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POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
STA. MESA, MANILA
COLLEGE OF ENGINEERING
COMPUTER ENGINEERING DEPARTMENT

CMPE 30193

METHODS OF RESEARCH

INSTRUCTIONAL MATERIAL

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INSTRUCTIONS FOR SUBMISSIONS OF THE COURSE REQUIREMENTS WHILE WE ARE IN PANDEMIC SITUATION

1. Send your answer to the assignment/ course requirements based on your own phase and whichever is applicable to you on or before the end of the First Semester of SY 2020-2021:

A. Via email gsmse18@gmail.com ;
B. Via COELMS Portal;
C. Compile your answer to the Activities / Assessment Tasks / Assignment and send back to :

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Anonas Street Sta. Mesa Manila

D. A drop box in the CEA Building near the guard house can be utilized for the student submissions of course requirements/ Activities and Assessment Task.

2. For Student Research Advising/ Consultation/ Questions/ Clarifications:

A. FlexTel or Flexible Mode of Learning Delivery will be observed or practiced within the First Semester SY 2020-2021
B. There will be an agreed schedule of online video conference via any free social media / platform as may be agreed by the class or group of students.
C. Mobile Text / Call or Landline Call is also encouraged.

LESSON 1: ACADEMIC HONESTY, PLAGIARISM & QUALITIES OF GOOD RESEARCHER

OVERVIEW

This lesson will help you develop qualities of a good researcher on upholding the highest Integrity and Honesty. It will begin with the definition of academic honesty and dishonesty and you will be familiarized on the different best practices in doing the research.

LEARNING OUTCOMES

1. Demonstrate knowledge on Academic Honesty in doing the research interest or field of specialization.
2. Evaluate the ethical and societal implications of a research design solutions to a problem in Computer Engineering.

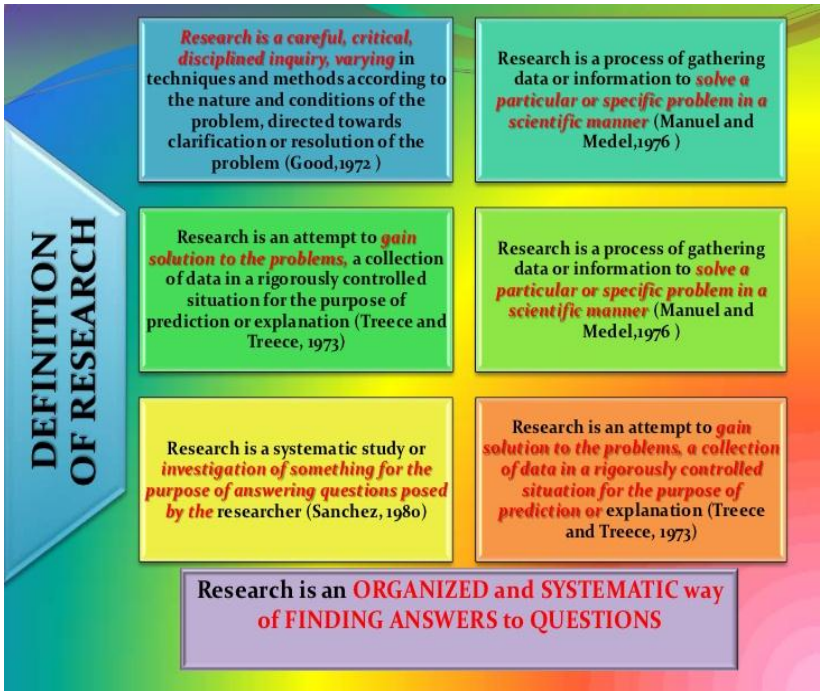
Source: https://www.sevanoland.com/academic-honesty.html

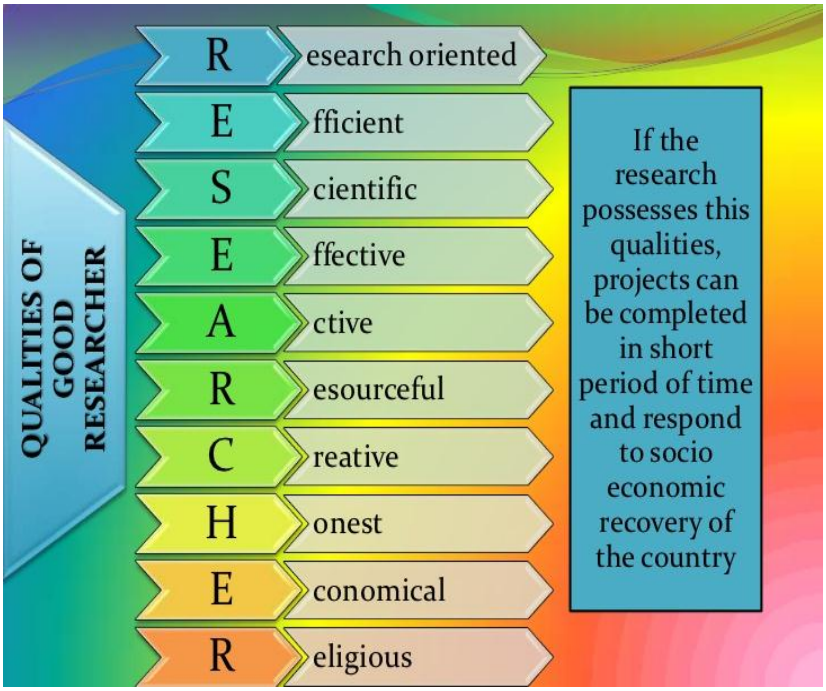
Academic Honesty means demonstrating and upholding the highest integrity and honesty in all the academic work that you do. It means doing your own work and not cheating, and not presenting the work of others as your own.

There are also what we called academic dishonesty - some are obvious, while some are less obvious. Some examples of dishonesty are Cheating; Bribery; Misrepresentation; Conspiracy; Fabrication; Collusion; Duplicate Submission; Academic Misconduct ;Improper Computer/Calculator Use; Improper Online, Tele Web , and Blended Course Use; Disruptive Behavior; and last, but certainly not least, plagiarism.

