



CAMBRIDGE

Knowledge and AI

Guiding students towards conscious use of AI

Silvia Pirola and Sarah Hughes

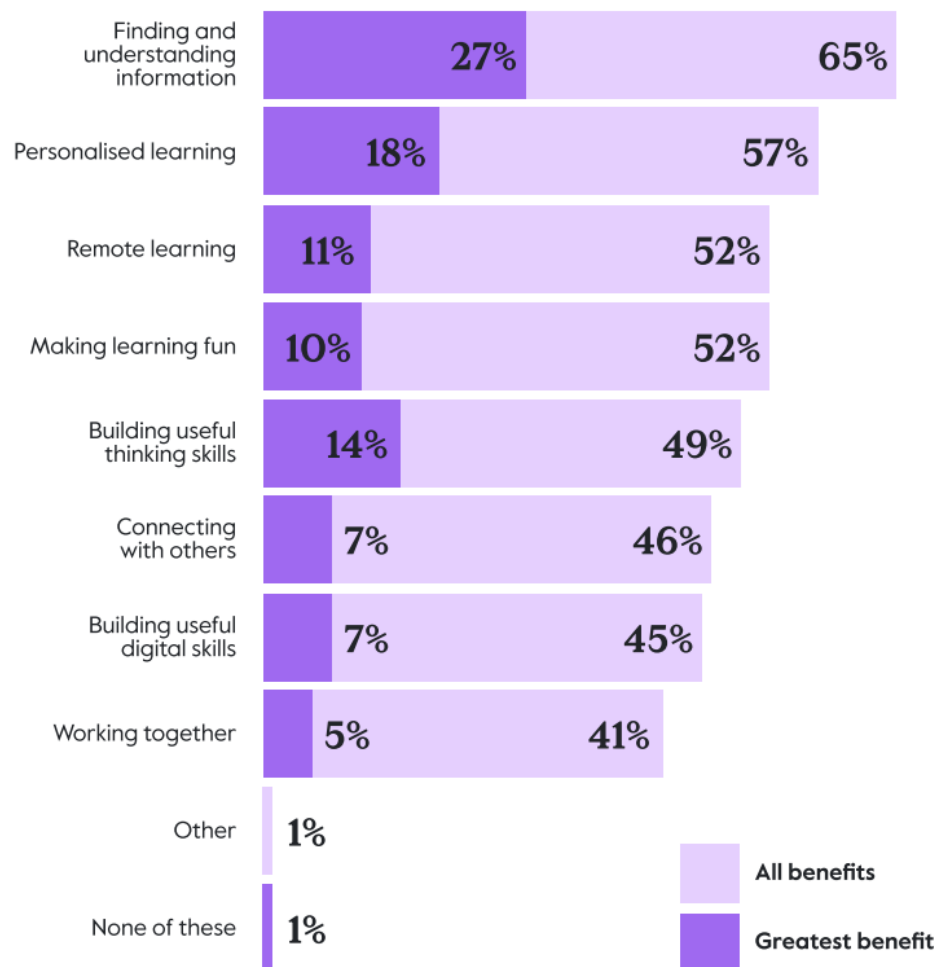
July 2026

Agenda

1. How are learners using generative AI?
2. What is the cognitive impact of using generative AI?
3. What does this mean for classroom practice?

How are students using generative AI?

