
Overview and understanding the roles of Research

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EDCT P



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Scientific

“Research is a systematic investigation into and

Research subjects and context

study of **materials and sources** in order to

Physical

Intellectual

Tangible

Intangible

establish facts and reach new conclusions.”

*Principles or generalizable
knowledge*

Evidence-based results

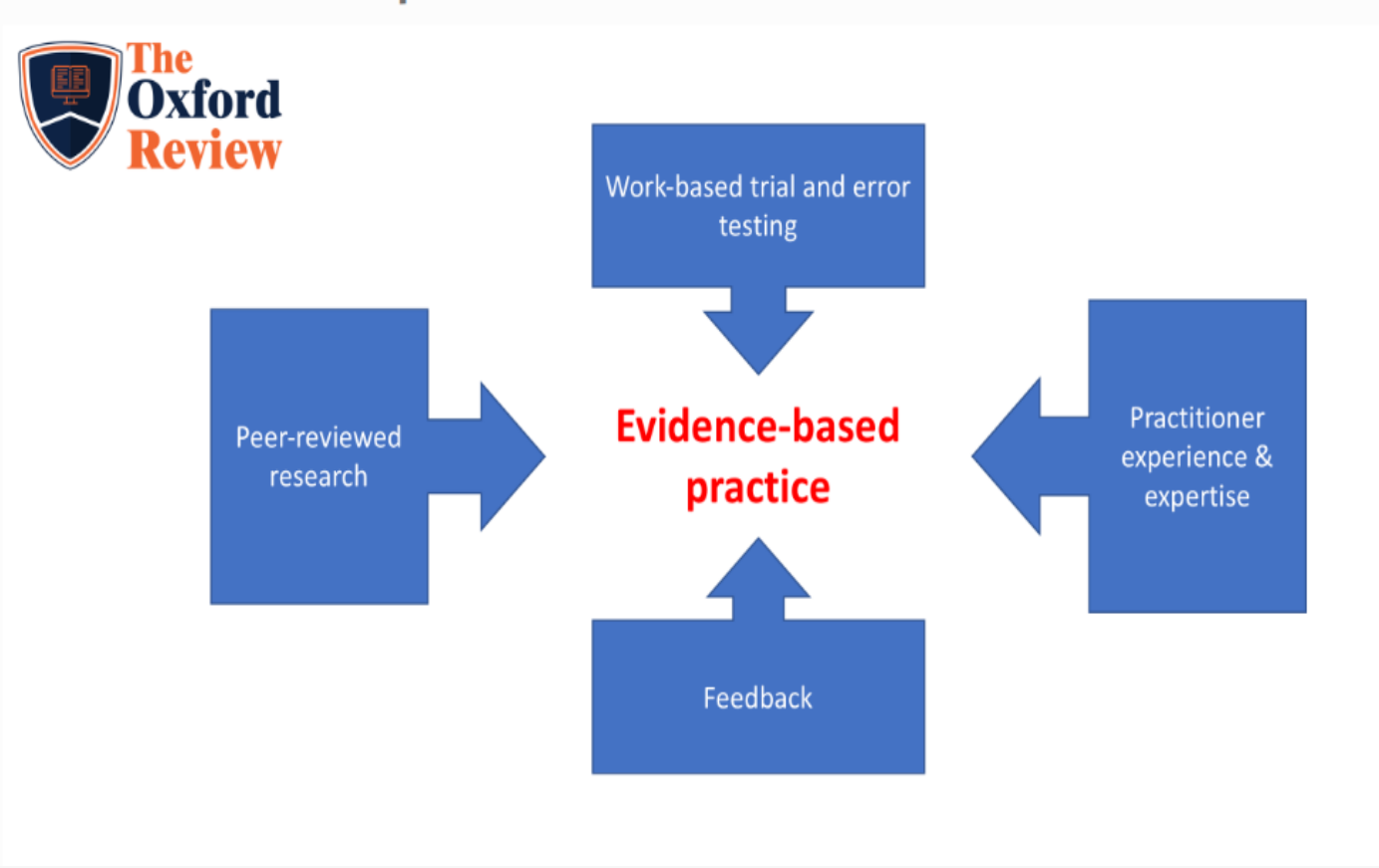
oxforddictionaries.com/definition/research



"Generalizable knowledge"

is information where the intended use of the research findings can be applied to populations or situations beyond that studied

