Research Methodology for Thesis Writing

A Practical Workshop for Postgraduate Research Students

Cross-disciplinary | Research Methods & Professional Development | UDST

Credits & References

This workshop is adapted from and inspired by the following sources:

AICC 5204: Research Methods & Professional Development — Lecture Series, UDST

Creswell, J.W. & Creswell, J.D. — "Research Design: Qualitative, Quantitative, and Mixed Methods Approaches" (5th ed.), SAGE

Saunders, M., Lewis, P. & Thornhill, A. — "Research Methods for Business Students" (8th ed.), Pearson

Kitchenham, B. & Charters, S. (2007) — "Guidelines for Performing Systematic Literature Reviews in Software Engineering", EBSE

COPE (Committee on Publication Ethics) — Core Practices, publicationethics.org

Additional content, frameworks, and perspectives by the lecturer.

Workshop at a Glance

~40 min of core content + ~20 min for settling in, open discussion, and Q&A

Core Content ~40 min

~5 min	**Introduction & Learning Outcomes** Why methodology matters; what we will cover today
~8 min	**The Research Process** A roadmap from problem to completion — and how it maps to your thesis
~8 min	**Paradigm & Research Question** Choosing your approach and formulating a focused, answerable question
~10 min	**Design, Literature & Ethics** Research design decisions, literature strategy, ethical obligations
~9 min	**The Methodology Chapter** What goes in, how to write it, and what examiners look for

~20 min | Settling in, open discussion, and Q&A

Learning Outcomes

By the end of this workshop, you will be able to:

1. Trace the key stages of the research process and explain how each maps onto your thesis structure
2. Select and justify a research paradigm — qualitative, quantitative, or mixed methods — appropriate to your discipline and research question
3. Formulate a focused, answerable research question aligned with MSc-level thesis objectives
4. Describe the essential components of a methodology chapter and connect your methodological choices into a coherent, defensible design

01

The Research Process

A Roadmap from Problem to Thesis

Why Methodology Matters to Your Examiner

The single most common question an examiner asks is not "What did you find?" but "Why did you do it this way?" — and your methodology chapter must answer it.

Credibility

A rigorous methodology gives your findings credibility. Examiners assess whether your approach could produce trustworthy results.

Replicability

Your methodology must be described in enough detail that another researcher could replicate your study.

Justification

Every methodological choice — paradigm, strategy, instrument, analysis — needs a reason. "I thought it was appropriate" is not sufficient.

Alignment

Research question, design, data, and analysis must align. Misalignment is the most common reason theses fail their viva.

The Research Process: Your Roadmap

Each stage maps to a thesis chapter or section:

1 Identify Problem	**2 Review Literature**	**3 Formulate Question**	**4 Design Study**
-> Intro / Ch.1	-> Lit Review	-> Intro / Ch.1	-> Methodology
5 Collect Data	**6 Analyse Data**	**7 Interpret Results**	**8 Write Thesis**
-> Methodology	-> Methodology / Results	-> Discussion	-> Full Document

See also: AICC5204_L1_IntroductionToResearchMethods (full detail)

How the Research Process Maps to Your Thesis

Your thesis chapters are not arbitrary — each one corresponds to a phase of the research process.

Chapter 1 — Introduction	Problem statement, research questions, objectives, and scope of the study
Chapter 2 — Literature Review	Critical synthesis of existing knowledge; identification of the research gap; theoretical framework
Chapter 3 — Methodology	Research philosophy, design, strategy, data collection and analysis methods, ethical considerations
Chapter 4 — Results / Findings	Presentation of what you found — data, outputs, patterns, themes
Chapter 5 — Discussion	Interpretation of findings in light of existing literature; implications; limitations
Chapter 6 — Conclusion	Summary of contributions, recommendations, and suggestions for future research

Theoretical & Conceptual Framework

Two terms frequently confused — and frequently penalised in viva when they are.

Theoretical Framework

A theoretical framework draws on an existing theory to explain or predict the phenomenon under study. It is borrowed from the literature.