Student views of benefits of technology use

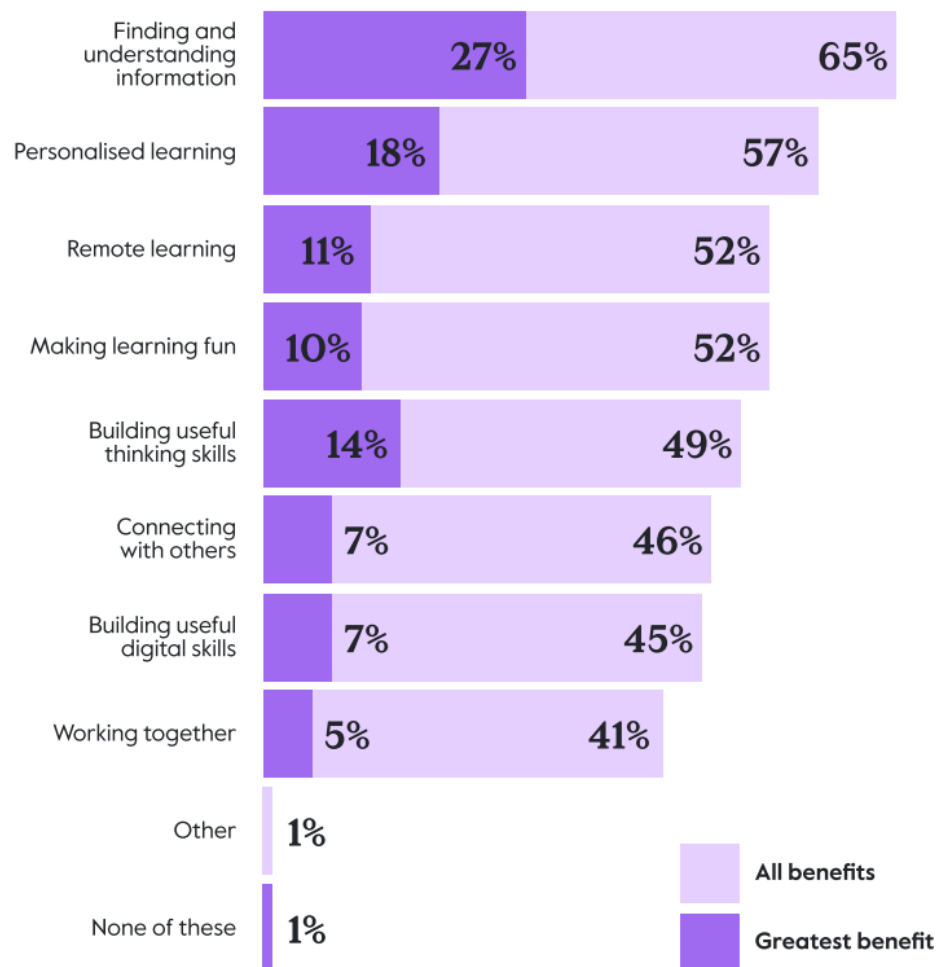


Questions for students:

*Which of the following, if any, do you view as benefits of technology in preparing you for the future?
Please select all that apply.*

*And which of the following, if any, do you view as the greatest benefit of technology in preparing you for the future?
Please select one option only.*

Student view of the need for subject knowledge



“

As AI gets more popular and more widely available the need to memorise subject knowledge becomes less important as we can find and implement subject knowledge easily with the help of AI.

”

Student, India

How students are currently using GenAI

AI as a tutor

**AI as a creative
partner**

**AI as a writing
assistant**

AI as a tutor

Explore new topics
and find sources for
further research

Receive feedback and
explanations

“

AI tools are great to understand some topics
and questions you don't understand.

If I don't understand a question, I can ask this
neural network to solve it for me and I can see
"Oh, OK, this how it works", or I can discuss
any topics with it.

I use AI on a daily basis, literally for any goals.

Student, Serbia

”

AI as a tutor

Explore new topics
and find sources for
further research

Receive feedback and
explanations

Create exam-style
questions

Create a study plan

“

When I was about to give my AS exams,
I shared all my information to ChatGPT regarding
subjects, my current study level and how many
hours I have to study, so it made me a timetable to
study each subject, regarding managing the time
of each subject before my coming exams.

It really helped me a lot.

Student, Pakistan

”

AI as a creative partner

Find inspiration for project work

Explore new topics

Create presentations

“

I do know a few people that use AI in a good way, such as they take just inspirations from it and they change it into their own type of words and into their own type of way.

By just taking that inspiration, they can create a whole new topic from their own mind that that information give them.

”

Student, UAE

AI as a writing assistant

Spelling and grammar checks

Write essays

Create presentations

“ Younger people in school, they don't really know the balance or the limit between using technology to do research and using technology to produce their content. I've seen some examples where children just use ChatGPT to make their own presentation.

That is the wrong way to use this kind of AI tool, because it shouldn't replace your work. If you only use this tool to make it for you, then you're not really learning the skill.

”

Student, Thailand

AI as a writing assistant

Spelling and grammar checks

Write essays

Create presentations

“You could write in a prompt such as 'write me an essay about airplanes' and give them a set amount of lines or a set amount of sentences, and also tell them to paraphrase it such as a 12th grader and 11th grader or even a 13th grader and then AI will instantly do that basically [...] and students would typically just copy and paste the whole text that AI gives them.”

Student, UAE

Activity

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How are your students using generative AI?



What is the cognitive impact of using generative AI?