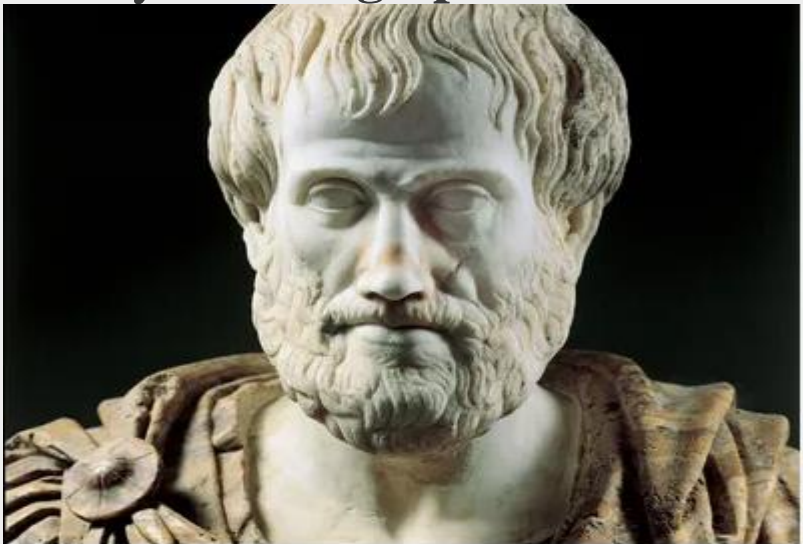
means that (1) conclusions are drawn from particular instances and (2) the information from the investigation is to be disseminated.



Historical perspective of scientific research & methods

Ancient Greek scientists

Aristotle, regarded as the father of science, was the first to realize the importance of **empirical measurement**, believing that knowledge could only be gained by **building upon what is already known**



Aristotle's methods can be summed up as follows.

1. Study what others have written about the subject.
2. Look for the general consensus about the subject
3. Perform a systematic study of everything even partially related to the topic.

The Muslim Influence On the History of the Scientific Method

They preserved the knowledge of the Ancient Greeks, including Aristotle, added and catalyzed the formation of a scientific method recognizable to modern scientists and philosophers.

The first, and possibly greatest Islamic scholar, was **Ibn al-Haytham**, best known for his summarized work in the 'The Book of Optics.' He developed a scientific method very similar to our own:

1. State an explicit problem, based upon observation and experimentation.
2. Test or criticize a hypothesis through experimentation.
3. Interpret the data and come to a conclusion, ideally using mathematics.
4. Publish the findings



Types of Research

1. Applied Research

It is a scientific study that seek to solve various practical problems in the day-to-day life. It find answers or solutions to everyday problems, cure illness, develop innovative technologies etc.

For example-

- 1.Improve agricultural crop production
- 2.Treat or cure specific disease
- 3.Improve energy efficiency of homes, offices, modes of transportation

2.Basic Research

It is called as Fundamental or Pure research. It Expands the person's knowledge. This type of research is not going to create or invent anything new. Instead, it is based on Basic science investigation.

For example-

- 1.How did universe begin?
- 2.What are protons?

3. Correlational Research

The relationship among 2 or more variables without necessarily determining the **cause** and **effect** is known as correlational research.

For example-

Correlation between obesity and diabetes mellitus, Correlation between smoking and cancer

Advantages-

1. It is easy to collect much information from many subjects at single time.
2. Wide range of variables and their interrelations.
3. Study variables are not easily produced in the laboratory.

Disadvantages-

1. Does not indicate causation (cause and effect)
2. Problems with self reporting method



4.Descriptive Research

This type of research provides accurate portrayal of characteristics of a particular individual, situation or group. Also known as statistical research. It deals with everything that can be counted and studied which have an impact on the lives of people.

Advantages-

- 1.Less expensive, time consuming
- 2.Collect a large amount of notes for detailed studying.

Disadvantages-

- 1.Require more skills
- 2.Does not identify cause behind the research

5. Ethnographic Research

- This type of research involves investigation of a culture through an in-depth study of members of culture.
- It involves systematic collection, description, analysis of data for development of theories of cultural behavior.
- There are anthropological studies that studies people, ethnic group, ethnic formations and social welfare characteristics.
- It is done on the basis of observations, interviews, questionnaire and data collection

6. Experimental Research

This study involves objective, systematic, controlled investigation for purpose of predicting and controlling the phenomena. It also includes examining the probability and causality among variables.

