

**Bule Hora University
College of Social Sciences and
Humanities**

**Department of Geography and
Environmental Studies
Research Methods in Geography
and
Environmental Studies for
Summer Program (GeES2071)**

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Course Requirements

1. Developing Research Proposal (20 marks)
2. Test one and Two(30 marks)
3. Final Exam (40 marks)
4. Class attendance (10 marks)

References

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I Introduction

1.1 What is research?

- Different authorities of the field define research differently. The following are the most common phrases used to define the concept research:
- an inquiry to obtain dependable and useful information;
- a scientific approach to study a problem;
- a systematic and objective search for reliable knowledge; etc.

Generally, research is the process of inquiry and discovery of knowledge involving scientific methods.

- It is a process of inquiry (the search for truth).
- It is a process of discovery because it is a movement from unknown to the known.
- It involves scientific methods in search of the truth on the basis of factual and objective evidences. The **scientific method** is the means by which researchers are able to make conclusive statements about their studies with a **minimum of bias**. It involves **several steps** such as:
 - **Observation** of researchable problem;
 - **Question** (translating that research idea into an answerable question)
 - **Hypothesis** (testable guess) to explain some aspect of your observation;
 - **Measuring** and **experimentation**;
 - **Analysis** (looking for explanations or solutions);
 - Formulation of **theories and laws**.

1.2 Reasons for undertaking research/ why do research?

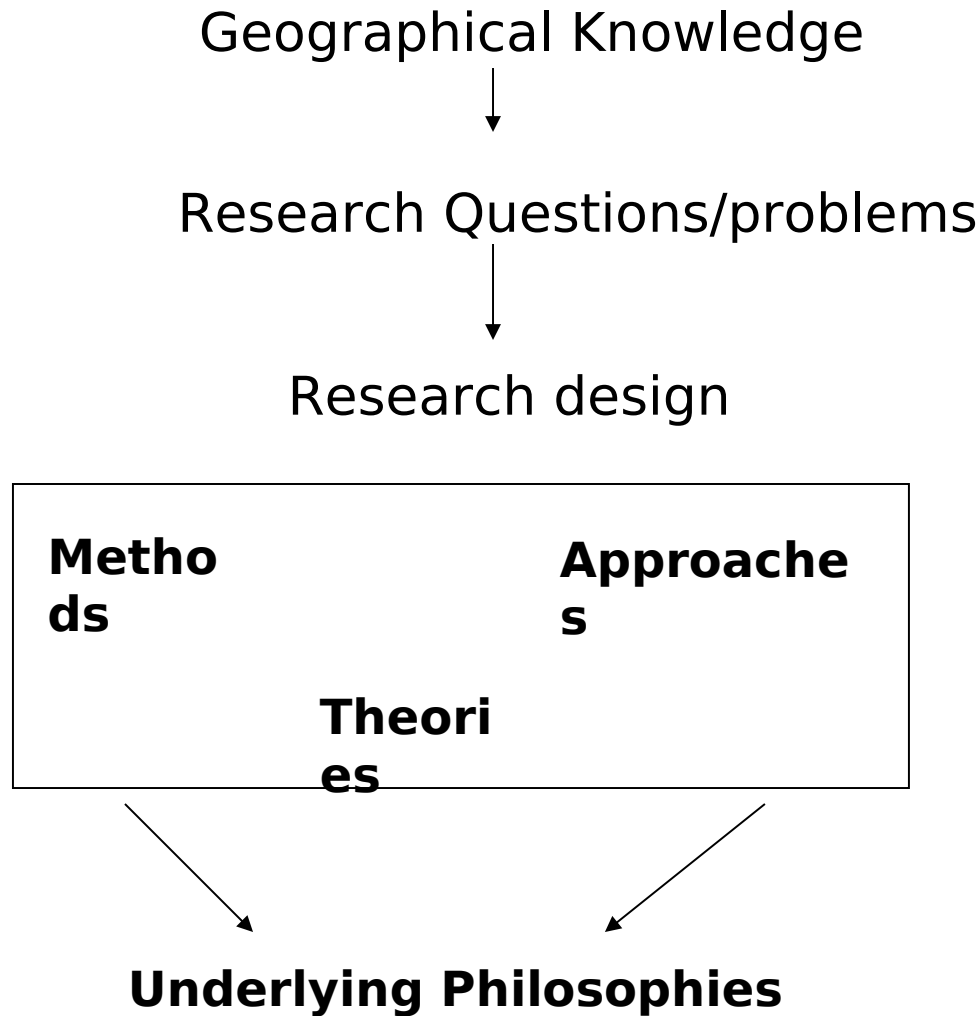
- For **professional researchers** the reasons for undertaking research usually center upon the following **five main motivations**:
- **exploration**
 - to investigate little understood phenomena,
 - to identify/ discover important variables,
 - to generate questions for further research, etc.
- **explanation**
 - to explain why forces created the phenomenon in question,
 - to identify why the phenomenon is shaped as it is
- **description**
 - to document and characterize the phenomenon of interest
- **understanding**
 - to comprehend and understand processes, interaction, phenomenon and people
- **prediction**
 - to predict future outcomes for the phenomenon
 - to forecast the events and behaviours resulting from the phenomenon

- **geographers** undertake research **for all the reasons/** motivations mentioned above often **in combination** with each other. For example, in your study you may start with some exploratory investigations to determine which variables or factors are important. Next you might try to describe the phenomena and how they are related. You may follow this by seeking to explain what caused the phenomena, to make a prediction about future outcomes.
 - **Example-1**, if we were interested to investigate **why people migrate to new**, relatively unknown area, the four could be linked in the following way:
 - explore possible causes/ reasons why people might want to move
 - describe the patterns of migration based upon the factors found during exploration
 - explain the patterns of migration identified when describing the exploratory factors
 - predict possible future migrations based upon the explanations of current patterns of migration

1.3 Research in Geography

- Any research project has the following **three components**
 1. A **subject matter** (what is being studied?)
 2. **Methodology** or Approach (how it is being studied)
 3. **Philosophical** bases

Fig 1 Philosophy, research design and geography



Geographical Knowledge

- Though various definitions exist, Geography can be regarded as a science concerned with the rational development, and testing of theories that attempt to explain and predict the spatial distribution and location of various characteristics on the surface of the earth.
- For geographers research is the process of trying to gain a better understanding of the relationships between humans, space, place and environment which leads them use scientific methods.

Methodology

- Geography uses the approaches used in both natural sciences (the quantitative approach) and social sciences(the qualitative approach). More over it uses the mixed methods approach.

Philosophical bases of research

- Philosophy aims at the **logical clarification** of **thoughts**.
- **Its task is** to make thoughts clear and to give them **sharp** boundary (Wittgenstein, 1921, quoted in Ragurman, 1994).
- There has been **different opinion** on how research should be conducted since human begin observing and recording phenomenon. Over the centuries **philosophers** have argued about:
- **Ideology**: the **understanding of** social or political reasons or purpose for **seeking knowledge**;
- **Epistemology**: how knowledge is derived at; the assumptions about how we can know the world (what can we know? How can we know it?)
- The **study of the nature** of knowledge including how it is created and shaped. It is concerned with what can be known and the confidence we have in knowledge.

- **Ontology**: the set of specific assumptions underlying a theory or system of idea (what can be known?)
- **Methodology**: a coherent set of rules and procedures which can be used to investigate a phenomenon or situation (within the framework dictated by epistemological and ontological ideas).
- As Hill (1981) discusses, your research aims to provide answers to questions. In doing so, you will be claiming to know something about a particular situation or phenomena or even the world in general. All such claims raise ideological, epistemological, ontological and methodological questions.
- **Understanding** philosophical approaches is important for two reasons:
 - for understanding what other researchers have done and why and
 - for finding an approach on which to base your own research and provide the theoretical context to justify your findings

Classification of Research

- Classification of research can be based on different considerations. Thus, we can base our classification on:
 1. the **nature of the dominant data** (qualitative or quantitative),
 2. the **purpose of the research** (applied or basic),
 3. the **type of analysis** that will be carried out (descriptive or analytical) (Conceptual or Empirical research) .
 4. **Other types of research**
 - The attempt to classify research into these categories is somewhat misleading since most research has elements of all the categories. It should be said that it is only an aid to broad understanding of the different types of research rather than distinct categories.

Qualitative and quantitative research Methodology

Qualitative research

- Qualitative research deals with designs techniques and measure that do not produce discrete numerical data.
- It involves extensive narrative data in order to gain insights into phenomena.
- Data analysis includes the coding of the data and production of verbal synthesis (**inductive process**).
- Types of qualitative research approaches:
 - **Historical/Narrative research:**
 - **Ethnographic research**
 - **Case study**
 - **Participant observational research,**
 - **Action research,**
 - **Ground theory**

Historical/Narrative research:

- Descriptions of events that draw on multiple sources of information to understand more fully what happened.
- By using a narrative approach, the research tries to understand how "people think and act in the situated contexts in which they live through their stories.
- Narratives are frameworks through which people

Ethnographic research:

Experiencing largely from the field of anthropology, ethnographic strategies focus on the study of a culture,

particularly what "socio-cultural knowledge participants

bring to and generate in the social setting being studied."

❖ The most common ethnographic approach is participant

Case study

- Attempts to shed light on a phenomena by studying indepth a single case example of the phenomena.
- The case can be an individual person, an event, a group, or an institution.

Participant observational research

- Participant observation is a qualitative method frequently used in social science research.
- It is based on a long tradition of ethnographic study in anthropology. In participant observation, the observer becomes "part" of the environment, or the cultural context.

Ground Theory

- Strauss and Corbin (1994), in their overview of grounded theory note that it is "a general methodology for developing theory that is grounded in data systematically gathered and analyzed", adding that it is sometimes called the constant comparative method and that it is applicable as well to quantitative research.
- The purpose of the methodology is to develop theory, through an iterative process of data analysis and theoretical analysis, with verification of hypotheses ongoing throughout the study.
- In grounded theory, the data may come from observations, interviews, and videotape or document analysis, and, as in other qualitative research, these data may be considered strictly qualitative or may be quantitative.
- A grounded theory perspective leads the researcher to begin a study without completely preconceived notions about what the research questions should be, assuming that the theory on which the study is based will be tested and refined as the research is conducted.