Examples: Technology Acceptance Model (TAM) for IT adoption studies; Resource-Based View (RBV) for business strategy research; Social Cognitive Theory for health behaviour studies.

Key question: Which established theory explains why the phenomenon you are studying behaves the way it does?

Conceptual Framework

A conceptual framework is constructed by the researcher to show the relationships between the key variables or concepts in their specific study. It is built from the literature but is original to the study.

Typically shown as a diagram: boxes (concepts) connected by arrows (hypothesised relationships).

Key question: What are the main concepts in your study and how do you propose they relate to each other?

02

Paradigm & Research Question

Choosing Your Approach and Framing Your Study

Research Paradigms: Choosing Your Approach

Your paradigm shapes everything: how you see knowledge, how you collect data, and how you analyse it.

Qualitative

Focus:

Meaning, experience, context

Common methods:

Interviews, focus groups, observation, case study

Examples by discipline:

Business: org culture
Health: patient experience
General Ed: learning behaviours

Quantitative

Focus:

Measurement, patterns, causality

Common methods:

Surveys, experiments, simulations, secondary data

Examples by discipline:

Engineering: performance metrics
Health: clinical trials
Computing: algorithm benchmarks

Mixed Methods

Focus:

Breadth + depth; triangulation

Common methods:

Sequential or concurrent qual + quant designs

Examples by discipline:

Computing: user study + performance test
Business: market survey + interviews
Health: RCT + patient narratives

Research Philosophy: Ontology and Epistemology

Ontology — The nature of reality — what exists and what it is like.

Epistemology — The nature of knowledge — how we know things and what counts as valid evidence.

Positivism

Knowledge comes from empirical observation and measurement of an objective reality.

Ontology:

Reality is objective and exists independently of the observer

Epistemology:

Knowledge is gained through observable, measurable facts

Typical methods:

Quantitative: experiments, surveys, statistical analysis

Example:

A survey measuring the relationship between leadership style and employee productivity in Qatari SMEs.

Interpretivism

Reality is socially constructed; meaning must be interpreted from the perspective of those involved.

Ontology:

Reality is socially constructed and subjective

Epistemology:

Knowledge is context-dependent and meaning-based

Typical methods:

Qualitative: interviews, observation, case study

Example:

Interviews exploring how nurses in primary care understand and manage patient non-compliance.

Pragmatism

Truth is determined by what works in practice; the research question drives the choice of method.

Ontology:

Reality is plural — what matters is what works

Epistemology:

Knowledge is judged by its practical consequences

Typical methods:

Mixed methods — approach dictated by the research question

Example:

Combining usage analytics and user interviews to evaluate the effectiveness of an e-learning platform.

Critical Realism

Reality exists independently of observation, but our knowledge of it is always partial and mediated.

Ontology:

Reality exists but is only partially observable

Epistemology:

Knowledge involves uncovering underlying mechanisms

Typical methods:

Mixed or qualitative; explanatory case studies; mechanism analysis

Example:

Examining why a health intervention succeeded in one hospital but failed in another by analysing structural mechanisms.

Inductive vs Deductive: Your Reasoning Strategy

Closely related to your paradigm, your reasoning approach shapes how theory and data interact in your research.

Inductive

Observation -> Pattern -> Theory

Starts with data; theory emerges from findings.

Common in qualitative research — grounded theory, phenomenology, ethnography.

Example: Interviewing patients to develop a theory of medication adherence barriers.

Useful when: little prior theory exists, or the research is exploratory.

Deductive

Theory -> Hypothesis -> Test

Starts with theory; tests whether data supports or refutes it.

Common in quantitative research — experiments, surveys, simulations.

Example: Testing whether federated learning reduces model bias in IoT datasets.

Useful when: established theory exists and hypotheses can be formulated and tested.

Your Research Question: The Foundation of Everything

If your research question is weak, no methodology can save your thesis. Getting it right at the start is the highest-return investment you can make.

A good research question is FINER:

F Feasible: You can answer it with available time, resources, and access

I Interesting: It contributes to knowledge in a meaningful way

N Novel: It addresses a gap — not already fully answered

E Ethical: Answering it does not harm participants or violate norms

R Relevant: It matters to your field and your programme of study

Examples by discipline:

Business:

"How does remote work policy affect employee engagement in SMEs in Qatar?"

