



The Ethical Researcher's Guide to Using AI Tools

A Workshop on Responsible AI Usage in Academic Research

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Part 1: Foundations

1. The Evolution of AI
2. Understanding Modern AI Tools
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Resources

- Workshop Website with Prompts
- Recommended Tools
- Q&A Session

The Evolution of AI

What is Artificial Intelligence?

Definition

Artificial Intelligence (AI) is the creation of systems that can perform tasks requiring human-like intelligence: learning, reasoning, problem-solving, and decision-making.

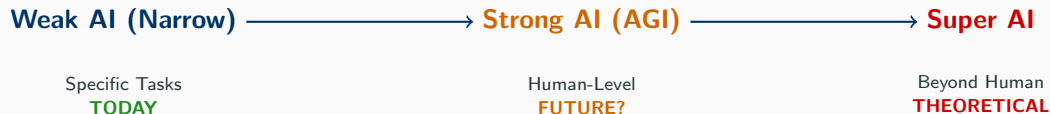
AI Can:

- Understand and generate text
- Recognize images and speech
- Analyze patterns in data
- Make predictions

AI Cannot (Yet):

- Truly understand meaning
- Have consciousness or emotions
- Replace human creativity
- Make ethical judgments

The Three Categories of AI



Important

ChatGPT, Claude, Gemini — all current AI tools are **Weak AI**. They excel at specific tasks but don't truly “understand” like humans do.

AI History: Key Milestones

1960s: First Steps

- **ELIZA (1964)** — First chatbot (therapist)
- **Shakey (1966)** — First mobile robot

1990s: AI Gets Smart

- **Deep Blue (1997)** — Beat chess champion
- **Google Search** — Web indexing

2010s: Deep Learning

- **AlexNet (2012)** — Image recognition
- **AlphaGo (2016)** — Beat Go champion

2020s: The Revolution

- **ChatGPT (2022)** — AI writes like humans
- **Gemini/Claude** — Multimodal AI

AI Tools for Researchers

AI Tools Overview

Tool	What It Does	Cost	URL
ChatGPT	General AI, coding, file analysis	Free / \$20/mo	chat.openai.com
Claude	Long docs, academic writing	Free / \$20/mo	claude.ai
Gemini	Images, Google integration	Free / \$20/mo	gemini.google.com
DeepSeek	Free GPT-4 alternative	Free!	chat.deepseek.com
Perplexity	Web search with citations	Free / \$20/mo	perplexity.ai

Key Point

Each tool has unique strengths. Smart researchers use **multiple tools** for different tasks!

Key Features to Know

Deep Research Mode

Available in ChatGPT & Gemini. AI browses the web, analyzes sources, and writes reports with citations.

z.ai by Zotero

AI integrated with Zotero. Chat with your library, summarize papers.

URL: z.ai

NotebookLM (FREE)

Google's AI for your papers. Upload docs → get AI podcasts, summaries, Q&A!

URL: notebooklm.google.com

DeepSeek (FREE)

Chinese AI rivaling ChatGPT. Completely free with no limits!

Prompt Engineering Fundamentals

What is Prompt Engineering?

Definition

Prompt Engineering is the art and science of crafting effective instructions to get the best possible output from AI systems.

Why It Matters:

- Same AI, different prompts → vastly different results
- Good prompts save time and improve quality
- Essential skill for researchers

Key Insight:

Reflection

“AI doesn’t read your mind. The quality of output depends entirely on the quality of your input.”

A Simple Framework for Effective Prompts

Context — Action — Role — Expectations

Context

Background,
domain, con-
straints

Action

What to do
(verb)

Role

Persona to
adopt

Expectations

Format, length,
style

Example Prompt Using CARE

[Role] Act as an academic researcher in digital marketing.

[Context] I'm writing a literature review on social media advertising.

[Action] Analyze the key themes in this field from 2020-2024.

[Expectations] Present findings in a table with columns: Theme, Key Authors, Gaps."

Result

This structured prompt will generate academic-quality, organized output rather than generic text.

