



# The Ethical Researcher's Guide to Using AI Tools

A Workshop on Responsible AI Usage in Academic Research

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Awara Bakhtiyar Rasool & Davar Adil Yassin

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Salahaddin University-Erbil

# Workshop Outline

## Part 1: Foundations

1. The Evolution of AI
2. Understanding Modern AI Tools
3. Prompt Engineering Fundamentals

## Part 2: AI for Research

4. Gap Finding & Idea Generation
5. Literature Review & Analysis
6. Data Analysis & Visualization

## Part 3: Quality & Ethics

7. AI Hallucinations & Limitations
8. Academic Integrity & Plagiarism
9. Ethical Guidelines

## Resources

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

# The Evolution of AI

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# 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

## 2010s: Deep Learning

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

## 1990s: AI Gets Smart

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

## 2020s: The Revolution

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

## AI Tools for Researchers

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# 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	<b>Free!</b>	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.

## NotebookLM (FREE)

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

**URL:** [notebooklm.google.com](https://notebooklm.google.com)

## z.ai by Zotero

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

**URL:** [z.ai](https://z.ai)

## DeepSeek (FREE)

Chinese AI rivaling ChatGPT. Completely free with no limits!

# **Prompt Engineering Fundamentals**

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# 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.”

# The CARE Framework

## A Simple Framework for Effective Prompts

**C**ontext — **A**ction — **R**ole — **E**xpectations

### Context

Background,  
domain, con-  
straints

### Action

What to do  
(verb)

### Role

Persona to  
adopt

### Expectations

Format, length,  
style

# CARE Framework: Example

## 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

# Prompt Engineering Tips

## 💡 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

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# 11 Research Tasks AI Can Assist With

## Q Planning

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

## E 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

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# 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

## Q 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

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# 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

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# 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.

# Workshop Resources

Access All Materials Online:

Workshop Website

 [davar3.github.io/ethical-ai-guide](https://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?

Awara Bakhtiyar Rasool & Davar Adil Yassin

Salahaddin University-Erbil

 ethical-ai-guide.github.io