RESEARCH METHODS

CENTRAL UNIVERSITY

FAITH • INTEGRITY • EXCELLENCE

Presented by

Dr. K. Kissi Mireku

What is Research

Research Meaning

- Research is purposeful investigation

There are three parts involved in any investigation.

- *The implicit question posed*
- *The explicit answer proposed*
- *Collection, analysis and interpretation of the information leading from the question to the answer.*

- It provides a structure for decision making.
  - *The word research identifies a process by which the organisation attempts to supply the information required for making sound management decisions.*

Research Meaning

- Research is not synonymous with common sense.
- The difference revolves around words such as "**systematic**", "**objective**", and "**reproducible**".
- Both research and common sense depend on information;
  - the distinction between them lies in the procedures and methods adopted by which the information is obtained and used in arriving at conclusions.
- Research cannot address itself to the complete information on a particular subject.
- Two secondary characteristics of research specify "**relevance**", and "**control**".

Research Definition

- **Investigating** using **scientific** procedures, by search again and again to find out the truth.
  - *Research is the continual search for truth using the scientific method.*
  - *It is the pursuit of the truth with the help of study, investigation, comparison and/or experimentation.*
- Systematic, investigative process employed to increase or revise current knowledge by discovering new facts
- Experiments to test scientific hypotheses at the heart of any science,
  - *The results of tested hypotheses becomes part of the accumulated body of knowledge of the field,*

Research Definition

- **Research,** according to WHO, 1992:
  - *Research is a quest for knowledge through diligent search or investigation or experimentation aimed at discovery and interpretation of new knowledge. Scientific method is a systematic body of procedures and techniques applied in carrying out investigation or experimentation targeted at obtaining new knowledge.*
- According to Oxford dictionary:
  - *A proposition laid down as a theme to be discussed and proved. A discussion to maintain and prove a thesis especially written or delivered by a candidate for university degree.*

ROLE OF RESEARCH IN IMPORTANT AREAS

- **Marketing :**
  - *Marketing research involves the process of systematic collection, compilation, analysis, and interpretation of relevant data for marketing decisions..*
- Tools are applied effectively for studies involving:
  - *demand forecasting,*
  - *consumer buying behaviour,*
  - *measuring advertising effectiveness,*
  - *media selection,*
  - *test marketing,*
  - *product positioning, and new product potential.*

ROLE OF RESEARCH IN IMPORTANT AREAS

❑Education

- ➢*Attention is on how to use scientific enquiry in education to make educationally relevant decisions. This include classroom management, student learning, curriculum development and others.*

❑Banking

Banking institutions have found it useful to setup research departments for the purpose of gathering and analysing information both for their internal operation and for making in-depth studies on economic conditions of business.

ROLE OF RESEARCH IN IMPORTANT AREAS

Computer Science

- *The most important aspect of **computer science** is **problem solving**, an essential skill for life.*
- *Students study the **design, development** and **analysis** of **software** and **hardware** used to solve problems in a variety of business, scientific and social contexts*
- *The CS department uses research to advance knowledge in information technology.*

Human Resource Development

- *The human resource development uses research to study wage fates, incentive schemes, cost of living employee turnover rates, employment trends and performance appraisal.*
- *It also uses research effectively for its most important activity namely manpower planning.*

ROLE OF RESEARCH IN IMPORTANT AREAS

Government

- *Research lays the foundation for all government policies in our economic system.*
- *Research is used for economic planning and optimum utilisation of resources for the development of the nation.*
- *It is also needed for systematic collection of information on the economic and social structure of the nation.*
- *Such information indicated what is happening to the economy and what changes are taking place.The most important aspect of computer science is problem solving, an essential skill for life.*

What is NOT Research ?

- *1. Authority*
- *2. Tradition*
- *3. Common sense*
- *4. Media myths*
- *5. Personal experience*

Research Category / Types

It is divided into two general categories:

❑Basic Research:

- Basic research is an investigation on basic principles and reasons for occurrence of a particular event or process or phenomenon.
- Basic research is inquiry aimed at increasing scientific knowledge
- Basic research is aimed at generating fundamental knowledge and theoretical understanding about basic human and other natural processes.
- The basic researcher's motivation often comes from an insatiable curiosity and a desire to gain knowledge for knowledge sake.

❑Basic research

- Seeks generalization, Aims at basic processes
- Attempts to explain why things happen
- Tries to get all the facts, Reports in technical language of the topic

Research Category / Types

❑ Applied Research:

- *is effort aimed at using basic research for solving problems or developing new processes, products, or techniques.*
- *Topics for applied research are often driven by current problems of all spheres of life.*
- *focused on answering real world practical question to provide relatively immediate solutions.*
- *Applied research is more realistic than basic research.*

❑ Applied research

- *Studies individual or specific cases without the objective to generalize*
- *Aims at any variable which makes the desired difference*
- *Tries to say how things can be changed*
- *Tries to correct the facts which are problematic*
- *Reports in common language*

Who Need Research?



