The University of Melbourne acknowledges the Traditional Owners of the unceded land on which we work, learn and live: the Wurundjeri Woi-wurrung and Bunurong peoples (Burnley, Fishermans Bend, Parkville, Southbank and Werribee campuses), the Yorta Yorta Nation (Dookie and Shepparton campuses), and the Dja Dja Wurrung people (Creswick campus).

The University also acknowledges and is grateful to the Traditional Owners, Elders and Knowledge Holders of all Indigenous nations and clans who have been instrumental in our reconciliation journey.

We recognise the unique place held by Aboriginal and Torres Strait Islander peoples as the original owners and custodians of the lands and waterways across the Australian continent, with histories of continuous connection dating back more than 60,000 years. We also acknowledge their enduring cultural practices of caring for Country.

We pay respect to Elders past, present and future, and acknowledge the importance of Indigenous knowledge in the Academy. As a community of researchers, teachers, professional staff and students we are privileged to work and learn every day with Indigenous colleagues and partners.

GenAI and lesson planning: Help or hindrance?

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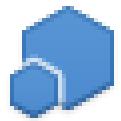
Dr Carmel Mesiti
cmesiti@unimelb.edu.au

Please complete this survey about your AI use before we start



Teacher workload, lesson planning, and GenAI

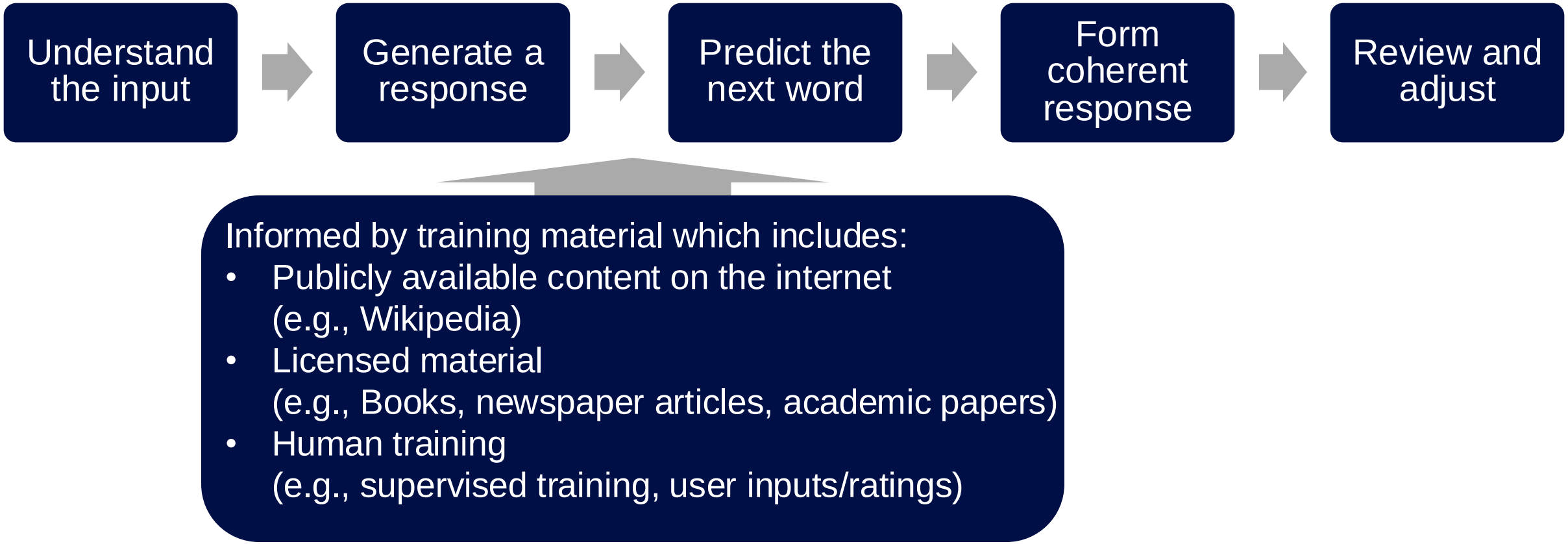
Significant workload attached with developing teaching materials (Hunter & Sonnemann, 2022)

Teachers want more time to plan lessons (Stacey et al., 2023)

Use of AI for lesson planning is being promoted to address teacher workload (e.g., Commonwealth of Australia, 2024a; 2024b)

Do GenAI tools consistently produce quality lesson plans?

