

AI In Innovation

Week 1 – SEMINAR

Effective Prompt Engineering.



Remember to record your attendance

- 1. Download the University of Bristol app**
- 2. Sign in with your university user-name and password**
- 3. Select 'Record attendance'**
(or tap on the notification)
- 4. If prompted, enable location services**
- 5. Tap 'Check in' for this class, then 'Finish'**
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GOALS OF TODAY

- Meet your team!
- Interactive tool exploration with ChatGPT and other LLMs
- Hands-on experimentation comparing outputs of different levels of prompt sophistication
- Prompt comparison exercises and output analysis comparing leading models e.g ChatGPT, Claude, Gemini, Grok
- Group exercise: Map AI's current role across 3 case study industries (health, government, media/creative)

Meet Your Team

Spend 5 mins introducing
yourself to each other

ACTIVITY: Warm Up (5 minutes)

Objective:

- Understand prompting techniques
- Compare across different AI systems to understand variations
- Tools: Claude, ChatGPT, Perplexity, Grok, Gemini...

Tasks

- Open whichever LLM you'd like: e.g. Claude, ChatGPT, Perplexity, Grok, Gemini, DeepSeek
- Enter this prompt: "Think of a number between 1 and 10..."
- ...and this prompt: "Name a European country..."
- ...and this prompt: "Name a day of the week..."

LLMs are imperfect...

THIS IS YOUR MACHINE LEARNING SYSTEM?

YUP! YOU POUR THE DATA INTO THIS BIG
PILE OF LINEAR ALGEBRA, THEN COLLECT
THE ANSWERS ON THE OTHER SIDE.

WHAT IF THE ANSWERS ARE WRONG?

JUST STIR THE PILE UNTIL
THEY START LOOKING RIGHT.



How do we maximise AI's
outputs?

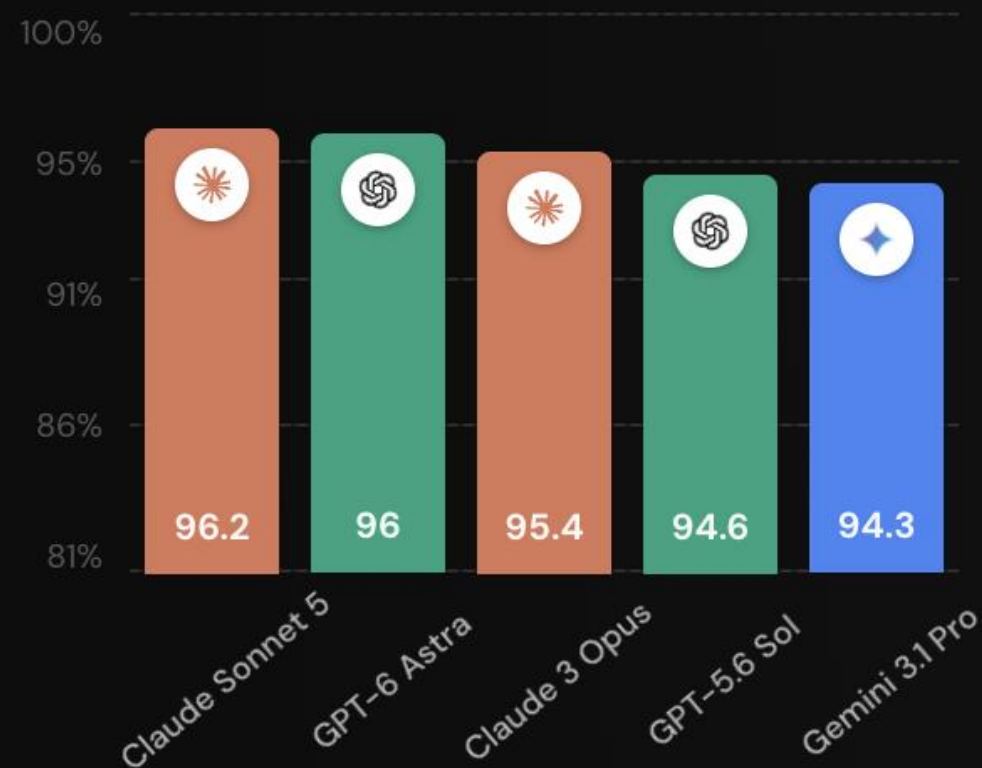
Key Skill: Prompt
Engineering

Not all LLMs are born equal...