Shifting AI's Tone

Using “Act as...” prompts dramatically changes the quality and style of AI responses.

For Academic Writing:

- “Act as an academic researcher...”
- “Act as a peer reviewer for a journal...”
- “Act as a thesis supervisor...”
- “Act as a methodologist...”

For Technical Tasks:

- “Act as a statistician using SPSS...”
- “Act as a Python data analyst...”
- “Act as a LaTeX expert...”
- “Act as a Harvard citation specialist...”

Remember

Personas help get better output, but you must still verify all information!

Context: Setting the Stage

What is Context?

Background information that helps AI understand your situation, field, and constraints.

What to Include:

- Your academic field/discipline
- The specific topic or problem
- Relevant constraints (word limit, deadline)
- Your level (PhD, Master's, etc.)

Examples:

- “I’m a Master’s student in Marketing...”
- “I’m writing a literature review on...”
- “This is for a 5000-word thesis chapter...”
- “I’m researching in the Kurdish context...”

Why It Matters

More context = more relevant output. AI can’t read your mind!

Action: What Do You Want?

What is Action?

The specific task you want the AI to perform. Use clear, strong verbs.

Strong Action Verbs:

- **Analyze** — Examine in detail
- **Compare** — Find differences
- **Summarize** — Condense info
- **Generate** — Create content

More Action Verbs:

- **Identify** — Find items
- **Explain** — Clarify concepts
- **Organize** — Structure content
- **Critique** — Evaluate critically

Avoid Vague Actions

“Write about...” → “Analyze the key themes in...”

Expectations: Define the Output

What are Expectations?

The format, length, style, and structure you want in the response.

Format Options:

- “Present as a table with columns...”
- “Use bullet points for each item...”
- “Write in academic paragraph form...”
- “Create a numbered list of 5 items...”

Style & Length:

- “Use formal academic language...”
- “Keep each point to 2-3 sentences...”
- “Include citations where possible...”
- “Be concise but comprehensive...”

Complete Expectation Example

“Present findings in a table with 4 columns: Author, Year, Key Finding, Methodology. Include 10-15 relevant papers.”

Advanced Prompt Techniques

Negative Prompts

"Do NOT include generic advice. Avoid clichés."

Context Dump

Upload docs, paste abstracts, provide background.

Chain-of-Thought

"Think step by step. First analyze X, then compare Y."

Ask to Clarify

"Ask me clarifying questions before proceeding."

Few-Shot Examples

Provide 1-2 examples of desired output.

Good vs. Bad Prompts

Bad Prompt ❌

“Write about digital marketing.”

Problems:

- Too vague
- No context or purpose
- No format specified
- Will get generic output

Good Prompt ✅

“Act as a marketing researcher. I’m a Master’s student studying the impact of influencer marketing on Gen Z purchasing behavior in Kurdistan. Generate 5 potential research gaps with supporting rationale and suggested methodologies.”

Includes: Role, Context, Specifics, Format

💡 Best Practices:

1. **Be Specific** — Include details, constraints, examples
2. **Iterate** — Refine based on output
3. **Break Down** — Complex tasks into steps
4. **Request Format** — Tables, bullet points, etc.
5. **Ask for Sources** — “Include citations”

⚠️ Common Mistakes:

1. Being too vague or broad
2. Not specifying the audience
3. Forgetting to ask for sources
4. Accepting first output without iteration
5. Not providing examples

Pro Tip

Always end with: “If you need any clarification, ask me before proceeding.”

AI for Research Tasks

11 Research Tasks AI Can Assist With

Planning

1. Gap Finding
2. Title Generation
3. Research Outline
4. Research Questions

Research

5. Literature Review
6. Novel Concepts
7. Article Comparison

Analysis

8. Data Analysis
9. Visualization
10. References
11. LaTeX Formatting

Critical Reminder

AI is an **assistant**, not a replacement. You remain the **author** and are responsible for all content.

Task 1: Finding the Research Gap

What is a Research Gap?