Computing & IT:

"To what extent does federated learning improve data privacy in healthcare IoT systems?"

Health Sciences:

"What are the barriers to medication adherence among hypertensive patients in primary care?"

Engineering:

"How does integration of renewable energy sources affect grid stability under peak demand?"

Refining Your Research Question: Weak to Strong

Most first-draft research questions are too broad, too vague, or not a question at all. Here is how to sharpen them.

Too broad

"What is the impact of AI on healthcare?"

No scope, no population, no specific phenomenon — impossible to answer in a thesis

Too narrow

"What is the accuracy of Model X on Dataset Y using configuration Z?"

Trivially answerable with one benchmark run — no theoretical or practical contribution

Still vague

"How does machine learning affect patient outcomes?"

Which ML technique? Which patients? Which outcomes? Which setting? All undefined

Just right

"To what extent does a federated learning approach improve diagnostic accuracy for diabetic retinopathy detection in resource-limited primary care settings?"

Specific population, intervention, comparison context, and measurable outcome — answerable and meaningful

03

Design, Literature & Ethics

Building a Defensible Methodology

Research Design: The Blueprint of Your Study

Research design is the plan that links your question to your data and your analysis. Every decision must be justified.

Research Strategy	Survey | Case Study | Experiment | Grounded Theory | Action Research | Systematic Review
Time Horizon	Cross-sectional (one point in time) vs. Longitudinal (tracked over time)
Data Collection	Questionnaire | Semi-structured interview | Observation | Experiment | Secondary data | document analysis
Data Analysis	Statistical analysis | Thematic analysis | Content analysis | Discourse analysis | Comparative analysis

See also: AICC5204_L4_StudyDesign (full detail on research strategies)

Sampling Strategy: Who and How Many?

Your sampling choice must be driven by your research question and design — not by convenience alone.

Probability Sampling (Quantitative)	
Simple random	Every member of the population has an equal chance of selection
Stratified	Population divided into subgroups; random sample within each
Systematic	Every nth member of a list is selected
Cluster	Groups (clusters) are randomly selected; all members studied

Non-Probability Sampling (Qualitative)	
Purposive	Participants selected because they have specific knowledge or experience
Snowball	Existing participants recruit further participants; useful for hidden populations
Convenience	Easiest to access — weakest for generalisability; must be justified
Theoretical	Used in grounded theory; sampling continues until theoretical saturation is reached

Data Collection: Choosing the Right Instrument

The instrument must match your paradigm, strategy, and research question. There is no universally best method.

Instrument	Typical Paradigm	Strengths	Watch out for
Questionnaire / Survey	Quantitative	Large samples; efficient; structured data	Low response rates; question bias; no depth
Semi-structured Interview	Qualitative	Rich, detailed, context-aware responses; flexible probing	Time-intensive; transcription; interviewer bias; small n
Observation / Ethnography	Qualitative	Captures real behaviour in natural settings	Highly time-intensive; observer effect; access issues
Experiment / Simulation	Quantitative	Control, causality, replicability	Artificial conditions; ethical constraints; generalisation limits
Secondary Data / Documents	Qual or Quant	No collection cost; large historical datasets available	Data not collected for your purpose; quality/access issues

Survey & Questionnaire Design: Getting It Right

A poorly designed questionnaire produces data that cannot answer your research question — no matter how large your sample.

Question types

Closed (Likert, multiple choice, ranking) for quantitative analysis. Open for qualitative depth. Avoid mixing without purpose.

Likert scale design

Use 5- or 7-point scales consistently. Label all points, not just the ends. Avoid agree/disagree for factual items.

Avoiding bias

No leading questions ("How much do you agree that X is important?"). No double-barrelled items ("Rate the speed and accuracy of the system.").

Pilot testing

Always pilot with 5-10 people from your target population before full deployment. Revise based on ambiguity and completion time.

Response rates

Low response rates threaten validity. Justify your achieved rate explicitly. Report non-response bias analysis if applicable.

