Research design is the master plan specifying the methods and procedures for collecting and analyzing the needed information in a research study. It plays a key role in scientific research process.

Research design is the researcher’s overall plan of research work for answering the research questions or testing the research hypothesis. Therefore, the subject for investigation is the core in deciding all the elements of research design.

Research design can be defined as a blueprint to conduct a research study, which confirms beforehand the research approaches, the variables under study, population and sampling design, tools and method of data collection, and method of analyzing data for the best answer to research question or to test research hypothesis. These are the elements of research design.

Research design basically provides an outline of how the research will be carried out and the methods that will be used. Every contents of such an outline can be considered as elements of research design.
Research design is the researcher’s overall plan for answering the research questions or testing the research hypothesis. Therefore, the subject for investigation is the core in deciding all the elements of research design. A research design includes the structure of a study and the strategies for conducting that study (Kerlinger, 1973).
Classification of Research Design

Research design can be classified in different ways. However, it is discussed here with following classifications:

➢ Exploratory Research Design;
➢ Descriptive Research Design;
➢ Developmental Research Design;
➢ Case study;
➢ Causal comparative Research Design; and
➢ Experimental Research Design.

It should be noted that a single research can adapt two (or more) designs to answer the research questions. If we use more than one research design to understand the phenomena very well, it is known as triangulation.

Triangulation in research is the use of more than one approach to researching a question. The objective is to increase confidence in the findings through the confirmation of a proposition using two or more independent measures.
Exploratory Research (ER) Design

- Exploratory research “tends to engage in new problems on which little or no previous research has been done”.
- It can be considered as an initial stage of the research on the subject. This type of research is usually conducted to study a problem that has not been clearly defined yet.
- Exploratory research is not intended to provide conclusive evidence, but helps us to have a better understanding of the problem.
- Exploratory research design does not aim to provide the final and conclusive answers to the research questions.
- It intends merely to explore the research questions or research hypothesis. Therefore, it helps to make foundation for conclusive research on the subject at future.
- The main purpose of ER is to narrow down the broader perspective. It tries to explore the new areas for conclusive research.
- It has been noted that “exploratory research is the initial research, which forms the basis of more conclusive research. It can even help in determining the research design, sampling methodology and data collection method”.
- Primary source (particularly, unstructured interviews) are the most popular data collection method in exploratory studies.
Key facts about exploratory research (ER)

- Curiosity about the new phenomenon is the starting point of ER
- ER diagnose and screen a situation to generate new knowledge for study
  - ER Carries a vague problem
- ER is not oriented toward definitive answer but helps to generate specific research question or hypothesis
  - No set method in ER
  - ER is less structured and more flexible
  - No formal research design in ER
  - Scientific process is less applied in ER
  - ER is based on informal approaches
- ER provides direction for more structured work at future.

Some examples for studies with exploratory research design in business studies:
The role of social networking sites as an effective marketing communication channel.
The emerging concept of corporate social responsibility and its role on business success.
Descriptive Research Design

As is understood by the name, the information considered for study, as well as the presentation of results will be descriptive in nature.

Descriptive research design are mostly used for social science and humanities subjects, like management, psychology, education, anthropology, political science, languages, etc.

Qualitative as well as quantitative approach can be used for descriptive research design.

Descriptive research is a systematic way of investigating the issue to “describe” a situation, subject, behavior, or phenomenon.

Descriptive researches are often described as studies that are concerned with finding out “what is”. However, it is also used to answer questions of who, what, when, and where associated with a particular research question or problem.

It is mainly done when a researcher wants to gain a better understanding of a topic.

Many types of researches can be included in the area of descriptive research design, e.g., historical research, developmental research, survey research, case studies research, and descriptive itself.
Key facts about descriptive research

- It is used to observe and describe a research subject or problem without influencing or manipulating the variables in any way.
- It can be either qualitative or quantitative.
- Multiple variables can be observed during study.
- Explaining the relationship and testing hypothesis are not the concern of descriptive research.
- Percentage summary and few descriptive statistics are used in descriptive research.
- Inferential statistics are rarely considered.
- It is oriented toward describing the existing phenomena based on detail factual information.
- The results of descriptive research is valuable for future plan and decision making process.
- It is more specific and conclusive than exploratory study.