Plagiarism is representing another person's work as your own. "Another person's work" includes written papers, oral works, music, media, art, ideas, and computer-based work. The work can be published or unpublished. Some types of plagiarism - such as purchasing a paper from a website, or "borrowing" a paper your roommate wrote last semester - are obvious infractions of the academic integrity code. However, it is also possible to plagiarize on accident.

Research is often described as an active, diligent, and systematic process of inquiry aimed at discovering, interpreting and revising facts. This intellectual investigation produces a greater understanding of events, behaviors, or theories, and makes practical applications through laws and theories. The term research is also used to describe a collection of information about a particular subject, and is usually associated with science and the scientific method.





LESSON 2: STEPS IN THE RESEARCH PROCESS AND TYPES OF RESEARCH

OVERVIEW

It is important to plan and outline the steps one must undertake to conduct a research study. This module provides a quick glance of the step-by-step process on getting started on a research project step by step. These steps taken together are referred to as the research process. The first lesson is a brief discussion of all these steps which will serve as a checklist in doing a research. Consequently, you will arrive at the research problem identified as uncertain or that displays dissatisfaction in terms of present knowledge in the field. It is also important to know the appropriate types of research applicable to the problems that the researcher would like to find out or seek for an answer. Choosing an appropriate research design will help the researcher attain the research goals or objectives.

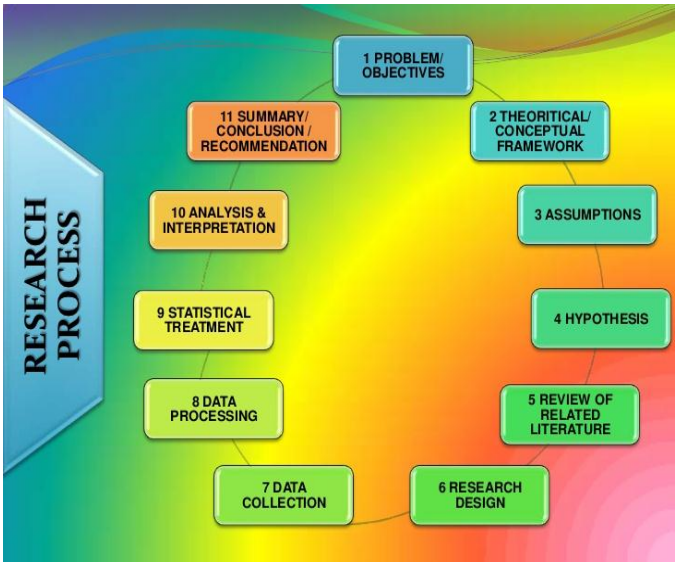
LEARNING OUTCOMES

At the end of the lesson, you should be able to:

1. Give an overview of the research process;
2. Enumerate and describe the major and minor phases of the research process; and,
3. Talk about the importance of understanding the classification or type of research.

DESIGNING THE RESEARCH PLAN

1. FORMULATE THE RESEARCH PROBLEM



The rigorous research process follows a specific procedure but will be worthless unless an important problem is identified. It is therefore important to find a subject that will keep the researcher interested. The decision on which of several problems to investigate depends on how important the problem is and how relevant the problem is to the researcher's field of specialization. However, even if the topic is

important, you will not be successful if you are not interested in the problem. A research topic or idea may come from related literature and studies, field of interest, recognition of problems in the field, from other researchers, professors, and collected data by local and national agencies that need analysis. It is also important to specify the objective of the proposed research and the specific information needed to attain the objectives.

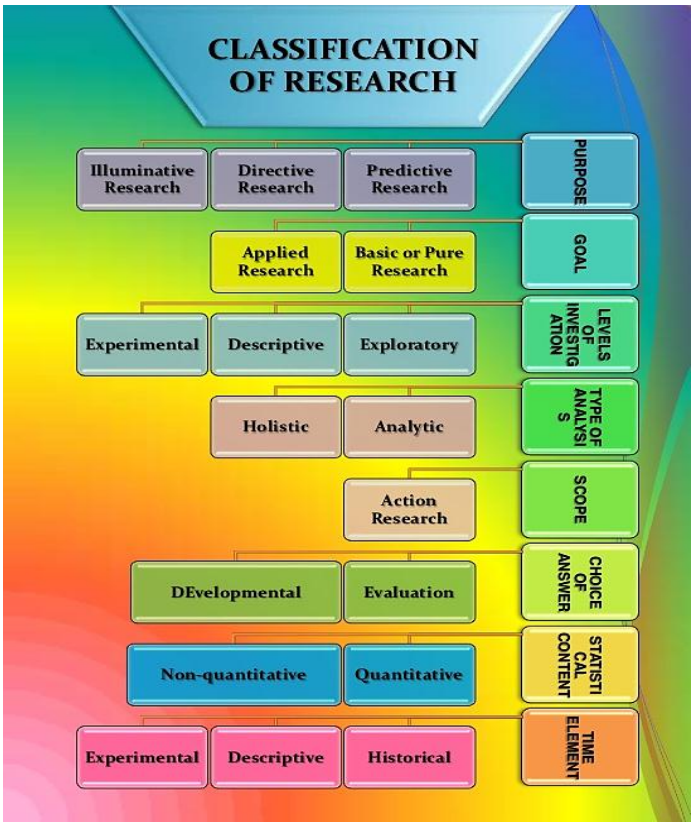
2. DETERMINE THE SOURCES OF DATA

As soon as the objectives are constructed and the data to be collected are identified or listed, the researcher will determine whether the data are available from secondary sources such as written reports and papers like articles, records, technical papers, curricula, grades, financial statements, photographs, and policy statements. If secondary data are not available, then he must plan the collection of new or primary data which should be collected by the researcher himself.

3. CHOOSE THE APPROPRIATE RESEARCH DESIGN

The next step is to select the appropriate research design in terms of relevance and the specific questions to be asked. There are several classification or types of research methods that a researcher may consider:

A. in terms of objective
    a. Basic
    b. Applied
B. In terms of measure
    a. Quantitative
    b. Qualitative
C. In terms of time
    a. Historical (past)
    b. Survey (present)
    c. {rediction (future)
D. In terms of intent
    a. Descriptive
        i. Surveys,
        ii. Case Studies,
        iii. Correlational,
        iv. Developmental,
        v. Comparative,
        vi. Evaluative
    b. Experimental



4. SELECT THE DATA GATHERING METHODS

Once the researcher has formulated his research problem and has determined possible sources of data, the next step is to determine the data-gathering method/s he will use. The methods used to gather the required data may be called “research tools”. These can be questionnaires, interviews, surveys, case studies, and reviews of performance data.

