Research Methodology

B.Sc. Third Year

Devendra Adhikari, Ph.D.
Professor

What is Research?

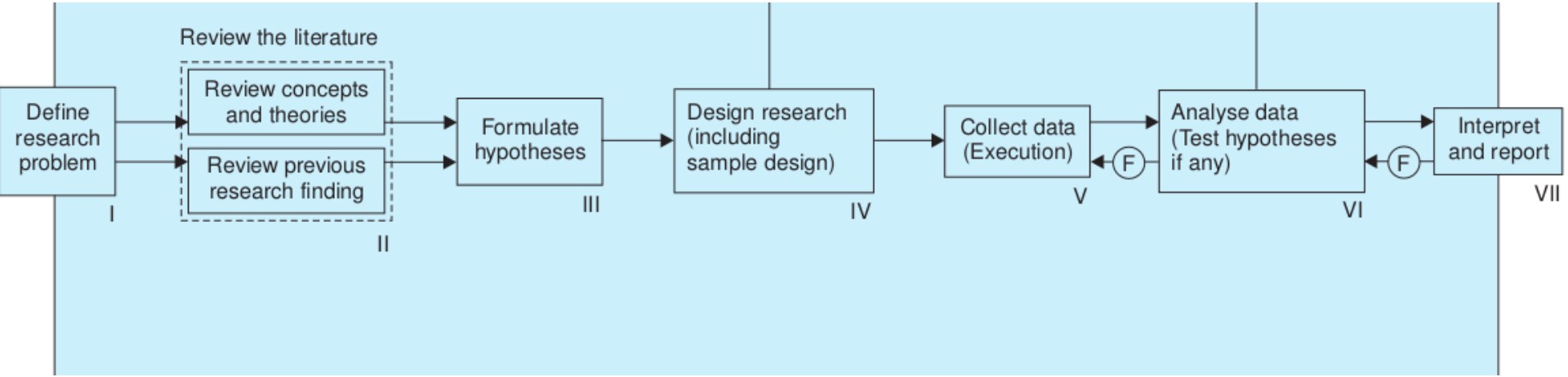
- Research is a formal work undertaken scientifically and systematically to find the solution of a problem. Research is an academic activity.
- Research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organising and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.
- According to the Advanced Learner's Dictionary meaning of research is "a careful investigation or inquiry especially through search for new facts in any branch of knowledge.

Conventional Research Method: Principles

The conventional research method, also called scientific method, is that which consists of seven steps:

- Formulate a research question/problem
- Make background observations/study
- Formulate a hypothesis
- Research design
- Collect data
- Interpret/analyse the results/test hypothesis
- Report/Publish the findings

Flowchart: Research Process



Importance of Scientific Method

- Scientific research is one of the most important means that the researcher makes conclusion after following many reliable and scientific methods to obtain information and data of high accuracy and reliability.
- The Scientific Method enables us to test a hypothesis and distinguish between the correlation of two or more things happening in association with each other and the actual cause of the phenomenon we observe.

Characteristics of Scientific Research

- Systematic: All steps must be interrelated to one another
- Logical: Agreeing with principles of logic
- Empirical: Conclusion must be based on experiments, evidences or observations
- Objectivity: It must answer the research questions
- Replicable: It must be reproducible
- Transferable

Historical Research Method

Historical research is the process of investigating and studying past events, people, and societies using a variety of sources and methods. This type of research aims to reconstruct and interpret the past based on the available evidence.

Historical Research: Examples

1. Examining the history of caste systems in Nepal
2. Analyzing the impact of technology on society
3. Documenting the history of marginalized communities
4. Tracing the evolution of political ideologies in Nepal

Historical Research Method: Types

1. Descriptive
2. Analytical
3. Comparative
4. Interpretive
5. Quantitative
6. Qualitative

Historical Research Method: Types

Descriptive Research

This type of historical research focuses on describing events, people, or cultures in detail. It can involve examining artifacts, documents, or other sources of information to create a detailed account of what happened or existed.

Analytical Research

This type of historical research aims to explain why events, people, or cultures occurred in a certain way. It involves analyzing data to identify patterns, causes, and effects, and making interpretations based on this analysis.

Historical Research Method: Types

Comparative Research

This type of historical research involves comparing two or more events, people, or cultures to identify similarities and differences. This can help researchers understand the unique characteristics of each and how they interacted with each other.

Interpretive Research

This type of historical research focuses on interpreting the meaning of past events, people, or cultures. It can involve analyzing cultural symbols, beliefs, and practices to understand their significance in a particular historical context.

Historical Research Method: Types

Quantitative Research

This type of historical research involves using statistical methods to analyze historical data. It can involve examining demographic information, economic indicators, or other quantitative data to identify patterns and trends.

Qualitative Research

This type of historical research involves examining non-numerical data such as personal accounts, letters, or diaries. It can provide insights into the experiences and perspectives of individuals during a particular historical period.

Importance of Historical Research

1. Provides a deeper understanding of the past
2. Helps preserve cultural heritage
3. Provides insights into long-term trends
4. Facilitates the development of hypotheses
5. Helps identify root causes of social problems
6. Provides a source of inspiration

Sources of Historical data

- **Archival research**: This involves analyzing documents and records that have been preserved over time, such as government records, diaries, letters, newspapers, and photographs. Archival research is often conducted in libraries, archives, and museums.
- **Oral history**: This involves conducting interviews with individuals who have lived through a particular historical period or event. Oral history can provide a unique perspective on past events and can help to fill gaps in the historical record.

Sources of Historical Research: Contd.