LLM rankings...

<https://www.vellum.ai/llm-leaderboard>

Best in Reasoning (GPQA Diamond)



Prompt Engineering 101

The most effective prompts average around 21 words with relevant context, yet the prompts people try are usually less than nine words... use these tips to write great prompts!

1. **Use natural language.** Write as if you're speaking to another person. Express complete thoughts in full sentences.
2. **Be specific and iterate.** Tell the LLM what you need it to do (summarize, write, change the tone, create). Provide as much context as possible.
3. **Be concise and avoid complexity.** State your request in brief — but specific — language. Avoid jargon.
4. **Make it a conversation.** AI can spit out a decent result instantly... But improve your outputs by fine-tuning your prompts if the results don't meet your expectations or if you believe there's room for improvement. Use follow-up prompts and an iterative process of review and refinement to yield better results. Push for volume. Play with variation. Then sort and refine
5. **Use your documents.** Personalize the LLM's output with information from your own.
6. **Make the LLM your prompt editor.** Start your prompts with: "Make this a power prompt: [original prompt text here]." The LLM will make suggestions on how to improve your prompt. Ensure it says what you need, and then paste it back into the LLM to get an output.
7. **Magic in = magic out:** Creative people don't wait for ideas, they collect them - from books, walks, convos, weird ads, art, architecture. They feed the model great inputs

Prompt Engineering 101

The 'PICKSE' framework

Persona: [The role, expertise or specific job title the AI must adopt]

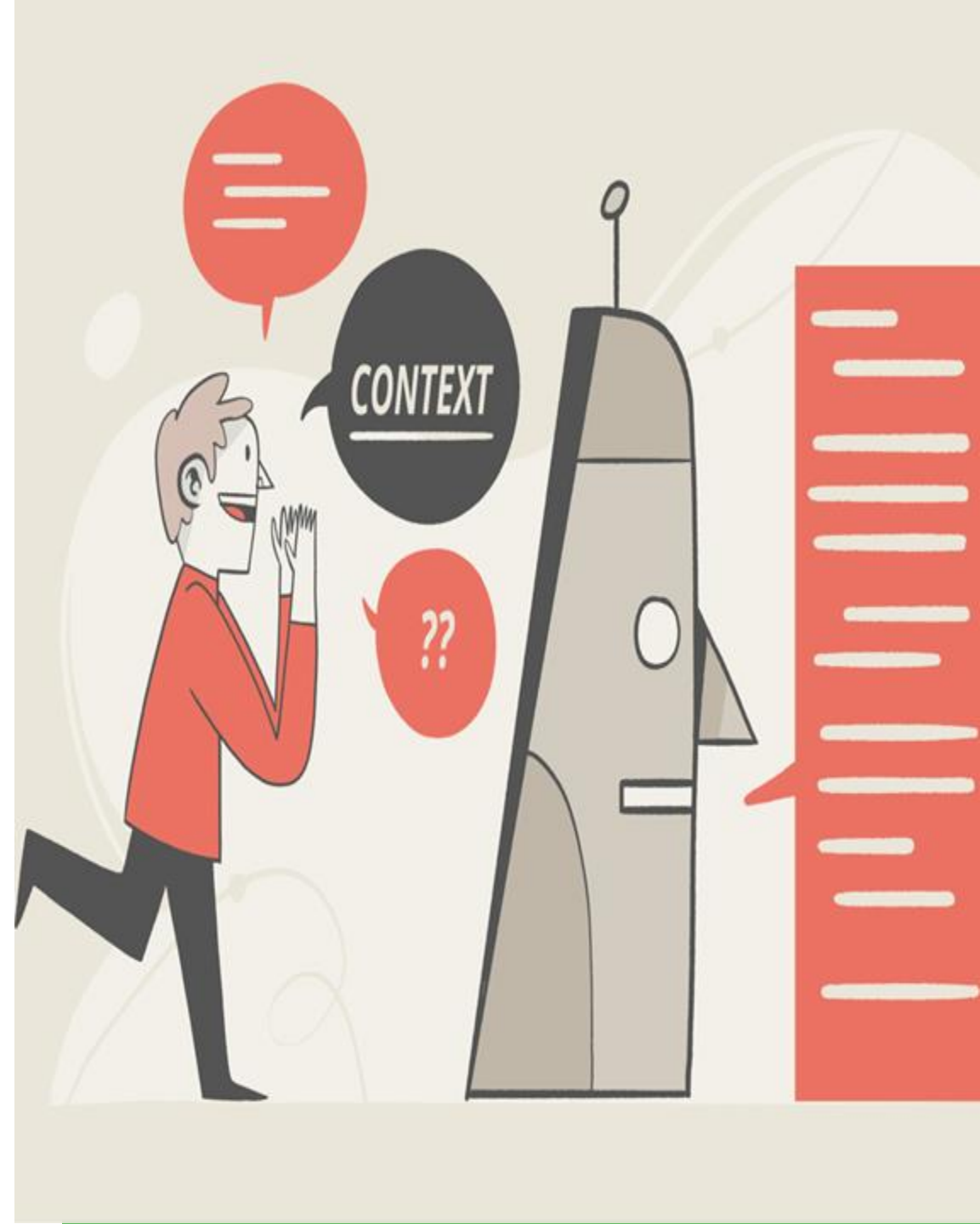
Intention: [PROVIDE BACKGROUND TO YOUR GOALS]