5. CONSTRUCT THE DATA GATHERING INSTRUMENTS

Once the method is selected, the researcher prepares the form for observation, the questionnaire, or the schedule for interview. In some cases, ready-made or standardized instruments are available, however, they may need validation to fit to the setting and needs of the respondents. It is best to use standardized questionnaires if they are available. They save time and they have been tested for validity and reliability. If you design your own questionnaire, it should be tried out on a sample group from the target population, but they should not be included in the main survey.

6. IDENTIFY THE POPULATION AND DETERMINE THE SAMPLE SIZE

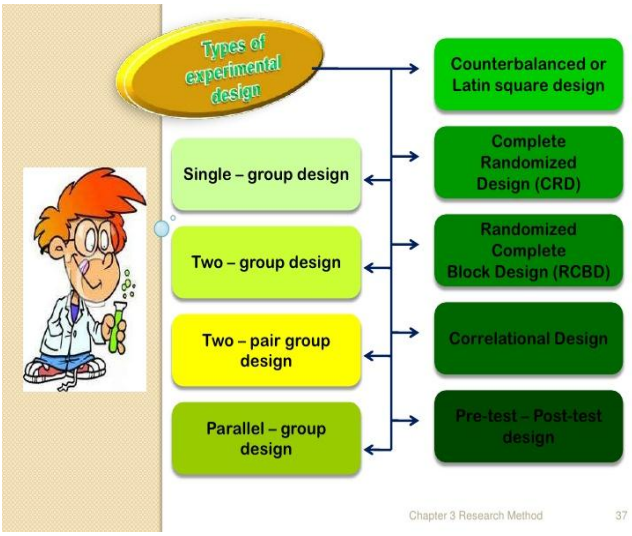
The researcher identifies the population which refers to the entire collection of people or things covered in the research. He is allowed to select a part of the population called a sample. A sample can be chosen in such a way that it gives statistically reliable results. If properly selected, it provides accurate information about the population**.**

7. DESIGN THE DATA-COLLECTION PLAN

The data-collection plan refers to the process or the procedure and mechanism of administering the data-collection instruments. The necessary permits should be obtained, (e.g.) in the academic sector, an official letter endorsed by the adviser, chair or the dean to the head of the institutions where instruments are to be fielded. This is a complex part of the research process. The design must include ethical procedures to be observed in the data-collection process. Likewise, the plan should include the option where the researcher and the respondent interact with each other.

8. DESIGN THE DATA-ANALYSIS PLAN

The data-analysis plan must consider the selection of the appropriate statistical measures to use whether descriptive or inferential, the level of significance to consider in the analysis of data, and all assumptions and limitations in the scope of the study.



IMPLEMENTATION OF THE RESEARCH PLAN

1. COLLECT THE DATA NEEDED

This is the most difficult and critical step in the research process. It covers the larger part of the budget estimate in the study. It covers transportation expenses, printing of questionnaires and personally collecting data from respondents. Some of the difficulties usually encountered are: varying behavior of administrators and of respondents, distance of research locale, errors inherent in the interview and questionnaire methods, varying skills of researchers and their assistants, and many other factors.

2. PROCESS AND ANALYZE THE DATA COLLECTED

Data collected are in the form of descriptions, scores, opinions, measures, statements, perceptions, characteristics, observations, etc. They are gathered to establish traits, meanings, comparisons, and relationships.

The researcher who has now the raw data may start to arrange them by editing, coding and tabulating. Editing is reviewing responses as to novelty, consistency, and completeness. Coding is classifying the data collected and assigning nominal, ordinal, interval, or ratio scales as needed. Tabulating is classifying the data by tables, charts, and figures. Software's are now available to process the data. Data analysis should be appropriated with the research design. Measures of relationship are available for all types of scales. It is always wise to consult a statistician in addition to the researcher's knowledge of statistics that he learns from school.

3. PREPARE THE RESEARCH REPORT

The research report should be prepared in consonance with the format of the institution, business agency, or funding agency. It is the product of the research process. It should be edited for language points, contents and style format. The outline of the report varies according to the type of research project and the purpose for which it is prepared.

PRESENTATION OF RESEARCH RESULTS

1. PRESENT RESEARCH RESULTS AND RECOMMENDATIONS FOR DISCUSSION AND PUBLICATION.

The researcher presents the findings of his work to the users of its results. In an academic setting, institutions require passing the oral defense before a panel of examiners. During the oral defense, questions of general interest and questions by chapter are answered by the researcher. Passing the oral defense is a requirement for graduation in a course.

Links:

http://www.ohiodominican.edu/library/help/knowhow/module_research/M0_A1c.htmhttp://www.umsl.edu/~lindquists/STEPS.html

ACTIVITIES

Read any supplemental books, journals, materials on research and conduct comprehensive review, identification and determination of research issues and problems.

ASSESSMENT TASKS

1. Why is it important for the researcher to learn all the steps of the research process?

2. Be able to establish the need to study the specific research problem and write a two-page research topic based on your field of specialization or research interest.

