U O W

Research Methodology

Types of Research & Design

UNIVERSITY
OF WOLLONGONG
AUSTRALIA

Outline

Exploratory research

Descriptive and diagnostic research

Hypothesis-testing research

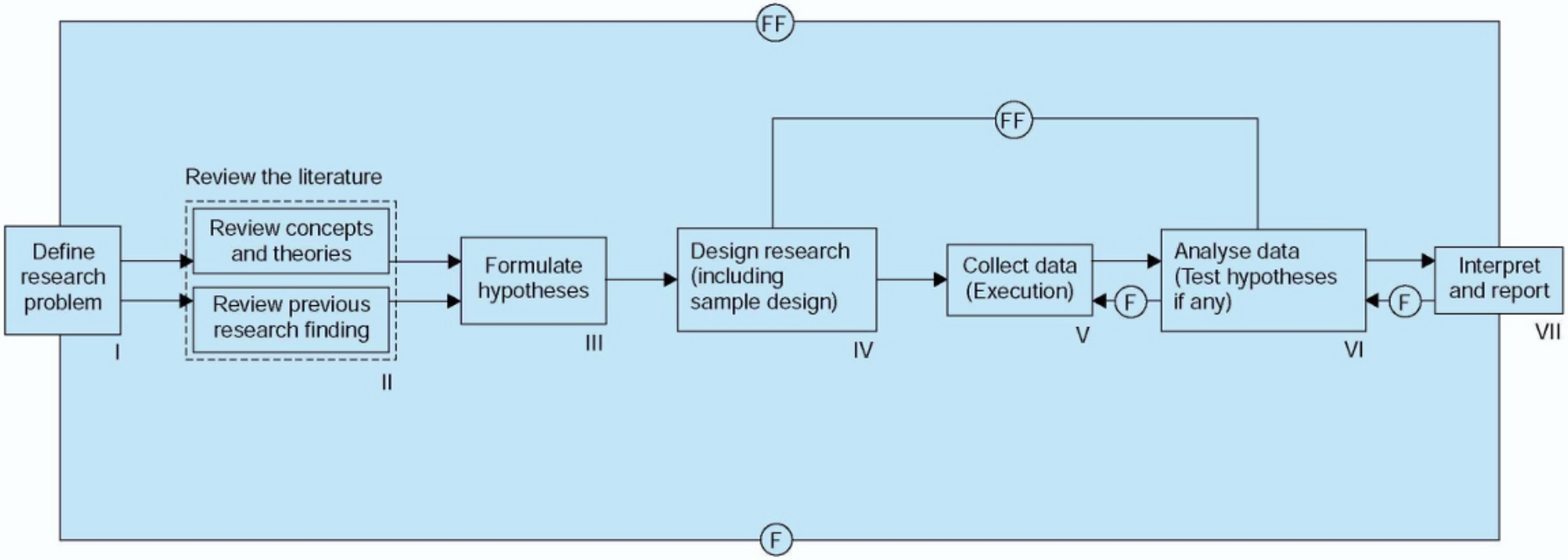
Causal research (Explanatory research)

Qualitative research

Quantitative research

Scientific research

RESEARCH PROCESS IN FLOW CHART



Where (F) = feed back (Helps in controlling the sub-system to which it is transmitted)

(FF) = feed forward (Serves the vital function of providing criteria for evaluation)

Design

1. The purpose of the study,
2. The type of research design,
3. The nature of data collection if required and the techniques of data collection that would be used,
4. What is the research problem/hypotheses,
5. The method of research,
6. The methods of data analysis that would be adopted and
7. The manner in which the report would be prepared

Types Of Research Design:

There are different types of research designs. They may be broadly categorised as:

(1) Exploratory Research Design
(2) Descriptive and Diagnostic Research Design
(3) Hypothesis-Testing Research Design
(4) Causal Research (Explanatory research)

	Causal research	Exploratory research(http://researchmethodology.net/researchmehodology/nesearch-design/exploratory-research /)	Descriptive research (http://research.methodology.net/research-methodology/research-design/conclusive-research/descriptive-research/)
Amount of uncertainly characterizing decision situation	Cleary defined	Highly ambiguous	Partially defined
Key research statement	Research hypotheses	Research question	Research question
When conducted?	Later stages of decision making	Early stage of decision making	Later stages of decision making
Usual research approach	Highly structured	Unstructured	Structured

Example

- Causal (by hypothesis): Which two factors more significant for users to use a cloud system?
- Exploratory: Which cloud storage are students interested in?
- Descriptive: Which mobile products are the most popular to young people?

Exploratory Research

- For a problem that has not been studied more clearly
- The objective of exploratory research is to gather preliminary information that will help define problems
- On the basis of the collected facts the researcher may be able to formulate a sound research problem for further research.
- It may also enable the researcher to get himself familiar to the phenomena which he expects to investigate at a later stage.
- The **aim** of an exploratory study may be clarification of concepts, establishing priorities for future research.
- Must be flexible enough to provide opportunity for considering different aspects of a problem under study

Exploratory Research

- Exploratory research often relies on techniques such as
  - literature review
  - qualitative approaches
  - in-deep interview, questionaries, focus group, case studies, etc.