Reworked
AI (artificial intelligence)

This article is more than 3 months old

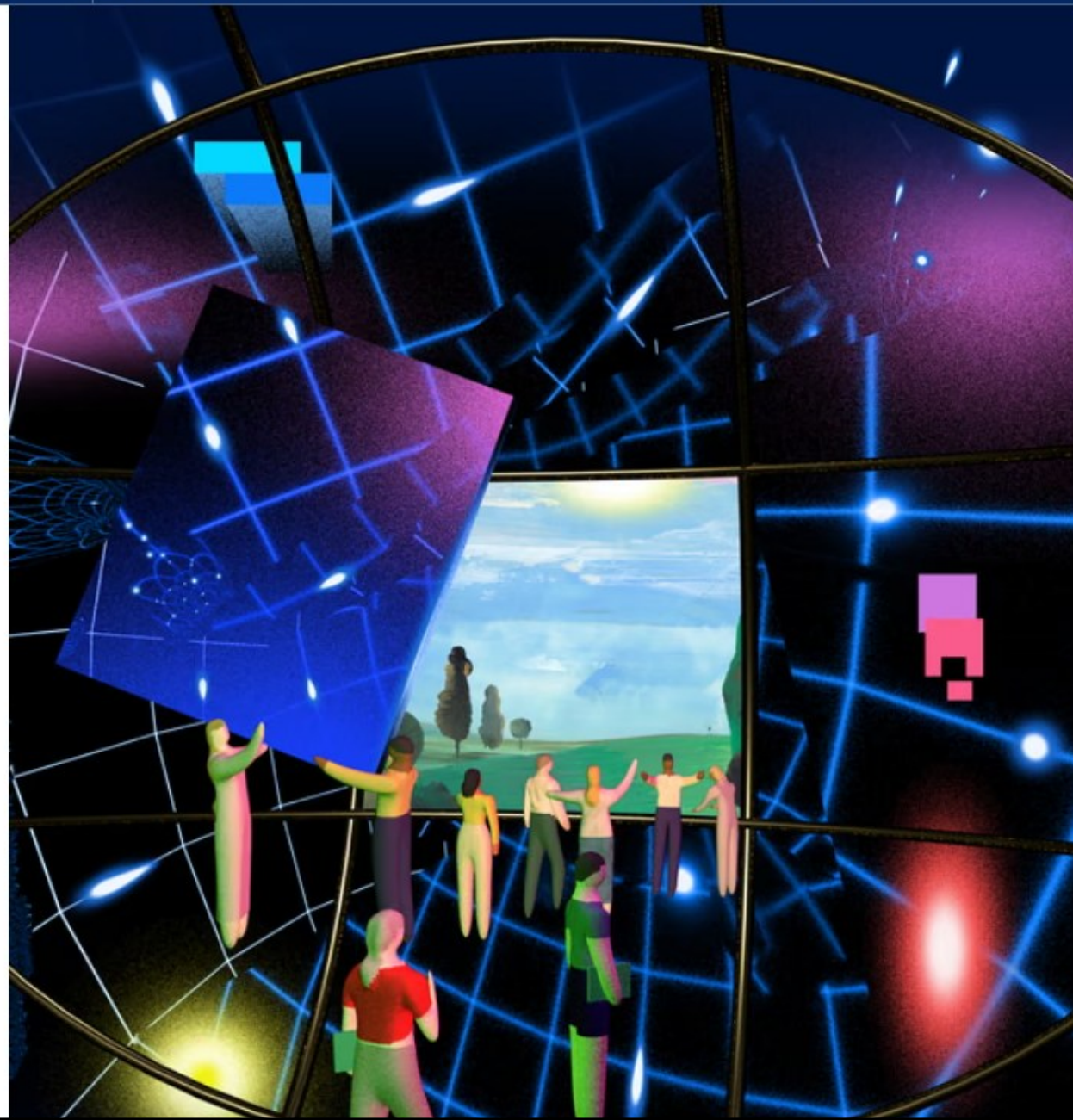
'I wish I could push ChatGPT off a cliff': professors scramble to save critical thinking in an age of AI

