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CREATE CHANGE

UQ SchoolsNet - Engaging Minds in IT (Dec 2025)

Practical AI - Tools for Educators: Choose your Adventure

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A new human computer interface

OpenAI ChatGPT was released on 30 Nov 2022

**A prompt is a piece of text that triggers
a specific response or action**

Come up with concepts
for a retro-style arcade game

Write a text message
asking a friend to be my plus-one at a wedding

Show me a code snippet
of a website's sticky header

Plan a trip
to explore the nightlife scene in Bangkok

 Send a message



Rarely has a technology possessed such profound potential to both revolutionize and challenge the boundaries of education

- Answer questions
- Feedback on writing
- Feedback on programming
- Brainstorm new ideas
- Personalised Chatbot tutors/mentors



- Provide direct answers across multiple domains
- Write essays for you
- Write programming code for you
- Perform data analysis

Initial Flaws Identified by Educators

3 years since the first initial release and already most are not valid ...

Can't take
feedback

Can't reflect

Can't do
math

I'll be able to
detect it

The text will
have false
facts

Can't
include
references

Can't
understand
images

Can't reason

Current LLM Prompts for Teachers

ChatGPT 5.2

ShareAdd people

Activity1 Source

Categorise the top LLM prompts used by high and primary school teachers.

Could you please clarify a few things so I can categorize the top LLM prompts accurately:

- Are you interested in prompts used globally or within a specific country or region?
- Should the categories be based on subject area (e.g., math, history), task type (e.g., lesson planning, grading help), or something else?
- Are you looking for actual example prompts, or just high-level categories with descriptions?
- Would you like me to focus on prompts used by teachers with students, or also include behind-the-scenes uses like curriculum development?

Let me know so I can tailor the research appropriately!

1. globally

2. all

3. just high level categories with descriptions and a sample of the prompt

4. all

Great, I'll look into globally used LLM prompts by both primary and high school teachers, organizing them into high-level categories by subject, task type, and audience. I'll include descriptions and sample prompts for each category. I'll let you know when the research is ready—feel free to keep chatting with me in the meantime!

Checking content

1 source

Ask anything

StopUpdate

ChatGPT can make mistakes. Check important info.

5 meta-categories of teacher LLM prompts (Primary + High School)

Meta-category	Includes (examples)	Audience	Description	Sample prompt
Plan & Design	lesson planning, unit sequencing, activity ideas, resource creation	Teacher (planning)	Uses LLMs to draft or refine lesson/unit structure and generate teaching resources quickly	"Design a 3-lesson sequence on this topic with learning goals, activities, and a simple exit ticket for each lesson."
Teach & Explain	concept simplification, worked examples, alternative explanations, model answers	Student-facing (often teacher-mediated)	Produces clear explanations and worked examples at an appropriate level and tone	"Explain this concept for a 10-year-old using a real-world analogy, then give two quick check-for-understanding questions."
Assess & Give Feedback	quizzes, rubrics, marking guides, formative comments, feedback suggestions	Teacher (planning)	Supports assessment construction and faster, more consistent feedback	"Create a rubric for this task with 4 criteria and 4 performance levels, then draft example feedback for a 'developing' response."
Differentiate & Support Learners	personalization, scaffolds, tutoring prompts, accessibility/EAL adaptations, metacognitive prompts	Mixed (teacher planning + student-facing)	Adapts materials for diverse needs and provides scaffolded tutoring-style support	"Rewrite this passage at two reading levels and add sentence starters for students who struggle to begin."
Communicate & Manage	parent emails, admin notes, behaviour strategies, classroom routines, meeting summaries	Teacher (planning)	Helps with professional communication and classroom management planning	"Draft a supportive email to parents about upcoming assessments, including practical ways they can help at home."

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**My aim today is to
challenge
what you think is possible in
Education?**

Text instructions are all you need



Example 1: Maths Worksheet Creator

- Asks questions to get audience and topic
- Uses Python code to do the calculations
- Provides step by step teacher solutions
- Provides either a MS Word or Latex version
- Implemented as an Open AI Custom GPT
- <https://chat.openai.com/g/g-ZEXukr2ci-math-worksheet-creator>

Example 1: Maths Worksheet Creator

Math Worksheet Creator 5.2 ▾

Create a worksheet on Area for Year 10 students

Hi! 🌟 I'm **Math Worksheet Creator**, an expert maths teacher that creates **engaging maths worksheets in Microsoft Word format**, complete with **clear word problems and full step-by-step teacher solutions**.

Before I create your **Year 10 Area worksheet**, I just need a few details so I can tailor it perfectly for your students:

1. What specific area topics should be covered?

(e.g. triangles, trapeziums, circles, composite shapes, surface area, real-world applications)

2. Year level:

You mentioned *Year 10* — please confirm if this is **standard**, **advanced**, or **mixed-ability**.