Criteria: [DEFINE SUCCESS AND IDEAL OUTPUTS]

Knowledge: [SPECIFY WHICH SOURCES IT SHOULD USE]

Structure: [EXPLAIN THE FORMAT YOU REQUIRE]

Examples: [INCLUDE EXAMPLES OF SIMILAR OUTPUT]



DEMO: Example 'PICKSE' Prompt

Persona:

You are an AI Innovation Consultant at Bristol University, specialising in analysing how governments around the world are adopting and regulating artificial intelligence technologies.

Intention:

You need to produce a market assessment of how AI is being used in governments globally. The output should help identify adoption trends, opportunities, and constraints in public sector AI, including case studies of leading countries.

Criteria (for Success):

- Provide an evidence-based, neutral, and analytical assessment.
- Include specific country examples (e.g., UK, US, China, UAE, Estonia, Singapore).
- Highlight both opportunities (e.g., efficiency, citizen services, data-driven decision-making) and constraints (e.g., data privacy, ethics, procurement challenges, digital divides).
- Use data points (e.g., adoption statistics, policy frameworks, budget allocations).
- Ensure recommendations are actionable for civil service teams.
- Avoid overly technical jargon or marketing language. Maintain a policy/strategy consultant tone.

DEMO: Example 'PICKSE' Prompt continued

Knowledge:

- Draw on credible recent sources (2022–2025) such as OECD reports, World Bank, McKinsey Global Institute, World Economic Forum, GovTech/AI in Government Index, and official government AI strategies (e.g., UK National AI Strategy, Singapore Smart Nation, EU AI Act).
- Reference all data points with source attribution.
- Use recent publications (2022–2025) where possible.

Structure:

- Executive Summary (2–3 key insights about global government AI adoption).
- Current Landscape (how AI is being used in government, by region/country).
- Drivers & Trends (political, economic, social, technological, regulatory).
- Opportunities (public service innovation, efficiency, new citizen engagement models).
- Constraints & Risks (ethics, bias, digital inequality, procurement barriers, workforce impact).
- Country Case Studies (e.g., UK, Estonia, Singapore, UAE, US, China).
- Recommendations for policymakers & academics.

Examples:

- Example report: *OECD AI in the Public Sector Report (2023)*
- Example structure: McKinsey Global Institute's "Government AI Adoption" study format
- Example lecture slides: World Bank GovTech Case Studies

AI Guidelines: Beware!