An unexplored or under-researched area in existing literature where your research can contribute new knowledge.

Why It Matters:

- Justifies your research
- Shows originality
- Guides your focus
- Required in thesis proposals

AI Can Help By:

- Analyzing recent papers
- Identifying understudied areas
- Suggesting research questions
- Finding dimension combinations

Task 1: Gap Finding — Live Demo Prompt

Copy This Prompt

“Act as an academic researcher specializing in **Digital Marketing**. I am a Master's student interested in studying **social media marketing in the Kurdistan Region**.

Analyze recent literature (2020-2024) and identify 5 potential research gaps. For each gap, provide:

- The gap description (what is missing)
- Why it matters (significance)
- 2-3 potential research questions
- Suggested methodology

Focus on understudied contexts, populations, or variable combinations. Present in a structured format with clear headings.”

Task 2: Research Outline Generation

What is Research Outline Generation?

Using AI to create a complete, structured thesis or dissertation outline based on your research title.

Why It Matters:

- Provides research roadmap
- Ensures logical structure
- Saves planning time
- Identifies all sections needed

AI Can Generate:

- Chapter breakdowns
- Section headings
- Content descriptions
- Word count estimates

Task 2: Research Outline — Live Demo Prompt

 Copy This Prompt

“Act as an academic thesis advisor. Based on the following research title, generate a complete Master’s thesis outline:

Title: [PASTE YOUR TITLE HERE]

Provide a comprehensive outline including:

- All chapters with numbered sections/subsections
- Brief description of each section’s content
- Suggested word count per chapter
- Key components for Literature Review & Methodology
- Expected tables/figures for each chapter

Format as a hierarchical structure (1, 1.1, 1.1.1). Total target: 15,000-20,000 words.”

Task 3: Research Questions & Hypotheses

What are Research Questions & Hypotheses?

Clear, testable statements that guide your entire research study and methodology.

Why It Matters:

- Focuses your research
- Determines methodology
- Required in proposals
- Guides data collection

AI Can Generate:

- Main RQ + sub-questions
- Null & alternative hypotheses
- Variable relationships
- Testable statements

Task 3: Research Questions — Live Demo Prompt

 Copy This Prompt

“Act as a research methodology expert. Based on my research title:

Title: [PASTE YOUR TITLE HERE]

Generate comprehensive research questions and hypotheses:

- 1 Main Research Question (broad, overarching)
- 3-5 Specific Sub-Questions (measurable, focused)
- Corresponding Null & Alternative Hypotheses for each
- Identify IV, DV, and mediating/moderating variables

Format: RQ1, RQ1a, RQ1b... with H0/H1 pairs. Ensure all are testable and aligned with quantitative/qualitative methodology.”

Task 4: Title & Idea Generation

What is Title Generation?

Using AI to brainstorm research titles, refine topic scope, and generate thesis ideas.

Why It Matters:

- Saves brainstorming time
- Explores different angles
- Helps narrow your focus
- Generates variations

AI Can Help By:

- Generating 10+ title options
- Varying methodologies
- Suggesting variables
- Explaining contributions

Remember

Use AI titles as **starting points**. Always refine with your supervisor!

Task 4: Title Generation — Live Demo Prompt

Copy This Prompt

“Act as a thesis supervisor at a business school. Generate 10 potential research titles for a Master’s thesis in **Marketing** focusing on **digital advertising effectiveness**.

Requirements for each title:

- Be specific and clearly researchable
- Include independent and dependent variables
- Vary the methodological approaches (quantitative, qualitative, mixed)
- Consider the Kurdistan Region context where applicable

For each title, provide a 2-sentence explanation of the potential contribution. Present as a numbered list.”

Task 5: Literature Review Assistance

What is Literature Review Assistance?

Using AI to organize, summarize, and find patterns across multiple research papers.

What AI Can Do:

- Summarize papers
- Organize by themes
- Track chronological trends
- Compare methodologies

What AI Cannot Do:

- Access real databases
- Verify citations
- Replace critical reading
- Guarantee accuracy

Critical Warning

AI may generate **fake citations**! Always verify using Google Scholar.