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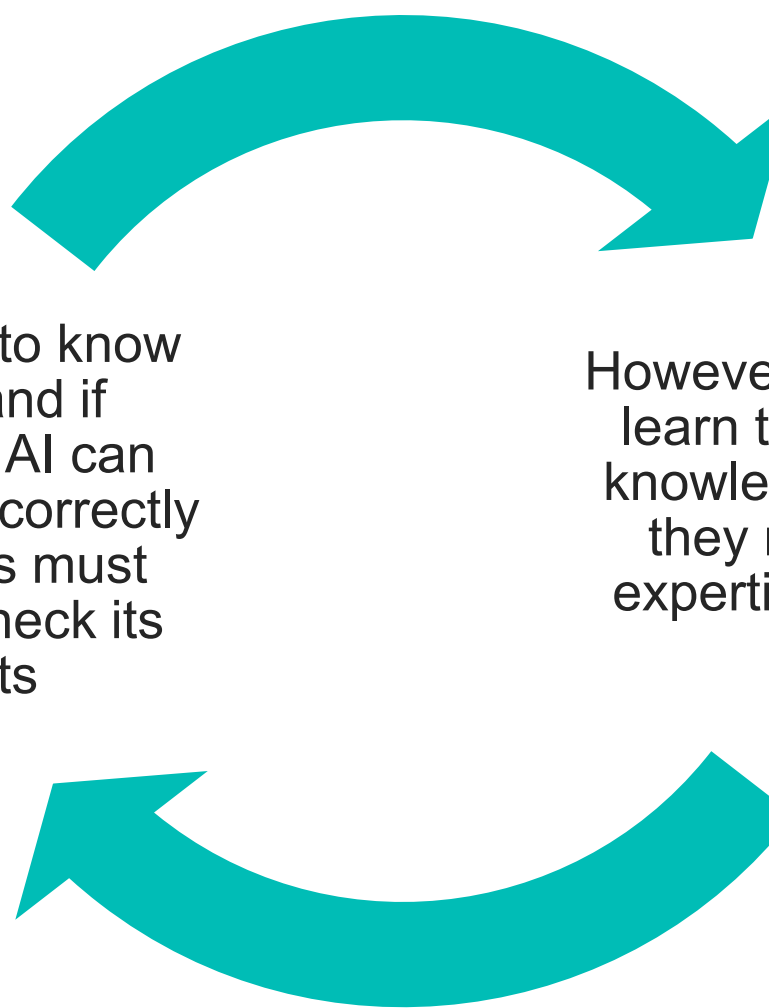
About this content

As AI has upended the way students learn, academics worry about the future of the humanities - and society at large



Longer term risk of GenAI use

Longer term risk of GenAI use



It is difficult to know
beforehand if
generative AI can
solve a task correctly
so learners must
vigilantly check its
outputs

However, if they do not
learn the underlying
knowledge and skills,
they may lack the
expertise required to
do so

The risk of GenAI use



The product problem

1. Construct under-representation
 - Written products only surface what can be inferred from text features; disciplinary reasoning, evaluative judgement and the process behind the text are not directly observed.
2. Construct irrelevant variance
 - When GenAI can produce the same product as a competent student, scores reflect access to and use of AI rather than the construct of interest
3. Threat of ecological validity
 - Learners now co-produce their writing with AI. A *product-only* assessment either misrepresents how writing actually happens, or admits AI and starts measuring a different construct.

Liu, S (2027, in press) Construct Transformation and Validity Challenges in AI mediated L2 Speaking.
Language Assessment Quarterly 4/5 2027 Assessment

“Generative artificial intelligence is increasingly being integrated into education, where it can boost learners’ performance. However, these uses do not promote the deep cognitive and metacognitive processing that are required for high-quality learning.”

Yan, Greiff, Lodge & Gašević (2025)

“On the one hand, these systems can produce fluent, coherent, and lexically sophisticated texts at remarkable speed... On the other hand, their rhetorical limitations... raise concerns about plagiarism, diminished critical thinking, and the erosion of academic literacy.”

Hyland (2026)

The good, the bad and the ugly



AI tools ... can foster self-directed learning and improvement when carefully integrated into coursework. They can facilitate enhanced writing fluency, offer personalised tutoring, and reduce the cognitive load of drafting and revising.



These writing assistants can quickly produce completed essays and papers, leaving little else for the student to do aside from reading and perhaps editing the content.



AI tools can be detrimental to the development of writing skills... Many teachers are concerned that this erodes critical thinking skills and undermines ethical considerations since students are not performing the work themselves.

Different uses of AI result in different cognitive impacts

AI as a tutor

- Scaffolding
- Enhanced metacognition

AI as a creative partner

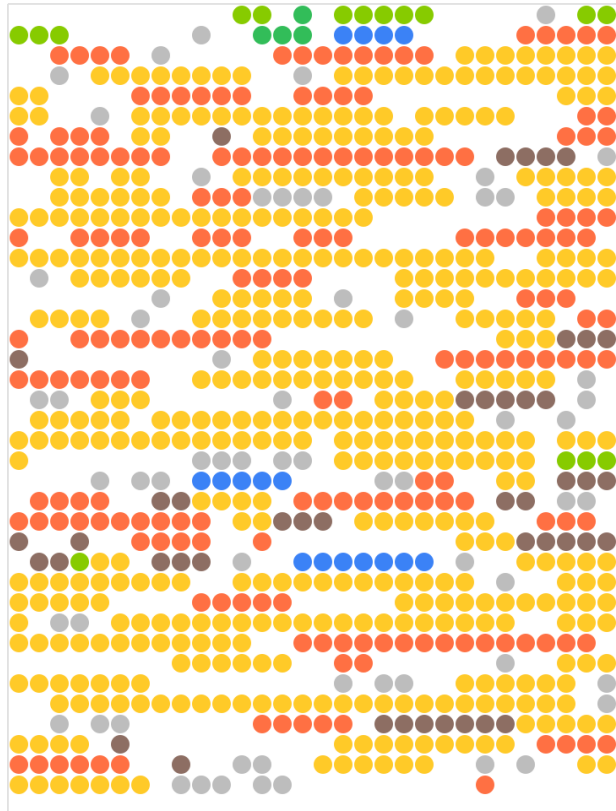
- Idea generation
- Boosting divergent thinking

