

Introduction

IT 3204N – RESEARCH METHODS IN COMPUTING

Some of the reasons for doing research

How research can be used to gather evidence to inform your practice

The applications of research

Characteristics and requirements of the research process

Types of research from the perspective of applications, objectives and enquiry modes

Research paradigms



Research: an integral part of your practice

More than a set of skills, research is a way of thinking:

- examining critically the various aspects of your day-to-day professional work;
- understanding and formulating guiding principles that govern a particular procedure;
- and developing and testing new theories that contribute to the advancement of your practice and profession.

Research: a way to gather evidence for your practice

Evidence-based practice (EBP) is the delivery of services based upon research evidence about their effectiveness; the service provider's clinical judgement as to the suitability and appropriateness of the service for a client; and the client's own preference as to the acceptance of the service.

- encourages professionals and other decision-makers to use evidence regarding the effectiveness of an intervention in conjunction with the characteristics and circumstance of a client and their own professional judgement to determine the appropriateness of an intervention when providing a service to a client.
- promoted as an acceptable and scientific method for policy formulation and practice assessment

Research is one of the ways of collecting accurate, sound and reliable information about the effectiveness of your interventions, thereby providing you with evidence of its effectiveness.

The applications of research

From the viewpoint of

The service provider

To answer questions such as:

- How many people are using the service or the product?
- Why do some people use the service/product while others do not?
- How effective is the service/product?
- How can the service/product be improved?
- Which type of people use or do not use the service/product?
- How satisfied or dissatisfied are the consumers of the service/product?
- What are the problems with the service/product?

The administrator,
manager and/or planner

To answer questions such as:

- What are the needs of the community?
- What types of service/product are needed by the community?
- How many service providers are needed?
- What are the training needs of the staff?
- How many cases can a worker handle in a day?
- How can the effectiveness of each worker be evaluated?
- How can the service/product be made more popular?

The consumer

To answer questions such as:

- Am I, as a consumer, getting value for money?
- How good are the service providers?
- What are the long-term effects of the product I am using? Where is the evidence?

The professional

To answer questions such as:

- Which is the most effective intervention for a particular problem?
- What is the relationship between X and Y?
- How valid is a particular theory in the present conditions?
- What is the best way of measuring attitudes?
- What is the process through which people decide to adopt a programme?

Research: what does it mean?

Implying that the process being applied:

1. is being undertaken within a framework of a set of philosophies;
2. uses procedures, methods and techniques that have been tested for their validity and reliability;
3. is designed to be unbiased and objective.

Research: what does it mean?

Philosophical orientation may stem from one of the several paradigms and approaches in research – positivist, interpretive, phenomenology, action or participatory, feminist, qualitative, quantitative – and the academic discipline in which you have been trained.

The concept of ‘validity’ can be applied to any aspect of the research process and ensures that in a research study correct procedures have been applied to find answers to a question.

‘Reliability’ refers to the quality of a measurement procedure that provides repeatability and accuracy.

‘Unbiased and objective’ means that you have taken each step in an unbiased manner and drawn each conclusion to the best of your ability and without introducing your own vested interest

Definitions of Research

a careful, systematic, patient study and investigation in some field of knowledge, undertaken to establish facts or principles. (Grinnell 1993: 4)

a structured inquiry that utilises acceptable scientific methodology to solve problems and creates new knowledge that is generally applicable' (Grinnell 1993: 4)

a systematic investigation to find answers to a problem (Burns 1997:2)

a systematic, controlled empirical and critical investigation of propositions about the presumed relationships about various phenomena (Kerlinger 1986: 10)

nevertheless sociological research, as research, is primarily committed to establishing systematic, reliable and valid knowledge about the social world (Bulmer 1977:5)

Research

It is a process for collecting, analysing and interpreting information to answer questions.

To qualify as research, it must have certain characteristics: it must, as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical and critical.

Characterisitcs

Controlled – in exploring causality in relation to two variables, set up the study in a way that minimises the effects of other factors affecting the relationship.

Rigorous – You must be scrupulous in ensuring that the procedures followed to find answers to questions are relevant, appropriate and justified.