Task 5: Literature Review — Live Demo Prompt

Copy This Prompt

“Act as an academic researcher. I am conducting a literature review on **influencer marketing and consumer purchase intentions**.

Analyze the key themes in this research area from 2020-2024. For each theme:

- Identify the main focus and scope
- List key authors and seminal papers
- Describe common methodologies used
- Note any gaps or inconsistencies in findings

Present your findings in a table with columns: Theme Name, Key Focus, Main Authors, Common Methods, Research Gaps. Include at least 5 themes.”

Task 6: Novel Concept Generation

What is Novel Concept Generation?

Using AI to help create new definitions, frameworks, or conceptual combinations for original contributions.

Types of Novelty:

- New definitions
- Combined frameworks
- Extended theories
- New constructs

AI Can Help By:

- Combining concepts
- Suggesting terminology
- Providing justification
- Comparing to existing work

Critical

You **MUST** rewrite AI-generated concepts in your own words. Never copy-paste!

Task 6: Novel Concepts — Live Demo Prompt

 Copy This Prompt

“Act as a theoretical researcher. I want to create a novel concept that combines **social media marketing** with **cultural identity theory** in the context of the Kurdistan Region.

Develop:

- A new term or concept name
- A formal academic definition (2-3 sentences)
- Theoretical justification explaining why this combination is meaningful
- How it differs from existing concepts in the literature
- 3 potential research questions using this concept

Use formal academic journal language throughout.”

Task 7: Article Comparison

What is Article Comparison?

Using AI to systematically compare multiple research papers across key dimensions.

Comparison Dimensions:

- Research objectives
- Methodology/sample
- Theoretical framework
- Key findings

Use Cases:

- Contrast old vs. new studies
- Compare methodologies
- Find conflicting findings
- Build synthesis

Pro Tip

Upload PDFs or paste abstracts directly into ChatGPT or Claude for accurate comparison.

Task 7: Article Comparison — Live Demo Prompt

Copy This Prompt

“Act as an academic reviewer. I will provide you with two research paper abstracts. Compare them systematically on these dimensions:

- Research objectives and questions
- Theoretical/conceptual framework
- Methodology and sample characteristics
- Key findings and conclusions
- Limitations acknowledged

Present your analysis in two formats: 1. A comparison table with the dimensions as rows 2. A 5-sentence synthesis paragraph highlighting key similarities and differences
[PASTE YOUR TWO ABSTRACTS HERE]”

Task 8: Data Analysis Assistance

What is Data Analysis Assistance?

Using AI to help with statistical test selection, code generation, and results interpretation.

AI Can Help With:

- Choosing the right test
- Writing SPSS/Python/R code
- Interpreting outputs
- Creating tables

Tools to Use:

- ChatGPT Code Interpreter
- Claude with data upload
- Gemini for analysis
- Specialized AI tools

Important

You must understand the statistical concepts. AI helps with execution, not learning!

Task 8: Data Analysis — Live Demo Prompt

Copy This Prompt

“Act as a statistical consultant. I have survey data with these variables:

- Independent: Social Media Usage (Likert 1-5)
- Dependent: Purchase Intention (Likert 1-5)
- Moderator: Age Group (categorical: 18-25, 26-35, 36+)

I want to test if social media usage affects purchase intention, and if age moderates this relationship. Provide: 1. The appropriate statistical test and why 2. SPSS syntax to run this analysis 3. How to interpret the key outputs 4. How to report the results in APA format”

Task 9: Visualization & Posters

What is Visualization Assistance?

Using AI to generate charts, graphs, diagrams, posters, and even audio/video explanations.

What AI Can Create:

- Charts & graphs (bar, line, scatter)
- Research model diagrams
- Conference posters
- Audio podcasts & summaries

Key Tools (Google):

- **Gemini** — Images & figures
- **NotebookLM** — Podcasts & explanations
- ChatGPT — Python code
- Canva AI — Poster design

NotebookLM by Google

Upload your papers and generate: audio podcasts, deep-dive summaries, explanation videos, and interactive Q&A about your research!