How GenAI works



Today’s focus

Is GenAI a help or hindrance for planning a lesson?

Today

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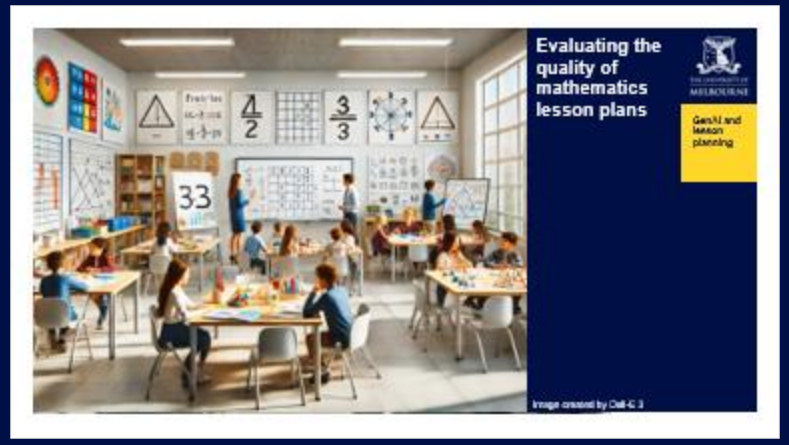

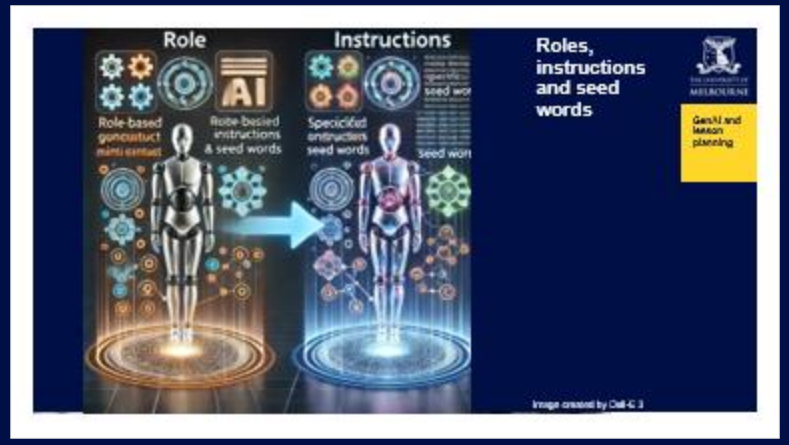

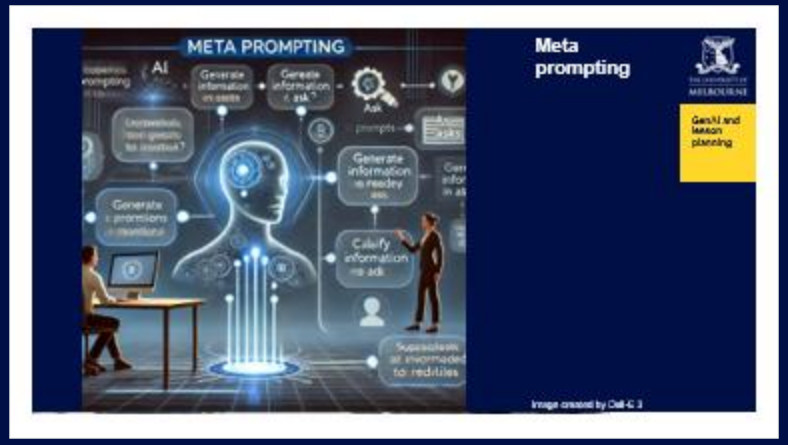

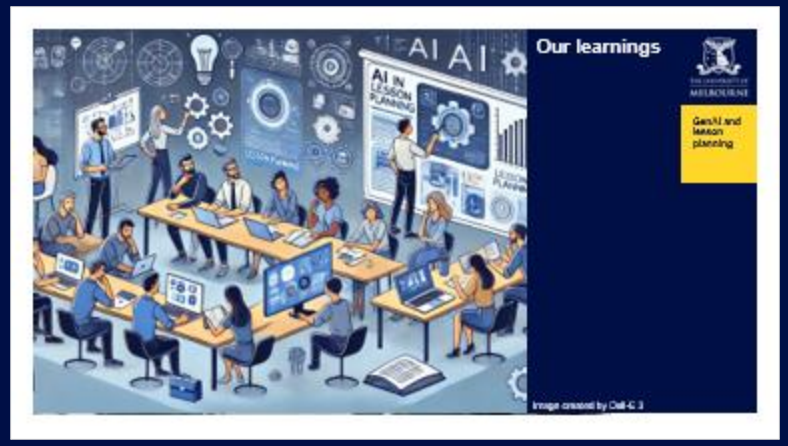

Evaluating the quality of mathematics lesson plans

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GenAI and lesson planning

Image created by Dall-E 3

Evaluating the quality of mathematics lesson plans

The mathematics	Cognitive demand	Access to mathematical content	Agency, Authority and Identity	Uses of Assessment
