Research Design

Research Process

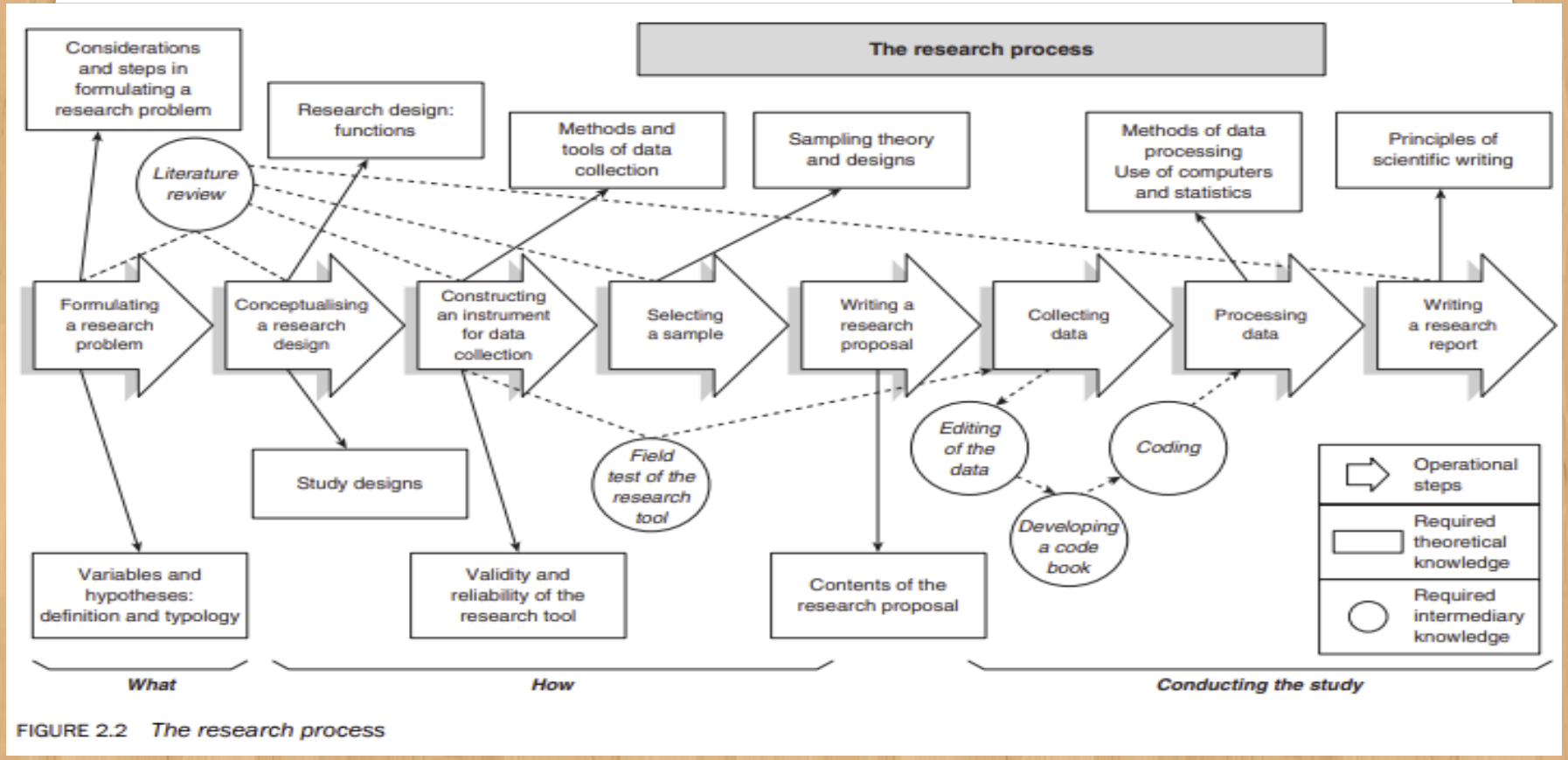


FIGURE 2.2 *The research process*

The Eight Steps of Research Process

Step 1. Formulating a research problem

- decide *what* you find out about

Step 2. Conceptualising a research design

- the main function is to explain *how* you will find answers to you research questions

Step 3. Constructing an instrument for data collection

- the first practical step in carrying out a study

- decide how to collect data for the study

- construct a research instrument for data collection

Step 4. Selecting a sample

- sampling is done to minimize, within the limitation of cost, the gap between the values obtained from the sample and those in the population.