Instrument validity

Use established, validated instruments where possible. If designing your own, establish face validity through expert review and pilot.

Qualitative Data Analysis: Thematic Analysis Step by Step

Braun & Clarke's (2006) six-phase framework is the most widely used approach to thematic analysis. Each phase must be described in your methodology.

1

Familiarise with data

Transcribe, read, and re-read. Note initial ideas. Immersion before coding.

2

Generate initial codes

Systematically code features of the data relevant to your research questions. Code the entire dataset.

3

Search for themes

Collate codes into potential themes. Gather all data relevant to each theme.

4

Review themes

Check themes against coded extracts and the full dataset. Refine, merge, or split themes.

5

Define and name themes

Identify the essence of each theme. Write a clear definition. Name themes analytically, not descriptively.

6

Write up

Produce the analysis with compelling examples. Connect to research questions and existing literature.

Quantitative Data Analysis: Choosing the Right Test

The choice of statistical test is determined by your data type, distribution, and the relationship you are testing — not by what is familiar.

Purpose	Parametric test	Non-parametric equivalent	When to use non-parametric
Compare two groups	Independent t-test	Mann-Whitney U	Non-normal dist. or ordinal data
Compare 3+ groups	One-way ANOVA	Kruskal-Wallis	Non-normal dist. or small samples
Relationship between vars	Pearson correlation	Spearman correlation	Ordinal data or non-linear relationship
Predict an outcome	Linear regression	Logistic regression	Binary or categorical outcome variable
Before/after comparison	Paired t-test	Wilcoxon signed-rank	Non-normal dist. in paired data

Report effect sizes (Cohen's d, eta-squared) alongside p-values. Statistical significance alone is insufficient for a strong methodology chapter.

Literature Review: Your Evidential Foundation

Why it matters:

- Establishes what is already known — and what is not
- Justifies why your research question is worth asking (the gap)
- Provides the theoretical framework that underpins your methodology
- Demonstrates your command of the field to your examiner

The Systematic Approach:

1 Plan

Define your search question (PICOC/RQs), choose databases (Scopus, Web of Science, PubMed), set inclusion/exclusion criteria

2 Search & Screen

Run keyword searches, remove duplicates, apply title/abstract screening, then full-text screening

3 Synthesise

Extract data, assess quality, synthesise findings — identify themes, gaps, and contradictions

See also: AICC5204_L2_SystematicLiteratureReview (full SLR methodology)

Research Ethics: Non-Negotiable Foundations

Ethical research is not a bureaucratic hurdle — it is a professional and moral obligation, and examiners take it seriously.

Informed Consent

Participants must understand the purpose, risks, and voluntary nature of their involvement before agreeing.

Anonymity & Confidentiality

Protect participant identity in data storage, reporting, and publication. Know the difference between the two.

Data Integrity

Collect, store, and report data accurately. Fabrication, falsification, and selective reporting are research misconduct.

Ethical Approval

Most universities require formal ethics approval before data collection. At UDST, obtain clearance before you begin fieldwork.

Dual Use & AI Ethics: For Computing & IT and AI research: consider misuse potential, bias in algorithms, and data privacy under GDPR/PDPPL.

See also: Research_Ethics_Redesigned (full coverage of COPE principles, misconduct, IRB)

Reflexivity: The Researcher in the Research

In qualitative research, the researcher is the instrument. Ignoring your own position does not remove its influence — it conceals it.

What is reflexivity?

Reflexivity is the ongoing process of critically examining how your background, assumptions, values, and position as a researcher influence your study — from question formulation through data collection and interpretation.

Positionality statement

A positionality statement (typically in the methodology chapter) describes who you are in relation to your research. Insider researcher? Professional practitioner? Personal connection to the topic? These shape what you see and what you miss.

Practical strategies

Reflexive journal: document decisions, reactions, and interpretations throughout the study. Member checking: return findings to participants to verify your interpretation of their meaning. Peer debriefing: discuss emerging interpretations with a colleague or supervisor.

When it is most critical

Interviews and focus groups (your questions and probes are shaped by your assumptions). Case study research (selection of the case reflects your judgement). Action research (you are both researcher and participant in the change process).