Action Research

- *Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework ([Rapoport, 1970](#), p. 499).*
- It also makes clear, as [Clark \(1972\)](#) emphasizes, that action research is concerned to enlarge the stock of knowledge of the social science community. It is this aspect of action research that distinguishes it from applied social science, where the goal is simply to apply social scientific knowledge but not to add to the body of knowledge.
- Action research has been accepted as a valid research method in applied fields such as organization development and education.

Quantitative research

- Quantitative research includes designs, techniques and measures that produce discrete numerical or quantifiable data.
- Data analysis is mainly statistical (**deductive process**).
- Types of quantitative research approach:
 - **Statistical/Correlational Analysis,**
 - **Experimental,**
 - **Quasi-Experimental,**
 - **Surveys/ Ex post facto,**
 - **Descriptive research,**
 - **Causal-comparative research,**

Statistical/Correlational Analysis

- A research design to see whether there is a relationship between two or more variables.

Experimental

- A strategy that tests the effect of an independent variable by applying it to one group of cases but not to a second group.

Quasi-Experimental

At least one variable is manipulated to determine the effect of the manipulation. Intact, naturally formed groups are used.

Surveys/ Ex post facto

 Surveys collect information, typically from an individual, to measure relationships or correlations among variables such as background, behavior, attitudes/beliefs, opinions, and knowledge of events or policies. (If surveys include open-ended questions, they could represent a qualitative methodology.)

Descriptive research

1. involves collecting data in order to test hypotheses or answer questions regarding the subjects of the study.
2. In contrast with the qualitative approach the data are numerical. The data are typically collected through a questionnaire, an interview, or through observation.
3. In descriptive research, the investigator reports the numerical results for one or more variables on the subjects of the study.

Causal-comparative research

1. attempts to establish cause-effect relationships among the variables of the study.
1. The attempt is to establish that values of the independent variable have a significant effect on the dependent variable.
1. This type of research usually involves group comparisons. The groups in the study make up the values of the independent variable, for example gender (male versus female),
2. However, in causal-comparative research the independent variable is not under the experimenters control, that is, the experimenter can't randomly assign the subjects to a gender classification (male or female) but has to take the values of the independent variable as they come. The dependent variable in a study is the outcome variable.

2.0 Planning Research Project (The Research Process)

- The research process consists of a number of closely related activities necessary to effectively carry out research.
- The following are some of the stages in the research process:
 1. Identification and formulation of the research problem/topic
 2. Literature review
 3. Developing the objectives, research questions and hypothesis,
 4. Preparing the research design
 5. Determining the sample,
 6. Data collection,
 7. Data analysis and interpretation,
 8. Validation of results/ Conclusion

• Flowchart: Steps in the development of a research proposal

Questions you must ask	Steps you will take	Important elements of each step
What is the problem and why should it be studied?	Selection, analysis and statement of the research problem	- problem identification - prioritising problems - analysis - justification
What information is available?	Literature review	- literature and other available information
Why do we want to carry out the research? What do we hope to achieve?	Formulation of research objectives	- general and specific objectives - hypotheses
What additional data do we need to meet our research objectives? How are we going to collect this information?	Research methodology	- variables - types of study - data collection techniques - sampling - plan for data collection - plan for data processing and analysis - ethical considerations - pre-test or pilot study
Who will do what, and when?	Work plan	- human resources - timetable
What resources do we need to carry out the study? What resources do we have?	Budget	- material support and equipment - money
How will the project be administered? How will utilisation of results be ensured?	Plan for project administration and utilisation of results	- administration - monitoring - identification of potential users
How will we present our proposal to relevant authorities, community and the funding agencies?	Proposal summary	- briefing sessions and lobbying

1. Research Problem: Identification and Formulation

- This involves the identification of a general topic and formulating it into a specific research problem.
- It requires thorough understanding of the problem and rephrasing it in a meaningful terms from analytical point of view.
- The understanding of the problem needs:
 - ❖ Discussions with colleagues or experts in the field (Brainstorming)
 - ❖ Examine conceptual and empirical literature on the topic

Sources of research problem

- ❖ Some of the important sources of research problem are:
 - Professional experiences-the researchers own experiences in the field;
 - Inference from theory;
 - Professional literatures-reports, bibliographies of books, and articles, periodicals, abstracts, etc.;
 - Technical and social changes- new developments may bring forth new problems for research.

Problem Statement

- ❖ **The problem statement describes the context for the study and it also identifies the general analysis approach” (Wiersma, 1995, p. 404).**

2. Literature Review

- The purpose of the literature review is to situate your research in the context of what is already known about a topic.
- It need not be exhaustive, it needs to show how your work will benefit the whole.
- It should provide the theoretical basis for your work, show what has been done in the area by others, and set the stage for your work.
- It should probably move from the more general to the more focused studies, but need not be exhaustive, only relevant.
- Sometimes the literature review is incorporated into the introduction section. However, most professors prefer a separate section, which allows a more thorough review of the literature.

- The literature review serves several important functions:
 - Ensures that you are not "reinventing the wheel".
 - Gives credits to those who have laid the groundwork for your research.
 - Demonstrates your knowledge of the research problem.
 - Demonstrates your understanding of the theoretical and research issues related to your research question.
 - Shows your ability to critically evaluate relevant literature information.
 - Indicates your ability to integrate and synthesize the existing literature.
 - Provides new theoretical insights or develops a new model as the conceptual framework for your research.
- Convinces your reader that your proposed research will make a significant and substantial contribution to the literature (i.e., resolving an important theoretical issue or filling a major gap in the literature).

- Most literature reviews suffer from the following problems:
 - Lacking organization and structure
 - Lacking focus, unity and coherence
 - Being repetitive and verbose
 - Failing to cite influential papers
 - Failing to keep up with recent developments
 - Failing to critically evaluate cited papers
 - Citing irrelevant or trivial references
 - Depending too much on secondary sources
- There are different ways to organize your literature review. Make use of subheadings to bring order and coherence to your review. For example, having established the importance of your research area and its current state of development, you may devote several subsections on related issues as: *theoretical models, measuring instruments, cross-cultural and gender differences, etc.*

Sources of literature

- The library is the most likely physical location for the research literature. Within library there is access to books, periodicals, technical reports, and academic thesis.
- Now a days Internet service has made world wide access of information. They are comprehensive, fast and cost effective.
- Irrespective of the sources of the literature , ethics of research that the source is acknowledged through a clear system of reference (avoid plagiarism).

3.1 Objectives

- The **OBJECTIVES** of a research project summarises what is to be achieved by the study.
- Objectives should be closely related to the statement of the problem.
- The **general objective** of a study states what researchers expect to achieve by the study in general terms.
- It is possible (and advisable) to break down a general objective into smaller, logically connected parts. These are normally referred to as **specific objectives.**
- Specific objectives should systematically address the various aspects of the problem as defined under 'Statement of the Problem' and the key factors that are assumed to influence or cause the problem. They should specify **what** you will do in your study, **where** and **for what purpose.**

Why should research objectives be developed?

- The formulation of objectives will help to:
- **Focus** the study (narrowing it down to essentials);
- **Avoid** the collection of data which are not strictly necessary for understanding and solving the problem you have identified; and
- **Organise** the study in clearly defined parts or phases.
- Properly formulated, specific objectives will facilitate the development of your research methodology and will help to orient the collection, analysis, interpretation and utilisation of data.

How should you state your objectives?

- Take care that the objectives of your study:
 - Cover the different aspects of the problem and its contributing factors in a **coherent** way and in a **logical sequence**;
 - Are **clearly phrased** in **operational terms**, specifying exactly what you are going to do, where, and for what purpose;
 - Are **realistic** considering local conditions; and
 - Use **action verbs** that are specific enough to be evaluated.
 - **Examples** of action verbs are: to determine, to compare, to verify, to calculate, to describe, and to establish.
Avoid the use of vague non-action verbs such as: to appreciate, to understand, or to study.
- Keep in mind that when the project is evaluated, the results will be compared to the objectives. If the objectives have not been spelled out clearly, the project cannot be evaluated.

3.2 Research Questions

- Research question may be drawn from the statement of the problem.
- The purpose of the research question is to make the research focused. Thus, it sails a research study in a particular direction.
- A good question is:
 - Stated as a question:
 - Specific,
 - Includes key terms and / or variables to be investigated,
 - Can be operationalized,
 - Is written in simple and precise form.

3.3 HYPOTHESES

- Based on your experience with the study problem, it might be possible to develop explanations for the problem, which can then be tested. If so, you can formulate hypotheses in addition to the study objectives.
- A HYPOTHESIS is a prediction of a relationship between one or more factors and the problem under study that can be tested.

4. Research design

- A research design is the conceptual framework within which the research will be conducted. Some scholars call it the blue print of the research.
- The research design is meant to ensure efficiency of the research project. It ensures collection of relevant evidence with minimal expenditure of effort, time and money.
- The design used is dependent upon or objectives of the research. The research may be done for exploration, description, diagnosis or experimentation.
- In general, the research design is used to structure the research: to show how all the major parts of the research project- the samples, methods, etc. work together to address the central research question.
- The major types of research designs are the **qualitative, quantitative and mixed methods** with the different approaches under them.

- **Qualitative Research approach:**
 - Historical
 - Ethnographic
 - Ground Theory
 - Participatory Observation
 - Case study
 - Action research
- **Quantitative Research Approach:**
 - Statistical/Correlational Analysis,
 - Experimental,
 - Quasi-Experimental,
 - Surveys/ Ex post facto,
 - Descriptive research,
 - Causal-comparative research,
- **Mixed methods Approach:**
 - Sequential exploratory
 - Sequential Explanatory
 - Sequential transformative
 - Concurrent triangulation
 - Concurrent nested
 - Concurrent transformative

5. Sampling

- The entire population in which the research is to be undertaken is called population.
- Sometimes , the entire population will be sufficiently small, and the researcher can include the entire population in the study. This type of research is called a census study.
- Usually, the population is too large for the researchers to attempt to survey all of its members. A small, but carefully chosen sample can be used to represent the population.
- The sample reflect the characteristics of the population from which it is drawn.
- Sampling methods are classified as either **probability or nonprobability**.