- a sample is a small number of units selected in a manner that represent the study population.

The Eight Steps of Research Process

Step 5. Writing a research proposal

- tells the reader about the research problem and how you're planning to investigate.
- writing the detailed operational plan for finding answers to your research problem

Step 6. Collecting data

- actual collection of data from which you will draw inferences and conclusion to your study.

Step 7. Processing and analysis of data

- depends on what type of research used – qualitative or quantitative or mixed method

Step 8. Writing a research report

- depends on what type of research used – qualitative or quantitative or mixed method

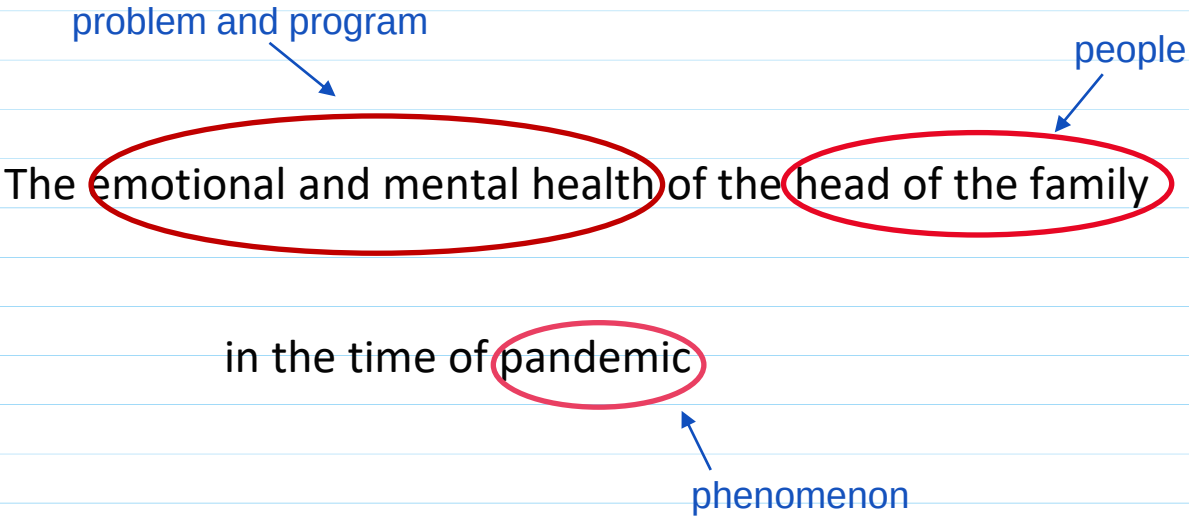
Sources of Research Topics/Ideas - the **4P's**

People	Problem	Program	Phenomenon
- individuals - organizations - groups - communities	- issues situations, conditions, concerns etc.	- contents, structures, outcomes, attributes, satisfaction	- phenomenon itself, cause and effect, relationships

Note: Can be a combination of at least 2 p's

R. Kumar, 2011

Sources of Research Topics/Ideas - the 4P's



Research Problem – Ideas for new studies

Method	Rationale
Replication	Author's results have significant importance and can be verified with different people/subject, that is why it is replicated or repeated.
Extension	Extended because variable/s has been excluded; examine for theoretical significance, or better measurement or didn't conduct the appropriate analysis, etc. Can extend by conducting a similar study which will lead to the improvement of the research literature.

Research Problem – Ideas for new studies

Method	Rationale
Testing the external validity (i.e., generalizability) of a study	Suggestions for important issue would work well in your intended research environment.
Improving a study's internal validity (i.e., accuracy of claims about causation)	You might realize that the study did not control one or more important variables and the lack of control of these variables led to an ambiguous interpretation of the results.
Reconciling conflicting results	Found conflicting results in the study that you have read that you want to conduct a new study to resolve the conflict. Conflicting results are due to different ways in which the studies were conducted, use of different measurement instruments, or use of different participant populations.