LESSON 3: RESEARCH PROBLEM IDENTIFICATION

OVERVIEW

A research, whether it is academic, business, engineering, marketing, media, social research, etc., always starts with a research problem. A major problem is usually stated clearly, followed by specific questions that need to be answered by the research

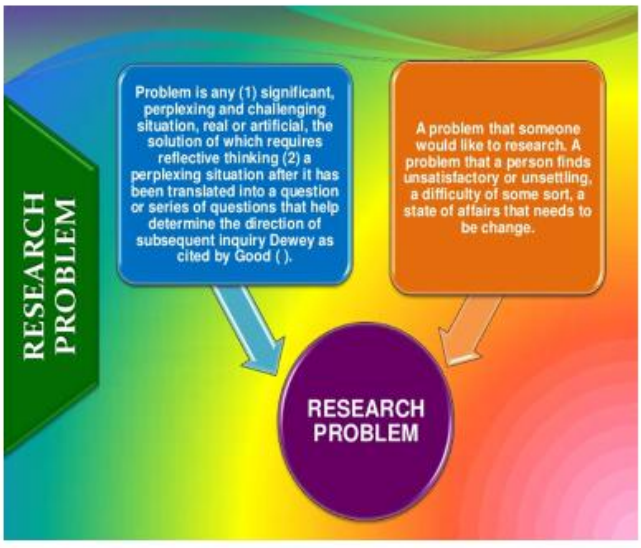
The research problem presents what the researcher wants to find out about something. There are many methods that might help researchers formulate good research problems. These include brainstorming, focus group discussion (FGD), Delphi methods, concept mapping, and other methods such as reading relevant literature and previous research studies. Ideas for a research problem are influenced by the researcher's intent, educational background, education, and experiences.

LEARNING OUTCOMES

After completion of this lesson, you will be able to competently do these:

1. Conceptualize a research issues and concerns based on the inductive and deductive reasoning.
2. Articulate a sense of scientific inquiry in the context of ICT / Science/ Engineering issues and concerns; and,
3. Develop a systematic approach in writing a research inquiry or statement of the problem
4. Create an introduction to your chosen field of research specialization.

Practical problems exist in many fields. Many researchers are involved in health and human development projects, social and service programs. It is possible to get ideas for research topics by reading the literature of previous researches that may be refined for off-shoots or using other approaches. Educators have many ways to formulate research problems based on specializations, programs, research priorities, technological and scientific advancement, and thrusts of education



STATEMENT OF THE PROBLEM

The statement of the problem is research problem that the researcher is interested to explore and investigate.

1. The question must be clear
2. The question must be feasible to answer
3. The question is arrange logically
4. The question is significant
5. The question must be ethical.

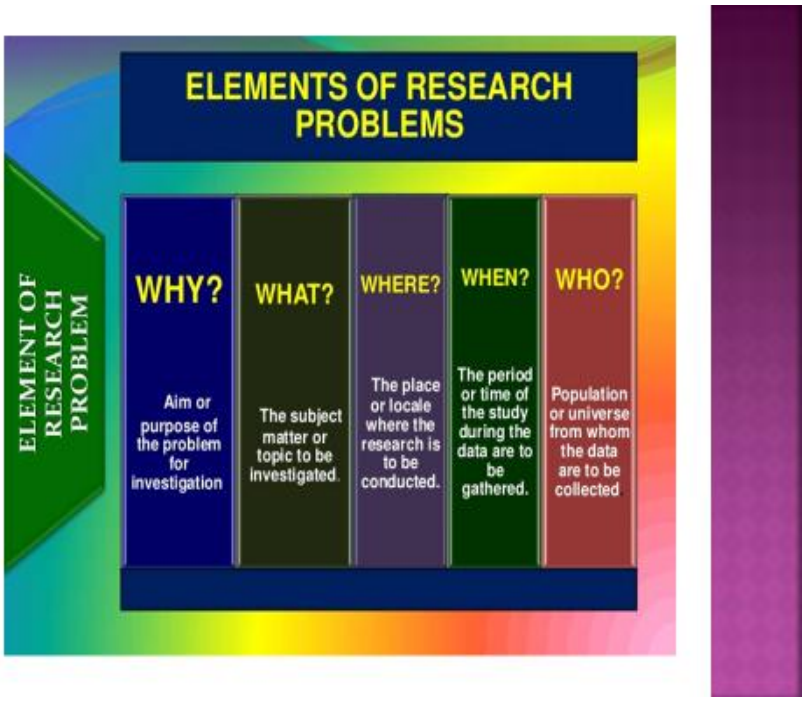
RESEARCH QUESTIONS

1. What specifically do you want to better understand and about the settings or respondents you are studying?
2. What do you do not know that you want to learn?
3. What questions best capture the variables you want to explore?
4. Are questions logically arranged?

SOURCES OF RESEARCH PROBLEMS

Some sources of Research Problems but not limited to

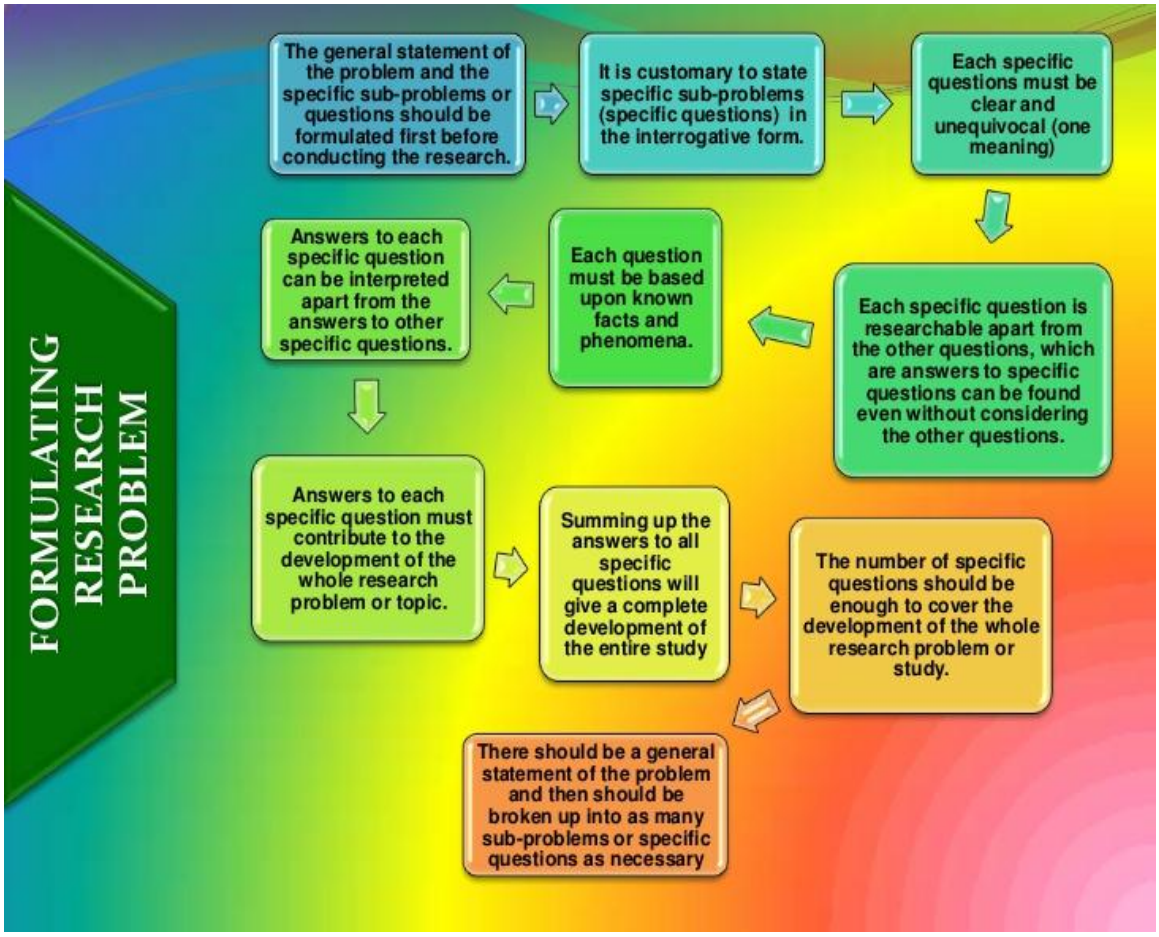
- ✓ Observation
- ✓ Literature
- ✓ Deduction from theory
- ✓ Context
- ✓ Current social and political issues
- ✓ Practical situations
- ✓ Personal experiences and insights
- ✓ Problem statement
- ✓ General topic and specific focus
- ✓ Purpose of the study
- ✓ Significance or usefulness