Probability Sampling

- In probability sampling each member of the population has a known probability of being selected.
- Probability methods include **random sampling, systematic sampling, stratified sampling and clustered sampling.**
- **Random Sampling:**
 - is the purest form of probability sampling. Each member of the population has an equal chance to be selected.
 - The advantage of probability sampling is that sampling error can be calculated. Sampling error is the degree to which a sample might differ from the population.
- Types of simple random method:
 - Lottery method
 - Random number table

- **Systematic Sampling:**

- It is called an N^{th} name selection technique.
- this is quicker but not everyone has a chance to be included, the first number could be chosen at random.
- After the required sample size has been calculated, every N^{th} record is selected from a list of population members.
- Its only advantage over the random sampling technique is simplicity.

- **Stratified sampling:**

- Where there is heterogeneity in the population this can be reflected in the strata, i.e., each stratum can be weighed to reflect the heterogeneity. In this way a proportional representation of the whole population can be gained.
- is commonly used probability method that is superior to random sampling because it reduces sampling error.

- A stratum is a subset of the population that share at least one common characteristics.
- The researcher first identifies the relevance strata and their actual representation in the population.
- Random sampling is then used to select subjects for each stratum until the number of subjects in that stratum is proportional to its frequency in the population.

- **Clustered Sampling**

- Best used where there is a wide geographical spread. Clusters may be chosen subjectively to be representative of the whole.

- **Nonprobability sampling:**

- Here members are selected from the population in some non probability manner.
- These include **Convenience sampling, judgment sampling, quota sampling and snow ball sampling.**

- **Convenience sampling:**

- is used in exploratory research where the researcher is interested in getting an inexpensive approximation of the truth.
- As the name implies, the sample is selected because they are convenient.
- This nonprobability method is often used during preliminary research effort to get a gross estimate of the result, without incurring the cost or time required to select a random sample.

- **Judgment sampling:**

- is a common nonprobability method.
- The researcher selects the sample based on judgment.
- This is usually an extension of convenience sampling.
- For example, a researcher may decide to draw the entire sample from one representative city, even though the population includes all cities. When using this method the researcher must be confident that the chosen sample is truly representative of the entire population

- **Quota sampling:**

- Is the nonprobability equivalent of stratified sampling
- Like stratified sampling the researcher first identifies the strata and their proportions as they are represented in the population
- Then convenience or judgment sampling is used to select the required number of subjects from each strata.
- This differs from stratified sampling where the strata are filled by random sampling.

- **Snowball sampling:**

- Is a special nonprobability method used when the desired sample characteristics is rare.
- It may be extremely difficult or cost prohibitive to locate respondents in these situation.
- Snowball sampling relies on referrals from initial subjects to generate additional subjects
- While this technique can dramatically lower search costs, it comes at the expense of introducing bias because the technique itself reduces the likelihood that the sample will represent a good cross section from the population.

6. Data collection

7. Data analysis and interpretation

- The methods used to analyse data will depend on the type of research, **qualitative or quantitative research**, which is again influenced by personal and **methodological preference and educational background**.
- For quantitative data analysis, **issues of validity and reliability are important**. Thus, the researcher must make sure that their **measurements are stable and consistent and that there are no errors or bias present**.
- Qualitative data analysis is **a very personal process**.
 - For qualitative data, the researcher might analyse as the research progresses, **continually refining and reorganizing in light of the emerging results**.
 - For quantitative data, the analysis can be left until the **end of the data collection process**,

QUALITATIVE DATA ANALYSIS

- For qualitative data, the researcher might analyse as the research progresses, continually refining and reorganizing in light of the emerging results.
- it is useful to produce an interview summary form or a focus group summary form which you complete as soon as possible after each interview or focus group has taken place. **This includes** practical details about the time and place, the participants, the duration of the interview or focus group, and details about the content and emerging themes.
- The method you use will depend on:
 - your research topic,
 - your personal preferences, and
 - the availability of time, equipment and finances.

- The format for analysis could be a transcript from an:
 - interview or focus group,
 - a series of written answers on an open-ended questionnaire, or
 - field notes or
 - memos written by the researcher.
- It is useful to write memos and notes as soon as you begin to collect data as these help to focus your mind and alert you to significant points which may be coming from the data. These memos and notes can be analysed along with your transcripts or questionnaires.

Types of qualitative Analysis

1. **Thematic analysis**
2. **Comparative Analysis**
3. **Content analysis**
4. **Discourse analysis/ conversational analysis**

❖ **Thematic analysis**

- ✓ data is analysed by theme;
- ✓ is highly inductive, that is, the themes emerge from the data and are not imposed upon it by the researcher;
- ✓ the data collection and analysis take place simultaneously.

❖ **Comparative analysis.**

- ✓ data from different people is compared and contrasted and the process continues until the researcher is satisfied that no new issues are arising.
- ✓ Comparative and thematic analyses are often used in the same project, with the researcher moving backwards and forwards between transcripts, memos, notes and the research literature

❖ **Content analysis**

- with the analysis being left until the data has been collected;
- the most common method of doing this is to code by content.
- This type of analysis can be used for open-ended questions which have been added to questionnaires in large quantitative surveys, thus enabling the researcher to quantify the answers.

❖ **Discourse analysis/ conversational analysis**

- These methods look at patterns of speech, such as how people talk about a particular subject, what metaphors they use, how they take turns in conversation, and so on ;
- These analysts see speech as a performance; it performs an action rather than describes a specific state of affairs or specific state of mind.
- Much of this analysis is intuitive and reflective, but it may also involve some form of counting, such as counting instances of turn-taking and their influence on the conversation and the way in which people speak to others.

Processing the data

- It is possible to undertake the mechanical process using computing software which can save you a lot of time, although it may stop you becoming really familiar with the data.
- There are many dedicated qualitative analysis programs of various kinds available to social researchers that can be used for a variety of different tasks.
- For example, software could locate particular words or phrases; make lists of words and put them into **alphabetical order; insert key words or comments; count occurrences of words or phrases or attach numeric codes**. Some software will **retrieve text**, some will **analyse text** and **some will help to build theory**.
- Although a computer can undertake these mechanical processes, **it cannot think about, judge or interpret qualitative data**.

Quantitative Data Analysis

- For **quantitative data**, the analysis can be **left until the end of the data collection process**, and if it is a large survey, statistical software is the easiest and most efficient method to use.
- **Computing software:**
 - The most common package used by social scientists at this present time is **SPSS** for windows, which has become increasingly user-friendly over the last few years.
 - Also, many software packages at the push of a key produce professional graphs, tables and pie charts which can be used in your final report, again saving a lot of time and effort.
- **Statistical techniques**
 - For those who do not have access to data analysis software, a basic knowledge of statistical techniques is needed to analyse your data.
 - If your goal is to describe what you have found, all you need to do is count your responses and reproduce them. This is called a frequency count or **univariate analysis**.

- In **bivariate analysis** often you will need to find out if there is a connection between one variable and a number of other variables. For example, a researcher might want to find out whether there is a connection between watching violent films and aggressive behaviour.
- In **multivariate analysis** the researcher is interested in exploring the connections among more than two variables. For example, a researcher might be interested in finding out whether women aged 40-50, in professional occupations, are more likely to try complementary therapies than younger, non-professional women and men from all categories.

8. Validation of results/ Conclusion

- *validity*—the extent to which the interpretations of the results of the study follow from the study itself and the extent to which results may be generalized to other situations with other people.
 - *external validity*—the extent to which findings of a study can be generalized to people or situations other than those observed in the study.
 - *internal validity*—the extent to which the outcomes of a study result from the variables that were manipulated, measured, or selected rather than from other variables not systematically treated.

THE ELEMENTS OF A PROPOSAL

1. Introduction and Theoretical Framework

- “The introduction is the part of the paper that provides readers with the **background information** for the research reported in the paper.
- Its purpose is to establish a framework for the research, so that readers can understand how it is related to other research” (Wilkinson, 1991, p. 96).
- If a researcher is working within a particular theoretical framework/line of inquiry, the theory or line of inquiry should be introduced and discussed early, preferably in the introduction or literature review.
- Remember that the theory/line of inquiry selected will inform the statement of the problem, rationale for the study, questions and hypotheses, selection of instruments, and choice of methods. Ultimately, findings will be discussed in terms of how they relate to the theory/line of inquiry that under girds the study.

- Theories, theoretical frameworks, and lines of inquiry may be differently handled in quantitative and qualitative endeavors.
 - “In quantitative studies, one uses theory deductively and places it toward the beginning of the plan for a study. The objective is to test or verify theory. One thus begins the study advancing a theory, collects data to test it, and reflects on whether the theory was confirmed or disconfirmed by the results in the study. The theory becomes a framework for the entire study, an organizing model for the research questions or hypotheses for the data collection procedure” (Creswell, 1994, pp. 87-88).
 - In qualitative inquiry, the use of theory and of a line of inquiry depends on the nature of the investigation. In studies aiming at “grounded theory,” for example, theory and theoretical tenets emerge from findings. Much qualitative inquiry, however, also aims to test or verify theory, hence in these cases the theoretical framework, as in quantitative efforts, should be identified and discussed early on.

2. Statement of the Problem

- “The problem statement describes the context for the study and it also identifies the general analysis approach” (Wiersma, 1995, p. 404).
- “A problem might be defined as the issue that exists in the literature, theory, or practice that leads to a need for the study” (Creswell, 1994, p. 50).
- It is important in a proposal that the problem stand out—that the reader can easily recognize it.
- A problem statement should be presented within a context, and that context should be provided and briefly explained, including a discussion of the *conceptual or theoretical framework* in which it is embedded.
- Effective problem statements answer the question “Why does this research need to be conducted.”

3. Questions and/ or Hypothesis

3.1 Question

- *Questions* are relevant to normative or census type research (How many of them are there? Is there a relationship between them?). They are most often used in qualitative inquiry, although their use in quantitative inquiry is becoming more prominent.
- A *research question* poses a relationship between two or more variables but phrases the relationship as a question; a *hypothesis* represents a declarative statement of the relations between two or more variables (Kerlinger, 1979; Krathwohl, 1988).