How coherent is the mathematical content?	*To what extent are students expected to grapple with and making sense of mathematical concepts?*	*To what extent does the plan support access to the content of the lesson for all students?*	*To what extent are students the source of ideas and discussion of them?*	*To what extent does instruction build on student ideas and address misunderstanding when they arise?*

Inspired by Schoenfeld, A. H. (2013). Classroom observations in theory and practice. *ZDM*, *45*(4), 607–621. https://doi.org/10.1007/s11858-012-0483-1

Roles, instructions and seed words

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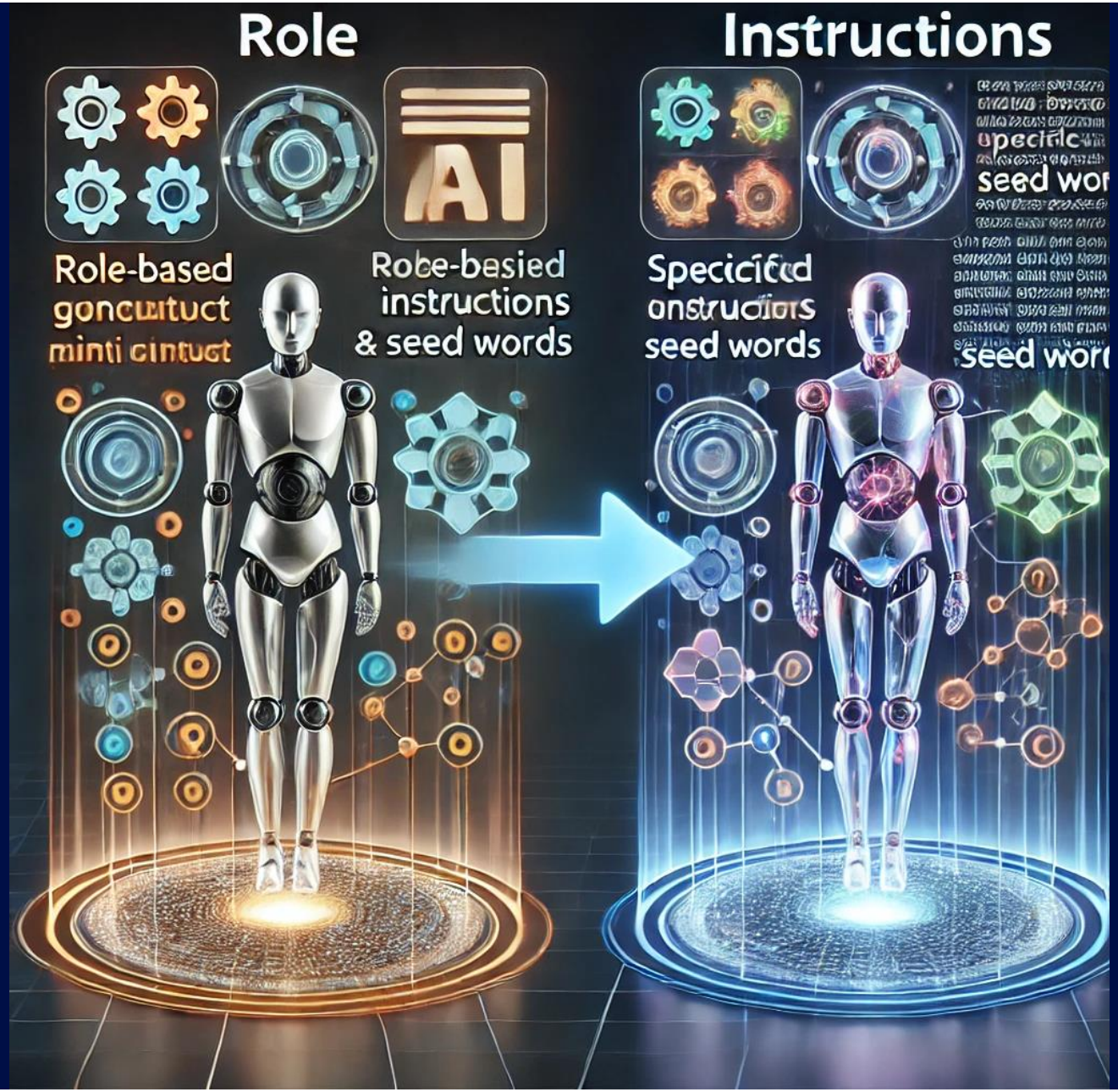