AI as a writing assistant

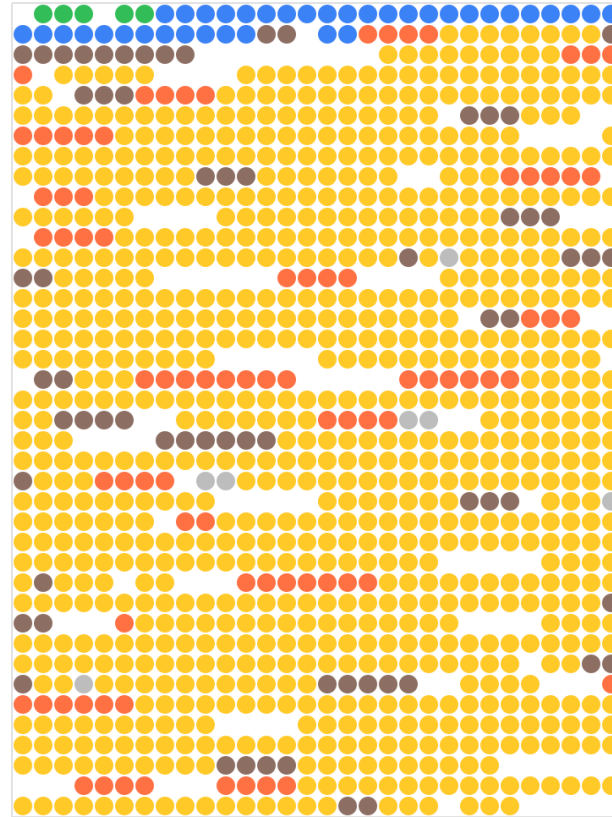
- Reduced cognitive load
- Risk of shallow processing

Human tutor vs ChatGPT vs AI tutor

Human Tutor



ChatGPT



AI tutor...?



Effects of LLM and note-taking on reading comprehension and retention



Desirable difficulty

Note-taking (on its own or with the LLM) led to better comprehension and retention than using the LLM

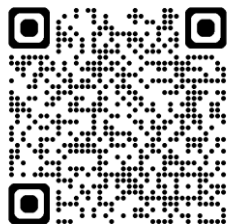


Learners preferred using LLM over note-taking

Learners preferred combining LLM + note-taking over using LLM alone



Most common learners' prompts:
Seeking additional information, and deepening understanding, information condensation, help understanding the text



Kreijkes, P., et al. (2025). Effects of LLM use and note-taking on reading comprehension and memory: A randomised experiment in secondary schools. *Computers & Education*, 243. 1-24.

Key takeaways

Trade-offs between **effectiveness for learning** and **propensity to engage**

Integration of LLMs needs to be **very** carefully considered – thoughtful integration

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Does ChatGPT make the grade?

Jude Brady (International Education Research Hub), **Martina Kuvalja** (Digital Assessment and Evaluation), **Alison Rodrigues** (International Education Research Hub) **and Sarah Hughes** (Digital Assessment and Evaluation)

AI as a tutor

AI as a creative partner

AI as a writing assistant

“...you can then apply your research skills and select and synthesise. You will get a very low mark just using ChatGPT. You can't just copy and paste. You'd need to have ... the skills developed ... but then I feel like those skills are developed from not using a source like ChatGPT ... it's ... a paradox.”

Student using ChatGPT, UK

“Generative artificial intelligence is increasingly being integrated into education, where it **can** boost learners’ performance. However, these uses do not promote the deep cognitive and metacognitive processing that are required for high-quality learning.”

Yan, Greiff, Lodge & Gašević (2025)

Strategies for the effective use of GenAI in the classroom

Some current solutions used in teaching and learning

Does the learner have the knowledge and skills apparent in the product?