OTHER SOURCES OF RESEARCH PROBLEMS ARE THAT YOU MAY CONSIDER ARE

1. Research priorities and needs of CHED, DOST, NEDA, DepEd, TESDA in different fields of specialization
2. Research priorities of the institution, PUP
3. Research priorities and needs in the college of engineering, ICT, or Science
4. Research priorities of industries, companies, and other agencies

5. Personal interests influenced by work
6. Current issues and problems needing solutions in the work environment
7. Off-shoots of Design Project, Thesis, Feasibility Studies, ICT Project
8. Relevant literature in one's field of interest or specialization
9. Suggestions from professors/advisers/stakeholders/community/barangay
10. Projects that need evaluation for efficiency, effectiveness, relevance, responsiveness, access, quality, excellence, sustainability, efficacy etc.
11. Technological advancement
12. Extensions of investigations previously done by other researchers



FACTORS THAT INFLUENCE THE SELECTION AND FORMULATION OF A RESEARCH PROBLEM

A. VALUE OF THE RESEARCH PROJECT

The time relevance of the research should be considered. The outputs of the study should have long-term professional benefits. It should have wider practical application to the field, to the sector, and to the community.

B. AVAILABILITY OF DATA

No matter how good and current a research problem is, if the data are not available, then the research study cannot be carried out. For example, a tracer study of scholars in a particular postgraduate course is a good study but if the respondents cannot be traced anymore, then the research cannot be pushed through.

C. CAPABILITY OF THE RESEARCHER

The researcher's background and capability are very important factors in the success of any research project. Taking research methods for academic purposes is a necessity. Training is another strategy needed to be able to follow the formal procedures in undertaking researches. Other qualities needed by a researcher are experience, ingenuity, resourcefulness, imagination, creativity, good attitude, and sound decision-making.

D. RECENCY OF ISSUE

We say that change occurs with time. Changes over time affect results. If a researcher wishes to evaluate partially the implementation of a certain project, the research should be finished before it is fully implemented. Selection and formulation of a research problem should consider timeliness or recency of an issue to be solved.

E. COST OF THE RESEARCH

The inputs to a study are time, effort and energy required of the researcher and the cost required by a given study. It is not easy to estimate the time, energy and cost a study will require. An experienced researcher can easily determine all of these but a novice takes much longer time to calculate the total cost of a research. Cost reduction can be achieved by being resourceful

ACTIVITIES

- Read supplemental books on Research or visit the given link below
    - http://www.esc.edu/esconline/across_esc/writerscomplex.nsf/0/f87fd7182f0ff21c 852569c2005a47b7
    - http:www.sciencedirect.com
    - http://www.socialresearchmethods.net/kb/probform.php
    - http://www.socialresearchmethods.net/kb/resprob.php
    - **e-journals/e-books**
      PUP website: infotrac.galegroup.com/itweb/pup

ASSESSMENT TASKS

Write your proposed research concept paper that you would like to work on, submit and discuss the following:

1. Value of the research project to your field of specialization
2. Availability of data (from key informants, primary sources, secondary Sources, data gathering methods, etc.)
3. Your capability to undertake this research
4. Recency of issue
5. Cost of the research

LESSON 4: LITERATURE SEARCH AND REVIEW

OVERVIEW

In case of a design project or thesis, a research proposal or research report has a chapter on Review of Related Literature and Studies. This section, which is the Chapter 2, contains previous research findings that are relevant to the research study at hand. It has the following features: 1. Thematic arrangement of literature and studies and 2. Synthesis of Reviewed Literature and Studies

The researcher needs to review research reports from journals, proceedings, and theoretical frameworks to assist him in creating direction for his study. Related literature and studies play an important role in a research because it serves as a foundation of the proposed study. Related literature is composed of discussions of facts and principles to which the present proposed study is related. Related studies on the other hand are studies, inquiries or investigations already conducted to which the present proposed study is related or has similarity.

LEARNING OUTCOMES

After completion of this lesson, you will be able to competently do these:

1. Differentiate between related literature and related studies;
2. Explain the importance, purposes and functions of related literature and studies;
3. Describe the characteristics of a good review of literature and studies; and,
4. Cite different sources of information.

Sources of related literature and studies are books, encyclopedias, almanacs and other similar references; unpublished thesis and dissertations; reports from seminars; official reports from educational, social, economic, scientific and political from the government and other entities; constitution and laws; bulletins, circulars and orders derive from government offices and departments; records of schools, public and private; articles published in professional journals.