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Inclusion of roles, instructions and seed text (e.g., Spasić & Janković, 2023)

Role

- Assign a role or persona to the AI tool
  (e.g., a secondary school mathematics teacher)

Instructions

- Provide clear, explicit instructions
  (e.g., format of output)

Seed text

- Provides guidance on style, tone, context, and content
  (e.g., for students aged 13 – 14, using real-world examples)

Spasić, A. J., & Janković, D. S. (2023). Using ChatGPT Standard Prompt Engineering Techniques in Lesson Preparation: Role, Instructions and Seed-Word Prompts. *2023 58th International Scientific Conference on Information, Communication and Energy Systems and Technologies (ICEST)*, 47–50. https://doi.org/10.1109/ICEST58410.2023.10187269

Inclusion of roles, instructions and seed text (e.g., Spasić & Janković, 2023)

An example

As a high school teacher, generate a detailed and meaningful lesson plan for the teaching of division of two fractions that is appropriate for students aged 13 – 14 years. The lesson plan should be created using the *instructional model.* Please include specific examples and explanations.

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Inclusion of roles, instructions and seed text (e.g., Spasić & Janković, 2023)

An example

As a high school teacher, generate a detailed and meaningful lesson plan for the teaching of division of two fractions that is appropriate for students aged 13 – 14 years. The lesson plan should be created using the *instructional model*. Please include specific examples and explanations.

1. Use a prompt with a role, instructions, and seed text to generate another lesson on your topic
2. Analyse the lesson plan using the rubric
3. Record your scores on the reverse side

Spasić, A. J., & Janković, D. S. (2023). Using ChatGPT Standard Prompt Engineering Techniques in Lesson Preparation: Role, Instructions and Seed-Word Prompts. *2023 58th International Scientific Conference on Information, Communication and Energy Systems and Technologies (ICEST)*, 47–50. https://doi.org/10.1109/ICEST58410.2023.10187269