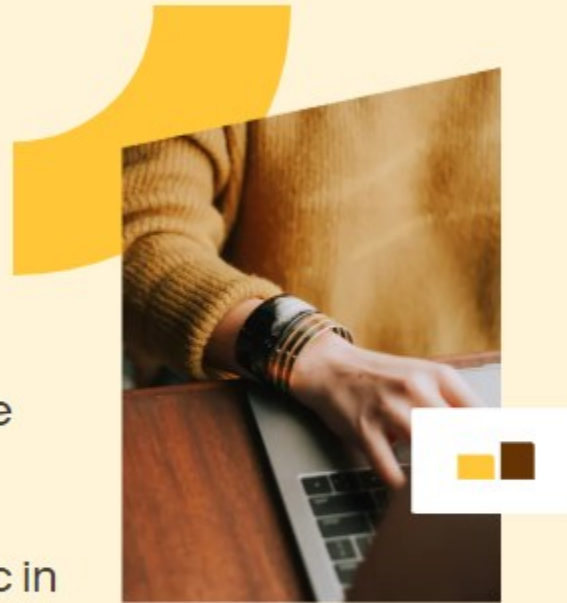
- Viva, presentation, live discussion, teacher assessment
- Quiz based on the learner's work
- Process data and dynamic assessment

Is the learner motivated to use AI effectively (rather than as short cut?)

- Self-management, self-regulation and meta-cognition

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How do you encourage the effective use of GenAI in the classroom?



AI personas: a support for metacognition



The Stranger

“Nice chatting to you, good luck with your work!”

AI can provide interesting starting points, but is not a citable source. Verify information through legitimate sources



The Intern

“I’m happy to help – just don’t expect perfection!”

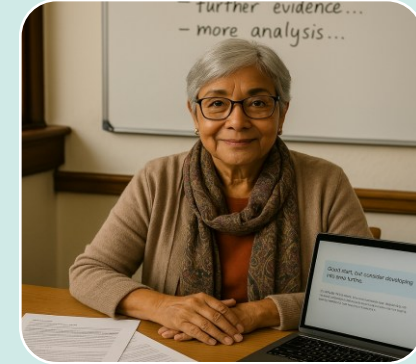
You must develop and maintain your critical thinking skill and subject expertise to be able to check their work.



The Translator

“I can help you understand and express ideas effectively.”

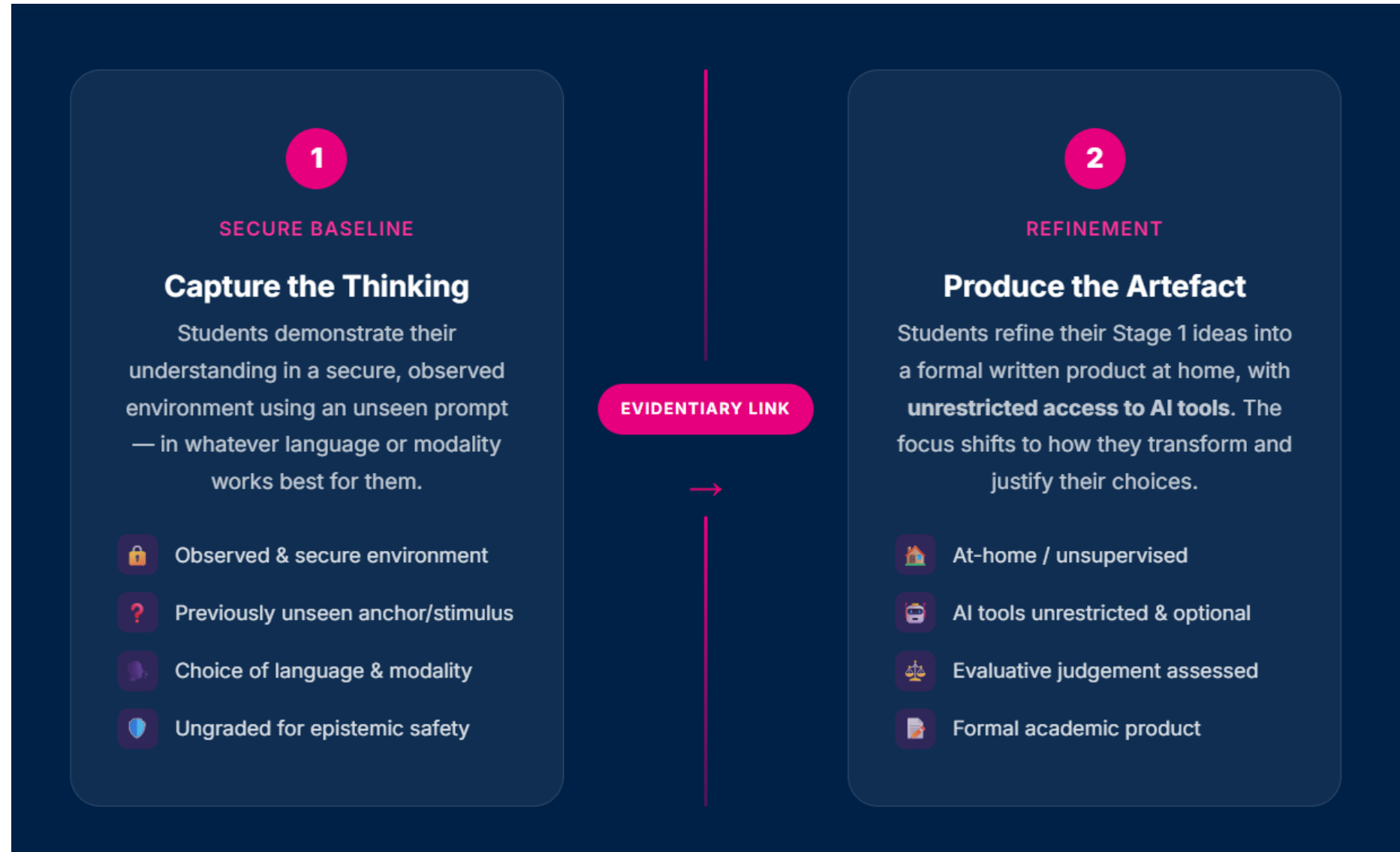
Core ideas and understanding must be your own!