Related – means the legal bases, literature and studies which have direct bearing or relation to the present study. It determines the relevance of the study to the government's thrusts. The major sources of related legal bases are laws and department directives such as circulars, orders, memoranda, and others which are related to the present study.

Related Literature sources are books, journals, magazines, novels, proceedings, speeches, development plans, and many others. The presentation of related literature could be presented in thematic format, based on the topic or sequence of the statement of the problems. This Related literature can use of the internet, websites and e-libraries.

Related Studies refer to published and unpublished research studies relevant to the study at hand. These are available as academic theses and dissertations in libraries. Studies in different institutions are available either in print or through the library's information retrieval system.

The two major parts of Chapter 2 both for qualitative and quantitative researches are the presentation of the review of literature and studies and the synthesis of the reviewed literature and studies. With the thematic presentation and organization of literature and studies, the major and sub-major variables which will serve as headings and sub-headings must be identified.

To identify the variables or topic headings and its proper sequence to be discussed in the review of literature and studies, the presentation of variables in the conceptual framework and statement of the problem in Chapter 1 should be considered.

Except for classical theories and any other relevant literature, all the literature and studies included in the review shall have been published or written (if unpublished, such as theses and dissertations) at least ten (10) years before the conduct of the current study. The minimum number of literature and studies to be reviewed shall be forty (40) or more for Master's, and fifty (50) or more for doctoral.

In general, the review of literature and studies should: 1. provide a much relevant context for the research; 2. acknowledge existing theories, points of view, hypotheses, etc. in the field of research, and 3. justify the research

The conclusion and the last part of chapter 2 is the synthesis of the reviewed Literature and Studies. This is the segment of the paper in which two or more existing elements are combined or synthesized as it is called to form a new whole. It is also in this part where the discussion of the uniqueness of the paper when contrasted to presented literature and synthesis takes place. The very purpose of giving synthesis of the reviewed literature and studies is to draw conclusions about the findings in the literature so that the researcher will identify how the literature addresses the research questions.

PURPOSES OF REVIEW OF RELATED LITERATURE AND STUDIES

The review of related literature and studies serves many purposes. Since it is a part of the research process, it contributes to the overall success of a research project. It has the following purposes:

1. It gives the researcher several ideas on how to select and formulate his own research problem.
2. It helps the researcher identify studies that have been done related to the topic he is interested in.
3. It avoids possible duplication of similar studies.
4. It guides the researcher on the possible theoretical frameworks he can use for his current study.
5. It gives direction to the researcher on how he will create his own conceptual framework.
6. It allows the researcher to browse several kinds of research designs, sampling techniques, statistical procedures, questionnaires, and processes of presenting, analyzing, and interpreting data, on which he could base his choice for his paper.
7. It gives a picture of a comparative analysis between variables used in reviewed materials and those used in the current study.

BASES FOR A GOOD REVIEW OF LITERATURE AND STUDIES

Books, journals, magazines, theses, and dissertations provide a rich body of literature and studies. To determine which among them would be valuable to the researcher, the following should be considered:

The reviewed materials must be current. Time moves so fast that what is current is obsolete tomorrow. The researcher should be keen in identifying the changes brought about by rapid social, economic and technological transformation. Even the change in leadership will affect practices in an organization.

Literature and studies reviewed must be relevant to the study. Each material reviewed should be analyzed carefully to justify its inclusion in the research paper. If there are similarities with the current study, the justification that there is no duplication of the same work should be explained.

Findings or results of reviewed studies should be objective and free of biases. Materials whose findings are highly opinionated like those pertaining to politics and religion should be avoided.

The data used in the reviewed materials should be scrutinized in terms of sampling technique used to ensure that generalizations are based on the normal population.

Reviewed materials related to the current study should be enough to establish a strong and viable trending of results.

SOURCES OF RELATED LITERATURE AND STUDIES

Here are some possible sources of related literature and studies:

1. Undergraduate Design Project, Graduate theses and dissertation Universities offering graduate studies keep published and unpublished theses and dissertation in their libraries. Similar copies are provided to national libraries. Theses and dissertations funded by agencies like those by the Fund for Assistance to Private Education (FAPE) are available in their library. Foreign graduate theses and dissertations are published in “Dissertation Abstract International” and full copies are available upon your request but requires a minimal fee.
2. Encyclopedia of Educational Research
3. Books and monographs
4. Internet sites and resources (websites, e-journals, e-books)

ACTIVITIES

Read topics on:

- Ethical considerations in reviewing related literature and studies
- American Psychological Association (APA) style and format in giving proper attribution to cited authors and references.
- E-journals/E-books
- PUP website: infotrac.galegroup.com/itweb/pup ƒ Password: powersearch

ASSESSMENT TASKS

1. Read at least three (3) related literature and three (3) related studies relevant to your approved concept paper. Submit a short report using the format below:
   1.1 Introduction
      1.1.1 State a brief introduction of the nature of your problem based on the title
   1.2 Body of the review
      1.2.1 Briefly discuss what others have found or thought about their research studies. State reported results and present a composite picture of what is known and what might have some bearing on your paper.
   1.3 State some conclusions that you feel are justified based on the current state of knowledge revealed in the reviewed materials.
   1.4 Using the APA format, write your references with full bibliographic data for all sources or reviewed materials.

LESSON 5: QUANTITATIVE AND QUALITATIVE METHODS

OVERVIEW

Quantitative Methods deals with numbers and data that can be measured. It relies on random sampling and structured data collection instruments that fit diverse experiences into predetermined response categories. Quantitative research is most likely to provide answers to questions such as who? when? where? what? and how many?

Qualitative Methods deals with descriptions and data can be observed but not measured. It approximates or characterizes but does not measure the attributes, characteristics, and properties of a thing or phenomenon. Qualitative research is most likely to provide answers to questions such as “why?” and “how?”

Mixed Method is a combination of Quantitative and Qualitative Methods.

LEARNING OUTCOMES

After completion of this lesson, you will be able to competently do these:

1. Describe the characteristics of the Quantitative, Qualitative and Mixed Method of Research
2. Identify and determine specific research type for specific purpose in engineering, science and ICT.