Meta prompting

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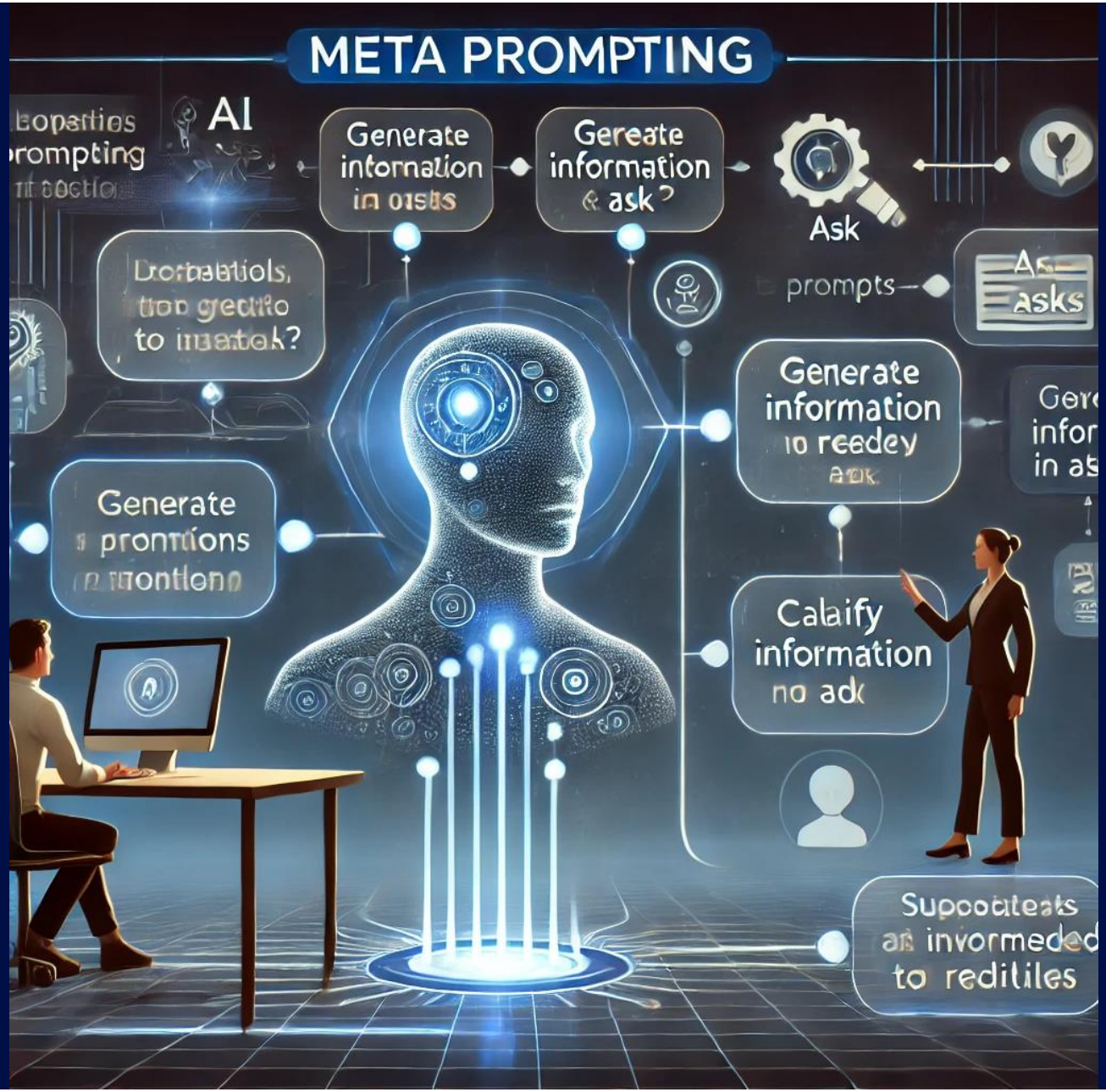
GenAI and lesson planning



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Meta Prompting (e.g., Schulhoff et al., 2024)

Prompt AI to ask questions to collect the information needed to complete the task
Can also include role, instructions and seed text

An example

You are a secondary school mathematics teacher. I am going to ask you to develop a detailed and meaningful lesson plan on the division of two fractions using the *instructional model*. You will need to include specific examples and explanations. What information do you need from me to complete this task?