AI and Research Integrity: A 2026 Obligation

Generative AI tools are now part of the research environment. Ignoring them in your methodology is no longer an option.

Acceptable use

Grammar and language editing of your own written work. Summarising literature to support (not replace) your own reading. Brainstorming research directions — not generating research conclusions.

Unacceptable use

Generating data, results, or analysis outputs and presenting them as your own. Using AI to write sections of your thesis without disclosure. Paraphrasing sources via AI to avoid citation — this is still plagiarism.

COPE position

COPE (Committee on Publication Ethics) states that AI tools cannot be listed as authors — authorship requires accountability. Any use of AI in research must be disclosed transparently in the methods or acknowledgements.

UDST and your supervisor

Check your programme's academic integrity policy on AI use. When in doubt, declare. Undisclosed use discovered post-submission carries far greater consequences than declared use does.

Validity, Reliability & Trustworthiness

Your examiner will ask: "How do you know your findings are credible?" You must have a prepared answer in your methodology chapter.

Quantitative Research

Internal validity:

Does your design measure what you claim? Have you controlled for confounds?

External validity:

Can findings be generalised beyond your specific sample or setting?

Reliability:

Would the same study produce the same results if repeated? (Cronbach's alpha, test-retest)

Construct validity:

Do your measures actually capture the theoretical construct you claim?

Qualitative Research

Credibility:

Are findings truthful from the participants' perspective? (member checking, prolonged engagement)

Transferability:

Can findings be applied to similar contexts? Achieved through thick description.

Dependability:

Could another researcher follow your process and reach similar conclusions? (audit trail)

Confirmability:

Are findings from the data, not researcher bias? (reflexivity, negative case analysis)

04

The Methodology Chapter

Connecting Your Choices to Your Thesis

What Goes in Your Methodology Chapter

The methodology chapter justifies every significant choice you made about how you conducted your research.

Typical Chapter Structure:

3.1 Introduction & Chapter Overview

3.2 Research Philosophy / Paradigm

3.3 Research Approach & Design

3.4 Research Strategy (e.g. case study, survey)

3.5 Data Collection Methods & Instruments

3.6 Sampling Strategy

3.7 Data Analysis Methods

3.8 Validity, Reliability & Trustworthiness

3.9 Ethical Considerations

3.10 Limitations

The Golden Rule:

Every choice in your methodology chapter must be:

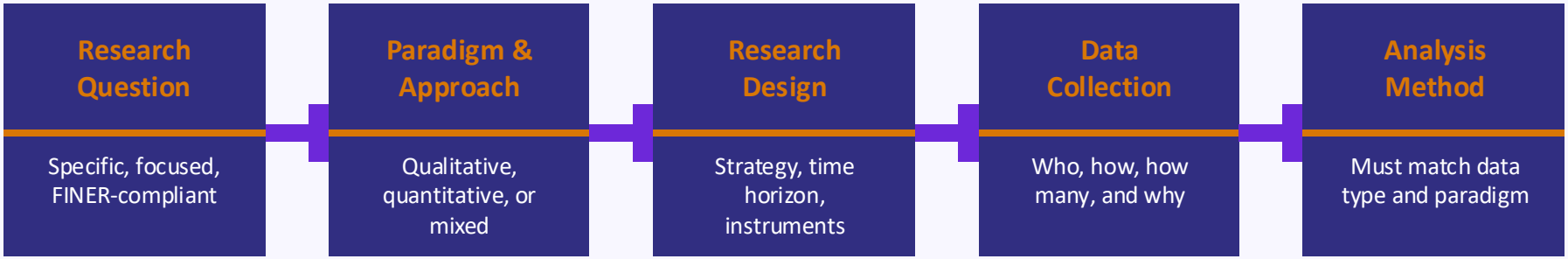
Described — what did you do?

Justified — why this approach and not others?

Situated — where does this fit in the established methodology literature?

The Alignment Principle: Everything Must Connect

The most common reason theses receive major corrections is misalignment. Test every link in this chain before you submit.