Exploratory Research

Analysis of insight stimulating cases or methods from previous work

- Exploring the cases or methods from the previous work.
- Thinking regarding the formulation of the research problem.

Descriptive Research

- The purpose of descriptive type of design is to describe some event, situation, people, group or community or some phenomena.
- Fundamentally, it is a fact of an entity, aiming at precise and systematic measurement of some dimensions of a phenomenon.
- It does not answer questions about how/when/why the characteristics occurred

Examples of Descriptive Research

- Usually a descriptive design involves detailed numerical descriptions, such as distribution of the population of a community by age, sex, caste or education.
- Estimating the proportion of people in a particular geographical locality in respect of their specific views or attitudes.
- Case studies and preliminary observation of a group

Diagnostic Research

- Find out relationship between causes and also suggest ways for the solution.
- Discover and test whether certain variables (factors) are associated.
- Diagnostic studies are mostly motivated by hypotheses.
- Diagnostic studies seek immediate to timely solution.
  - Before going through other references, remove and solve the factors and the causes responsible for giving rise to the problem.

Causal Research

- Causal research, also known as **explanatory research** is conducted in order to identify the extent and nature of cause-and-effect relationships.
- Causal research can be conducted in order to assess impacts of specific changes on existing norms, various processes etc.
- Causal studies focus on an analysis of a situation or a specific problem to explain the patterns of relationships between variables.

There are two research methods for exploring the cause-and-effect relationship between variables:

1 Experimentation (e.g., in a laboratory), and
2 Statistical research.

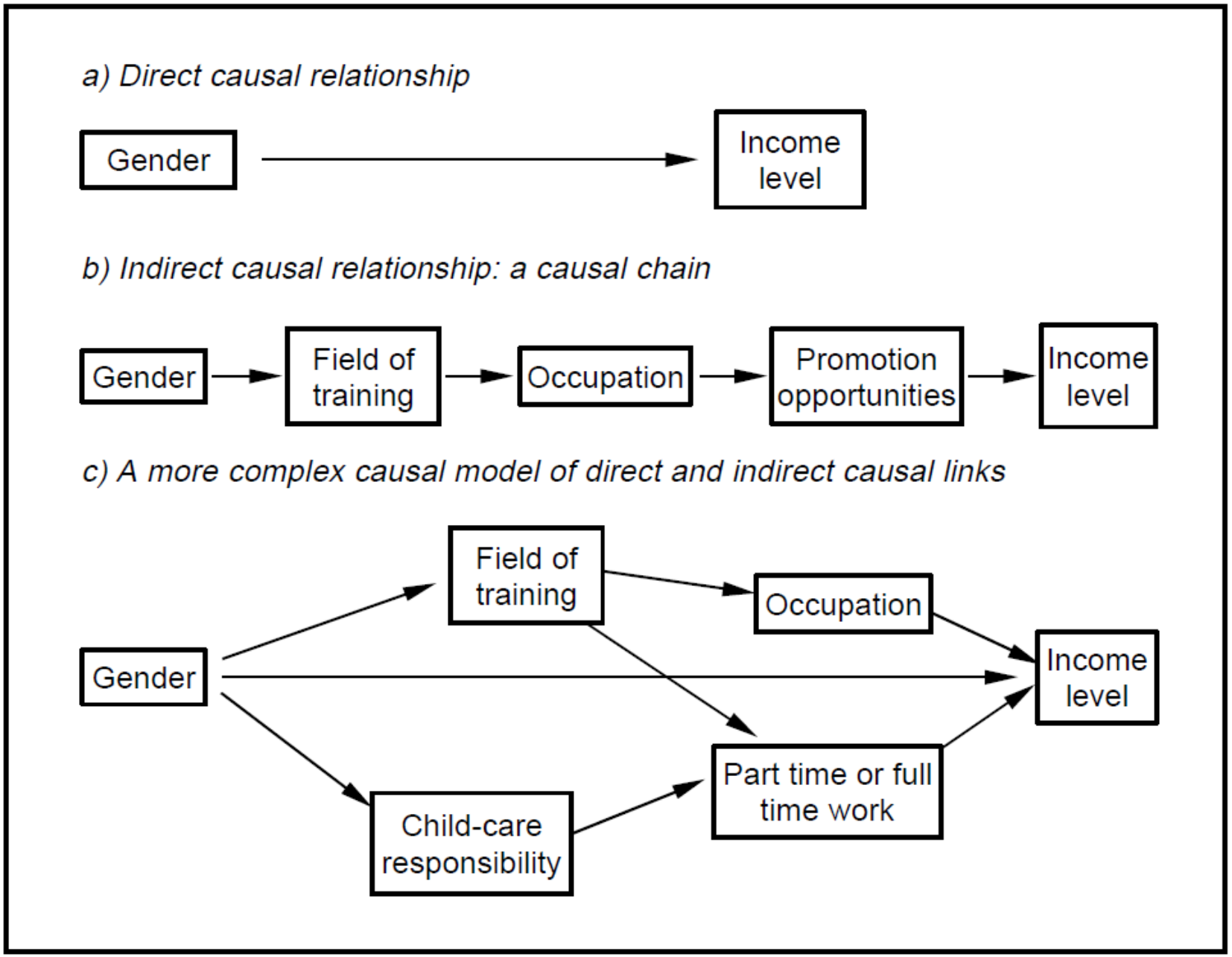


Figure 1.1 *Three types of causal relationships*

Example of Causal Research

A company wants to find out why fewer customers were demanding one of its cloud storage service, so management might experiment to find out if possibly the current subscribing price would be a cause.