The Tutor

“I won’t do it for you – but I can help you learn to do it”.

Use AI to enhance your learning process, not to bypass it.



ROCKS for writing good prompts

Role

- I am a... and I want to...

Objective

- I am trying to...

Community

- The audience is....

Key

- Length and language style

Shape

- Note the format

ROCKS for writing good prompts for feedback

Role

- I am a student studying Cambridge A Level English General Paper. And I want some feedback on this essay.

Objective

- Your task is to give me feedback against these criteria... I want to be able to improve my essay against each of the criteria.

Community

- I am 17 years old and English is my second language, keep this in mind when giving me feedback.

Key

- No more than 500 words and in simple language, structured using the assessment criteria

Shape

- In bulleted text

The Panel



“One effective strategy I use is “**AI reflection mapping**”, where students first generate an AI response to a question, then deconstruct it—highlighting strengths, weaknesses, and any misconceptions. They must support their critiques with evidence from textbooks or reliable sources.”

Science teacher

Mongolia

The Panel



“I use several strategies to help my students use generative AI in ways that strengthen their thinking skills rather than replace them. [...] To prevent over-reliance, students must first attempt a question independently before using AI to compare, refine, or critique their work, ensuring AI acts as a feedback partner rather than completing the task for them.”

Computing teacher

Malaysia

The Panel



“I encourage students to use AI as a brainstorming partner especially for outlining essays or exploring multiple perspectives on a topic. But I always emphasize the importance of verifying information and reflecting on how they arrived at their conclusion”

Business and Mathematics teacher

Pakistan

Some references, reading and links

Deep, P. D., & Chen, Y. (2025). The role of AI in academic writing: Impacts on writing skills, critical thinking, and integrity in higher education. *Societies*, 15(9), 247.