1. Use Meta Prompting to develop another lesson plan on your topic
2. Analyse the lesson plan using the rubric
3. Record your scores on the reverse side

Schulhoff, S., Ilie, M., Balepur, N., Kahadze, K., Liu, A., Si, C., Li, Y., Gupta, A., Han, H., Schulhoff, S., Dulepet, P. S., Vidyadhara, S., Ki, D., Agrawal, S., Pham, C., Kroiz, G., Li, F., Tao, H., Srivastava, A., … Resnik, P. (2024). *The Prompt Report: A Systematic Survey of Prompting Techniques*. arXiv. http://arxiv.org/abs/2406.06608

Meta prompting with refinement

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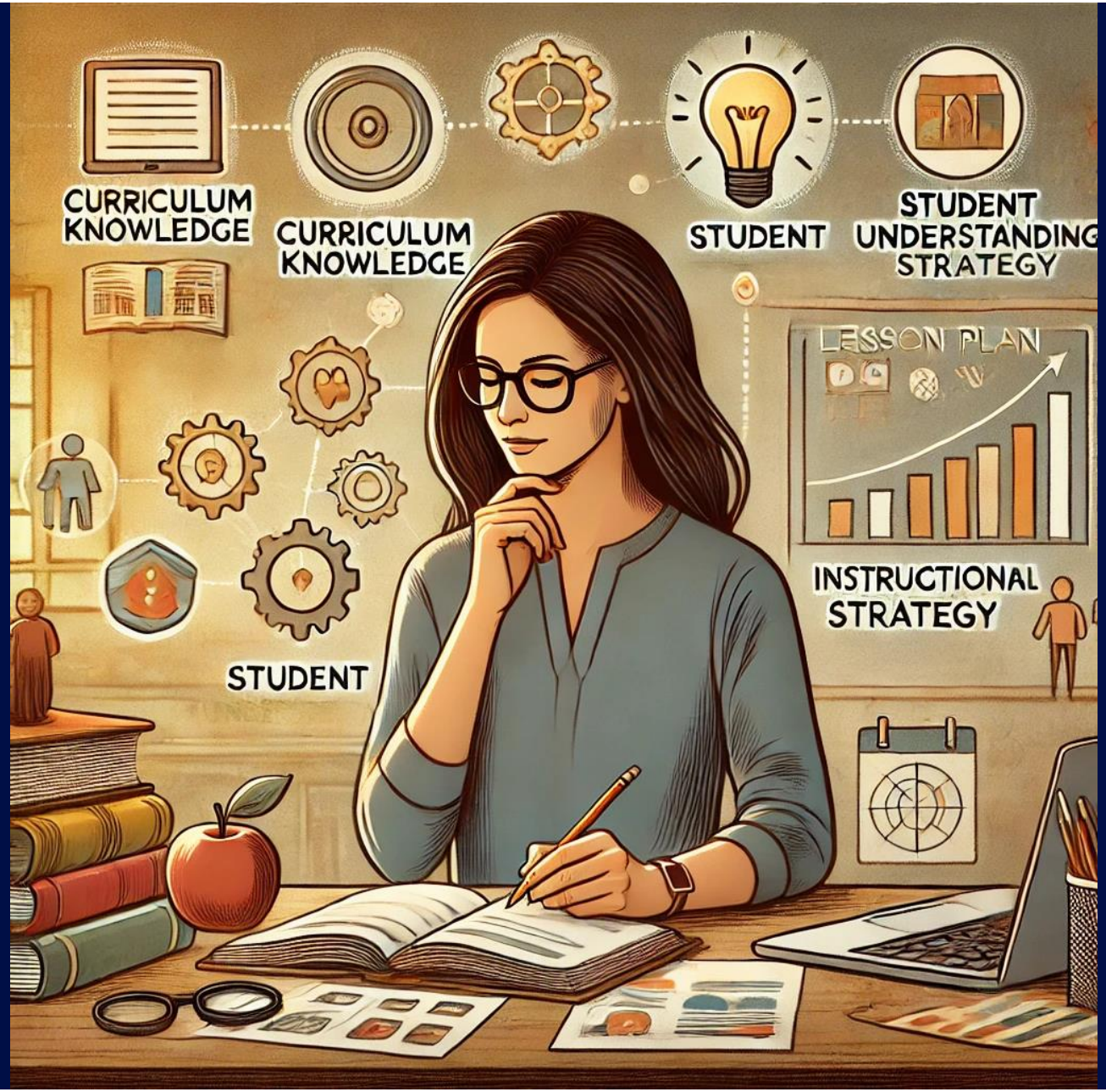

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Meta prompting with refinement

(e.g., HUIT, 2024)

It's unlikely AI will give you what you are looking for as the first output, but it provides a starting point.