The purpose of such research is to find out what is causing a specific change, and in business, this might be a decline in sales.

Understanding the Difference between Qualitative and Quantitative Research

- **Qualitative research** explores attitudes, behaviour and experiences through such methods as interviews, **focus groups** and other methods. It attempts to get an in-depth opinion from participants.
- As attitudes, behaviour and experiences are important, fewer people take part in the research
- Under the umbrella of qualitative research there are many different methodologies.

Focus Group: a small, but demographically diverse group of people who focus on a topic. The process may consist of interviews and discussions in regards of their perceptions, opinions and attitudes towards the topic.

Understanding the Difference between Qualitative and Quantitative Research

- **Quantitative research** generates statistics through the use of large-scale survey research, using methods such as questionnaires or structured interviews.
- A researcher has stopped you on the streets, or you have filled in a questionnaire.
  - If you extract the information and analyse it with statistical method, then it is quantitative research.
  - Otherwise, it is qualitative research.

- Do not think that quantitative research is ‘better’ than qualitative research.
- Neither is better than the other – they are just different and both have their strengths and weaknesses.

Examples of Qualitative Research Methodology

Action research

- Action research is an interactive inquiry process that balances problem-solving actions implemented in a collaborative context with data-driven collaborative analysis or research to understand underlying causes enabling future predictions about personal and organizational change.
- is a philosophy and methodology of research generally applied in the social sciences
- It seeks transformative change through the simultaneous process of taking action and doing research, which are linked together by critical reflection.

Examples of Qualitative Research Methodology

Action research

- In action research, the researcher works in close collaboration with a group of people to improve a situation in a particular setting.
- The researcher does not ‘do’ research ‘on’ people, but instead works with them, acting as a facilitator. Therefore, good group management skills and an understanding of group dynamics are important skills for the researcher to acquire.
- This type of research is popular in areas such as organisational management, community development, education and agriculture.

- Action research begins with a process of communication and agreement between people who want to change something together.
- Obviously, not all people within an organisation will be willing to become co-researchers, so action research tends to take place with a small group of dedicated people who are open to new ideas and willing to step back and reflect on these ideas.
- The group then moves through four stages of **planning, acting, observing and reflecting**. This process may happen several times before everyone is happy that the changes have been implemented in the best possible way.
- Various types of research method may be used,
  - for example: the diagnosing and evaluating stage questionnaires, interviews and focus groups may be used to obtain opinion on the proposed changes.

Examples of Qualitative Research

Grounded theory

- Grounded theory is a systematic methodology that has been largely applied to qualitative research conducted by social scientists.
- Grounded theory is a methodology which was introduced in 1967 by two researchers named Glaser and Strauss. It tends to be a popular form of inquiry in the areas of social science research.
- The methodology involves the construction of hypotheses and theories through the collecting and analysis of data. Grounded theory involves the application of inductive reasoning.

Examples of Qualitative Research

Grounded theory

- Method:
  - develop a theory which offers explanation about
  - the main concern of the population of your substantive area and
  - how that concern is resolved or processed.

Examples of Qualitative Research

Grounded theory

- The emphasis in this methodology is on the generation of theory from data
  - Discovery of emerging patterns in data.
  - Different from other types of research which might seek to test a hypothesis that has been formulated by the researcher.
- Data collection
  - Methods such as focus groups and interviews tend to be the preferred data collection methods,
  - A comprehensive literature review which takes place throughout the data collection process.

Examples of Ground Theory

- From data,
  - the main concern of online learners is finding the time to study and temporal integration is the theory which explains how the concern is resolved or processed.
  - For a group of computer users, their concern was GPU power and the changing equipment is the theory which resolved the concern.

Scientific Research

- It involves the collection, organization and analysis of information to increase understanding of a topic or issue. A research project may be an expansion on past work in the field.
- Some of scientific research can be classified into quantitative research.
- Some of them do not have data collection process, mainly in computer science, maths and engineering
  - Cryptography
  - Algebra
  - Theoretical computer science
  - …

Developing a Research Plan

- Help to organize ideals in a form whereby it will be possible to look for flaws and inadequacies, if any
- Provide an inventory of what must be done and which materials have to be collected as a preliminary step
- It is a document that can be given to others for comments

Research plan

- Research objective: clearly stated in one/two lines of what the researcher expects to do
- Problem: explicitly stated so that one may know what information is to be obtained for solving the problem
- Major concepts (want to measure) should be defined
- Method to be used in solving the problem
- Details of techniques to be adopted
- Methods of sampling and processing data
- Results of pilot test, if any, should be reported
- Time and cost budgets should be planned