<https://doi.org/10.3390/soc15090247>

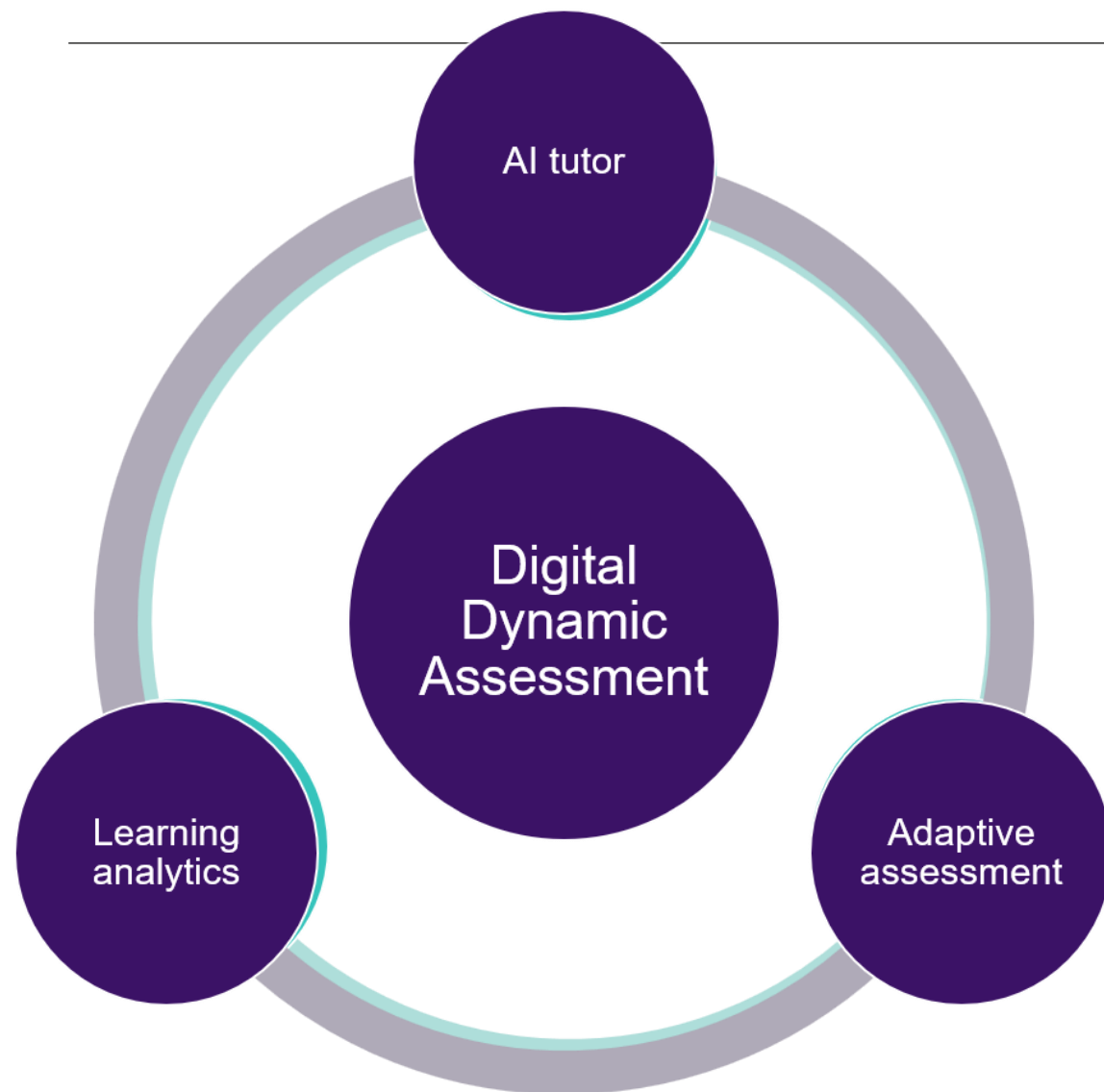
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Liu, S (2027, in press) Construct Transformation and Validity Challenges in AI mediated L2 Speaking. *Language Assessment Quarterly* 4/5 Assessment

Oakley, B., Johnston, M., Chen, KZ., Jung, E., Sejnowski, T. (2026). The Memory Paradox: Why Our Brains Need Knowledge in an Age of AI. In: Rangeley, M., Fairfax, N. (eds) *The Artificial Intelligence Revolution*. Springer, Cham. https://doi.org/10.1007/978-3-032-11814-1_22

[AI Personas — Kelly Webb-Davies](https://kellywebbdavies.com/aipersonas) <https://kellywebbdavies.com/aipersonas>

Our Education Futures Team and Research



Cambridge's Futures Lab Dynamic Assessment Project

Exploring whether learners can benefit from structured support in real time during a assessment and learning.

The study, focussed on one maths topic, will include multiple sessions over four weeks. Data will be collected from September 2026.

If your school would like to take part in this, or upcoming Futures Lab studies, contact futures.lab@cambridge.org

Where to find out more



How do teachers and learners collaborate in online schools?

In this research we worked with teachers and students in a variety of online classrooms to find out how collaborative learning worked.

[Read more](#)



Cambridge International Education's guide to using AI in the classroom

Our guide to Getting Started with AI in the Classroom helps teachers explore the potential of AI to improve learning experiences and to encourage students to become more engaged and achieve better outcomes.

[Read more](#)

Research insights



New Cambridge research helps shape the future of assessment

This cross-Cambridge University research, led by the [Digital Education Futures Initiative](#), looks forward to 2050, not to predict the future of assessment, but to use Futures Thinking to anticipate plausible assessment futures.

[Read the report.](#)



Extended Reality in mathematics assessment

[We explore the potential of extended reality in mathematics assessments](#); as well as describing which mathematical topics that could effectively use XR we discuss the challenges to adoption of XR.



Handwriting and typing answers: what are the similarities and differences?

In this blog researcher Santi Lestari describes what we know about [the difference in the way learners answer questions that involve extended writing when they type and when they handwrite.](#)

[More research insights](#)

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Feedback



Exit pass



I'm
wondering
about...



Will do ...
differently



I saw ... from
a different
perspective

Any questions?

Cambridge Schools Conference, July 2026
Future-ready: preparing learners to thrive

Thank you!

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