

6. Type of Research and Type Research Design

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Abstract:

The main objective of research to obtain new finding and validate existing data about phenomena studied through systematic, scientific, controlled, careful and rigorous investigation. The type of research classified as pure research, applied research, descriptive research, analytical research, fundamental research, conceptual research, empirical research, longitudinal research, laboratory research, exploratory research, conclusion oriented research. To make judgment about cause-effect relationship, experimental design might use. The research includes survey, fact finding, case study, correlation study, comparative study enquiries of different kinds.

Main focuses of chapter to understanding of type of research and research design to prepare empirical analysis and also describes main variables operationalize and explains measure selection behavior. Research design is used to collect the relevant data and technique to facilitate the smooth scaling of the various research operations making yielding maximal information. Research design is also provides backbone structure to researcher for planning of answering the research question or testing from hypothesis. This type of research design includes descriptive design, exploratory design, experimental design, longitudinal design, cross-sectional design, casual design, action research design, cohort research design and case study design.

Keywords: Research Types, Research Design, Observational Methods, Analytical Research, Experimental Research Design.

Research:

The research is related to systematic investigation on the basis of the methodology of research and knowledge on a particular topic or subject, the user group, the research problem it investigates etc. According to Creswell (2003) need to focus on three methods like quantitative, qualitative and mixed method approaches.

Quantitative research methods are deals with numbers and amounts for describing an event that support the hypotheses and predication modal.

Qualitative research method enable researcher to use texts for findings, quality of subject and kind of providing picture from researcher view. Mixed method includes the mixing of both qualitative and quantitative data. Types of research shown in figure number 1.

6.1 Types of Research:

6.1.1 Pure Research or Basic Research:

The research carried out for new idea generation, new facts and fundamental principle for human knowledge.

Based on experimentation and observation by following rigorous standards and methodologies to meet specific objective and ensure credibility of conclusions of research published into pre-reviewed journals.

Pure research was studies on elements after Mendeleev's periodic table published and Penicillin discovery by Alexander Fleming was big step in discovery of antibiotic in medicinal science. Pure research is marvelous change setup of human mind and it generates knowledge and education.^[1]

6.1.2 Applied Research:

Applied research main aim to discover solution, to provide knowledge and to applied social research data into decisions to solve problems associated with serious risks. With help of employing experimental research, accepted known theories, principles, case studies and interdisciplinary research one can solve certain problems.

Characteristics:

- Solve problematic facts.
- Without generalize objective studies individual or specific cases.
- Represent how things can be changed.
- Tries to correct problematic facts.^[2]

Qualitative Research:

Qualitative research refers to much more subjective non- quantitative, use different methods of collecting data, analyzing data, interpreting data for meanings, definitions, characteristics, symbols metaphors of things. Qualitative research further classified into following types:

Ethnography:

This research mainly focus on culture of group of people which includes share attributes, language, practices, structure, value, norms and material things, evaluate human lifestyle. Ethno: people, Grapho: to write, this disciple may include ethnic groups, ethno genesis, composition, resettlement and social welfare characteristics.

Phenomenology:

It is very powerful strategy for demonstrating methodology to health professions education as well as best suited for exploring challenging problems in health professions educations.

Case Study Research:

It is used to generate deep understanding of complex issue in real life matter. It involve wide variety of principle in medicine for examine patient.

Quantitative Research:

Quantitative research aim to measure numeric figures, quantity, amounts, used extensively in field of economics and commerce. Quantitative research refers as systematic empirical investigation of phenomena quantitative data and their relationship.^[3]

6.1.3 Descriptive Research:

The research which is determines "the way things are". The descriptive research may include behavior observation research, you can observe a lot by watching and survey research.

Types of Descriptive Research:

- Observational Method
 - Survey Method
 - Case Study Method
- a. **Observation Method:** This is type of correlation research which adopt researcher observes ongoing behavior. There may be 3 types of approach for observational researches are covert observation, overt observation and research participation.
 - b. **Survey Method:** The brief interview or discussion with some person about relevant topic. It is used to take opinion, thought and feelings. In this predetermined set of question should give to the indulging of population interest towards.
 - c. **Case Study Method:** These studies are related to analysis of events, periods, persons, decisions, policies, and institutions studied by one or more methods. Study is conducted on the basis of inquiry of subject instance of class of phenomena that provides an analytical frame.^[4]

6.1.4 Analytical Research:

It is related with carrying analysis on certain phenomenon with the help of analytical tools. Analytical research used already available facts and information; analyze them to make critical evaluation.