Research Problem – Ideas for new studies

Method	Rationale
Generating a new theory	Especially in new areas of inquiry, one might use the grounded theory (generated and developed from the data gathered by the researcher) data to explain how and why some interesting phenomenon operates. One might also test additional implications of an existing theory.
Suggestions for future research	One of the easiest ways to get ideas from past research is to look for the author's suggestions for future research. This is frequently valid and excellent sources of research ideas.
Theses and dissertations / studies done	A section devoted to future research that identifies subsequent studies the author believes need to be completed.

Reminders in Choosing Research Topics/Ideas

- Make the topic small. Think small rather than big.
  - limit the scope and scale of research: think narrow rather than broad
- Keep the focus clear, limited, bounded and narrow.
- Don’t be over ambitious.
- Be realistic on what can be done in the time available, consider the current situation and whether, or how much this might compromise the viability and worth of the research.
- Decide what can and cannot be done within the time and timescale available.
- Decide why the research is important, topical, interesting, timely, significant, original relevant and positively challenging.

Reminders in Choosing Research Topics/Ideas

- Choose a research that will be useful, and decide how and for whom it will be useful – significance of the study.
- Choose a topic that is manageable and practicable.
- Decide what the research will “deliver”?
- What will the research do?
- Choose a topic for which there is a literature.
- Decide what can and cannot be done within the time and timescales available.
- Consider whether you have the right personality, characteristics, experience and interpersonal behavior to conduct the proposed piece of research.

Reminders in Choosing Research Topics/Ideas

- Choose a topic for which you know you will able to receive expert, informed supervision.
- Be clear on why you – personally, professionally, career relatedly – want to do the research and what you personally want out of it, and wheather the research will enable you to achieve this.
- Choose a topic that will sustain your interest over the duration of the research.
- Consider the necessary complexity (where it exists) of the research phenomenon, scope and conduct of the research and the difficulty of the research issues, foci and conduct.
- Consider how future research will be able to build on your research, i.e that the research opens up possibilities rather closes them down.

Variable

- a characteristic or attribute of an individual or an organization that can be measured or observed and that varies among the people or organization being studied.

Types of variable:

• **Independent variables** - those that (probably) cause, influence, or affect outcomes. Also called treatment, manipulated, antecedent, or predictor variables.

• **Dependent variables** - those that depend on the independent variables. They are the outcomes or results of the influence of the independent variables. Also known as criterion, outcome, effect, and response variables.

• **Intervening or mediating variables -** stand between the independent and dependent variables. They mediate the effects of the independent variable on the dependent variable.

Example:

IV smoking → causes → DV lung cancer

IV smoking → I damaged lung cells → DV lung cancer

Variable

- **Extraneous variable** - any other variable that could affect the dependent variable, but is not explicitly included in the experiment.

(https://stattrek.com/statistics/dictionary.aspx?definition=extraneous-variable)

- variable that is not intentionally being studied in the test.

(https://www.statisticshowto.com/extraneous-variable)

Example:

A hungry student taking a test .

Research Hypothesis

- prediction the researcher makes about the expected outcomes of relationships among variables
- often used in experiments in which investigators compare groups.
- must be capable of being confirmed or not confirmed

Example:

Is there a significant difference between the scores of students taught by using the lecture approach and the scores of students taught by using the cooperative learning approach?

Research Design

- plan or strategy that is drawn up for organizing the research and making it practicable, so that research questions can be answered based on evidence and warrants. (Cohen,et al, 2018)

- the overall scheme or program of the research

Note: It is the purpose of the research that determines its design.

example: You want to know the general comments of the public on the government's response to the pandemic a year after the lockdown.

A survey design might be suitable.