Task 9: Visualization — Live Demo Prompt

Gemini: Generate Research Figure

“Create a professional visualization showing the relationship between **Social Media Engagement** and **Brand Loyalty** across three age groups.

Requirements:

- Use a grouped bar chart style
- Academic-appropriate colors (blues, grays)
- Include proper labels and legend
- Make it suitable for a journal article

”

NotebookLM: Generate Podcast

Upload your thesis chapter or literature review → Click “Audio Overview” → Get a 10-minute podcast summary of your research!

Task 10: Reference Management

What is Reference Management?

Using AI to format, convert, and organize citations in the correct style.

AI Can Help With:

- Converting citation styles
- Formatting references
- Finding missing info
- Alphabetizing lists

Common Styles:

- Harvard (SUE standard)
- APA 7th Edition
- IEEE, Chicago, MLA
- Journal-specific styles

SUE Standard

Harvard referencing is the official style at Salahaddin University.

Task 10: References — Live Demo Prompt

Copy This Prompt

“Act as a citation expert specializing in Harvard referencing style. Convert the following references to Harvard format:

[PASTE YOUR REFERENCES HERE]

For each reference:

- Format according to Harvard style guidelines
- Ensure author names are: Surname, Initial.
- Italicize journal/book titles appropriately
- Include DOI or URL where available

Then alphabetize the complete list, remove any duplicates, and flag any entries with missing information.”

Task 11: LaTeX Formatting

What is LaTeX?

A professional document preparation system used for academic papers, especially those with equations, tables, and figures.

Why Use LaTeX:

- Professional typesetting
- Automatic formatting
- Better equations
- Required by journals

AI Can Help With:

- Converting Word to LaTeX
- Creating tables/figures
- Writing TikZ diagrams
- Debugging errors

Task 11: LaTeX — Live Demo Prompt

 Copy This Prompt

“Convert the following text into a professional LaTeX document:

[PASTE YOUR TEXT HERE]

Requirements:

- Use the article document class, 12pt font
- Include a title, author, and abstract section
- Format any tables using booktabs package
- Number sections and subsections automatically
- Add proper figure placeholders with captions

Provide the complete LaTeX code that I can compile directly in Overleaf.”

AI Hallucinations & Limitations

What are AI Hallucinations?

Definition

AI Hallucination: When an AI generates information that is false, fabricated, or not grounded in reality — but presents it confidently as fact.

Common Hallucination Types:

- **Fake Citations** — Non-existent papers
- **Wrong Authors** — Misattributed work
- **Invented Statistics** — Made-up numbers
- **False Facts** — Incorrect information

Why It Happens:

- AI predicts “likely” text
- No real understanding
- Training data gaps
- Pattern matching, not reasoning

Hallucination Examples

Fake Citation

AI Output:

"Smith, J. & Johnson, M. (2023). The Impact of Social Media on Consumer Behavior. *Journal of Marketing Research*, 45(2), 123-145."

Reality: This paper doesn't exist. The authors, volume, and page numbers are fabricated.

Invented Statistics

AI Output:

"According to a 2024 UNESCO report, 78% of universities in the Middle East have adopted AI policies."

Reality: No such report exists. The percentage is made up.

The Danger

AI hallucinations can destroy your academic credibility. One fake citation in a thesis can have serious consequences.

How to Detect and Prevent Hallucinations

🔍 Detection Methods:

1. **Verify Citations** — Check Google Scholar
2. **Cross-Reference** — Use multiple sources
3. **Check DOIs** — Real papers have DOIs
4. **Read Abstracts** — Confirm content matches
5. **Be Skeptical** — Question confident claims

🛡️ Prevention Strategies:

1. Ask AI to “only cite verifiable sources”
2. Request URLs/DOIs with citations
3. Use AI tools with web access
4. Treat all outputs as drafts
5. Never submit without verification

Golden Rule

Trust, but verify. AI can help you find sources, but YOU must confirm they exist and say what AI claims.