- *In this 'Age of Information'*
  - *How to find the information*
  - *How to evaluate it*

Who Need Research?

- When you think of a researcher….









- *In this 'Age of Information'*
  - *How to report it clearly and accurately*
  - *How to improve it*
  - *How to make money out of it*


Who Need Research?

'Researching Skills'

In this 'Age of Information'

- How to find the '**right**' information
- How to evaluate it
- How to develop/improve it
- How to report it clearly and accurately
- How to make money out of it

Searching Skills

Reviewing Skills

Engineering/Scientific Skills

Writing Skills

Business Skills

Research Fundamentals

One Fundamental Aspect of Research is "Asking Questions"

- As many as one can…
- Framing Questions
- Identifying Sensible/Meaningful/Useful/Relevant/Important Questions
- Investigate those questions
- Report those questions

One Fundamental Aspect of Research is "Asking Sensible Questions"

…

- How to find the information
- How to evaluate it
- How to report it clearly and accurately
- How to improve it
- How to make money out of it
- ….

Research Methods

Basic and applied research, further divided into three types of research bearing some characteristics feature as follows:

- **Quantitative Research Method** also called Positivism
- **Qualitative Research Method** also called Interpretivism
- **Mixed Method Research** also called Pragmativism

Quantitative Research

- Quantitative research is based on the measurement of quantity or amount.
  - *It is numerical, non-descriptive, applies statistics or mathematics and uses numbers.*
  - *It is applicable to phenomena that can be expressed in terms of quantity.*
- As the name suggests, is concerned with trying to quantify things; it asks questions such as ‘how long’, ‘how many’ or ‘the degree to which’.
- Quantitative methods are research techniques that are used to gather quantitative data, data that can be sorted, classified, and measured.
  - *The results are often presented in tables and graphs.*
  - *It is conclusive.*
  - *It investigates the what, where and when of decision making.*

Qualitative Research

- Qualitative research is concerned with qualitative phenomenon
  - *i.e., phenomena relating to or involving quality or kind.*
  - *It is concerned with the quality of information.*
- Qualitative methods attempt to gain an understanding of the underlying reasons and motivations for actions and establish how people interpret their experiences and the world around them.
- Qualitative methods are generally associated with the evaluation of social dimensions.
- It provide results that are usually rich and detailed, offering ideas and concepts to inform your research.
- Qualitative methods can tell you how people feel and what they think, but cannot tell you how many of the target population feel or think that way as quantitative methods can.

Qualitative Research

- Qualitative research is concerned with qualitative phenomenon
  - *i.e., phenomena relating to or involving quality or kind.*
  - *It is concerned with the quality of information.*
- Qualitative methods attempt to gain an understanding of the underlying reasons and motivations for actions and establish how people interpret their experiences and the world around them.
- Qualitative methods are generally associated with the evaluation of social dimensions.
- It provide results that are usually rich and detailed, offering ideas and concepts to inform your research.
- Qualitative methods can tell you how people feel and what they think, but cannot tell you how many of the target population feel or think that way as quantitative methods can.

Differences between Qualitative and Quantitative Research

Quantitative	Quanlitative
Objective Subjective	Objective Subjective
Research questions: How many?	Research questions: What? Why?
Test theory	Develops theory
Measurable (in numeric terms)	Interpretive
Report statistical analysis.	Report rich narrative, individual; interpretation
Establishes relationships, causation	Describes meaning, discovery
Generalizations leading to prediction, explanation, and understanding	Patterns and theories developed for understanding
Highly controlled setting: experimental setting (outcome oriented)	Flexible approach: natural setting (process oriented)

Qualitative and Quantitative Research

	Quantitative	Qualitative
Aim	The aim is to count things in an attempt to explain what is observed. It is also to test hypotheses that the researcher generates.	The aim is a complete, detailed description of what is observed. It is also to discover and encapsulate meanings once the researcher becomes immersed in the data.
Purpose	Generalizability, prediction, causal explanations.	Contextualization, interpretation, understanding perspectives.
Theory	Theory is largely causal and is deductive.	Theory can be causal or non-causal and is often inductive.
Tools	Researcher uses tools, such as surveys, to collect numerical data.	Researcher is the data gathering instrument.
Procedures	Procedures are standard, and replication is assumed.	Research procedures are particular, and replication is

	Quantitative	Qualitative
Output	Data is in the form of numbers and statistics.	Data is in the form of words, pictures or objects.
Sample	Usually a large number of cases representing the population of interest. Randomly selected respondents.	Usually a small number of non-representative cases. Respondents selected on their experience.
Objective/ Subjective	Objective – seeks precise measurement & analysis.	Subjective - individuals' interpretation of events is important
Researcher Role	Researcher tends to remain objectively separated from the subject matter.	Researcher tends to become subjectively immersed in the subject matter.
Analysis	Statistical. Analysis proceeds by using statistics, tables, or charts and discussing how they relate to hypotheses.	Interpretive. Analysis proceeds by extracting themes or generalizations from evidence and organizing data to present a coherent, consistent picture. These generalizations can then be used to generate hypotheses.