1. **Do not share personal or information** with AI tools – you cannot rely on their data protection
2. **All outputs are hallucinations** i.e. fabricated and ungrounded.
3. LLMs are optimised for **coherence, not truth** (That's a design feature, not a bug)
4. These systems **do not understand what they are creating**.
5. These systems can and **should be used only as a drafting assistant** (structuring notes, summarising papers) with all outputs fact-checked by humans.
6. **The persuasive but false outputs can cause real harm**. These systems are highly persuasive and are designed to be this - hence coherence, the appearance of "helpfulness" and the use of authoritative language.
7. Being trained on market data, these systems exhibit large **biases towards market benefit rather than societal benefit**.

ACTIVITY: LLM Evaluation (10 minutes)

Objective:

- Understand prompting techniques
- Compare cross different AI systems to understand variations
- Tools: Claude, ChatGPT, Perplexity, Grok, Gemini...

Tasks

- Use the 'PICKSE' framework to compare LLMs
- Ask 3 different LLMs the question:

‘What caused the fall of Rome?’

- Side-by-side LLM comparison: using the same prompt, compare the outputs of two or more LLMs to quickly see the impact of your changes.
- Quality grading: Grade response quality on a 5-point scale to track improvements in response quality per prompt
- Prompt versioning: Create new versions of your prompt and re-run the test suite to quickly iterate and improve results.

REFLECTION: Effective Prompt Engineering

How are they different... and why?

Why do these differences matter?

“Promptism” - what impact does the fluency of an AI answer have on our cognition?

Does a convincing answer make us think more...or less?

Self-Ask Prompting

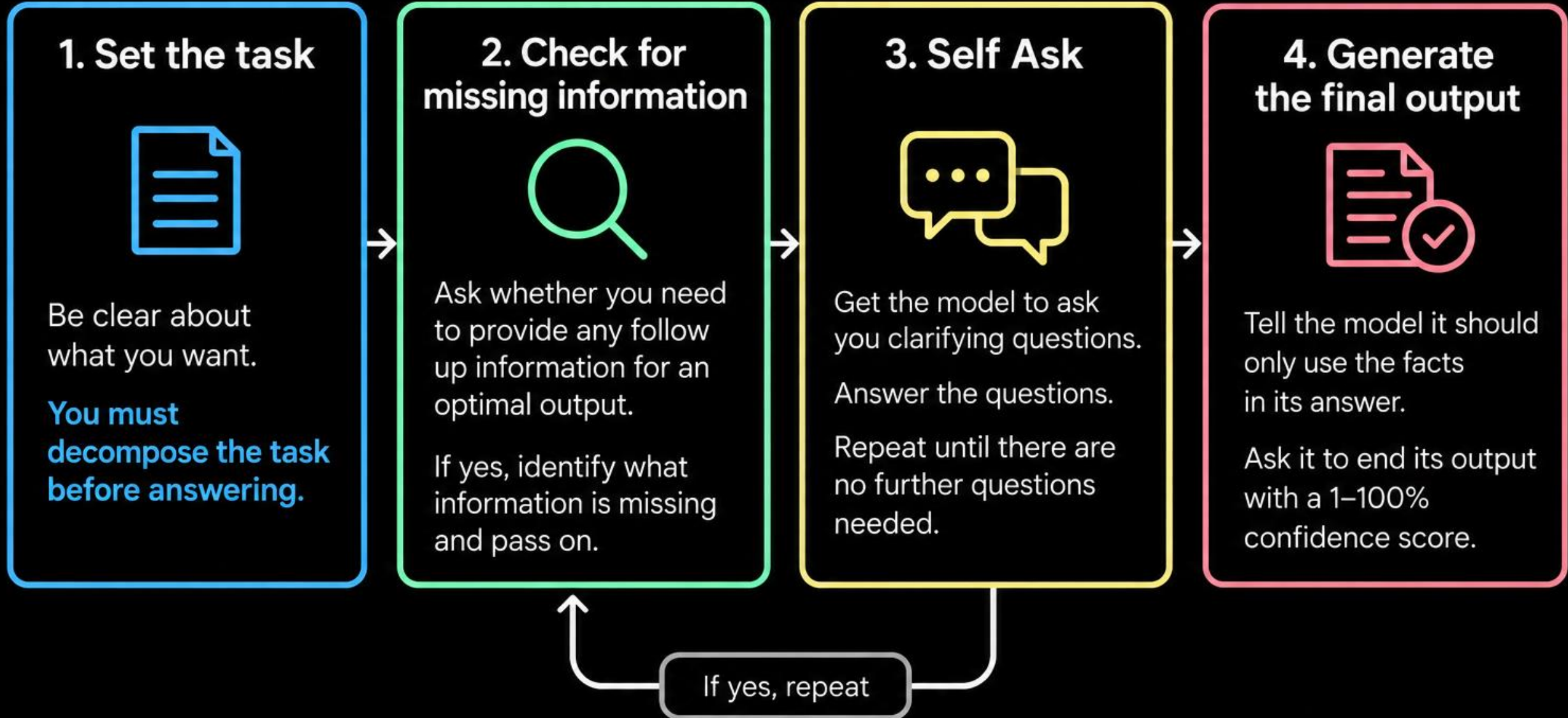
Don't let AI jump straight to an answer. Make it ask you the questions it needs to understand the task first.