Some examples of descriptive research: Work-life balance of bank managers, nurses etc. It is also used by market researchers to judge the habits of customers, or by companies wishing to judge the morale of staff.
Developmental research is a systematic way of investigating the issues related with changes over an extended period of time. The main objective of developmental research is to study on variables regarding their changing pattern over a period of time.

The following three types make clear understanding about the developmental research:

- **Longitudinal Studies**
- **Cross Sectional Studies**
- **Cross Sequential Studies**
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<th><strong>Longitudinal Studies</strong></th>
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<td>Longitudinal studies assess changes over an extended period of time by looking at the subjects for months or even years. It can be classified as trend study, cohort study, or panel study. <strong>Trend study</strong> is based on the data collected at intervals spread over a period of time from the sample. It is useful to know the pattern of change over time and prediction for the future. <strong>Cohort study</strong> is based on the data collected at intervals spread over a period of time from the some specified groups. The result of cohort studies can provide valuable qualitative and quantitative information regarding the differences in development between various groups during the passage of time. For example, looking at academic and social development, we may choose a small sample from each of the low- and high-income areas and assess them on various measures every year for a period of ten years. <strong>Panel studies</strong> measure the same sample of respondents at different points in time with respect to the specified dependent variable, e.g., attitude.</td>
<td>In order to answer a research question, cross sectional study attempts to gather data and information in one-shot from a cross-section of societies or entities. For example, to study the academic and social development a researcher can use small group of 3 year olds, 6 year olds, 9 year olds and 12 year olds to collect data at the same time. Therefore, under the cross sectional studies, data can be collected at the same time but from the varied samples. Sample survey is the popular way to conduct the cross sectional studies.</td>
<td>Cross sequential studies combine both longitudinal and cross sectional methods in an attempt to minimize the lapses of both. For this method, groups of different age children (three, six, and nine for example) may be studied for a period of three years to both assess developmental changes and assure that the typical three year old is similar to the typical 6 year old after three years of development.</td>
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A case study is an in depth study of a particular situation rather than a far-reaching statistical survey. A case study provides more realistic responses than a purely statistical survey. A case study is a specific and holistic in nature. The case study tends to examine a small number of units across a large number of variables and conditions (Reverse to survey study).

The case study has been especially used in social science, psychology, anthropology and ecology.

It is a method used to narrow down a very broad field of research into one easily researchable topic.

The case study research design is also useful for testing whether scientific theories and models actually work in the real world, with respect to the selected case.

**Snapshot case studies:** Detailed study of one unit

**Longitudinal case studies:** Studies of the same unit at multiple time points

**Pre-post case studies:** Studies at two points of time separated by a critical event

**Cross-case studies:** Multiple case studies for the purpose of comparison

It can also be classified as: Exploratory case study; Descriptive case study; and Explanatory case study.
Case study research refers to an in-depth, detailed study of an individual, entity or a small group.

Such studies are typically comprehensive and systematic. But, the result can not be generalized to all cases in a given population.

The sources of data and information are: Interview, observation, relevant documents, diary and the like.

Case study research is not used to determine cause and effect, nor is it used to discover generalizable truths or make predictions.

The main characteristics of case study research are that it is narrowly focused, provides a high level of detail, and is able to combine both objective and subjective data to achieve an in-depth understanding on the subject.

They are commonly used to collect in-depth data in a natural setting where the researcher has little or no control over the events and there is a real life context.

Often times, the goal of a case study is provide information that may research in the formation of a hypothesis for future research.

Case studies are commonly used in social science research.
A causal-comparative research design is a research design that seeks to find relationships between independent and dependent variable/s after an action or event has already occurred.

The fixed study group or entity, variables under study, and not manipulated treatment are the fundamentals of causal-comparative research.

The researcher's goal is to determine whether the independent variable affected the dependent variable, by comparing two or more groups (comparison groups) of individuals or entities. Therefore, this type of research design can also be termed as explanatory studies.

It is also referred to as *ex post facto* (after the fact) research.

Statistical tools are extensively used in causal-comparative research.