Advantages-

1. Best in establishing the cause and effect relationships

Disadvantages-

1. Artificiality

2. Feasibility

3. Unethical

Variables-

There will be two variables- Dependent and Independent

Types of Research Continues

7. Exploratory Research

- This type of research will be conducted for a problem that has not been clearly defined.
- It helps to determine the best research design, data collection method and selection of subjects. It is quite informal relying on the secondary research.

For Example-

- Online marketing and exploring through different sites

8. Ground Theory Research

- It studies about the problems existing in a given social environment and how people involved handles them. It operates almost in a reverse fashion from traditional research and involves 4 stages- Codes, Concepts, Categories and Theory

For Example-

- Creating a situation and looking at how people react to it

9. Historical Research

- Research involving analysis of events that occurred in the remote or recent past.
- Application- Understanding this can add perspective on how we can examine the current situation

10. Phenomenological Research

It aim to describe an experience that has been actually lived by a person.

For example-

A person suffering from cancer, quality of life of the patient at that point of time.

Scientific discoveries powered by Research

Genome editing

“It has given scientists the power to surgically remove - and just as excitingly, monitor the activity of - genes and the regulatory elements that control them.

CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats)

CRISPR can be used to edit, knock-out, inhibit and activate genes

RNA-sequencing

“Being able to sequence the transcriptome of cells from different physiological conditions has opened the door for identifying critical molecular markers for such disease states and has greatly aided in the development and / or identification of therapeutics and diagnostics.”

Penicillin: “Not only did it save so many lives but it jump-started antibiotic drug discovery which has helped evolve all modern medicine.”

The molecular structure of DNA

So much of our modern-day research revolves around genetics: from pinpointing the causes of genetic disorders, to manipulating the genome of organisms and observing how this affects their behaviors.

Even outside of life sciences, DNA profiling has changed the world of forensic science to improve the criminal justice systems.”

Scientific discoveries powered by Research

Levodopa

Levodopa crosses the blood-brain barrier and gets converted to dopamine, which gives really fast symptomatic relief to PD patients who lack dopamine-producing cells

Painkillers and anaesthetic

“That you can stop a headache with a pill, be cut open during an operation, or even have a limb removed without your mind registering pain is incredible.”

Vaccines

“They have prevented countless numbers of deaths and diseases, all because of one man and a cow.”

Electricity:

Almost Half of the global population depends on Electricity for survival and livelihood.

Importance of Research in Medicine

1. disease diagnosis

- diagnostic tools and technologies have allowed for earlier and more accurate diagnoses of diseases.
- For instance, breast cancer (mammography), cervical cancer (pap smear) etc. Early detection always reduce case fatality rate
- Recently in diagnosis of COVID19, Ebola Virus Disease, Arboviruses and VHF's

2. Innovative treatments

- Research is essential to find out what treatments work best, and more specifically what treatments work best for what patient.
- It can provide important information about how effective a medical intervention is and its possible adverse effects.
- These interventions include drugs, vaccines, medical devices, and others.

3. Disease prevention

- Medical research has contributed to the prevention of diseases such as **polio**, **smallpox**, and **measles** which caused the deaths of millions of people in the past.
- Recently, following the Covid-19 pandemic, medical research led to the development of **vaccines** that gradually slowed down the progress of the disease.

4. Public Health

- in 1854 when there was an outbreak of cholera in the in London, John Snow conducted an epidemiological study and found the source of contamination to be a public pump.
- When the contaminated pump was closed from public access, the outbreak of cholera ended.
- Research provides important information about disease trends, risk factors, outcomes of treatment or public health interventions, functional abilities, patterns of care, and health care costs and use.

Medical research's importance in improving the economy

- Economists have found medical research to have an enormous impact on the quality of healthcare which in turn affects human health and longevity.
- If the research enterprise is impeded, or if it is less robust, important societal interests are affected.
- Covid-19 vaccine development, for example, contributed to the lifting of the lockdown in many countries and allowed individuals to resume work.
- Compared to treatment, current research on disease prevention shows that preventive services are able to significantly reduce deaths and illnesses at reasonable costs.
- All of these findings have informed and influenced national budget planning and policy decisions.

Benefits of research to researchers

- **Research expands your knowledge base**
- **Research gives you the latest information**
- **Research helps you know what you're up against**
- **Research builds your credibility**
- **Research helps you narrow your scope**
- **Research teaches you better discernment**
- **Research introduces you to new ideas**
- **Research helps with problem-solving**
- **Research helps you reach people**
- **Research encourages curiosity**



THANK YOU FOR THE
GREAT AUDIENCE