- **Artifact analysis:** This involves examining physical objects from the past, such as tools, clothing, and artwork, to gain insights into past cultures and practices.
- **Secondary sources:** This involves analyzing published works, such as books, articles, and academic papers, that discuss past events and cultures. Secondary sources can provide context and insights into the historical period being studied.

Sources of Historical data: contd.

- **Statistical analysis**: This involves analyzing numerical data from the past, such as census records or economic data, to identify patterns and trends.
- **Fieldwork**: This involves conducting on-site research in a particular location, such as visiting a historical site or conducting ethnographic research in a particular community. Fieldwork can provide a firsthand understanding of the culture and environment being studied.
- **Content analysis:** This involves analyzing the content of media from the past, such as films, television programs, and advertisements, to gain insights into cultural attitudes and beliefs.

Limitations of Historical Research

- **Reliance on incomplete or biased data:** Historical research is often limited by the availability and quality of data. Many primary sources have been lost, destroyed, or are inaccessible, making it difficult to get a complete picture of historical events. Additionally, some primary sources may be biased or represent only one perspective on an event.
- **Difficulty in generalizing findings:** Historical research is often specific to a particular time and place and may not be easily generalized to other contexts. This makes it difficult to draw broad conclusions about human behavior or social phenomena.

Limitations of Historical Research: contd.

- **Lack of control over variables**: Historical research often lacks control over variables. Researchers cannot manipulate or control historical events, making it difficult to establish cause-and-effect relationships.
- **Subjectivity of interpretation**: Historical research is often subjective because researchers must interpret data and draw conclusions based on their own biases and perspectives. Different researchers may interpret the same data differently, leading to different conclusions.

Limitations of Historical Research: contd.

- **Limited ability to test hypotheses:** Historical research is often limited in its ability to test hypotheses. Because the events being studied have already occurred, researchers cannot manipulate variables or conduct experiments to test their hypotheses.
- **Lack of objectivity:** Historical research is often subjective, and researchers must be aware of their own biases and strive for objectivity in their analysis. However, it can be difficult to maintain objectivity when studying events that are emotionally charged or controversial.

Limitations of Historical Research: contd.

- **Limited generalizability:** Historical research is often limited in its generalizability, as the events and conditions being studied may be specific to a particular time and place. This makes it difficult to draw broad conclusions that apply to other contexts or time periods.

Experimental Research Method

Experimental research is a scientific approach to research, where one or more **independent variables** are manipulated and applied to one or more **dependent variables** to measure their effect on the latter. The effect of the independent variables on the dependent variables is usually observed and recorded over some time, to aid researchers in drawing a reasonable conclusion regarding the relationship between these 2 variable types.

Mostly related to a laboratory test procedure, experimental research designs involve collecting **quantitative data** and performing statistical analysis on them during research. Therefore, making it an example of quantitative research method.

Types of Experimental Research

1. Pre-Experimental Research
2. Quasi-Experimental Research
3. True Experimental Research

Pre-Experimental Research

A pre-experimental research study is an observational approach to performing an experiment. Free experimental research can occur in one of these design structures:

One-shot case study research design: In this form of experimental research, experimenters subject a single group to a stimulus and test them at the end of the application.

One-group pretest-posttest design: In this type of research, researchers apply a test both before and after the application of the stimuli.

Static group comparison design: In a static group comparison, researchers assess two different groups, with only one group receiving the stimuli the researchers are assessing.

Quasi-Experimental Research

The quasi-experimental research bearing a resemblance to the true experimental research, but not the same. In quasi-experiments, the participants are not randomly assigned, and as such, they are used in settings where randomization is difficult or impossible.

This usually occurs because of rules or regulations that prevent researchers from applying random allocations in some settings, such as a research study at a university.

True Experimental Research Design

It is the most accurate type of experimental design in which participants are randomly assigned.

Posttest-only control group design: In this design structure, a researcher divides participants into two groups at random. One group acts as a control and doesn't receive the stimuli being tested, while the second group does receive the stimuli researchers are assessing. Researchers perform tests at the end of the experiment to determine the practical results of being exposed to the stimuli.

True Experimental Research Design: contd.

Pretest-posttest control group design: Under this structure, researchers provide tests to the participants both before and after the non-control group receives exposure to the stimuli. Researchers test groups twice, so this structure provides multiple methods of assessing the results.

Solomon four-group design: This is the most comprehensive design structure for an experimental research project. Under the Solomon four-group design, participants receive an assignment to one of four randomly allocated groups. These groups provide all four possible permutations for both control and non-control groups and post-test or pre- and post-test control groups. Having a comprehensive set of data with multiple ways of differentiating between groups can enhance researchers' abilities to reach conclusions based on the resulting data.

Problems in Experimentation

1. Poor control of experimental bias with procedures such as randomization
2. Diversity of experimental tasks
3. Lack of underlying theory
4. Inappropriate research designs
5. Lack of internal validity
6. It is a time-consuming process

Ex Post Facto Research Design

An ex post facto research design is a method in which groups with qualities that already exist are compared on some dependent variable. Also known as "after the fact" research, an ex post facto design is considered quasi-experimental because the subjects are not randomly assigned - they are grouped based on a particular characteristic or trait.

Although differing groups are analyzed and compared in regards to independent and dependent variables it is not a true experiment because it lacks random assignment. The assignment of subjects to different groups is based on whichever variable is of interest to the researchers.

Ex Post Facto Research Design: Example

For example, a researcher is interested in how weight influences self-esteem levels in adults. So the participants would be separated into differing groups (underweight, normal weight, overweight) and their self esteem levels measured. This is an ex post facto design because a pre-existing characteristic (weight) was used to form the groups.