3.2 Hypotheses

- *Hypotheses* are relevant to theoretical research and are typically used only in quantitative inquiry.
- When a writer states hypotheses, the reader is entitled to have an exposition of the theory that lead to them (and of the assumptions underlying the theory).
- Just as conclusions must be grounded in the data, hypotheses must be grounded in the theoretical framework.
- Questions and hypotheses are testable propositions deduced and *directly derived from theory* (except in grounded theory studies and similar types of qualitative inquiry).

4. The Design--Methods and Procedures

- “The methods or procedures section is really the heart of the research proposal. The activities should be described with as much detail as possible, and the continuity between them should be apparent” (Wiersma, 1995, p. 409).
- Indicate the methodological steps you will take to answer every question or to test every hypothesis illustrated in the Questions/Hypotheses section.
- In the design section, indicate
 - the variables you propose to control and how you propose to control them, experimentally or statistically, and
 - the variables you propose to randomize, and the nature of the randomizing unit (students, grades, schools, etc.).
- Be aware of possible sources of error to which your design exposes you. You will not produce a perfect, error free design (no one can). However, you should anticipate possible sources of error and attempt to overcome them or take them into account in your analysis. Moreover, you should disclose to the reader the sources you have identified and what efforts you have made to account for them

4.1 Sampling

- The key reason for being concerned with sampling is that of *validity*—the extent to which the interpretations of the results of the study follow from the study itself and the extent to which results may be generalized to other situations with other people (Shavelson, 1988).
- Perhaps the key word in sampling is *representative*. One must ask oneself, “How representative is the sample of the survey population (the group from which the sample is selected) and how representative is the survey population of the target population (the larger group to which we wish to generalize)?”

4.2 Instrumentation

- Outline the instruments you propose to use (questionnaire, interview, observation, etc.).
- If instruments have previously been used, identify previous studies and findings related to reliability and validity. If instruments have not previously been used, outline procedures you will follow to develop and test their reliability and validity. In the latter case, a pilot study is nearly essential.
- Include an appendix with a copy of the instruments to be used or the interview to be followed. Also include sample items in the description of the instrument.

4.3 Data Analysis

- Specify the procedures you will use, and label them accurately (e.g., ANOVA, MANCOVA, HLM, ethnography, case study, grounded theory). If you triangulated, carefully explain how you went about it.
- Indicate briefly any analytic tools you will have available and expect to use (e.g., Ethnograph, NUDIST, AQUAD, SAS, SPSS, SYSTAT).
- Provide a well thought-out rationale for your decision to use the design, methodology, and analyses you have selected.

5. Purpose of the Study

- “The purpose statement should provide a specific and accurate synopsis of the overall purpose of the study” (Locke, Spirduso, & Silverman, 1987, p. 5).
- Briefly define and delimit the specific area of the research.
- The purpose statement can also incorporate the ***rationale for the study***.
- Key points to keep in mind when preparing a purpose statement.
 - Try to incorporate a sentence that begins with “The purpose of this study is . . .” This will clarify your own mind as to the purpose and it will inform the reader directly and explicitly.
 - Clearly identify and define the central concepts or ideas of the study. When defining terms, make a judicious choice between using descriptive or operational definitions.
 - Identify the specific method of inquiry to be used.
 - Identify the unit of analysis in the study.

6. Limitations and Delimitations

- A *limitation* identifies potential weaknesses of the study. Think about your analysis, the nature of self-report, your instruments, the sample. Think about threats to internal validity that may have been impossible to avoid or minimize—explain.
- A *delimitation* addresses how a study will be narrowed in scope, that is, how it is bounded. This is the place to explain the things that you are not doing and why you have chosen not to do them—the literature you will not review (and why not), the population you are not studying (and why not), the methodological procedures you will not use (and why you will not use them).
- Limit your delimitations to the things that a reader might reasonably expect you to do but that you, for clearly explained reasons, have decided not to do.

7. Significance of the Study

- Indicate how your research will refine, revise, or extend existing knowledge in the area under investigation.
- This can be a difficult section to write. Think about *implications*—how results of the study may affect scholarly research, theory, practice, educational interventions, curricula, counseling, policy.
- When thinking about the significance of your study, ask yourself the following questions.
 - **What will results mean to the theoretical framework that framed the study?**
 - **What suggestions for subsequent research arise from the findings?**
 - **What will the results mean to the practicing educator?**
 - **Will results influence programs, methods, and/or interventions ?**
 - **Will results contribute to the solution of educational problems?**
 - Will results influence educational policy decisions?
 - What will be improved or changed as a result of the proposed research?
 - How will results of the study be implemented, and what innovations will come about?

8. Review of the Literature

- “The review of the literature provides the background and context for the research problem. It should establish the need for the research and indicate that the writer is knowledgeable about the area” (Wiersma, 1995, p. 406).
- The literature review accomplishes several important things.
 - It shares with the reader the results of other studies that are closely related to the study being reported (Fraenkel & Wallen, 1990).
 - It relates a study to the larger, ongoing dialogue in the literature about a topic, filling in gaps and extending prior studies (Marshall & Rossman, 1989).
 - It provides a framework for establishing the importance of the study, as well as a benchmark for comparing the results of a study with other findings.
 - It “frames” the problem earlier identified.

- In a proposal, the literature review is generally brief and to the point. Be judicious in your choice of exemplars—the literature selected should be pertinent and relevant (APA, 2001). Select and reference only the more appropriate citations. Make key points clearly and succinctly.

9. Time Framework

10. Budget breakdown

11. Reference

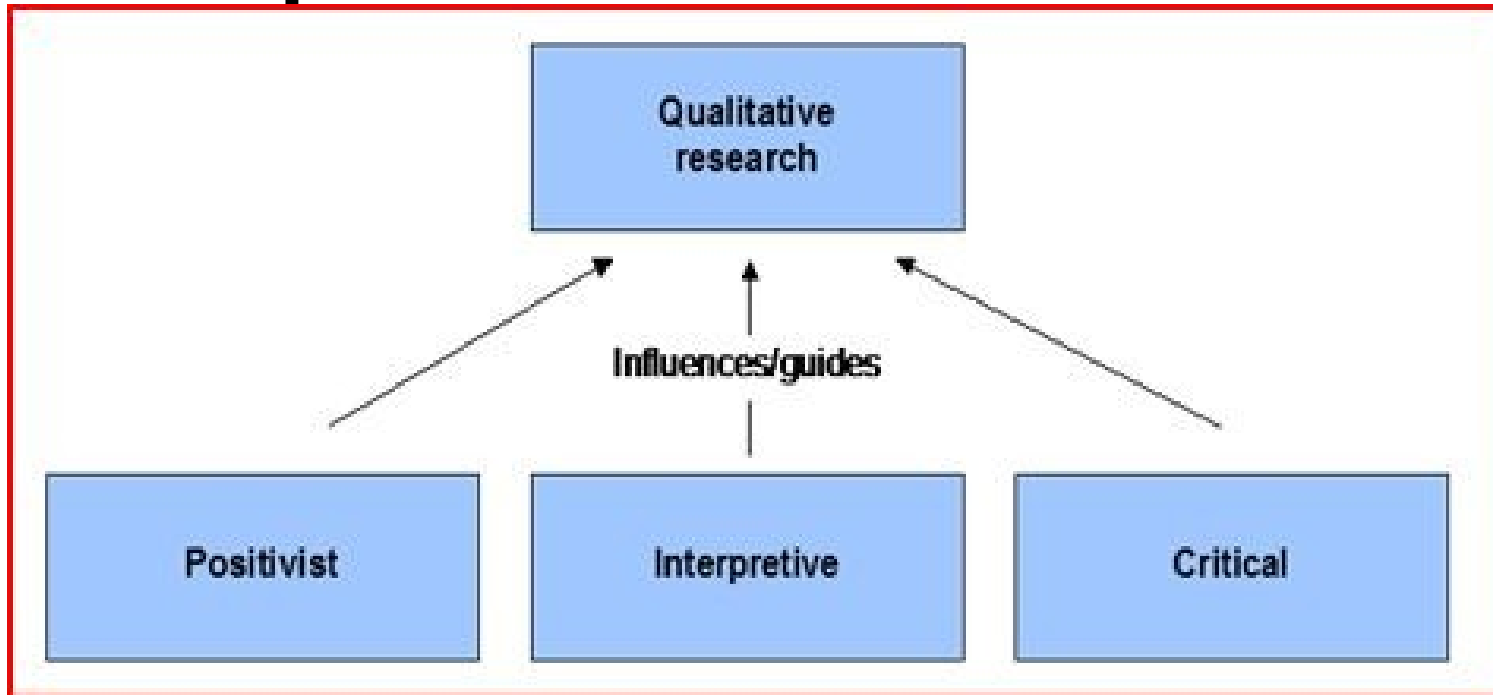
12 Appendix

3.0 QUALITATIVE RESEARCH

- **Qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena.**
- Qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live.
- Qualitative research, broadly defined, means "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification"
- **It uses a naturalistic approach** that seeks to understand phenomena in context-specific settings

3.1 Philosophical Perspectives of Qualitative Research

- [Orlikowski and Baroudi \(1991\)](#) suggest three categories, based on the underlying research epistemology: **positivist, interpretive and critical.**



1. Positivist Research

- Positivists generally assume that **reality is objectively given and can be described by measurable properties** which are independent of the observer (researcher) and his or her instruments.
- Positivist studies generally attempt to test theory, in an attempt to increase the predictive understanding of phenomena.
- Examples of a positivist approach to qualitative research include [Yin's \(2002\)](#) and [Benbasat et al's \(1987\)](#) work on case study research.

2. Interpretive Research

- Interpretive researchers start out with the assumption that access to reality (given or socially constructed) is only through social constructions such as language, consciousness and shared meanings.
- The philosophical base of interpretive research is hermeneutics and phenomenology ([Boland, 1985](#)).
- Interpretive studies generally attempt to understand phenomena through the meanings that people assign to them and interpretive methods of research "aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context" ([Walsham 1993](#), p. 4-5).

- Interpretive research does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges ([Kaplan and Maxwell, 1994](#)).
- Examples of an interpretive approach to qualitative research include [Boland's \(1991\)](#) and [Walsham's \(1993\)](#) work. [Klein and Myers' \(1999\)](#) paper suggests a set of principles for the conduct and evaluation of interpretive research.