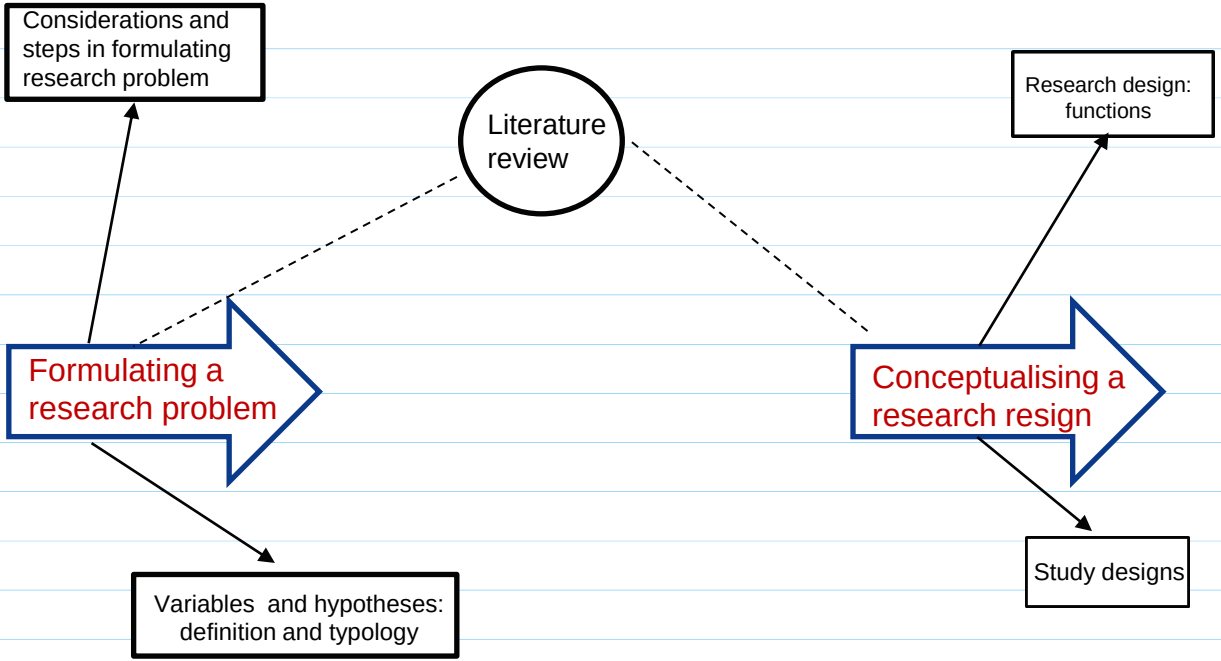
Research Design

TABLE 11.1 PURPOSES AND KINDS OF RESEARCH

Kinds of research purpose	*Kinds of research*
Does the research want to test a hypothesis or theory?	Experiment, survey, action research, case study
Does the research want to develop a theory?	Ethnography, qualitative research, grounded theory
Does the research need to measure?	Survey, experiment
Does the research want to understand a situation?	Ethnographic and interpretive/qualitative approaches
Does the research want to see what happens if…?	Experiment, participatory research, action research
Does the research want to find out 'what' and 'why'?	Mixed methods research
Does the research want to find out what happened in the past?	Historical research

(Cohen,et al, 2018)

Research design



Other Research Terms

- **Reliability** – in research means consistency: do we get the same result if measured repeatedly?
- **Validity** is about whether our measurement really measures our concept (or something else)? Is it meaningful as a measurement tool for this concept?
  - **internal validity** – answers the questions: Was the research sound? Was the research done right?
    - **external validity** –results can be generalized to different groups of people, situations and measures
- **Generalizability**– simply a measure of how useful the results of a study are for a broader group of people or situations. (https://www.hydroassoc.org/research-101)

Literature Review

- process of **searching the existing literature** relating to your research problem to develop theoretical and conceptual frameworks for your study

Specifically, a review of the literature:

• will tell you whether the ***problem*** you have identified ***has already been researched***. If it has, you should either revise the problem in light of the results of other studies to build on the previous literature or look for another problem, unless you think there is a need to replicate the study.

• will ***assist*** you ***in forming*** your ***research questions***

• might ***give*** you ***ideas*** as to ***how to proceed with and design your study*** so that you can obtain an answer to your research question(s).

Literature Review

- ***can point out methodological problems specific to the research question(s)*** you are studying. Are special groups or special pieces of equipment needed to conduct the research? If so, the literature can give clues as to where to find the equipment or how to identify the particular groups of participants needed.

- ***can identify appropriate data-collection instruments so that you will not need to construct a new instrument***. Familiarity with the literature will also help after you have collected your data and analyzed your results.

