CMED 236

Research Methods

Lecture 3: Types Of Research/Designs

By Linet Angwa

Lecture outline

- Types of research
- Research designs and research methodology

✓ Broad classifications

✓ Classification based on purpose

✓Classification based on method of data collection

✓Classification based on time horizon

TYPES OF RESEARCH

Basic Research

- Basic (**pure, fundamental**) research is designed to study **fundamental structures and processes** in order to understand them.
- It generates scientific knowledge and hence develops a broad scientific base that provides a basis for solving problems.
- It is motivated by curiosity and desire to generate new knowledge.

Examples: Research on guinea pigs to determine side effects of drugs and trial of vaccines

Applied Research

- Applied research is undertaken to **apply or test a theory** and evaluate the usefulness of the theory in solving problems.

Example: Determine the effectiveness of various teaching methods or examinations

Action Research

- Undertaken in order to solve a **specific, immediate and concrete problem** in a local setting.
- Action research contributes minimal theory but provides answers to problems that cannot wait for theoretical solutions.

Example: Investigate ways of preventing typhoid fever or malaria

Evaluation Research

- Research conducted to **measure the effectiveness or performance** of a programme, concept or campaign in achieving its objectives.
- Involves a **systematic process of collecting and analysing data** in order to **make decisions**.
- Done to determine if intended results are realized. It is initiated by a need to make a decision. A good evaluation research should address issues such as:

- Utility *(informative, timely and useful).*
- Feasibility *(appropriateness).*
- Cost *(worthiness).*
- Propriety *(protection of rights of individuals) and*
- Accuracy *(validity, reliability and comprehensiveness of information).*

Example: Opinion polls on performance of the NARC government.

Types of Evaluation Research

1. Needs assessment:

✓Needs assessment of students in a school.

✓Needs assessment for a particular community.

2. Formative evaluation - Evaluation of a programme while it is still being developed.
3. Summative evaluation - Evaluation of a fully developed programme.

RESEARCH DESIGN AND RESEARCH METHODOLOGY

- **Research design** is generally referred to as a master plan or blueprint of how the researcher intends to conduct the research.
- In particular, research design is “the type of study” the researcher intends to conduct to address the research problem.
- Choice of the research design is guided by the kind of evidence required to address the research problem. It is therefore linked to the research problem and research objectives.

- In turn, the research design informs the methods and procedures for collecting and analyzing the required information.
- The research problem, objectives of the study, available data and the cost of obtaining the data will determine which research design will be chosen.
- **Research methodology** focuses on the research process: the kind of tools and procedures to be employed and the individual steps in the research process.

- It touches on the population, sample and sampling design, measurement, data collection methods and analysis.
- Research methodology determines the precision, confidence and generalizability of a study's findings.
- A good methodology depends critically on a researcher's careful identification and choice of an appropriate design.

The distinction between the design and methodology is

- *Research design focuses on the end-product* (the kind of study that is planned to gather the kind of evidence desired to adequately address the research question).
- *Research methodology focuses on the "how" (*the conduct of the research to provide the required evidence to ensure confidence and generalizabilty of the results.)

In most research reports, research design is discussed as part of research methodology.

➢Features of a Good Design

1. *Minimises biases.*
2. *Maximises reliability of data collected and analysed.*
3. *Yields maximum information.*

- A research design appropriate for a particular research problem should take into account the following;

- ✓ means of obtaining information,
- ✓ the availability and skills of the researcher and his staff,
- ✓ objectives of the problem to be studied and the availability of time and money for the research work.

Classification

- Types of research or research designs can be broadly based on methods of analysis and purpose, method of data collection and time horizon.

1. Broad classifications:

a) Qualitative design.

b) Quantitative design.

Broad Classifications

Qualitative Research

- utilizes **designs**, **techniques** and **measures** that do not produce **discrete data.** The data is usually in the form of **words** *rather than* **numbers**. The words are grouped into categories.
- Qualitative research measures quality. It examines qualitative phenomena (quality or kind) e.g. *human behaviour, attitude* and *behavioural sciences*.

- Qualitative research is a highly subjective research discipline, designed to look beyond the percentages to gain an understanding of feelings, impressions and viewpoints.