3. Critical Research

- Critical researchers assume that social reality is historically constituted and that it is produced and reproduced by people.
- Although people can consciously act to change their social and economic circumstances, critical researchers recognize that their ability to do so is constrained by various forms of social, cultural and political domination.
- Critical research focuses on the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory i.e. it should help to eliminate the causes of alienation and domination.
- Examples of a critical approach to qualitative research include [Ngwenyama and Lee's \(1997\)](#) and [Hirschheim and Klein's \(1994\)](#) work

3.2 Characteristic Features of Qualitative Research

- [Bogdan and Biklen, 1982;](#)
[Lincoln and Guba, 1985; Patton, 1990;](#)
[Eisner, 1991](#) have listed the following to represent the characteristics of qualitative research:
 1. **Qualitative research uses the natural setting as the source of data.** The researcher attempts to observe, describe and interpret settings as they are, maintaining what Patton calls an "empathic neutrality" (1990, p. 55).
 2. **The researcher acts as the "human instrument" of data collection.**
 3. Qualitative researchers predominantly **use inductive data analysis.**
 4. Qualitative research **reports are descriptive**, incorporating expressive language and the "presence of voice in the text" (Eisner, 1991, p. 36).

5. Qualitative research **has an interpretive character**, aimed at discovering the meaning events have for the individuals who experience them, and the interpretations of those meanings by the researcher.
6. Qualitative researchers **pay attention to the idiosyncratic (personal peculiarity) as well as the pervasive, seeking the uniqueness of each case.**
7. Qualitative research **has an emergent (as opposed to predetermined) design**, and researchers focus on this emerging process as well as the outcomes or product of the research.
8. Qualitative research **is judged using special criteria for trustworthiness, criteria such as credibility, transferability, Dependability, conformability.**

3.3 The Role of the Researcher in Qualitative Inquiry

- Before conducting a qualitative study, a researcher must do three things.
 - First, **the researcher must adopt the stance suggested by the characteristics of the naturalist paradigm.**
 - Second, **the researcher must develop the level of skill appropriate for a human instrument**, or the vehicle through which data will be collected and interpreted.
 - Finally, **the researcher must prepare a research design that utilizes accepted strategies for naturalistic inquiry** (Lincoln and Guba, 1985).
- Glaser and Strauss ([1967](#)) and Strauss and Corbin ([1990](#)) refer to what they call the **"theoretical sensitivity" of the researcher.** This is a useful concept with which to evaluate a researcher's skill and readiness to attempt a qualitative inquiry.

- **Theoretical sensitivity refers to a personal quality of the researcher.** It indicates an awareness of the subtleties of meaning of data. It refers to
 - the attribute of having insight,
 - the ability to give meaning to data,
 - the capacity to understand, and
 - the capability to separate the pertinent from that which isn't ([Strauss and Corbin, 1990, p. 42](#)).
- Strauss and Corbin believe that theoretical sensitivity comes from a number of sources, including
 - professional literature,
 - professional experiences, and
 - personal experiences.

- The credibility of a qualitative research report relies heavily on the confidence readers have in the researcher's ability to be sensitive to the data and to make appropriate decisions in the field ([Eisner, 1991](#); [Patton, 1990](#)).
- Lincoln and Guba ([1985](#)) identify the characteristics that make humans the "instrument of choice" for naturalistic inquiry.

3.4 QUALITATIVE RESEARCH METHODOLOGIES

- A research methodology is a strategy of inquiry which moves from the underlying philosophical assumptions to research design and data collection.
- The choice of research method influences the way in which the researcher collects data. Specific research methods also imply different skills, assumptions and research practices.
- The six research qualitative research approaches that will be discussed here are action research, case study research, historical, ethnography, participatory observation and grounded theory
- **1. Action Research**
- **2. Case Study Research**
- **3. Ethnography**
- **4. Grounded Theory**
- **5. Historical**
- **6. participatory observation**

1 Action Research

- There are numerous definitions of action research, however one of the most widely cited is that of Rapoport, who defines action research in the following way:
- *Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework ([Rapoport, 1970](#), p. 499).*
- This definition draws attention to the collaborative aspect of action research and to possible ethical dilemmas which arise from its use. It also makes clear, as [Clark \(1972\)](#) emphasizes, that action research is concerned to enlarge the stock of knowledge of the social science community. It is this aspect of action research that distinguishes it from applied social science, where the goal is simply to apply social scientific knowledge but not to add to the body of knowledge.
- Action research has been accepted as a valid research method in applied fields such as organization development and education (e.g. see the Special Issue on action research in [Human Relations, Vol. 46, No. 2, 1993](#), and [Kemmis and McTaggart, 1988](#)). In information systems, however, action research was for a long time largely ignored, apart from one or two notable exceptions (e.g. [Checkland, 1991](#)). More recently, there seems to be increasing interest in action research.

2. Case Study Research

- The term "case study" has multiple meanings. It can be used to describe a unit of analysis (e.g. a case study of a particular organisation) or to describe a research method. The discussion here concerns the use of the case study as a research method.
- Case study research is the most common qualitative method used in information systems ([Orlikowski and Baroudi, 1991](#); [Alavi and Carlson, 1992](#)). Although there are numerous definitions, [Yin \(2002\)](#) defines the scope of a case study as follows:
 - A case study is an empirical inquiry that:
 - investigates a contemporary phenomenon within its real-life context, especially when
 - the boundaries between phenomenon and context are not clearly evident ([Yin 2002](#)).

- Clearly, the case study research method is particularly well-suited to IS research, since the object of our discipline is the study of information systems in organizations, and "interest has shifted to organizational rather than technical issues" ([Benbasat et al. 1987](#)).
- Case study research can be positivist, interpretive, or critical, depending upon the underlying philosophical assumptions of the researcher (for a fuller discussion, see the section of [Philosophical Perspectives](#) above). [Yin \(2002\)](#) and [Benbasat et al. \(1987\)](#) are advocates of positivist case study research, whereas [Walsham \(1993\)](#) is an advocate of interpretive in-depth case study research.

3. Ethnography

- Ethnographic research comes from the discipline of social and cultural anthropology where an ethnographer is required to spend a significant amount of time in the field. Ethnographers immerse themselves in the lives of the people they study ([Lewis 1985](#), p. 380) and seek to place the phenomena studied in their social and cultural context.
- After early ground-breaking work by [Wynn \(1979\)](#), [Suchman \(1987\)](#) and [Zuboff \(1988\)](#), ethnography has now become more widely used in the study of information systems in organizations, from the study of the development of information systems ([Hughes et. al, 1992](#); [Orlikowski, 1991](#); [Preston, 1991](#)) to the study of aspects of information technology management ([Davies, 1991](#); [Davies and Nielsen, 1992](#)). Ethnography has also been discussed as a method whereby multiple perspectives can be incorporated in systems design ([Holzblatt and Beyer, 1993](#)) and as a general approach to the wide range of possible studies relating to the investigation of information systems ([Pettigrew, 1985](#)).

- In the area of the design and evaluation of information systems, some very interesting work is taking place in a collaborative fashion between ethnographers on the one hand, and designers, IS professionals, computer scientists and engineers on the other. This collaborative work is especially strong in the UK and Europe and is growing in the US.
- » [Myers \(1999\) overview article entitled "Investigating Information Systems with Ethnographic Research"](#) (this is the PDF version of a paper published in [Communications of the AIS](#). Please note that the Association for Information Systems owns the copyright and use for profit is not allowed)

4. Grounded Theory

- Grounded theory is a research method that seeks to develop theory that is grounded in data systematically gathered and analyzed. According to [Martin and Turner \(1986\)](#), grounded theory is "an inductive, theory discovery methodology that allows the researcher to develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations or data." The major difference between grounded theory and other methods is its specific approach to theory development - grounded theory suggests that there should be a continuous interplay between data collection and analysis.
- Grounded theory approaches are becoming increasingly common in the IS research literature because the method is extremely useful in developing context-based, process-oriented descriptions and explanations of the phenomenon (see, for example, [Orlikowski, 1993](#)).

3.5 Research Design and Data Collection

Strategies

- Lincoln and Guba ([1985](#)) provide a fairly detailed outline for the design of naturalistic inquiry, which includes these general steps:

1. **Determine a focus for the inquiry.**
This should establish a boundary for the study, and provide inclusion/exclusion criteria for new information. Boundaries, however, can be altered, and typically are.
2. **Determine the fit of the research paradigm to the research focus.** The researcher must compare the characteristics of the qualitative paradigm with the goals of the research.
3. **Determine where and from whom data will be collected.**

4. **Determine what the successive phases of the inquiry will be.** Phase one, for example, might feature open-ended data collection, while successive phases will be more focused.
5. **Determine what additional instrumentation may be used, beyond the researcher as the human instrument.**
6. **Plan data collection and recording modes.** This must include how detailed and specific research questions will be, and how faithfully data will be reproduced.
7. **Plan which data analysis procedures will be used.**
8. **Plan the logistics of data collection, including scheduling and budgeting.**
9. **Plan the techniques that will be used to determine trustworthiness.**

3.5.1 Sampling Strategies for Qualitative Researchers

- ***Purposeful sampling (non-probability sampling)*** is the dominant strategy in qualitative research.
- ***Non-probability Sampling Non-probability sampling*** does not involve the use of randomization. Therefore, to be considered representative, non-probability sampling methods cannot rely on the theory of probability (random theory). We can also use purposive or even accidental, haphazard, or convenience sampling to get a representative sample relying on other techniques than randomization.
- Purposeful sampling seeks information-rich cases which can be studied in depth ([Patton, 1990](#)).