Type of Analytical Research:

- a. **Reviews:** The search involves meta- analysis of quantitative methods of review. It also relates with making formal assessment of various research with intension of making any useful change or conclusion if necessary.
- b. **Historical Research:** It is a systematic collection and evaluation of data to explain, understand events, action and describe that occurred in past. Historical research source material may include documents, numerical records, oral statements and records. The

main aim of historical research to find critical search for truth to conceptualize, histories and contextualize to explain there is no agreed definition of what time period constituted on temporary history has existed or can exist.

- c. **Philosophical Research:** This research is related to the theoretical bases of branch of experience and knowledge which is fundamental in nature of reality, knowledge and existence.
- d. **Research Synthesis:** To summarizing the facts related with particular question, two or more research studies are assessed.

Techniques of Survey Research are:

- Questionnaires
 - Interviews
 - Survey
- e. **Grounded Theory:** Grounded theory out of many discoveries or construction theories and their data obtained systematically with the help of comparative analysis. The methodology after revision should be more flexible and widely adopted to assume reality of external world. This may include qualitative data, interviews, and review of records, surveys and observations.

These research place priorities on study phenomenon over method of study, the researcher role are important in creating categories and interpreting data beside strategies as tools or prescriptions. ^[5]

6.1.5 Fundamental Research:

To acquire the new knowledge experimentation and theoretical work has to done primarily.

It increases scientific knowledge of researcher and has no planned or immediate uses, their results may be useful in future.

Benefits of Fundamental Research

- Economical gaining
- Benefits to society
- New knowledge acquisition

6.1.6 Conceptual Research:

The research is conducted on the basis of already present information and observation on given topic. It can be used in developing theories or new interpretation by abstract concepts and ideas.

While conducting a conceptual research, choose the topic, collect relevant literature, identify specific variables, generate the framework, this type of research is mainly relies on previously conducted studies, already existing relevant information and literature.

6.1.7 Empirical Research:

This type of research based on collection of data which lead to generation of new ideas, observation and experiments or by using scientific instruments.

The study conclusion is drawn from concretely empirical evidence and verifiable evidence. It is derived from Greek word Empeirikos which means "experienced".

6.1.8 Longitudinal Research:

In this type of research, we conduct much observation of subject variables for long time (over a weeks, months and years), without interfere with subject.

Collection of data at the onset of study and gather repeatedly over a period of time depends on length of study to observe how variable change in this duration.

Main importance of longitudinal research is in studying development and lifespan issues.

Types of Longitudinal Studies:

- a. **Retrospective Study:** This study may involve to looking at historic information for past records.
- b. **Cohort Analysis:** In this type of study group being selected based on historical, geographic, birth.
- c. **Panel Study:** Involves sampling a cross-section of individuals.^[6]

6.1.9 Laboratory Research:

In laboratory research provide conditions with technological research, measurement and experiments are to be performed.

Any chemical substances, microscopically, parasitological, hematological, immunological, biochemical, tissue culture research can be carried out into laboratory.

It involves study of natural science with experiments.

6.1.10 Exploratory Research:

This research is conducted for not clearly defined problems. It helps to determine data collection method, research design and selection of subjects.

It depends on reviewing of literature, information collection through informal discussion with consumer's competition.

Way to implement exploratory research into research plan. We need to focus on groups mainly contain 8 to 12, ask them relevant question on subject and issue being searched.^[7]

6.1.11 Conclusion Oriented Research:

This research deal with redesign enquiry, to pick up problem and prepared to conceptualize.