- Qualitative research or designs emphasize understanding of social phenomena through direct observation or communication with participants or texts and may stress on contextual and subjective accuracy over generality.

Examples are;

- ✓ case studies,
- ✓ participant observation,
- ✓ ethnographic studies (studies of various groups), and
- ✓ naturalistic studies.

- Qualitative approach of research is a method of inquiry employed in many different academic disciplines, traditionally in the social science but also in other research that applies to social set-up, e.g. market research.
- It is all about exploring, understanding phenomena and answering questions.

Good, sound qualitative research is;

- ✓flexible,
- ✓highly-focused, and
- ✓designed to be completed quickly

because the results are seen or heard first-hand, readers relates to the findings easily.

Qualitative Research - Key Characteristics

- A qualitative researcher immerses her/himself in the setting.
- Nothing is predefined or taken for granted.
- A qualitative research is an interactive process in which the persons studied teach the researcher about their lives.
- Qualitative researchers attend to the experience as a whole, not as separate variables. The aim of qualitative research is to understand experience as unified.

Strengths

- Because of close researcher involvement, the researcher gains an insider's view of the field. This allows the researcher to find issues that are often missed (such as subtleties and complexities) by the scientific, more positivistic enquiries.
- Qualitative descriptions can play the important role of suggesting possible relationships, causes, effects and dynamic processes.

- The researcher could turn to qualitative reports in order to examine forms of knowledge that might otherwise be unavailable, thereby gaining new insight.
- Qualitative research adds flesh and blood to social analysis.

Limitations

- Because of the subjective nature of qualitative data and its origin in single contexts, it is difficult to apply conventional standards of reliability and validity.
- Contexts, situations, events, conditions and interactions cannot be replicated to any extent nor can generalisations be made to a wider context than the one studied with any confidence.

- The time required for data collection, analysis and interpretation is lengthy.
- Researcher's presence has a profound effect on the subjects of study.
- Issues of anonymity and confidentiality present problems when selecting findings.
- The viewpoints of both researcher and participants have to be identified and elucidated because of issues of bias.

Quantitative Research

- Quantitative designs measure **quantity** or **amount**.
- Applicable to phenomena that can be expressed in terms of quantity e.g. *mean age*, *GDP* and *population size*.
- Entails **designs**, **techniques** and **measures** that produce **discrete numerical** or **quantifiable data.**
- Random sampling is utilized to ensure representativeness of a sample.

- Some research designs that can be described as **quantitative include** – *experimental designs*, *causo-comparative and correlational research.*
- Quantitative research refers to a systematic, empirical investigation of social phenomena via statistical, mathematical or computational techniques.

- Because it is so deeply rooted in numbers and statistics, quantitative research has the ability to effectively translate data into easily quantifiable charts and graphs

Key Characteristics

❖**Control**:

✓The most important element because it enables the scientist to identify the causes of his or her observations.

✓Experiments are conducted in an attempt to answer certain questions. They represent attempts to identify why something happens, what causes some event, or under what conditions an event does occur. Control is necessary in order to provide unambiguous answers to such questions.

- ✓To answer questions in education and social science we have to eliminate the simultaneous influence of many variables to isolate the cause of an effect.
- ✓Controlled inquiry is absolutely essential to this because without it the cause of an effect could not be isolated.

❖**Operational Definition**:

✓Terms must be defined by the steps or operations used to measure them.

✓Such a procedure is necessary to eliminate any confusion in meaning and communication.

❖**Replication**:

✓To be replicable, the data obtained in an experiment must be reliable; that is, the same result must be found if the study is repeated.

✓If observations are not repeatable, our descriptions and explanations are thought to be unreliable.

❖**Hypothesis Testing**:

✓The systematic creation of a hypothesis and subjecting it to an empirical test.

Strengths

- Precision - through quantitative and reliable measurement
- Control - through sampling and design
- Ability to produce causality statements, through the use of controlled experiments
- Statistical techniques allow for sophisticated analyses
- Replicable

Limitations

- Because of the complexity of human experience it is difficult to rule out or control all the variables;
- Because of human agency people do not all respond in the same ways as inert matter in the physical sciences;
- Its mechanistic ethos tends to exclude notions of freedom, choice and moral responsibility;
- Quantification can become an end in itself.
- It fails to take account of people's unique ability to interpret their experiences, construct their own meanings and act on these.