Types of Non-probability Sampling Method

- Patton ([1990, pp. 169-183](#)) identifies and describes 16 types of purposeful sampling. These include:
 - convenience sampling
 - snowball or chain sampling
 - extreme or deviant case sampling;
 - typical case sampling;
 - maximum variation sampling;
 - confirming or disconfirming case sampling;
 - politically important case sampling; and others
- **Convenience or accidental or haphazard sampling** : units are sampled according to what is conveniently, accidentally, or haphazardly available.
 - Purposive sampling** : units from a prespecified group are purposively sought out and sampled
 - Proportional and non-proportional quota sampling**: sample until exact proportions of certain types of units are obtained, or until sufficient units in several different categories are obtained
 - Snowball sampling/ chain sampling**: initial unit (s) are sampled, and these units then identify more units to sampled, and so on
 - modal instance sampling**: mode is the "most common" occurrence; in modal instance sampling, units are prototypical of a predefined group are sampled
 - expert sampling**: units which are identified as having particularly high quality of information are sampled
 - heterogeneity or diversity sampling**: opposite of modal sampling; intentionally samples units from throughout spectrum of responses

- According to Lincoln and Guba ([1985](#)), the most useful strategy for the naturalistic approach is **maximum variation sampling**. This strategy aims at capturing and describing the central themes or principal outcomes that cut across a great deal of participant or program variation. For small samples a great deal of heterogeneity can be a problem because individual cases are so different from each other.
- The maximum variation sampling strategy turns that apparent weakness into a strength by applying the following logic: Any common patterns that emerge from great variation are of particular interest and value in capturing the core experiences and central, shared aspects or impacts of a program ([Patton, 1990, p. 172](#)).

Sampling Error

- In spite of the apparent flexibility in purposeful sampling, researchers must be aware of three types of sampling errors that can arise in qualitative research.
 - The first relates to **distortions caused by insufficient breadth in sampling;**
 - the second from **distortions introduced by changes over time;** and
 - the third from **distortions caused by lack of depth in data collection at each site (Patton, 1990).**

Deciding When to Stop Sampling

- Qualitative researchers have few strict guidelines for when to stop the data collection process.
- Criteria include:
 - 1) exhaustion of resources;**
 - 2) emergence of regularities; and**
 - 3) overextension, or going too far beyond the boundaries of the research (**[Guba, 1978](#)**).**
- The decision to stop sampling must take into account the research goals, the need to achieve depth through triangulation of data sources, and the possibility of greater breadth through examination of a variety of sampling sites.

3.5.2 Data Collection Techniques

- There are different data collection techniques in qualitative research (**interviews, observation, group discussion, case studies, etc.**).
- The two prevailing forms of data collection techniques discussed in association with qualitative inquiry are **interviews and observation**.

Interviews

- Qualitative interviews may be used either as the primary strategy for data collection, or in conjunction with observation, document analysis, or other techniques ([Bogdan and Biklen, 1982](#)).
- Qualitative interviewing utilizes open-ended questions that allow for individual variations.
- Patton ([1990](#)) writes about three types of qualitative interviewing:
 - 1) informal, conversational interviews;
 - 2) semi-structured interviews; and
 - 3) standardized, open-ended interviews.

- Although it is prepared to insure that basically the same information is obtained from each person, there are no predetermined responses, and in semi-structured interviews the interviewer is free to probe and explore within these predetermined inquiry areas.
- In keeping with the flexible nature of qualitative research designs, interview guides can be modified over time to focus attention on areas of particular importance, or to exclude questions the researcher has found to be unproductive for the goals of the research ([Lofland and Lofland, 1984](#)).

Recording Data.

- A basic decision going into the interview process is how to record interview data. Whether one relies on **written notes or a tape recorder** appears to be largely a matter of personal preference. For instance, Patton says that a tape recorder is "indispensable" (1990, p. 348), while Lincoln and Guba "do not recommend recording except for unusual reasons" (1985, p. 241).
- Lincoln and Guba base their recommendation on the intrusiveness of recording devices and the possibility of technical failure. Recordings have the advantage of capturing data more faithfully than hurriedly written notes might, and can make it easier for the researcher to focus on the interview.

Observations

- The classic form of data collection in naturalistic or field research is observation of participants in the context of a natural scene.
- Observational data are used for the purpose of description-of settings, activities, people, and the meanings of what is observed from the perspective of the participants.
- Observation can lead to deeper understandings than interviews alone, because it provides a knowledge of the context in which events occur, and may enable the researcher to see things that participants themselves are not aware of, or that they are unwilling to discuss ([Patton, 1990](#)).
- A skilled observer is one who is trained in the process of monitoring both verbal and nonverbal cues, and in the use of concrete, unambiguous, descriptive language.

- There are several observation strategies available.
 - In some cases it may be possible and desirable for the researcher to watch **from outside**, without being observed.
 - Another option is to maintain a **passive presence**, being as unobtrusive as possible and not interacting with participants.
 - A third strategy is to engage in **limited interaction**, intervening only when further clarification of actions is needed. Or the researcher may exercise more active control over the observation, as in the case of a formal interview, to elicit specific types of information.
 - Finally, the researcher may act as **a full participant** in the situation, with either a hidden or known identity.
- Each of these strategies has specific advantages, disadvantages and concerns which must be carefully examined by the researcher ([Schatzman and Strauss, 1973](#)).

Recording Data.

- Field researchers rely most heavily on the use of **field notes**, which are running descriptions of settings, people, activities, and sounds.
- Field notes may include **drawings or maps**. Acknowledging the difficulty of writing extensive field notes during an observation, Lofland and Lofland ([1984](#)) recommend jotting down notes that will serve as a memory aid when full field notes are constructed. This should happen as soon after observation as possible, preferably the same day.
- In addition to field notes, researchers may use **photographs, videotapes, and audio tapes** as means of accurately capturing a setting.

Other Sources of Data

- Another source of information that can be invaluable to qualitative researchers is **analysis of documents**. Such documents might include:
 - **official records,**
 - **letters,**
 - **newspaper accounts,**
 - **diaries,**
 - **reports,**
 - **published data, etc.**
- There are some specialized forms of qualitative research which rely solely on analysis of documents. For example, Gagel ([1997](#)) used a process known as *hermeneutic inquiry* to investigate the literature on both literacy and technology.

3.5.3 Analysis of Data

- Bogdan and Biklen ([1982, p. 145](#)) define qualitative data analysis as "**working with data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is important and what is to be learned, and deciding what you will tell others**".
- Qualitative researchers tend to **use inductive analysis of data**, meaning that the critical themes emerge out of the data ([Patton, 1990](#)).
- Qualitative analysis requires some creativity, for the challenge is to place the raw data into logical, meaningful categories; to examine them in a holistic fashion; and to find a way to communicate this interpretation to others.

Stages of data analysis

1. Open Coding

- Analysis begins with identification of the themes emerging from the raw data, a process sometimes referred to as "**open coding**" ([Strauss and Corbin, 1990](#)).
- During open coding, the researcher must **identify and tentatively name the conceptual categories into which the phenomena observed will be grouped.**
- The goal is to create descriptive, multi-dimensional categories which form a preliminary framework for analysis.
Words, phrases or events that appear to be similar can be grouped into the same category. These categories may be gradually modified or replaced during the subsequent stages of analysis that follow.

2. Axial coding

- The next stage of analysis involves **re-examination of the categories identified to determine how they are linked**, a complex process sometimes called "**axial coding**" ([Strauss and Corbin, 1990](#)).
- The discrete categories identified in open coding are compared and combined in new ways as the researcher begins to assemble the "big picture."
- The purpose of coding is to not only describe but, more importantly, to acquire new understanding of a phenomenon of interest.
- Therefore, causal events contributing to the phenomenon; descriptive details of the phenomenon itself; and the ramifications of the phenomenon under study must all be identified and explored.
- During axial coding the researcher is responsible for building a conceptual model and for determining whether sufficient data exists to support that interpretation.

3 Translation/ interpretation

- Finally the researcher must translate the conceptual model into the story line that will be read by others.
- Ideally, the research report will be a rich, tightly woven account that closely approximate the reality it represents (Strauss and Corbin, 1990, p. 57).

3.5 Judging Qualitative Research

3.5.1 Reviewers judgement

- Eisner ([1991](#)) believes that the following three features of qualitative research should be considered by reviewers:
 - **Coherence:** Does the story make sense? How have the conclusions been supported? To what extent have multiple data sources been used to give credence to the interpretation that has been made?
 - **Consensus:** The condition in which the readers of a work concur that the findings and/or interpretations reported by the investigator are consistent with their own experience or with the evidence presented.
 - **Instrumental Utility:** The most important test of any qualitative study is its usefulness. A good qualitative study can help us understand a situation that would otherwise be enigmatic or confusing.
- A good study can help us anticipate the future, not in the predictive sense of the word, but as a kind of road map or guide. "Guides call our attention to aspects of the situation or place we might otherwise miss" ([Eisner, 1991, p. 59](#)).

3.5.2. Addressing Trustworthiness in Qualitative Research

- Lincoln and Guba ([1985, p. 300](#)) have identified one alternative set of criteria that correspond to those typically employed to judge quantitative work (see Table 1).

Comparison of criteria for judging the quality of quantitative versus qualitative research	
Conventional terms (Quantitative research)	Naturalistic terms (Qualitative research)
internal validity	credibility
External validity	transferability
reliability	Dependability
objectivity	conformability

Internal Validity versus Credibility

- In conventional inquiry, internal validity refers to the extent to which the findings accurately describe reality.
- The naturalistic researcher, on the other hand, assumes the presence of multiple realities and attempts to represent these multiple realities adequately. Credibility becomes the test for this.
- Credibility depends less on sample size than on the richness of the information gathered and on the analytical abilities of the researcher (Patton, 1990).

- Credibility can be enhanced through triangulation of data. Patton identifies four types of triangulation:
 - 1) methods triangulation;**
 - 2) data triangulation;**
 - 3) triangulation through multiple analysts; and**
 - 4) theory triangulation.**
- Other techniques for addressing credibility include making segments of the raw data available for others to analyze, and the use of "member checks," in which respondents are asked to corroborate findings (Lincoln and Guba, 1985, pp. 313-316).

External Validity versus Transferability

- In conventional research, **external validity refers to the ability to generalize findings across different settings.**
- Making generalizations involves a trade-off between internal and external validity (Lincoln and Guba, 1985). That is, in order to make generalizable statements that apply to many contexts, one can include only limited aspects of each local context.
- Lincoln and Guba (1985) admit that generalizability is "an appealing concept," because it allows a semblance of prediction and control over situations. Yet they suggest that the existence of local conditions "makes it impossible to generalize".