Sources of Information in a Literature Review

- books
- articles in journals
- empirical and non-empirical research
- reports
- policy documents
- public and private records
- research papers and reports
- theses and dissertations
- manuscripts

Sources of Information in a Literature Review

- databases
- conference papers
- primary sources
- online databases
- electronic journals or media
- secondary sources – second hand, non-original materials like encyclopedias, newspaper articles, research syntheses, reports etc.
- tertiary sources – collections or compilations of primary and secondary sources like almanacs, bibliographies, handbooks, indexes, abstract etc.

Types of Research Designs

Qualitative

- expressed in words.
- used to understand concepts, thoughts or experiences.
- enables you to gather in-depth insights on topics that are not well understood.

Examples:
interviews with open-ended questions, observations described in words, and literature reviews that explore concepts and theories.

Quantitative

- expressed in numbers and graphs.
- used to test or confirm theories and assumptions.
- can be used to establish generalizable facts about a topic.

Examples: experiments, observations recorded as numbers, and surveys with closed-ended questions.

https://www.scribbr.com/methodology/qualitative-quantitative-research/

Types of Research Designs
Mixed Methods

- involves collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks.

- the core assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone.

J. Creswell, 2015

Example:

DeLuca, S., & Rosenblatt, P. (2010). *Does moving to better neighborhoods lead to better schooling opportunities? Parental school choice in an experimental housing voucher program*. The Teachers College Record, 112(5), 7-8.

Types of Research Designs
Qualitative

1. Interview

- Any person-to-person interaction, either face to face or otherwise, between two or more individuals with a specific purpose in mind.
- Involves asking questions of respondents and recording their answers.
- Can be structured or unstructured

example: job interview of applicants or reporter's interview with respondents

2. Observation

- a purposeful, systematic and selective way of watching and listening to an interaction or phenomenon as it takes place.

example: a mother watching her kindergarten son on his first day of school

3. Focus Group

- attitudes, opinions or perceptions towards an issue, product, service or programme are explored through a free and open discussion between members of a group and the researcher.
- like collectively interviewing a group of respondents.

Types of Research Designs
Qualitative

example: small group discussion of doctors specializing in infectious disease

4. Ethnography - study and describe the functioning of cultures
through a study of social interactions and expressions between people and groups.
example: center for the elders

5. Case study

- the 'case' becomes the basis of a thorough, holistic and in-depth exploration of the aspect(s) that one wants to find out about.
- the total study population is treated as one entity and studied intensively.

example: An investigation of the occurrence of hate crimes among
Asians in the USA.

Types of Research Designs
Quantitative

1. Experimental research

- seeks to determine if a specific treatment influences an outcome in a study.
- tests the impact of a treatment (or an intervention)on an outcome, controlling for all other factors that might influence that outcome.
- "If I do this to one group but not the others (cause) does it change the outcome (effect)?

(www.Omegastatistics.com)

example: The side effects of the covid-19 vaccines among different races in the world.

2. Non- Experimental

2.1 Survey

- research method based on questionnaires or interviews.
- provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population.

Types of Research Designs
Quantitative

2.2 Descriptive - describes the subject with words or numbers or both
example: health and wellness of call center agents

2.3 Correlational – measures the relationship or association between variables of the study
example: age and job satisfaction

2.4 Causal Comparative – focus is on the effect of an independent variable on a dependent variable by comparing two or more groups of individuals.
example: Behaviors of the children and the elderly towards lockdown in this time of pandemic.

Types of Data Collection Instruments of the Research Designs

Qualitative

- in-depth interviews
- focus groups
- observations
- on-line forums
- web chats

Quantitative

- surveys
- structured observation methods
- questionnaires
- online
- reports

https://www.scribbr.com/methodology/qualitative-quantitative-research/

Types of Data - Research Designs

Qualitative

- descriptive data expressed in words
- responses of open-ended questions
- data usually are focused on individual experiences and beliefs

Quantitative

- numerical data
- results of close ended questions
- data on describing the characteristics of the population

https://www.scribbr.com/methodology/qualitative-quantitative-research/

Data Collection - Research Designs

Qualitative

- descriptive data expressed in words
- responses of open-ended questions
- data usually are focused on individual experiences and beliefs
- - field notes or memos

Quantitative

- numerical data
- results of close ended questions
- data on describing the characteristics of the population

https://www.scribbr.com/methodology/qualitative-quantitative-research/

Analysis of Data - Research Designs

Qualitative

- Thematic analysis - themes emerged from the data
- Comparative analysis -data from different people is compared and contrasted and the process continues until the researcher is satisfied that no new issues are arising.
- Content Analysis- researcher systematically works through each transcript assigning codes, which may be numbers or words, to specific characteristics within the text.