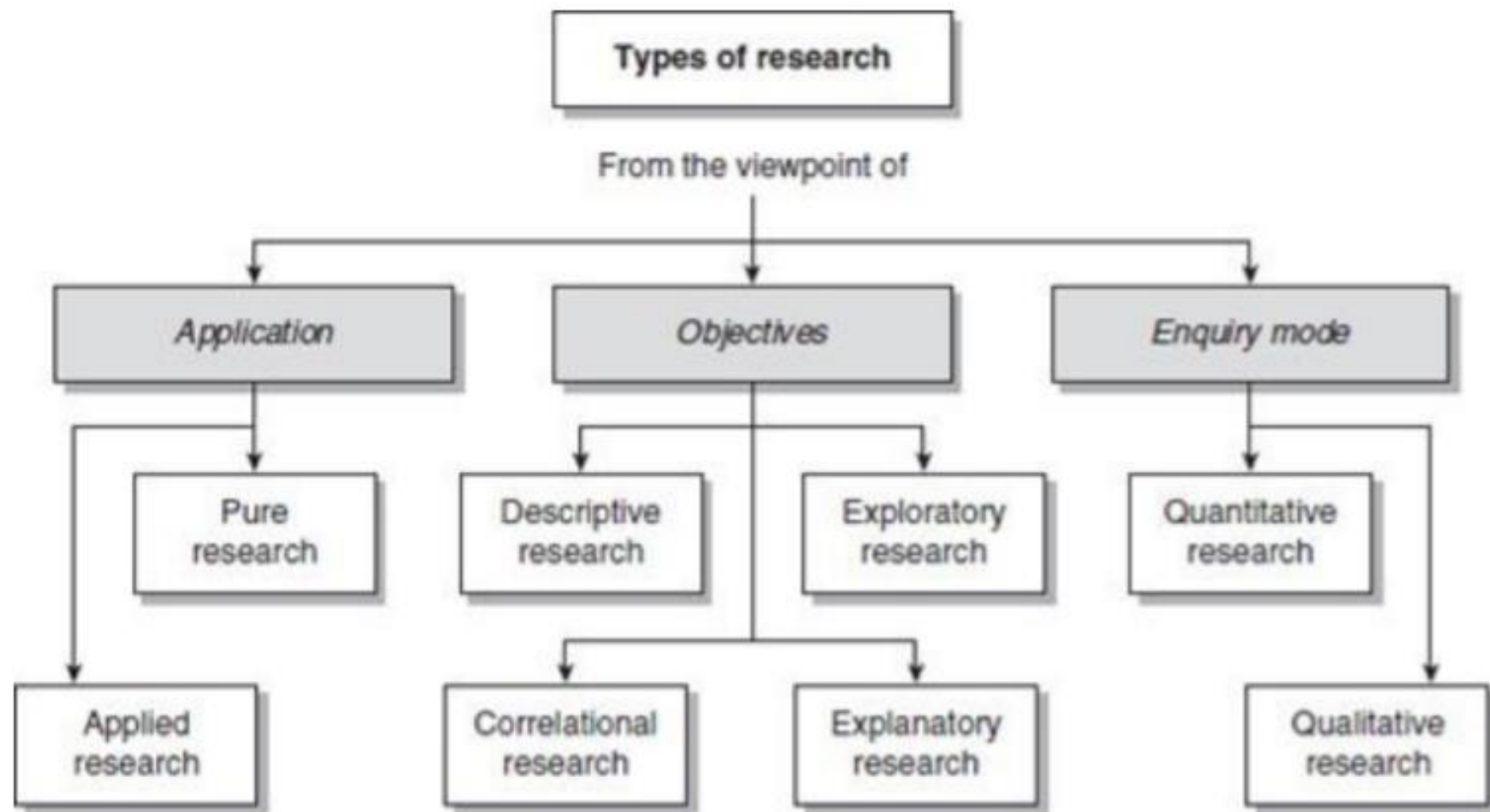
Systematic – This implies that the procedures adopted to undertake an investigation follow a certain logical sequence. The different steps cannot be taken in a haphazard way. Some procedures must follow others.

Valid and verifiable – This concept implies that whatever you conclude on the basis of your findings is correct and can be verified by you and others.

Characterisitcs

Empirical – This means that any conclusions drawn are based upon hard evidence gathered from information collected from real-life experiences or observations.

Critical – Critical scrutiny of the procedures used and the methods employed is crucial to a research enquiry. The process of investigation must be foolproof and free from any drawbacks.



Types of Research

Application perspective

- Pure research involves developing and testing theories and hypotheses that are intellectually challenging to the researcher but may or may not have practical application at the present time or in the future.
- Applied research is mostly used in the social sciences. The research techniques, procedures and methods that form the body of research methodology are applied to the collection of information about various aspects of a situation, issue, problem or phenomenon so that the information gathered can be used in other ways.