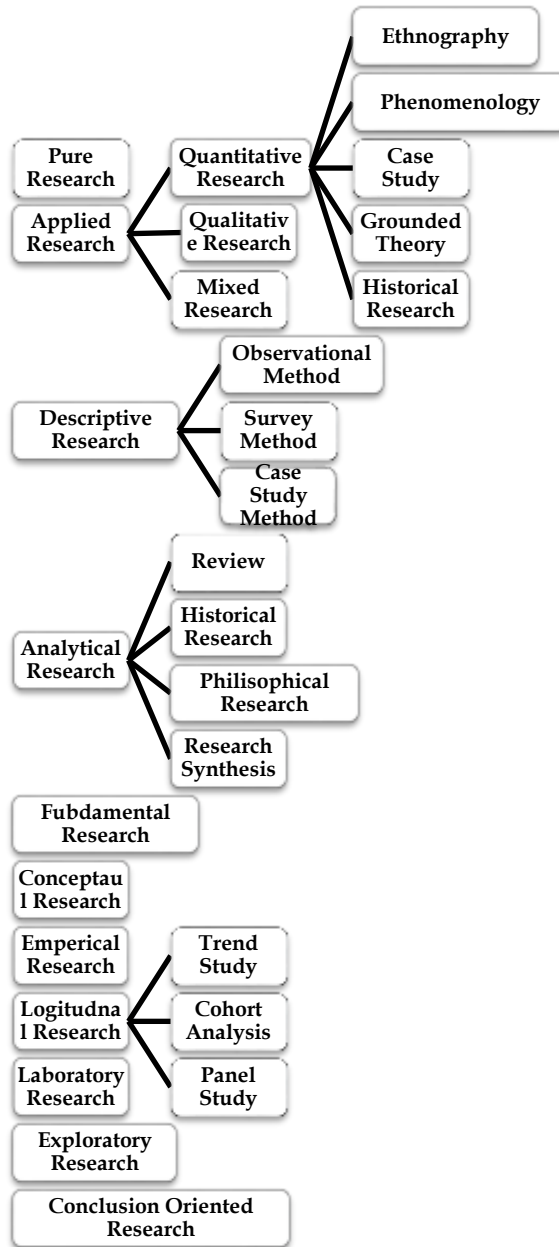


Figure No. 1: Types of Research

Research Design:

Research design is used to reduce the costs, bear a significant control on the consistency of the results accomplished, provides a solid base for the complete research.

With the help of preplanning, it is possible to minimum spending money, effort and to get maximum information. Research design is used to collect the relevant data and technique to facilitate the smooth scaling of the various research operations making yielding maximal information.

Poor groundwork of research design displeases the entire project. Types of research design shown in figure number 2.

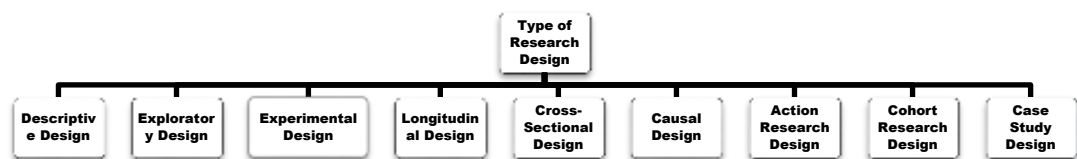


Figure No. 2: Types of Research Design

6.2 Types of Research Design:

A researcher must have knowledge of various types of research designs to choose which type of research design should be applied for the research. There are different types of research designs which are explained below.

6.2.1 Descriptive Design:

Descriptive design includes phenomena being researched and characteristics of population. To describe internal validity does not require characteristics of population. It used for statistics of data, average and frequencies.

Advantage:

- Amount of data gathered by this research and which can be used for future references.
- It gives overviews of study which is helpful to determines variables used for study.
- Limitation of study can use for development or as a useful tools.

Disadvantage:

- To disapprove hypothesis, outcome of descriptive design cannot be used.
- Study depends on measurement and instrumentation for observation.
- Using observational method outcome can be collected.

6.2.2 Exploratory Design:

Design used for research where no design study is done before. Later investigation can be best understood to get knowledge through this design. The study used for explanation whether future study is possible or not and data can be used for further development for more research.

Advantage:

- Research priority can be determined through exploratory design.
- All answer like What, Why, how we can get through data collection.
- Background data can be collected through exploratory design for particular topic.

Disadvantage:

- Whole population can be generalizing through data of exploratory research.
- Unstructured style of research.

This design is followed to realize following purposes:

- Clarifying concepts and defining problem.
- Formulating problem for more precise investigation.
- Increasing researcher's familiarity with problem.
- Developing hypothesis.
- Establishing priorities for further investigation.

6.2.3 Experimental Design:

The casual relationship where particular cause leads to same effect, cause will proceed to effect so degree of associate is major.

The procedure is main which controls all factors of experiment.

Experimental design uses more measurements and more groups for longer periods of time.

Advantage:

- Placebo effects can be determined from treatment effects.
- From single study high level of evidence can be collected.
- It determines cause of something to take place.