The conformity in conclusion depends largely on the statistical inferences.

We can observe some overlapping features of causal-comparative research with experimental research and descriptive research. Because, it examines the cause and effect as well as describe the relationship. However, there are many differences. There is no manipulation in treatment or variables under study (therefore, it is non-experimental) and the base of causal-comparative research is the results of inferential statistics (therefore, it is non-descriptive).
Key facts about causal-comparative research design

There are three dimensions of causal comparative research:
✓ Investigation of effects
✓ Investigation of causes
✓ Investigation of consequences

CHARACTERISTICS
Attempts to identify cause and effect relationships.
Involve two or more group variables.
Groups may differ in two ways: One group possesses a characteristic that the other does not.
Each group has the characteristic, but to differing degrees or amounts.
Involve making comparison.
Individuals are not randomly selected.
Cannot manipulate the independent variables.
Less costly and less time consuming.

For example: 1. Child nutrition condition in the family of working mothers and housewives.
2. Level of consumer awareness between male and female customers those who live in Kathmandu Valley.

There are two types of causal-comparative research designs:
➢ Retrospective causal-comparative research: The effects have already occurred and the researcher attempts to determine whether one variable may have influenced another variable.
➢ Prospective causal-comparative research: A researcher initiates a study beginning with the causes and is determined to investigate the effects of a condition.

Retrospective causal-comparative research designs are much more common.
Experimental (Interventional) Research Design

Experimental is most scientifically sophisticated research method. Experimental research is any research conducted with a scientific approach to investigate the effects of manipulation in independent variable/s on specified dependent variable.

Experimental research is one of the founding quantitative research methods. Discovering causal relationships (with manipulation in independent variable/s), is the key to experimental research.

Generally, one or more variables are manipulated to determine their effect on a dependent variable.

A true experimental research is considered to be successful only when the researcher confirms that a change in the dependent variable is solely due to the manipulation of the independent variable.

Experimental research design are concerned with examination of the effect of independent variable on the dependent variable, where the independent variable is manipulated through treatment or intervention(s), and the effect of those interventions is observed on the dependent variable.

It is defined as ‘observation under controlled conditions’
Manipulation: Manipulation is a conscious act by the researcher, where he or she varies the independent variable and observes the effect that manipulation has on the dependent variable of interest.

Control: Control refers to use of control group and controlling the effects of extraneous variables on the dependent variable in which researcher is interested. The subject in the control and experimental groups are similar in number and characteristics, but the subject in the control group receive no experimental treatment or any intervention at all. The experimental group receives the planned treatment or intervention and a comparison is made with the control group to observe the effect of this treatment or intervention.

Randomization: To reduce or eliminate the chances of systematic bias randomization is essential.

*Pre-experimental design *Quasi-experimental design * True experimental design
Can we Trust the Research?

Beware of the errors
The Hallo Effect: It is a form of cognitive bias (usually unconscious) that causes one's perception of another (person, place, or things) to be unduly influenced by a single positive trait. Everyday, we judge people by their appearance and are judged in return. Our first impression of the attractiveness of an individual affects how we view that person holistically. This is a phenomenon known as the halo effect.

The Horn Effect: The horn effect, closely related to the halo effect, is a form of cognitive bias (usually unconscious) that causes one's perception of another to be unduly influenced by a single negative trait. An example of the horn effect may be that an observer is more likely to assume a physically unattractive person is morally inferior to an attractive person, despite the lack of relationship between morality and physical appearance.

The Hawthorne Effect: The Hawthorne Effect refers to the fact that people will modify their behavior simply because they are being observed. It is also known as observer effect. It is a type of reactivity in which individuals modify an aspect of their behavior in response to their awareness of being observed, irrespective of the variables. The phenomenon is named after the location where the experiments took place, Western Electric’s Hawthorne Works electric company in the Hawthorne suburb of Chicago in the late 1920s and early 1930s. The original purpose of the Hawthorne studies was to examine how different aspects of the work environment, such as lighting, the timing of breaks, and the length of the workday, had on worker productivity.
The original purpose of the Hawthorne studies was to examine how different aspects of the work environment, such as lighting, the timing of breaks, and the length of the workday, had on worker productivity.