- In the naturalistic paradigm, the ***transferability*** of a working hypothesis to other situations depends on the degree of similarity between the original situation and the situation to which it is transferred.
- **The researcher cannot specify the transferability of findings; he or she can only provide sufficient information that can then be used by the reader to determine whether the findings are applicable to the new situation** (Lincoln and Guba, 1985).
- Other writers use similar language to describe transferability, if not the word itself. For example, Stake (1978) refers to what he calls "**naturalistic generalization**". Patton suggests that "**extrapolation**" is an appropriate term for this process. Eisner says it is a form of "**retrospective generalization**" that can allow us to understand our past (and future) experiences in a new way.

Reliability versus Dependability

- Kirk and Miller (1986) identify three types of reliability referred to in conventional research, which relate to:
 - 1) the degree to which a measurement, given repeatedly, remains the same;
 - 2) the stability of a measurement over time; and
 - 3) the similarity of measurements within a given time period.
- Although Kirk and Miller (1986) give several examples of how reliability might be viewed in qualitative work, the essence of these examples can be summed up in the following statement by Lincoln and Guba (1985): "Since there can be no validity without reliability (and thus no credibility without dependability), a demonstration of the former is sufficient to establish the latter".
- Nevertheless, Lincoln and Guba do propose one measure which might enhance the **dependability** of qualitative research. That is the use of an "**inquiry audit**," in which reviewers examine both the process and the product of the research for consistency.

Objectivity versus Confirmability

- Conventional wisdom says that research which relies on **quantitative measures to define a situation is relatively value-free, and therefore objective.**
- **Qualitative research, which relies on interpretations and is admittedly value-bound, is considered to be subjective.**
- In the world of conventional research, subjectivity leads to results that are both unreliable and invalid.
- There are many researchers, however, who call into question the true objectivity of statistical measures and, indeed, the possibility of ever attaining pure objectivity at all (Lincoln and Guba, 1985; Eisner, 1991).

- Lincoln and Guba (1985) choose to speak of the "**confirmability**" of the research. In a sense, they refer to the degree to which the researcher can demonstrate the neutrality of the research interpretations, through a "confirmability audit."
- This means providing an audit trail consisting of :
 - raw data;
 - analysis notes;
 - reconstruction and synthesis products;
 - process notes;
 - personal notes; and
 - preliminary developmental information.

3.6 Discussion and Conclusion

- The decision to use qualitative methodologies should be considered carefully; by its very nature, qualitative research can be emotionally taxing and extraordinarily time consuming. At the same time, it can yield rich information not obtainable through statistical sampling techniques.
- Qualitative researchers have a special responsibility to their subjects and their readers.
- Since there are no statistical tests for significance in qualitative studies, the researcher bears the burden of discovering and interpreting the importance of what is observed, and of establishing a plausible connection between what is observed and the conclusions drawn in the research report.
- To do all of this skillfully requires a solid understanding of the research paradigm and, ideally, guided practice in the use of qualitative observation and analysis techniques.

4.0 Quantitative Research

Methodology

- Quantitative research emerged around 1250 A.D. and was driven by investigators with the need to quantify data. Since then quantitative research has dominated the western cultural as the research method to create meaning and new knowledge.
- What constitutes a quantitative research method involves a numeric or statistical approach to research design.
- Leedy and Ormrod (2001) alleged that quantitative research is specific in its surveying and experimentation, as it **builds upon existing theories**.
- The methodology of a quantitative research maintains the assumption of an **empiricist paradigm** (Creswell, 2003).
- **The research itself is independent of the researcher. As a result, data is used to objectively measure reality.** Quantitative research creates meaning through objectivity uncovered in the collected data.

Purpose

- Quantitative research seek **causal explanation, prediction and generalization** of findings.
- The intention is to establish, confirm, or validate relationships and develop generalizations that contribute to the formulation of theories” (Leedy and Ormrod, 2001, p. 102).

Approach

- Follow deductive approach. Begins with hypotheses and theories,
- Involve experimentation to test hypothetical generalization. True experimental design provides manipulation and a high degree of control in the experiment and produce a higher degree of validity,
- Uses formal instruments to collect data (questionnaire, interview, etc.),
- Component analysis (analysis in a totality/ integrity),
- Reduces data to numerical indices,
- Abstract language in write-up,
- Research report are more of analytical than descriptive.

Features of Quantitative Research

- The aim is to classify features, count them, and construct statistical models in an attempt to explain what is observed,
- Researcher knows clearly in advance what he/she is looking for,
- All aspects of the study are carefully designed before data is collected.
- Researcher uses tools, such as questionnaires or equipment to collect numerical data,
- Data is in the form of numbers and statistics,
- Objective – seeks precise measurement & analysis of target concepts, e.g., uses surveys, questionnaires etc.
- Quantitative data is more efficient, able to test hypotheses, but may miss contextual detail.
- Researcher tends to remain objectively separated from the subject matter,
- Recommended during latter phases of research projects,

Major types of Quantitative Research

- Types of quantitative research include:
 - **Experimental**
 - **Quasi-experimental**
 - **Descriptive**
 - **Correlational (Ex-post facto) study**
 - **Survey**
 - **Causal- comparative**
- Basically, experimental and quasi-experimental studies are designed to examine cause and effect. These studies are usually conducted to examine the differences in variables thought to be caused by independent variables (treatments).
- Descriptive and correlational studies examine variables in their natural environments and do not include researcher imposed treatments.

Experimental research

- In the **experimental research**, the researcher investigates the treatment of an intervention into the study group and then measures the outcomes of the treatment.
- There are three types of exploratory approaches:
 - **pre-experimental**,
 - **true experimental**, and
 - **quasi-experimental** (Leedy & Ormrod).
- The pre-experimental design involves an independent variable that does not vary or a control group that is not randomly selected.
- Campbell and Stanley (1963) endorsed the true experimental design, which provides a higher degree of control in the experiment and produces a higher degree of validity. The true experimental designs result in a systemic approach to quantitative data collection involving mathematical models in the analyses.
- The quasi-experimental design involves non-random selection of study participants. Therefore, control is limited and true experimentation is not possible. Since the variable cannot be controlled, validity may be sacrificed.

Quasi-experimental design.

- Quasi-experimental designs were developed to provide alternate means for examining causality in situations which were not conducive to experimental control.
- The designs have been developed to control as many threats to validity as possible in situations where at least one of the three elements of true experimental research is lacking (i.e. manipulation, randomisation, control group).
- There are too many types of Quasi-experimental design (see Burns & Grove 1993 pp.305-316) to go into in great depth here. Most are adaptations of experimental designs where one of the three elements is missing. An example could be where the researcher uses groups (control and treatment) which have evolved naturally in some way rather than being randomly selected.
- This is a quasi-experimental approach using non-equivalent control groups.

Causal comparative research

- In the **causal comparative research**, the researcher examines how the independent variables are affected by the dependent variables and involves cause and effect relationships between the variables.
- The factorial design focuses on two or more categories with the independent variables as compared to the dependent variable (Vogt, 1999).
- The causal comparative research design provides the researcher the opportunity to examine the interaction between independent variables and their influence on dependent variables.

Descriptive research approach

- The descriptive research approach is a basic research method that examines the situation, as it exists in its current state.
- Descriptive research involves identification of attributes of a particular phenomenon based on an observational basis, or the exploration of correlation between two or more phenomena.

Correlational Analysis

- Correlational studies are not universally accepted as a form of quantitative research.
- They focus on relationships between variables

Sampling:

- Sampling is a method of selecting a certain number of units from a total population (Macleod Clark J and Hockey L. 1981).
- The way a sample is selected should be clearly demonstrated in a research report.
- The aim of a sample is that it should be as unbiased a cross section of the "parent" population as possible, i.e., a sample of subjects needs to be as representative as possible of the population under study.
- To obtain a cross section we need to devise a sampling frame to define the boundaries (limits) within the context of the study and to reflect the organisation within which the sampling is taking place.
- The larger the size of the sample, the lower is the likelihood of it failing to represent the population under study. However, the law of diminishing returns tells us that there is, for each study, a desirable sample size under which their may fail to be accuracy yet above which there is no better a reflection of the parent population.

Types of Probability sampling

- Probability sampling may be grouped into
 - a) random
 - b) systematic
 - c) Stratified sample
 - d) Cluster sample
- a) random- every individual has a chance of being included individuals given a number and random number tables are used to identify "victims" for the sample.
- b) systematic (nth sampling) e.g., every 5th/xth: this is quicker but not everyone has a chance to be included the first number could be chosen at random.

- c) Stratified sample: Where there is heterogeneity in the population this can be reflected in the strata, i.e., each stratum can be weighed to reflect the heterogeneity. In this way a proportional representation of the whole population can be gained.
- d) Cluster sample : Best used where there is a wide geographical spread. Clusters may be chosen subjectively to be representative of the whole. The clusters can be further stratified. E.G., if we want to know about all A&E patients in the country we need to take a sample from a variety of A/E's. Each department can bring a number of patients into the sample according to whether they meet the stratification criteria.

Data Collection Techniques

- Instruments used to gather primary data:
 - Questionnaire
 - Interview
 - Etc
- Secondary data sources
 - Document analysis
 - Official records
 - Letters
 - Newspapers
 - Dairies
 - etc

Measurement (levels)

- **Nominal:** Subjects of research are differentiated by possessing or not possessing a given characteristic, e.g., pass/fail, single/married, and divided into a number of categories but the difference between the categories is not measurable in any real sense. This is the least sophisticated level of measurement.
- **Ordinal:** Subjects are ranked in order from greatest to least or best to worst. Again there is no precisely measurable difference between the ranks.
- **Interval:** Genuinely quantitative measurement such as that of temperature is measured at the interval level of measurement. Here the difference between 10 and 11 degrees centigrade is the same as the difference between 11 and 12 degrees centigrade.
- **Ratio:** In a scale of measurement where the difference between points on the scale is precise (as in the measurement of height and weight,) *and the scale starts at zero* the level of measurement is referred to as ratio. Height and weight start at zero. You can not weigh less than 0.00kg and cannot be less than 0.00mm in length/height; these are ratio scales. You can however record temperatures of the weather in terms of minus x degrees centigrade and this is why the scale is interval and not ratio.