- It leads to the assumption that facts are true and the same for all people all of the time.
- Quantitative research often produces banal and trivial findings of little consequence due to the restriction on and the controlling of variables.
- It is not totally objective because the researcher is subjectively involved in the very choice of a problem as worthy of investigation and in the interpretation of the results.

Mixed Methods

- Combination of quantitative and qualitative methods is often called ‘mixed methods’
- The different approaches are never substitutes for each other.
- When appropriate, both approaches can be combined to minimize the limitations and maximize the strengths of each. Increasingly research and development consultancy projects do combine qualitative and quantitative methods.

- Qualitative research can identify topics which are appropriate for quantitative methods
- Quantitative research can help to identify topics or social groups which warrant in-depth qualitative study
- Qualitative research can inform questionnaire design and wording.
- Qualitative research can help to interpret the results of quantitative studies

Reasons to use mixed methods

- Triangulation (convergence, corroboration)
- Complementarity (elaboration, enhancement, clarification)
- Development (results from one informs the other)
- Initiation (seeking paradox, contradicts new insights)
- Expansion (extend range of enquiry)

Order of mixed methods

SEQUENTIAL

QUAN → qual

QUAL → quan

SIMULTANEOUS

QUAN + qual

QUAL + quan

Simultaneous: limited interaction during data collection, finding complementary

Sequential: finding of one method used for planning subsequent method

Advantages and disadvantages of using both qualitative and quantitative methods

- Allows assessment of various objectives of a study.
- Qualitative methods yield in-depth explanation of a phenomenon while quantitative methods provide hard data.
- Reduce bias as each method is used to check the other.

Disadvantage

- Prohibitively expensive.
- Require a lot of time to facilitate adequate training to ensure their effective use.

SUMMARY

- *The word qualitative implies an emphasis on processes and meanings that are not rigorously examined or measured (if measured at all), in terms of quantity, amount, intensity, or frequency.*
- *Qualitative researchers stress*
  - ✓ *the socially constructed nature of reality,*
  - ✓ *the intimate relationship between the researcher and what is studied, and*
  - ✓ *the situational constraints that shape inquiry.*

- *In contrast, quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes. Inquiry is purported to be within a value-free framework*
- *When you want "strength in numbers," choose quantitative research. When "size doesn't matter," qualitative research is your best bet.*

CLASSIFICATION BASED ON PURPOSE OF STUDY

1. Exploratory research design

- An exploratory research study is most appropriate where little or nothing is known about a phenomenon and hence the need to explore in order to gain insights and ideas about it.
- Exploratory research helps to generate tentative explanations or hypotheses, which may be used as starting points for descriptive or causal research.

- In this regard, exploratory studies may be regarded as *pilot studies*.
- ✓ Pilot studies are particularly necessary when the available literature and other resources can not provide adequate guidance for designing and carrying out a study.
- Common ways of conducting exploratory research include a search for the literature, talking to experts, conducting group interviews and participant observation and basic econometric analysis.

2. Descriptive research design

- Descriptive research design is most appropriate where the researcher is fairly knowledgeable about the key aspects of a phenomenon but has little knowledge if any regarding their characteristics, nature or details.
- Hence a descriptive study is an extension of exploratory research that aims to generate knowledge that may be used to describe or develop a profile of what is being studied better describe the characteristics of variables in a particular situation/phenomenon.

- For instance, in a market integration study, one may generate “factors” that are shared by two markets and investigate their significance in each market. This would be the exploratory research.
- At the descriptive level, one then goes on to find the possible principal components of these factors.
- The components of the factors are then used to describe them in a manner that allows their meaningful economic interpretation.

3. Causal research design

- A causal research design (also called explanatory study) is concerned with determining cause and effect relationships.
- Causal studies may also seek to predict how one phenomenon (dependent variable) will behave or vary in response to variation in some other phenomena (independent variables).

