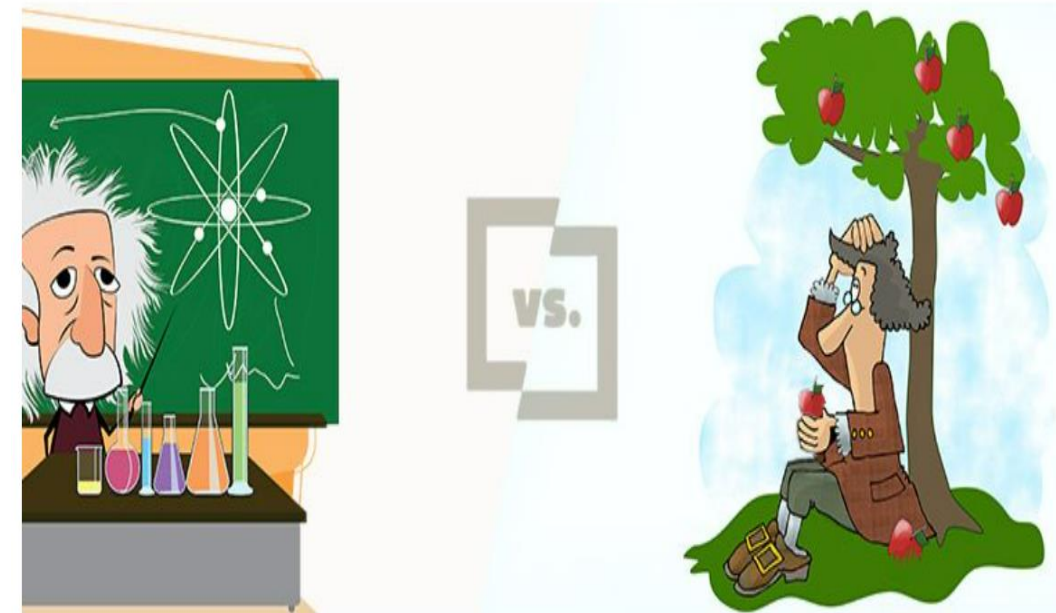
## Qualitative Designs

- Interview
- Focus group
- Case study
- Ethnographic Studies



## TYPES OF RESEARCH: CONCEPTUAL RESEARCH

- ❑ Conceptual research is that related to some abstract idea(s) or theory without experiment.
- ❑ Conceptual research is defined as a methodology wherein research is conducted by observing and analyzing already present information on a given topic
- ❑ Process: (a) Choose the topic for research, (b) Collect relevant literature, (c) Identify specific variables, (d) Generate the framework
- ❑ Conceptual Research Question Example:
  - *What causes heart disease?*
  - *How can we describe the movements of the planets?*



Source: QuestionPro (2022); Enago Academy (2022)

## TYPES OF RESEARCH: EMPIRICAL RESEARCH

- ❑ It is data-based research, coming up with conclusions which are capable of being verified by observation or experiment. We can also call it as experimental type of research.
- ❑ Empirical Research Question Example:
  - *What is the relationship between income and obesity?*
  - *Do gun control laws reduce violent crimes?*
  - *What is the effect of working during high school (or college) on GPA?*
  - *Are police officers compensated for working in higher-risk environments?*
  - *Are cigarette smokers less productive? Do they take more sick days?*
  - *Does firm performance affect CEO salaries?*

## TYPES OF RESEARCH: EXPLORATORY-FORMALIZED RESEARCH

- ❑ The objective of exploratory research is the development of hypotheses rather than their testing
- ❑ Formalized research studies are those with substantial structure and with specific hypotheses to be tested.
- ❑ Exploratory Research Question Example:
  - *How common are eating disorders among today's youth?*
  - *What is the effect of social media on the attention span of teenagers?*

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