- **Basic Measures**

- *mean*: is a measure of the central location or average of a set of numbers, e.g. the mean of 2 7 2 1 8 2 6 9 10 5 1 4 is 4.75
-
- *standard deviation*: is the square root of the variance!!
-
- *variance*: is a measure of dispersion (or spread) of a set of data calculated in the following way:

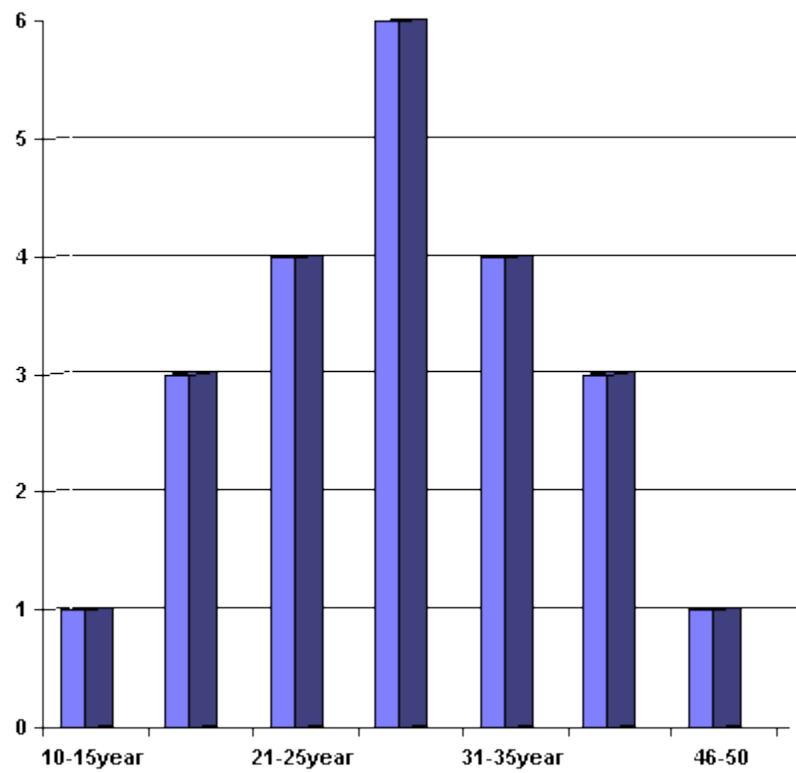
$$s^2 = \frac{\sum (x - \text{mean})^2}{n}$$

- *median*: is the centre or middle number of a data set, e.g. the median of 2 7 2 1 8 2 6 9 10 5 1 4 is 4.5
-
- *quartiles*: divide a distribution of values into four equal parts. The three corresponding values of the variable are denoted by Q1, Q2 (equal to the median) and Q3
-
- *range*: is a measure of dispersion equal to the difference between the largest and smallest value.

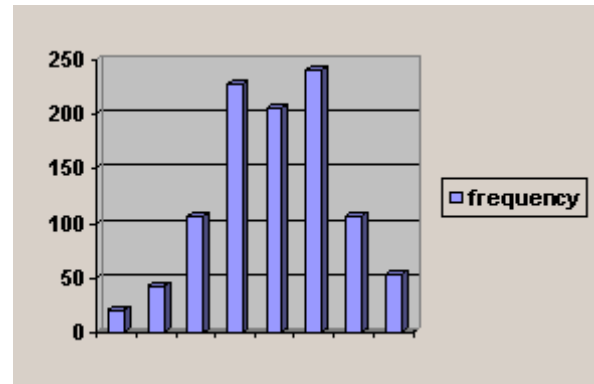
- **Mean**
- (full title = arithmetic mean) the value each item would have if all the values were shared out equally among all the items e.g., the mean of
- $2 + 2 + 2 + 2 + 4 + 4 + 5 + 6 + 6 + 6 + 8 = 47/11 = 4.27$
- the mean takes consideration of all the values.
- the mean can be corrupted by "freak" values thus if the values above referred to the age of children on a children's ward, the age would be 4.27 *but* if we add a 15 year old to the sequence the average age = 5.16
- **Median:**
- the value of the middle item of a distribution e.g., in the sequence above there are eleven values and the value occurring in the middle position is the value "4" thus 4 is the median average for this sequence.
- the median value tells us nothing about the other values in the sequence e.g., if the eight year old was replaced by a 15 year old, and one of the 2 year olds was replaced by a baby of just 2 days old, the median would not have changed at all.
- **Mode:**
- (modal value) the point of maximum frequency e.g., in the sequence of numbers above, the value "2" occurs most frequently and is thus the modal value.
- sometimes there is more than one peak e.g., if the values above referred to the age of children on a children's ward, and the eight year old child was replaced by a six year old child, there would be two modal values, one of the value "2" and the other of the value "6". The distribution would then be considered "bi-modal".
the modal value does not reflect the extremes of the sequence.

Normal distribution: this is illustrated by a normal (Gaussian) curve. see Graph 1

- This curve is symmetrical about the mean so that equal numbers fall above and below the mean.
Relatively few cases fall into the high or low levels and most cases fall close to the median so that the curve is bell shaped.
Normal distribution can be expected when characteristics that show continuous variation are plotted e.g., height is a trait that is prone to continuous variation.
- Normal distribution can be tested for by:
 - a) plotting the data on a graph and visually inspecting the line
 - b) using a probability graph in which if it is possible to draw a straight line through the values distribution is normal
 - c) applying the Chi-Square Test for normal distribution.
 - d) checking whether the mean, mode and median coincide (which they do if distribution is normal)
 - or
 - e) testing that:
 - 68% of all values will fall between $-1/+1$ standard deviation and
 - 95% of all values will fall between $-2/+2$ standard deviations.



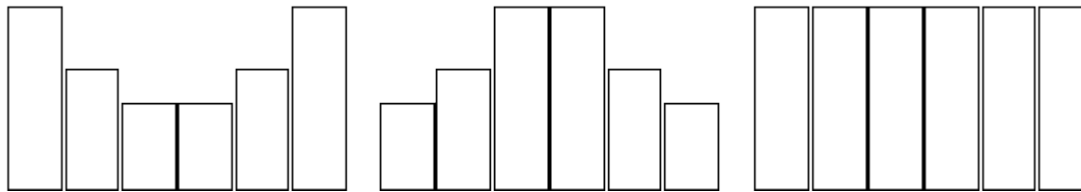
- **Frequency Distribution**
- **Example A**
- A new hybrid apple is developed with the aim of producing larger apples than a particular previous hybrid. In a sample of 1000 apples, the distribution of weights was as follows:



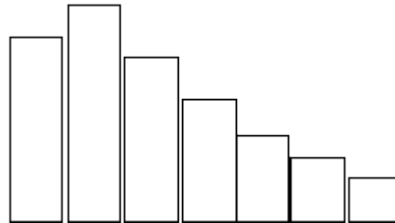
- Apples can only be sold to a particular supermarket with a weight greater than 150g. What proportion of the new hybrid apples would be rejected by this supermarket.
- How many grams above this weight of 150 g is the mean weight of apples?
- What is this difference in weights in units of the standard deviation of apple weights?
- Suppose that we graph the data using columns to show the amount in each group. We get a *frequency distribution*.
- **From the data there are 168 apples whose weight is less than 150 g and 832 apples whose weight is greater than 150 g. There are 1000 apples altogether.**
- **We can deduce that the proportion = 16.8 % cannot be sold to the supermarket.**
- **The mean weight of the apples is 223.35 g and the standard deviation is 78.9 g.**
- **The difference in weight between 150 g and the mean is 73.35 g and this is of a standard deviation.**

- **Measures of Location and Dispersion**

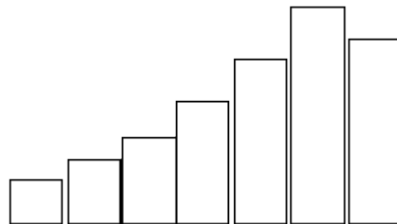
- A distribution is symmetrical if the difference between the mean and the median is zero. An appropriate pictorial representation of the data, (histogram, stem and leaf diagram etc.) would produce a mirror image about the centre:



- A distribution is positively skewed (or skewed to the right) if the mean - median is greater than zero. Such data when represented by a histogram would have a right tail that is longer than the left tail:



- A distribution is negatively skewed (or skewed to the left) if the mean - median is less than zero. Such data when represented by a histogram would have a left tail that is longer than the right tail:



- If data are skewed then the best measure of location is the median and the best measure of dispersion is the interquartile range.
- If data are symmetrical then the best measure of location is the mean and the best measure of dispersion is the standard deviation or variance.

- **Probability**

- This is an important concept in statistics and is an important part of our story.
- It is defined in the following way: if an experiment has n equally likely outcomes and g of them are the *event* E , then the probability of the event E , $P(E)$, occurring is
- $P(E) =$
- Some simple examples:
- the probability of getting a head from the toss of a fair coin is
- the probability of getting a six from the throw of a fair die is
- the probability of getting the ace of spades from cutting of a pack of cards is
- The smaller the probability the more unlikely the event is to happen. This is an important concept in quantitative methods in education research as we shall see.
- There is an important link between probability and the frequency distribution. Consider again the hybrid apple example above. We saw that the proportion of apples weighing less than 150 grams was 0.168. If we pick up one of the apples 'at random' then it could weigh less than 150 g and be rejected or it could weigh more than 150 g and be accepted by the supermarket.
- *The probability of picking such an apple is 0.168.*

- **Validity:**
- Refers to whether a particular instrument actually measures the construct it is designed to assess. E.G., a cardiac monitor is not a valid tool for measuring the peripheral pulse. A cardiac monitor is a valid tool for measuring the electrical activity of the heart.
- **Internal validity:**
- The extent to which the effects detected in a study are a true reflection of what is real, e.g., if the detected effect is that better nutrition leads to greater height gain in infants, internal validity exists if the height gain can not be attributed to another factor. (NB this other factor may be referred to as a confounding or extraneous variable).
- **External validity:**
- "The extent to which the study findings can be generalised beyond the sample used in the study" (Burns and Grove 1993). E.g., One study may find that better nutrition leads to increased height gain in infants but external validity exists only if this finding is found with other samples.
- NB the concept "Variable" appeared on the glossary of the previous session