In the most famous of the experiments, the focus of the study was to determine if increasing or decreasing the amount of light that workers received would have an effect on how productive workers were during their shifts. Employee productivity seemed to increase due to the changes but then decreased once the experiment was over.

What the researchers in the original studies found was that almost any change to the experimental conditions led to increases in productivity. When illumination was decreased to the levels of candlelight, production increased. In other variations of the experiments, production also improved when breaks were eliminated entirely and when the workday was lengthened.

The results were surprising and the researchers concluded at the time that workers were actually responding to the increased attention from their supervisors. Researchers suggested that productivity increased due to attention and not because of changes in the experimental variables.

The effect was first described in the 1950s by researcher Henry A. Landsberger during his analysis of experiments conducted during the 1920s and 1930s. Landsberger defined the Hawthorne effect as a short-term improvement in performance caused by observing workers.
The Placebo Effect:
A placebo is something given to a person that has no real physical effect. It could be such as sterile water, saline solution, or a sugar pill, or some other type of "fake" treatment. The placebo effect is a phenomenon that occurs when a person believes he or she is receiving real treatment (but really not) and reports an improvement in his or her condition. It is popular in medical researches. The more a person believes they are going to benefit from a treatment, the more likely it is that they will experience a benefit.

The placebo effect can be observed in the field of researches in HR management and Marketing as well. Like the Hawthorne effect the Placebo effect is also a type of psychological effects on the participants rather than the variable’s effect.

The Experimenter Bias Effect:
It is a circumstances of researcher's cognitive bias causes them to subconsciously influence the participants of an experiment as well as other elements research design. It is also known as observer-expectancy effect. In research, experimenter bias occurs when experimenter expectancies regarding study results bias the research outcome. It may cause by a researcher’s foregone conclusions.

Rating Errors: Easygoingness in rating of the respondents is one of the commonly observed errors in research. Following three tendencies hampers the validity of ratings:

The over-rater error: Rating in leniency or more favorableness.
The under-rater error: Rating in severity or more unfavorableness.
The central tendency error: Rating subjects toward the middle of the scale irrelevantly.
COMMON SOURCES OF ERROR IN RESEARCH

The Law of the Instrument:
The concept known as the law of the instrument, otherwise known as the law of the hammer, Maslow's hammer, or the golden hammer, is a cognitive bias that involves an over-reliance on a familiar tool. It is a human inclination to become attached to a certain instrument that may cause a research worthless.

Other Common Errors:
- Inappropriate statistical procedure
- Poor research formulation
- Selection of inappropriate research design
- Inadequate sample size
- Poor data collection method
- Poor logic
- Lapses in sample design
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<thead>
<tr>
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<tr>
<td>Qualitative research limits with the small horizon. Methods include focus groups, in-depth interviews, and reviews.</td>
<td>Qualitative research can be conducted using large-scale survey, using methods such as questionnaires or structured interviews etc.</td>
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<tr>
<td>Researcher is the data gathering instrument (for unstructured interviews, focus group discussion etc.). Therefore, it is more time consuming.</td>
<td>Researcher uses tools, such as questionnaires, secondary source to collect data. Therefore, data gather in this type is relatively less time consuming.</td>
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<tr>
<td>Mostly, data is in the form of words, pictures or objects. So more subjective and text-based.</td>
<td>Data is in the form of numbers and statistics. So more objective and number-based.</td>
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<td>The aim is a complete and detailed description about the phenomenon.</td>
<td>The aim is an accurate and reliable explanation. So it classifies features, count them, and construct statistical models in an attempt to analyze.</td>
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<td>Inductive reasoning is more applicable.</td>
<td>Deductive reasoning is more applicable.</td>
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<td>More in-depth information on a few cases.</td>
<td>Less in-depth but more breadth of information across a large number of cases.</td>
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<tr>
<td>No statistical tests, flexible, and less scientific.</td>
<td>Statistical tests, less flexible, and more scientific.</td>
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<td>Less generalizable: Qualitative data is more 'rich', time consuming, and less able to be generalized.</td>
<td>More generalizable: Quantitative data is more efficient and able to test hypotheses, but may miss contextual detail.</td>
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