Mixed Method Research

Combining quantitative and qualitative methods sounds like a good idea.

Using multiple approaches can capitalize on the strengths of each approach and offset their different weaknesses.

It could also provide more comprehensive answers to research questions, going beyond the limitations of a single approach.

Mixed methods can be useful where elements of both approaches can be used both to triangulate results and to develop richer pictures still of the phenomenon under investigation.

Triangulation is the process where using different methods of data collection and analysis will both enrich and confirm the picture you collect of a situation.

Types of Educational Research

Creswell defines ER "…Aside from the pure pursuit of knowledge for its own sake, research is linked to problem-solving,"

There are majorly 3 types of educational research.

- **Descriptive:**
  - *This type of research will try to describe things as they presently are.*
- **Correlation:**
  - *This type of study will try to identify the relationship between two or more things.*
    1. *What is the relation between IQ and self-esteem?*
    2. *Does a statistic aptitude test predict success in a statistic course?*
- ***Experimental:***
  - *This research tries to display a relation between two or more things. They usually might be groups.*

Empirical Investigations

Common tasks

- Identify goals, questions and measures (metrics)
- Choosing research method(s)
- Planning, designing, and carry out investigations
- Data collection,
- Data Analysis
- Results
- Validity considerations
- Conclusions


Why Research Is Important
For Students
Education and Beyond
Skills Development
Why Research is Important for Students, Humans, Education

Why Research is IMPORTANT to Student

Enhances knowledge:

- *When you research any topic, you get to know detailed information about that topic. The more the knowledge of the topic, the more successful is the research. So, in order to get good output, the student needs to do maximum research.*

Clarifies confusion:

- *The research helps in clarifying the complicated facts and figures. If the student has any doubt on the subject, the student must research and study it in detail so as to remove all sorts of confusion and get a proper understanding of the content.*

To have a proper understanding of the subject:

- *To understand the subject, one needs to go in depth of the lines. The scanning of the content will never do any good for the students.*
- *In order to learn the subject and to know the unknown facts, research, detail study, and full analysis are the must.*

To learn about the methods and issues:

- *Proper reading, the finding is the only way by which you can learn about the methods and the current issues. Not just the current issues, rather the previous past issues can also learn in detail through the research. The research includes various methods by which it can be done.*

Why Research is IMPORTANT to Student

- **Understand the published work:**

  Research is done through the work already published. The experts and the researchers had already done some of the research and the students are asked to go through that published material to understand the idea and the vision of those researchers.

- **Learn to create a balance between collaborative and individual work:**

  When the students do research, they get to know how to create a balance between the collaborative and the individual work. Individual work in which the student has to do, while the collaborative work means that work which has already been done by the previous researchers.

- **To know the interest:**

  The students also get to know their area of interest. Sometimes, the students aspire to become researchers only in their near future which is quite helpful.

- **To know how the original study originated:**

  Research is performed to understand the concept from scratch. Like, if you wish to know from where has the concept originated, then this could be done only through the research work.

  It can also define as an investigation because the student eventually ends up with expanded research.

THE FUTURE

- The investigators held creative workshops, and participants used the knowledge to develop three plausible scenarios of the future:
- **Brave open world** considers the rise of open science.
- **Tech titans** looks at the growing influence of technology.
- **Eastern ascendance** considers the role the East – and China in particular – might play

Experts debate the future of research at an interactive panel at the AAAS Annual Meeting in Washington, DC (from left): Dr. Peter Tindemans, Secretary General of EuroScience; Mary Woolley, President and CEO of Research!America; Prof. Sir Peter Gluckman, President Elect of the International Science Council; Dr. Joanne Tornow, Assistant Director for Biological Sciences at the National Science Foundation and, at the podium, Adrian Mulligan, Research Director for Customer Insights at Elsevier. (Photos by Alison Bert)

Assignment 1 – Group work

- Research on the following and present during our next class
- Why is students not attending Wednesday Service?
  - *Group 1 and 2*
- Which days and time are the best for students to attend lectures?
  - *Group 3 and 4*
- Why do students prefer outside hostel to campus ones?
  - *Group 5 and 6*

Assignment 1 – individual assignment

Explain the following terms and state their differences and similarities.

- Thesis
- Dissertation
- Research Paper
- Term Paper
- Report Writing
- Research Proposal