In the PUP Thesis Manual and Format, the researcher will discuss the method of research used in the conduct of study in Chapter 3 and it has the following parts:

QUANTITATIVE RESEARCH

1. Method of Research
2. Population, Sample Size, and Sampling Technique
3. Description of the Respondents
4. Instrumentation
5. Data Gathering Procedure
6. Statistical Treatment of Data

QUALITATIVE RESEARCH

1. Research Design
2. Tradition of Inquiry and Data Gathering
3. Sources of Data
4. Instrumentation
5. Ethical Considerations

TYPES OF RESEARCH BASED ON METHODS

The following definitions taken from experts:

Quantitative Research is explaining phenomena by collecting data that are analyzed using mathematically based methods. It is essentially about collecting using quantitative methods. For example, how many males get a academic awards at university compared to females? What percentage of teachers and school leaders belong to minority groups? Has pupil achievement in English/Math/Science improved in our school district over time? It is either calculated in mathematical approach or statistics. A phenomenon that would like to discover the: rise and fall of test scores, admission and enrolment population, predict, forecast, and finally test hypothesis is in quantitative.

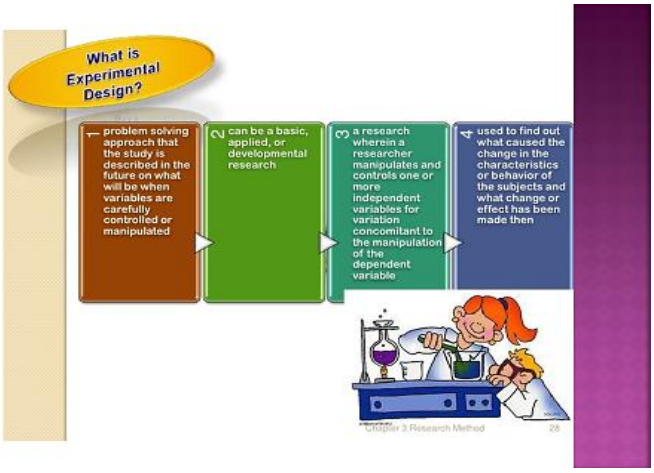
TYPES OF QUANTITATIVE RESEARCH

Action research – refers to a type of research that address specific question in the existing practice of teaching in the classroom. It offers opportunity for continued reflection. In all professional fields, the goal of action research is to improve processes. Action research is also beneficial in areas of teaching practice that need to be explored or settings in which continued improvement is the focus. It is very popular in the field of education because there is always room for improvement when it comes to teaching and educating others.

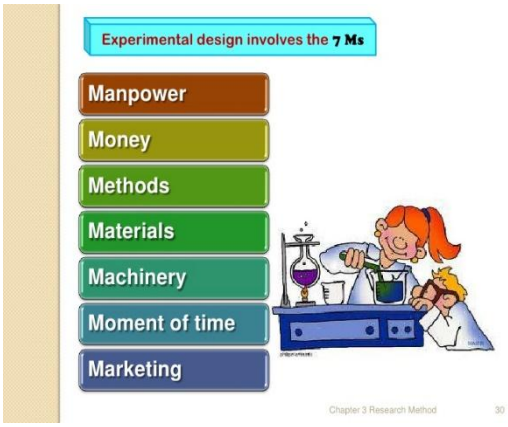
Causal-Comparative Research – is a research approach that seeks to explain differences between groups by examining differences in the experiences of group of respondents. This examines the effect of an independent variable (past experience) to a dependent variable. The results suggest a possible causal relationship but cause-and-effect relationship is avoided.

Survey Research – refers to a describe behavior pattern and gather people's perception, opinions, attitudes, and beliefs about a current issue in education. Descriptions are summarized by reporting the number or percentage of persons reporting each response. It requires thoughtful and careful planning, contrary to what others believed that it is easy, simple questions and answers.

Experimental Research - conducted with a scientific approach using two sets of variables. The first set acts as a constant, which you use to measure the differences of the second set. Any research conducted under scientifically acceptable conditions uses experimental methods. The success of experimental studies hinges on researchers confirming the change of a variable is based solely on the manipulation of the constant variable. The research should establish a notable cause and effect. If you don't have enough data to support your



decisions, you must first determine the facts. Experimental research gathers the data necessary to help you make better decisions.



Causal Comparative Research -the researcher investigates the effect of an independent variable on a dependent variable by comparing two or more groups of individuals. For **example**, an educational researcher may want to determine whether a computer-based ACT program has a positive effect on ACT test scores.

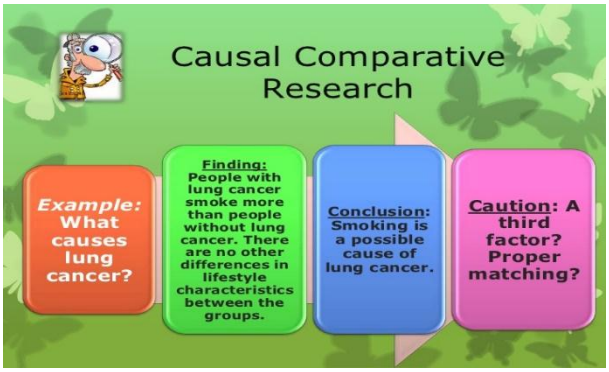


Table 1 – Strength and Weaknesses of Quantitative Research

Strengths	Weaknesses
• Testing and validating already constructed theories about phenomena occur. • Capable of testing hypothesis • Can generalize research findings • Useful for obtaining data that allow quantitative predictions. • Can eliminate confounding variables. • Provides precise, quantitative numerical data. • Data analysis is relatively less time consuming. • Results are relatively independent of the researcher (statistical analysis, significance). • Useful for studying large population	• Categories and theories used by researcher may not reflect local constituents' understandings • Research may overlook certain phenomena not accounted for by focus on the pre-determined theory of hypothesis. 3. Knowledge produced may be too abstract and general for direct application to specific local situations.

Qualitative Research refers to a research that make sense of the interpretative, naturalistic approach to the world that consists of field notes, interviews, conversations, photographs, memos to the self, artefacts, and documents. Researchers attempts to make sense of , interpret phenomena in terms of the meanings people bring to them. Creswell (2012) and Denzin and Lincoln (2018) claimed that qualitative research begins with an assumptions and the use of interpretative/theoretical frameworks that inform the study of research problems addressing the meaning individuals or groups ascribe to a social or human problem.