Self-test: Can you trace a direct, logical connection from your research question through to your analysis method? If any link breaks — that is where your examiner will probe.

Common Methodology Mistakes to Avoid

These are the patterns that examiners see most often — and that cause theses to be sent back for major revisions.

1

Description without justification

Writing "I used thematic analysis" without explaining why — not structural equation modelling, not content analysis, but thematic analysis

2

Convenience as justification

"I chose this sample because they were available" is not a methodological justification. Address representativeness explicitly.

3

Missing epistemological grounding

Jumping straight to method without stating your philosophical position. Start with: "This study adopts a [positivist/interpretivist] stance..."

4

Misaligned analysis method

Using quantitative statistics on qualitative interview data, or vice versa. Your analysis must match your data and paradigm.

5

No limitations section

Every study has limitations. Failing to acknowledge them does not hide them from your examiner — it signals poor critical awareness.

Viva: What Examiners Ask About Methodology

These are the questions that expose weak methodology chapters. Prepare a confident, evidence-based answer for each before your viva.

"Why did you choose this research paradigm?"

State your paradigm, connect it to the nature of your research question, and cite a methodology author (e.g., Creswell, Saunders) who supports the choice.

"Why this method and not [alternative]?"

Acknowledge the alternative, explain why it is less suited to your specific question, population, or context. The examiner wants to see that you considered options.

"How did you ensure the validity of your findings?"

Refer to the specific validity/trustworthiness strategies in your methodology chapter — triangulation, member checking, pilot testing, inter-rater reliability — not a generic claim.

"How do your limitations affect your conclusions?"

Do not minimise limitations. Examiners respect candour. Explain what the limitations constrain — and what they do not. Distinguish scope from flaw.

"Could your results be explained by an alternative methodology?"

This is a test of methodological self-awareness. Acknowledge the possibility, explain why your chosen approach is nonetheless the most appropriate, and note what a future study could do differently.

Writing Your Methodology Chapter: Practical Tips

Good methodology writing is not just about what you did — it is about making your reader trust that you know what you are doing.

1

Write in past tense for completed studies; future tense for proposals

This is a common and penalised error. Check your tense consistency throughout the chapter.

2

Cite methodology literature — not just your subject literature

Creswell, Saunders, Yin, Braun & Clarke are methodology authors. Cite the framework you are following, not just applying it unnamed.

3

Explain rejected alternatives

The strongest justification shows you considered alternatives and chose this approach for good reasons. "I could have used X, but Y is more appropriate because..."

4

Keep data analysis in the methodology chapter — not only in results

Your analysis procedure (how you analysed) belongs in methodology. The outcomes of analysis belong in results. Both chapters are needed.

5

Use your research questions as headings or signposts

Every section of your methodology should be traceable back to a research question. If it cannot, consider why it is there.

Where Are You? Your Methodology Checklist

Wherever you are in your research journey, use this checklist to identify your next action.

Getting started

Can you state your research question in one precise sentence?
If not, that is your first task — apply the FINER test before anything else.

Have you named and justified your research paradigm?

Write one paragraph: what stance you take, why, and which methodology authors support it.

Have you mapped question → design → data → analysis?

Complete the alignment chain before collecting data — fixing it later is costly.

Writing up

Is your analysis procedure described in Chapter 3 — not only implied in Chapter 4?
How you analysed belongs in methodology; what you found belongs in results. Both must be explicit.

Have you explicitly addressed validity, reliability, or trustworthiness?
Do not assume the examiner will infer it from your method choice. State and justify it directly.

Can you defend every methodological choice in your viva?

For each decision, prepare: what you did, why this and not an alternative, and who in the literature supports it.

Key Takeaways

- Methodology is about justification, not just description — every choice needs a reason
- Align your question, paradigm, design, data, and analysis: one broken link fails the thesis
- Inductive reasoning builds theory from data; deductive tests existing theory — know which you are doing
- The literature review argues your gap; your methodology justifies your approach to filling it
- Validity and trustworthiness must be explicitly addressed — not assumed from the method alone
- Ethics is not a chapter to pass — it is a professional obligation woven through your whole study