Self-Ask Prompting is a technique to tell the model to decide whether it needs follow-up information from you to be able to answer more accurately.

Add this text to your prompts:

'You must decompose the task before answering. Ask questions to clarify one at a time until you have enough information. End with a 0–100% confidence score.'

How to craft a 'Self Ask' prompt



Questions?

Seminar, Team & Case Study Allocations:

		<u>CASE STUDY</u>	<u>GROUP TUTOR</u>			<u>CASE STUDY</u>	<u>GROUP TUTOR</u>
A	1	VEED	LAURA	D	1	C THE SIGNS	LAURA
A	2	C THE SIGNS	LAURA	D	2	GCS	LAURA
A	3	GCS	LAURA	D	3	VEED	LAURA
A	4	VEED	ROB	D	4	C THE SIGNS	
A	5	C THE SIGNS	ROB	D	5	GCS	ROB
A	6	GCS	ROB	D	6	VEED	ROB
A	7	VEED	ROB +LAURA	E	1	C THE SIGNS	STEPHEN
B	1	VEED	STEPHEN	E	2	GCS	STEPHEN
B	2	C THE SIGNS	STEPHEN	E	3	VEED	STEPHEN
B	3	GCS	STEPHEN	E	4	C THE SIGNS	NENIE
B	4	VEED	NENIE	E	5	GCS	NENIE
B	5	C THE SIGNS	NENIE	E	6	VEED	NENIE
B	6	GCS	NENIE	F	1	C THE SIGNS	FRANCIS
B	7	VEED	STEPHEN + NENIE	F	2	GCS	FRANCIS
C	1	VEED	FRANCIS	F	3	VEED	FRANCIS
C	2	C THE SIGNS	FRANCIS	F	4	C THE SIGNS	HOLLYE
C	3	GCS	FRANCIS	F	5	GCS	HOLLYE
C	4	VEED	HOLLYE	F	6	VEED	HOLLYE
C	5	C THE SIGNS	HOLLYE				
C	6	GCS	HOLLYE				
R	1	VEED	FRANCIS + HOLLYE				

Case Studies:

	Government Communication Service (GCS)	C the Signs	VEED
Function	Implementing AI assistance tool across GCS	Cancer symptom tracking	AI-led video production
Industry	Government	Health	Media & Creative Industries
Stage of AI evolution	Legacy	Digital-first (not AI)	AI-first
Size	1,400 employees	30 employees	150 employees

ACTIVITY: AI Consulting Team

Objective:

- Practice increasingly sophisticated prompt engineering techniques.
- Begin developing a systematic consulting approach to analysing AI innovation cases.
- Build transferable skills that will support the main case study assessment

Process

Work in your groups on your assigned case study:

- Government (GCS) – Using AI to transform communication across government departments. <https://www.communications.gov.uk/>
- Health (C the Signs) – Supporting GPs with AI-enabled cancer symptom tracking.
<https://www.cthesigns.com/>
- Media/Creative (VEED) – Scaling AI-powered video production for global growth.
<https://www.veed.io>

ACTIVITY: AI Consulting Kick Off (10 mins)

Prompt Engineering Warm-Up

Each group iteratively explores their chosen industry challenge using prompts of increasingly sophistication.