Quantitative

Basic statistical tests such as:

- frequency counts
- cross tabulations
- correlation
- T-test
- Chi-square
- ANOVA

Using statistical software such as: Excel, SPSS, SAS etc.

Research Proposal Outline

Table 1: Research Proposal Outline

CHAPTER	COMPONENT	KEY POINTS
Cover page	▪ Topic/Title ▪ Name of researcher and co researchers ▪ Institution	Title should be descriptive of focus, simple, concise, eye-catching and use key words. Example: Effectiveness of educational intervention on stage of change in smoking cessation among the undergraduate university students.
	Table of contents	▪ Uses a hierarchy for heading and sub-heading ▪ Page number should be given sequentially
Abstract	▪ Background ▪ Methodology ▪ Expected outcome ▪ keywords	It starts by describing the background, then state the methodology and finally concludes the expected outcome with anticipated implications; should be written last approximately 250-300 words, as a concise summary of the proposal.

Chapter 1	Introduction	The introduction typically begins with a general statement of the problem area with logical information
	Background	▪ Establish the context of the research problem ▪ Helps the reader to get a preliminary understanding of the problem
	Research problem	▪ A good statement of problem clearly defines the problem. ▪ The problem statements will lead to a research questions
	Significance	Explain ▪ potential value of the study ▪ add scholarly knowledge ▪ practical implication ▪ how it will improve policy ▪ new program planning
	Research question	▪ It should be clear, focused, arguable, relevant, consistent and interesting Example: Role of diet on student performance Research question: What is the relationship between the diet and student performance in class?
	Research hypothesis	▪ Hypothesis are generated from specific theories ▪ Hypothesis is the best guess by researcher to answer research

		question ▪ Research question: what is the relationship between physical activity and anxiety among working women? Hypothesis: Physical activity reduce anxiety among working women
	Research objectives	▪ The component of the objective should be SMART - Specific - Measurable - Achievable - Realistic - Time-bound
	Operational definition	Operational definitions are precisely define which will be commonly use in the research proposal.
	Limitation	▪ Two types of study limitation; i. Design limitation ii. Researcher limitation ▪ Research design is largely established by the limitations of the researcher. Time should be consider to complete the study, budget constraints, and physical proximity.

Chapter 2	Literature review	The key objective of the literature review is to demonstrate that the proposed research will fill an important gap in the current research. So, ▪ It provide comprehensive review and references ▪ It should discuss relevant study ▪ It is very selective and critical ▪ Needs to be up to date 5-10 years before relevant research with proper referencing ▪ Provides new theoretical insights ▪ Develops a new model as the conceptual framework
	Conceptual framework	Presented by any of the following ▪ Flow charts ▪ Tree diagrams. ▪ Shape based diagrams – triangles, concentric circles, overlapping circles. ▪ Mind maps ▪ Soft systems

Chapter 3	Research methodology	▪ Study location ▪ Study design ▪ Sampling population ▪ Sampling frame ▪ Inclusion and exclusion criteria ▪ Sampling unit ▪ Sample size estimation ▪ Sampling method ▪ Study variables ▪ Instrument and data collection technique ▪ Instrument ▪ Validity and Reliability ▪ Data analysis
	Expected outcome	The expected result should answering the research questions and research objectives; and back up with statistics and theory employs in the study.

Ethics	▪ Inform consent form ▪ Patient information sheet	All ethical requirements of institution or research including consent should be indicated.
Work plan	▪ Gantt's chart ▪ Time line ▪ Flow chart	It present the timeline of various activities that researcher plan.
Budget	Different funding agencies have different format and requirement for research budget preparation.	Preparing a detailed budget during the proposal stage can minimize budget management difficulties during project implementation once the project is funded.
Reference	Different source ▪ Article ▪ Books ▪ Website ▪ Newspaper ▪ Conference proceedings Different style ▪ APA style ▪ Vancouver ▪ Harvard style	▪ List all relevant and up-to-date references should be cited ▪ May use soft wares such as Endnote or Refworks to help in writing

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Thank You!