Tips to refine an output:

- Correct mistakes and provide feedback
- Provide specific follow-up prompts for specific parts of the lesson
- Use "do" and "don't" to help refine outputs

1. Refine your 'meta prompting' lesson plan (Up to 3 additional prompts)
2. Analyse the lesson plan using the rubric
3. Record your scores on the reverse side

Harvard University Information Technology. (n.d.). *Getting started with prompts for text-based Generative AI tools*. Getting Started with Prompts for Text-Based Generative AI Tools. Retrieved November 11, 2024, from https://huit.harvard.edu/news/ai-prompts

Our learnings

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GenAI and lesson planning

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Our learnings

Please record your lesson plans scores via this form
https://go.unimelb.edu.au/d3k8

What kind of maths teacher is ChatGPT?

(Cameron & Mesiti, 2024)

Narrow view of mathematics teaching
Traditional approaches such as ‘telling’, stating of information and demonstration of procedures

Guidance is provided on *what* to teach, but now *how* to teach it
Teacher expertise is essential

Examples and student problems may not be suitable
e.g., problems asking to share ¾ of a cake between ½ of a party

Important to consider prompts
Instructional models, inclusion of examples/explanations, use of manipulatives

Cameron, S. & Mesiti, C. (2024). What kind of mathematics teacher is ChatGPT? Identifying the pedagogical practices preferences by Generative AI tools when preparing lesson plans. In J. Višňovská, E. Ross, & S. Getenet (Eds.), *Surfing the waves of mathematics education. Proceedings of the 46th annual conference of the Mathematics Education Research Group of Australasia* (pp. 135–142). MERGA. https://merga.net.au/wp-content/uploads/2024/07/MERGA46_2024_Mesiti_RP480_2024-06-29-01.pdf

Questions

Interested in:

- **Learning more?**
- **Being a participant in our future research?**
- **Having us run PD at your school?**

Register your details at https://go.unimelb.edu.au/sgk8

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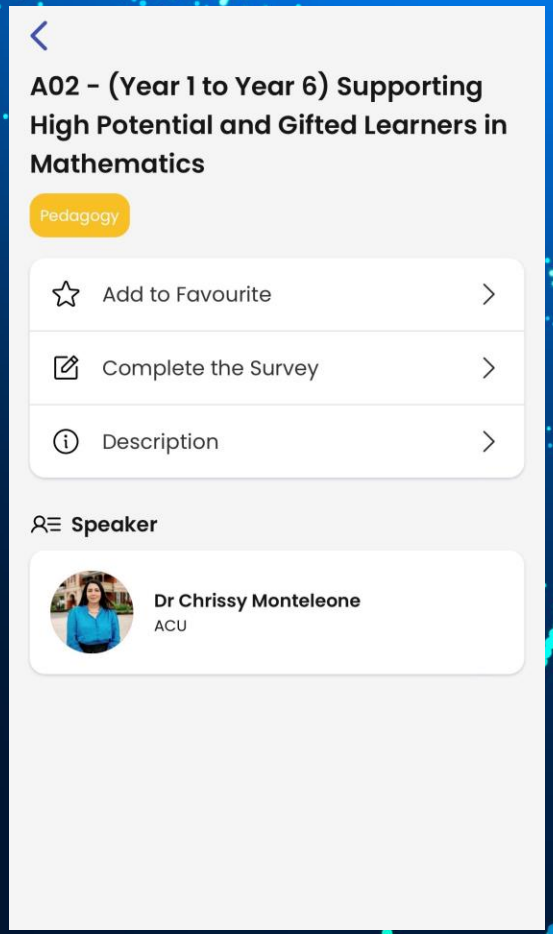
Be in it to WIN!



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