Step 1 – Beginner Prompting

Goal: Create and observe initial outputs about AI in your chosen industry

Start with this prompt:

“Tell me about how AI is being used in [select your case study - government communications / cancer diagnostics / video production].”

ACTIVITY: AI Consulting Kick Off (10 mins)

Step 2 – Intermediate Prompting

Goal: Next, push the model for more structure, specifics, and alignment to business problems.

Try this prompt:

“Explain key ways AI could be applied in [government communications / cancer diagnostics / video production], including the specific business challenges it addresses, relevant AI technologies, and current examples.”

REFLECTION: AI Consulting Kick Off

Reflect:

- What improved from Step 1?
- How can you improve the output further using prompting?
- What's flawed/missing in the output?
- How can you improve the output further *WITHOUT* using prompting?



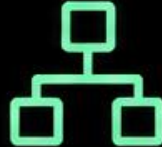
**Better
Question**



**Better
Information**



**Better
Tool**



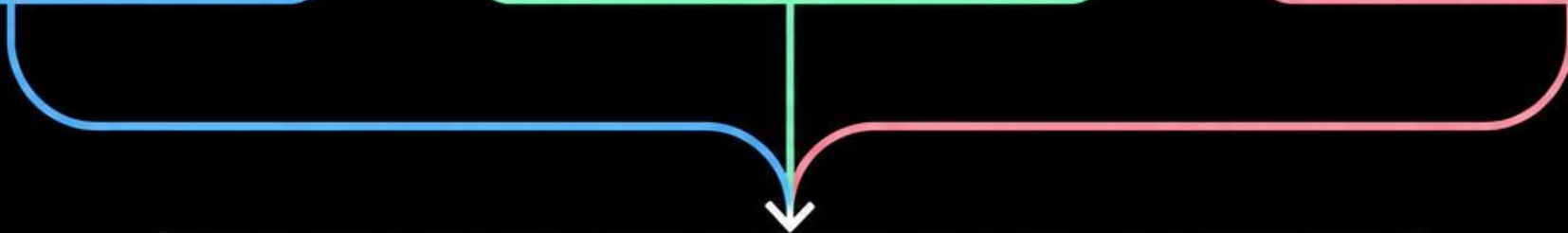
**Better
Process**



**Human challenge
and expertise**



**Better
Evaluation**



BETTER OUTCOME

ACTIVITY: AI Consulting Kick Off (10 mins)

Step 3 – Expert Prompting

Goal: achieve a consulting-style response that integrates technical + business + ethical dimensions.

Try this prompt:

“Act as an AI innovation consultant advising an organisation in [government communications / cancer diagnostics / video production]. Analyse the potential most pressing organisational challenges, potential AI-led solutions, and the key risks in deploying such systems. Provide recommendations for implementation strategy and measurable outcomes. Consider sector-specific factors.”

Add insights onto
the Digital Workspace:
[link here](#)



ACTIVITY: AI Consulting Kick Off (20 mins)

STEP 4: Consulting Framework Application

Using the outputs from Steps 1,2 and 3, as a group start to map your insights against the consulting framework below.

- Problem Context – What organisational/business challenge is being addressed?
- AI Solution – Which AI technologies could be used, and why are they a good fit?
- Implementation Approach – What steps would be required to develop and deploy the solution (partners, skills, governance)?
- Outcome Analysis – What success metrics would you expect (efficiency, accuracy, growth, cost reduction, patient outcomes, etc.)?

REFLECTION

- What are the capabilities and limitations of current AI systems?
- What made a prompt effective? Ineffective?
- Contrast with human intuition – where was the AI helpful, misleading, or incomplete?
- What are 3 key principles you might apply in tackling your AI innovation case study?

Questions?

Key Takeaways:

1. **Ask good questions:** The more detailed and precise your prompt, the more detailed and precise the response. Give it a clear role (e.g. editor), be creative and try different approaches
2. **Play to its strengths:** Think about the training data to identify LLMs' strengths
3. **Limited memory:** Don't expect the LLM to have perfect recall!
4. **Don't give up immediately:** If it's not working, try another approach
5. **Think critically:** and always check the outputs!

Next week...

We will explore AI + Humans: ethics, impact, & relationships