THE TYPES OF QUALITATIVE RESEARCH

Case Study refers to a study that describes a detailed description of the topic, the people involved, the area and the main focus of the topic. Data are collected through the multiple source of information such as interviews, observations, documents, and audio visual materials, and summarized in table based on the forms of data.

Ethnography refers to a study described and convey a phenomenon in real time experience of the informants but of the researcher as well. The study is most of the time but not limited to cultural phenomena. Ethnographic study explains how the culture work in a complex multilayered manner (macro, meso, micro). It describes how theory in a conservative perspective angle sees and the real setting of the phenomena. The researcher position himself by describing his involvement as a participant observer of the group involved in the research topic.

Grounded Theory study sought to develop a theory that explains key factors in the issue relevant on the topics being explored. Its central focus is to understand the phenomena and the theoretical model. The study uses multiple methods in qualitative research to establish in-depth and breadth of developing a theory.

Narrative research is understood as a spoken written text giving an account of an event or action chronologically connected. According to Creswell (2013), it is a collection of stories from individuals' lived experiences. It is a collaborative feature as: story told to the researcher, constructed between the researcher and the participant, or a story intended as a performance to convey a message. Narrative stories are analyzed in varied ways.

Phenomenology refers to a study that explains the lived experiences of the informants. A rigorous data collection in textual transcripts from interview, observation, thematic discussions from different expert to explain a phenomenon. The use of systematic data analysis procedures of significant statements, an exhaustive description of meanings, and themes cluster. The study ended by describing the experience of informants and validates it through coding and triangulation.

The researchers need to have a thorough understanding of the types and approaches to examine the meaning of experiences towards the phenomenon

Strong research involves accessing and evaluating various forms of information. The information needed to answer specific questions. Data may vary depending on the nature

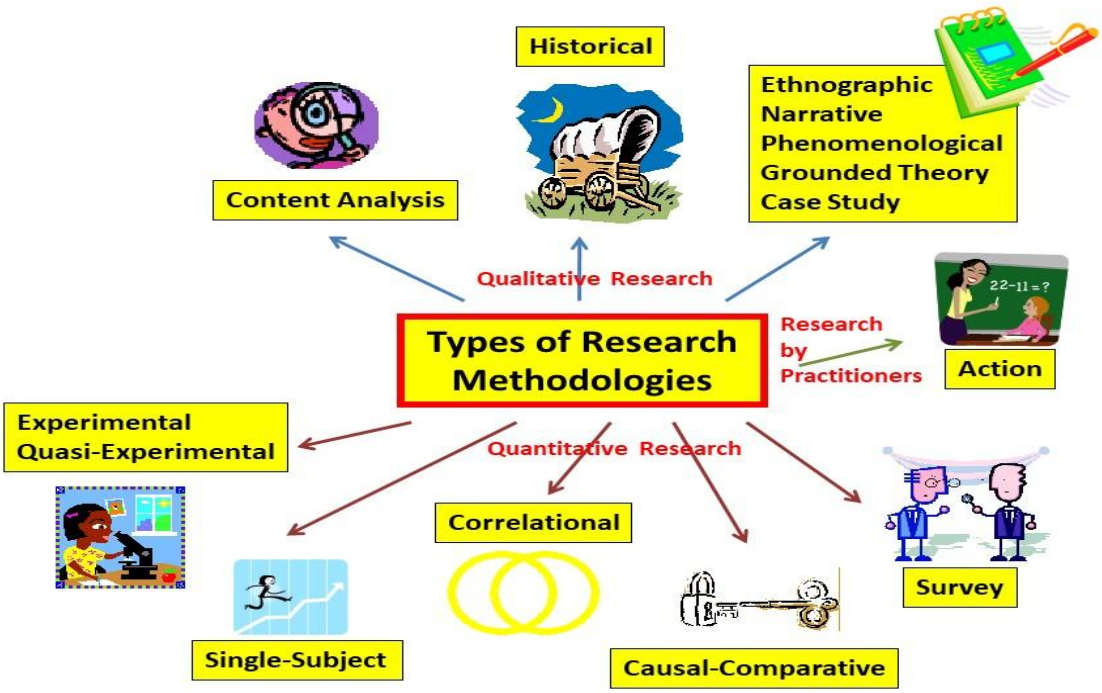
of questions, context, population, depth, breadth and extent about the topic. Thus, result to choose a mix method of research.

Table 2. Strengths and Weaknesses of Qualitative Research

Strength	Weaknesses
• Data are based on informants' own categories of meaning. • Data is collected in natural and contextual settings. • Describes rich detailed description of personal experiences of phenomena. • Useful in studying a limited number of in-depth cases. • Useful for describing complex phenomena. • Can conduct cross-case comparison and analysis. • Responsive to local situation, conditions and stakeholders need.	• Knowledge produced may not generalize to other people and settings. • Cannot make predictions. • Cannot test hypothesis • Collection of data is time consuming. • Bulk of data across different resources such as, interview transcript, observation, documents and artefacts.

Table 3 - Differences of Quantitative Research and Qualitative Research

Dimensions	Quantitative Research	Qualitative Research
Nature	Number	Experiences
People	Respondents	Participants/Informants
Sample Size	30 or more	Limited Informants
Types	Experiment, Correlational, Comparative, Evaluation, etc	Ethnography, Narrative, Historical, Phenomenology, Grounded Theory
Methods	Survey, Trending Analysis	Interview, Focus Group Discussion (FGD),Observations, Artefacts, Documentary Analysis, Case Analysis, Discourse Analysis, and Literature Review
Analysis	Statistical Data Analysis and Mathematical Analysis	Themes, Triangulations, Thematic Analysis, Coding, Categories Analysis, Memoing


Historical
Content Analysis
Ethnographic
Narrative
Phenomenological
Grounded Theory
Case Study
Qualitative Research
Types of Research Methodologies
Research by Practitioners
Action
Experimental
Quasi-Experimental
Quantitative Research
Correlational
Survey
Single-Subject
Causal-Comparative