Other AI Limitations

Technical Issues

- **Knowledge Cutoff** — Outdated info
- **No Understanding** — Pattern matching
- **Context Limits** — Forgets context
- **Math Errors** — Miscalculates

Content Issues

- **Bias** — Training data biases
- **Inconsistency** — Varies outputs
- **No Judgment** — Can't evaluate
- **Cultural Gaps** — Western-centric

Reflection

“AI is a knowledgeable but unreliable colleague. Great for brainstorming, dangerous for facts.”

Ethics & Academic Integrity

AI as an Assistant, Not a Replacement

The Core Philosophy

AI should **assist** your research, not **replace** your thinking. You remain the **author** and **intellectual owner** of your work.

✓ Good Use

Brainstorming, outlining, editing,
formatting, finding sources

✗ Bad Use

Writing entire sections, copying
without review, fabricating data

Remember

You must be able to **explain** and **defend** every part of your research. If AI wrote it and you don't understand it, you're not the author.

Critical Warning

Turnitin and other plagiarism detection systems now have AI detection capabilities. Universities are actively checking for AI-generated content.

What Gets Detected:

- Direct copy-paste from AI
- AI-typical phrasing patterns
- Lack of personal voice/style
- Generic academic language

Consequences:

- Paper rejection
- Grade penalties
- Academic misconduct charges
- Degree revocation (severe cases)

When and How to Disclose AI Use

Transparency is Key

Many journals and universities now require disclosure of AI tool usage.

Recommended Disclosure (in Methods or Acknowledgments):

Reflection

“AI tools (specifically ChatGPT/Claude) were used to assist with [literature search / coding / editing]. All AI-generated content was reviewed, verified, and substantially rewritten by the authors. The authors take full responsibility for the accuracy and integrity of the work.”

Check:

- Your university's AI policy
- Target journal's AI guidelines

The Golden Rules of Ethical AI Use

✓ **VERIFY** — Always check facts, citations, and claims

✍ **REWRITE** — Never copy-paste directly; use your own words

“ **CITE** — Acknowledge sources and disclose AI use

🧠 **UNDERSTAND** — Don't include anything you can't explain

👤 **OWN** — Take full responsibility for your work

The Myth vs. Reality

MYTH

“AI will replace researchers.”

REALITY

“AI will replace researchers who **don't** use AI.”

The Future Researcher

- Uses AI as a powerful tool in their toolkit
- Maintains critical thinking and verification skills
- Understands AI limitations and uses it appropriately
- Creates original contributions while leveraging AI efficiency

Resources & Closing

Recommended AI Tools

Language Models

- **ChatGPT** (OpenAI)
- **Claude** (Anthropic)
- **Gemini** (Google)
- **Copilot** (Microsoft)

Research Tools

- **Perplexity** — Search
- **Semantic Scholar**
- **Elicit** — Papers
- **Connected Papers**

Writing & Editing

- **Grammarly**
- **QuillBot**
- **Writefull**
- **Overleaf** (LaTeX)

Important

Be aware of privacy — don't upload sensitive research data to AI tools without checking their data policies.

Access All Materials Online:

Workshop Website

 **davar3.github.io/ethical-ai-guide**

- All prompts with copy buttons
- Extended examples and tutorials
- Tool recommendations
- Ethics guidelines



Scan to visit

Key Takeaways

1. **AI is a Powerful Assistant** — Use it to enhance, not replace, your research capabilities
2. **Prompt Engineering Matters** — Better prompts = better outputs (use CARE framework)
3. **Verify Everything** — AI hallucinates; always check citations and facts
4. **Maintain Integrity** — Rewrite, cite, disclose, and take responsibility
5. **Stay Ethical** — You are the author; AI is just a tool

Reflection

“The best researchers of tomorrow will be those who master the art of working *with* AI, not those who work *for* AI.”

Thank You!

Questions?

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 ethical-ai-guide.github.io