Types of Research

Objective perspective

- Descriptive study attempts to describe systematically a situation, problem, phenomenon, service or programme, or provides information about, say, the living conditions of a community, or describes attitudes towards an issue.
- Correlational study's main emphasis is to discover or establish the existence of a relationship/association/interdependence between two or more aspects of a situation.
- Explanatory research attempts to clarify why and how there is a relationship between two aspects of a situation or phenomenon.
- Exploratory research is when a study is undertaken with the objective either to explore an area where little is known or to investigate the possibilities of undertaking a particular research study.

Examples	Aim	Main theme	Type of research
<ul style="list-style-type: none"> Socioeconomic characteristics of residents of a community Attitudes of students towards quality of teaching Types of service provided by an agency Needs of a community Sale of a product Attitudes of nurses towards death and dying Attitudes of workers towards management Number of people living in a community Problems faced by new immigrants Extent of occupational mobility among immigrants Consumers' likes and dislikes with regard to a product Effects of living in a house with domestic violence Strategies put in place by a company to increase productivity of workers 	To describe what is prevalent regarding: <ul style="list-style-type: none"> a group of people a community a phenomenon a situation a programme an outcome 	To describe what is prevalent	Descriptive research
<ul style="list-style-type: none"> Impact of a programme Relationship between stressful living and incidence of heart attacks Impact of technology on employment Impact of maternal and child health services on infant mortality Effectiveness of a marriage counselling service on extent of marital problems Impact of an advertising campaign on sale of a product Impact of incentives on productivity of workers Effectiveness of an immunisation programme in controlling infectious disease 	To establish or explore: <ul style="list-style-type: none"> a relationship an association an interdependence 	To ascertain if there is a relationship	Correlational research
<ul style="list-style-type: none"> Why does stressful living result in heart attacks? How does technology create unemployment/employment? How do maternal and child health services affect infant mortality? Why do some people have a positive attitude towards an issue while others do not? Why does a particular intervention work for some people and not for others? Why do some people use a product while others do not? Why do some people migrate to another country while others do not? Why do some people adopt a programme while others do not? 	To explain: <ul style="list-style-type: none"> why a relationship, association or interdependence exists why a particular event occurs 	To explain why the relationship is formed	Explanatory research

Types of Research

Mode of enquiry perspective

- Quantitative research (structured approach) where everything that forms the research process – objectives, design, sample, and the questions that you plan to ask of respondents – is predetermined. It is more appropriate to determine the extent of a problem, issue or phenomenon.
- Qualitative research (unstructured approach) allows flexibility in all these aspects of the process. It is predominantly used to explore its nature, in other words, variation/diversity per se in a phenomenon, issue, problem or attitude towards an issue.

Difference with respect to:	Quantitative research	Qualitative research
Underpinning philosophy	Rationalism: 'That human beings achieve knowledge because of their capacity to reason' (Bernard 1994: 2)	Empiricism: 'The only knowledge that human beings acquire is from sensory experiences' (Bernard 1994: 2)
Approach to enquiry	Structured/rigid/predetermined methodology	Unstructured/flexible/open methodology
Main purpose of investigation	To quantify extent of variation in a phenomenon, situation, issue, etc.	To describe variation in a phenomenon, situation, issue, etc.
Measurement of variables	Emphasis on some form of either measurement or classification of variables	Emphasis on description of variables
Sample size	Emphasis on greater sample size	Fewer cases
Focus of enquiry	Narrows focus in terms of extent of enquiry, but assembles required information from a greater number of respondents	Covers multiple issues but assembles required information from fewer respondents
Dominant research value	Reliability and objectivity (value-free)	Authenticity but does not claim to be value-free
Dominant research topic	Explains prevalence, incidence, extent, nature of issues, opinions and attitude; discovers regularities and formulates theories	Explores experiences, meanings, perceptions and feelings
Analysis of data	Subjects variables to frequency distributions, cross-tabulations or other statistical procedures	Subjects responses, narratives or observational data to identification of themes and describes these
Communication of findings	Organisation more analytical in nature, drawing inferences and conclusions, and testing magnitude and strength of a relationship	Organisation more descriptive and narrative in nature

8-step Model

Phase I – Deciding what to research

- 1. Formulating a research problem

Phase II – Planning a research study

- 2. Conceptualizing a research design
- 3. Constructing an instrument for data collection
- 4. Selecting a sample
- 5. Writing a research proposal

Phase III – Conducting a research study

- 6. Collecting data
- 7. Processing and displaying data
- 8. Writing a research report