Disadvantage:

- Because of technical or ethical reasons few types of proceeds cannot be performed.
- It might not fit into real time.
- If procedure uses special equipment and facilities, experiments can be costly.

Basic Principles of Experimental Design:

- Principle of replication
- Principle of randomization
- Principle of local control

Types of Experimental Design

- Pre-experimental
- True experimental
- Quasi experimental

Pre-Experimental Design:

After implementing factors of effect and causes various groups are kept under observation. The research is conducted to understand investigation necessary for particular group.

Types of Pre-Experimental Research:

- Static-group comparison
- One -shot case study research design.
- One group pretest posttest research design

True Experimental Research Design:

To prove or disprove hypothesis statistics analysis required. To build relationship between (cause effect) groups, a true design required. It needs random distribution, variable can be manipulated and control group is not changed. ^[8]

6.2.4 Longitudinal Design:

This research design makes multiple observation, repetitive study and experiments. This involved same group of people for study over period of time.

The variable are identify and cause are found which made variable have caused change in their behavior. This also called panel research design.

Advantage:

- Data can be collected from particular phenomenon.
- Various variable established causal relationship.
- Pattern of change can be tracked.

Disadvantage:

- Method is changed over time, but researcher assumes that present trend may remain same for future also. ^[9]

6.2.5 Cross-Sectional Design:

The research design calculated among study participants at some time. Research variable data analyze from sample population which is collected from given point of time.

It has selection based on differences rather than selection, dependence based on existing variations; no time dimension so distinguishing features can be analyzed.

Advantage:

- Study used for large number of subjects.
- Grouping not selected, randomly based on population grouping is done.
- At a point in time provides characteristics of result.
- Results performed on population are more reliable.
- Use large number of subject involves.

Disadvantage:

- Very difficult to find same interest phenomena or subjects.
- Outcome does not provide any historical occurrence because of time-bound procedures.
- Different outcome from different time-frame.
- Cause and effect relationship cannot be determined from this research.

6.2.6 Action Research Design:

In this exploratory and understanding of problem is developed to follow characteristic based path to made strategies of intervention. Various forms are collected to follow new intervention strategies until problem strategies established. This path is cyclic; provide initializing, hypothesizing and specifying problem to make interventions and assessments.

Advantage:

- Because of cooperative and adaptive nature it can be used in community or world situation.
- It mainly focuses on solution driven and practical besides than theories.
- It increases change of learning from experiences also viewed as cyclic.
- Outcome is related to practice.
- Researcher has nothing to hide and controlled information.

Disadvantage:

- It is responsibility of researcher to enhance change so difficult to perform conventional studies.
- Test result may be bias one due to over- involvement of researcher.
- Documentation is really difficult because of no standard format.
- It is cyclic in nature so action research is difficult to conduct.[10]

6.2.7 Cohort Research Design:

This study conducted on short population over a period of time. It is generally deal with statistics section of population which is relevant to investigational problem.

Open-cohort study involves rate-based data and closed-cohort involves all participants entering the study at a specific point, with no new participants allowed later.

Advantage:

- Action research study is mandatory because involving random people in a study is unethical, so it is a risk-based study.
- To provide insights into overtime effects, the study should be flexible.
- Primary source and secondary source data can be used.
- Need to avoid debate related to cause and effects because it can gauge probable cause before outcome.

Disadvantage:

- No involvement of randomization, so lower than other research which selects random participants.
- Research has to wait for conditions because it takes a long time, so result credibility may change by variable.
- Factor between two cohort groups cannot be controlled.^[12]

6.2.8 Casual Design:

They relate with understanding of phenomena with statements "If A, then B". According to assumptions and norms one can make certain changes in this kind of research.

The explanation of tests by hypothesis seeks by majority of scientists like dependent variable, independent variable, variation in one phenomenon, variation in other phenomenon.

The following impact needs to be included in casual design:

Non-Superiority:

The relationship independent of variation and between two variables is called third variable.

Appropriate Time Order:

Before dependent variable independent variable must be tackled.

Empirical Association: Finding relationship between dependent and independent variables.

Advantage:

- Chances of replication are more.
- Study has systematic subject selection and has internal validation.
- It helps the world better understand by providing link between variables and eliminates possibilities.

Disadvantage:

- Two different events seem to be related and cannot be casual.
- Causality only inferred but because variable superfluous and perplexing variable exist so difficult to determine conclusion about relationship.
- It is not easy to predict which variable is cause and which is effect.^[13]

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