.

- A causal design requires thorough understanding of the problem so that the problem can be stated in much greater detail, usually in the form of hypotheses.
  - ✓ For example, a financial analyst may be interested to find out the relationship between certain figures reported in financial statements and the price of securities issued by the reporting firm.

- ✓Thus, the analyst may, for instance, be interested in testing the hypothesis: There is no relationship between earnings per share and market price per share

4. Evaluative study

- Evaluative research considers the implementation and effects or impacts on phenomena of intervention/treatment.
  - ✓ For example, a social worker may be interested to know the impact of social policies and programs on the welfare of a community .
- Evaluation research may be seen as a form of appraisal using valid research methods.

- Evaluation research is geared to produce information that helps in the decision-making process e.g. developing quality programs and services.

5. Correlational study

- Emphasis in correlational studies is on studying a situation or problem in order to explain the relationships between variables.

- Correlational studies examine the relationships between variables without necessarily trying to establish if one variable causes the other.

BASED ON METHOD OF DATA COLLECTION

1. Survey research design

- A survey may take the form of a census or sample.
- A *census survey* involves data collection from every member of the population while in a *sample survey*, data is collected from only a portion of the population of interest.
- A sample of one or just a few units is called a *case study*.

- If a sample is to be used a decision should first be made as to whether there is need for representativeness.
- If a representative sample is required it should be as representative as possible of the population of interest. How representative a sample is depends on the method used in sample selection.
- The method can be random or non-random. Non-random samples can be informed by such things as personal judgment, proximity and snowballs.

- Although other methods like observation can be used to collect data in a survey, the basic means of obtaining data in a survey is through communication with the respondents using a data collection instrument, called a *questionnaire*.
- The questionnaire can be administered through personal interviews, telephone interviews, or mailed and self-administered by the respondent.

2. Case study

- Case study is concerned with the in-depth study of one or few typical situations or members of the population of interest.
- The emphasis in a case study is the interrelationships amongst a number of factors and generation of answers to the question, why?
- The data collection methods employed may be similar to those used in surveys including interviews, observation and questionnaires.

3. Experimental design

- A causal design in the form of an experiment is capable of providing more convincing evidence of casual relationships than are exploratory or descriptive designs.
- Experiments are set up to examine cause and effect relationships among variables.
- In an experimental design, the researcher manipulates and controls one or more independent variables and observes the dependent variable(s) for variation related to the manipulation of the independent variable.

Properties of an experiment

1. *Independent and dependent variables*

- Experimental research designs are concerned with cause-and-effect relationships amongst variables.
- Experimental design must therefore have at least one independent variable capable of being manipulated and at least one dependent variable on which the effects of that manipulation can be observed.

2. *Manipulation*

- This is a process by which a researcher creates different levels of an independent variable.
- The variable should be capable of taking at least two different conditions, for example, in studying the effect of crowding on mental task performance, a researcher can have two levels of crowding i.e. crowded and non-crowded.

3. *Random assignment of subjects*

- Subjects are assigned to two different groups - experimental and control - randomly.
- The subjects may be exposed to other things besides the experimental conditions, and random assignment ensures that those other things are distributed equally in the groups and affects the two groups equally.

- There are two broad categories of experiments: *laboratory experiment* and *field experiment*.
- In a laboratory experiment, the researcher creates an artificial situation with the desired conditions and then manipulates some variables while controlling others.
- A field experiment is conducted in a realistic or natural setting although it also involves the manipulation of one or more independent variables under as carefully controlled condition as the situation can permit.

BASED ON TIME HORIZON

1. **Cross-sectional study**

- Study subjects are examined and their particular characteristics of interest are measured or observed at a single or one point in time.
- Data are gathered over a short period of time over a broad set of subjects.
- Survey research designs based on interviews are usually cross-sectional studies.

2. Longitudinal study

- Data are collected at different points in time from the same group of elements.
- The fixed sample may comprise of people, organizations or other entities.
- The sample remains relatively constant through time although there may be periodic additions to replace dropouts to keep the sample representative.

- Studies carried longitudinally require more effort and resources than cross-sectional studies.

THANK YOU!