3. How many questions would you like in total?

4. What difficulty structure would you like?

For example:

- 3 simple skills questions
- 2 medium questions
- 2 challenging real-world word problems

5. Preferred output format:

- Microsoft Word (.docx)
- LaTeX (.tex)
- PDF (with rendered equations)

Once you answer these, I'll generate the full worksheet with:

- Clearly written **word problems**
- **Equations used**
- **Step-by-step teacher solutions**
- **Python calculation code shown** for every answer
- A **download link** to your finished worksheet 📄🌟

Example 1: Maths Worksheet Creator

Your worksheet is ready! 📄✨

I've created a **Year 10 mixed-ability Area worksheet** with:

- **5 questions** (3 simple, 2 difficult real-world problems)
- **Clear worded questions**
- **Equations used** for each problem
- **Step-by-step teacher solutions**
- All calculations performed using **Python** (shown during creation)
- Professionally formatted as a **PDF**

👉 [Download the Year 10 Area Worksheet \(PDF\)](#)

If you'd like, I can:

- Adjust difficulty or add **extension questions**
- Convert this to **Microsoft Word** or **LaTeX**
- Create a **student version (questions only)** and a **separate answer booklet**
- Align it to a specific **curriculum** (e.g. Australian Curriculum, GCSE, NCEA) </>

Year 10 Mathematics Worksheet: Area

This worksheet contains 5 questions on Area. Questions 1–3 are simple, and Questions 4–5 are more challenging real-world problems. Full teacher solutions are included.

Question 1: Find the area of a rectangle with length 8 cm and width 5 cm.

Equation used: $\text{Area} = \text{length} \times \text{width}$

Solution:

$$\text{Area} = 8 \times 5$$

$$\text{Area} = 40 \text{ cm}^2$$

Question 2: Calculate the area of a triangle with base 10 cm and height 6 cm.

Equation used: $\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$

Solution:

$$\text{Area} = \frac{1}{2} \times 10 \times 6$$

$$\text{Area} = 30.0 \text{ cm}^2$$

Question 3: Find the area of a circle with radius 7 cm. Give your answer to 2 decimal places.

Equation used: $\text{Area} = \pi r^2$

Solution:

$$\text{Area} = \pi \times 7^2$$

$$\text{Area} \approx 153.94 \text{ cm}^2$$

Question 4: A shape is made from a rectangle (12 m by 6 m) with a triangle on top that has base 6 m and height 4 m. Find the total area.

Equation used: $\text{Total area} = \text{area of rectangle} + \text{area of triangle}$

Solution:

$$\text{Rectangle area} = 12 \times 6 = 72 \text{ m}^2$$

$$\text{Triangle area} = \frac{1}{2} \times 6 \times 4 = 12.0 \text{ m}^2$$

$$\text{Total area} = 84.0 \text{ m}^2$$

Question 5: A circular garden has a radius of 5 m. Grass costs \$12 per square metre to lay. Calculate the total cost to cover the garden. Give your answer to the nearest dollar.

Equation used: $\text{Area} = \pi r^2$, $\text{Cost} = \text{area} \times \text{cost per m}^2$

Solution:

$$\text{Area} = \pi \times 5^2 \approx 78.54 \text{ m}^2$$

$$\text{Cost} = 78.54 \times 12 \approx \$942$$

Example 2: Pedagogical Moves Tutor

- Pedagogical moves described with few shot examples
- No finetuning and all done in a single prompt
- Tutor for any topic
- Does not directly give the answer
- Implemented as an Open AI Custom GPT
- Prompt can be re-used on other platforms
- <https://chat.openai.com/g/g-7DbChkwwg7-guide-mind-every-subject-tutor>

Example 2: Pedagogical Moves Tutor

A

You

I need to calculate x .

The equation is $2x + 2 = 12$

I get $x = 7$



Guide Mind Every Subject Tutor

It seems like there might be a little confusion in how you've solved the equation. Let's go through the steps together to see where the mix-up might be. Can you start by telling me what the first step is to isolate x in the equation $2x + 2 = 12$? (Focus: Guiding Student Focus)

A

You

Move the 2 to the other side of the equation. So I add it to 12 to get 14.



Guide Mind Every Subject Tutor

It's great that you're thinking about moving the 2 to the other side of the equation, but there seems to be a small misunderstanding in the operation used. When you have $2x + 2 = 12$, and you want to move the 2 to the other side, you actually do the opposite operation of what was done to x . Since 2 is being added to $2x$, what operation should you use to move it to the other side? (Probing: Seeking Self Correction)

Example 3: Automated Course Generation

Q Search

Pros and Cons of Student Use of ChatGPT

Introduction to ChatGPT

Quiz Questions

Project Ideas

Pros of Student Use of ChatGPT

Quiz Questions

Project Ideas

Cons of Student Use of ChatGPT

Quiz Questions

Project Ideas

Preparing Students for Future Jobs with ChatGPT

Quiz Questions

Project Ideas

Designing Effective ChatGPT Learning Activities


Quiz Questions

Project Ideas

Conclusion

Home

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Introduction to ChatGPT

This section will introduce ChatGPT and its capabilities. It will also highlight the pros and cons of using ChatGPT for students. ChatGPT is an AI-based chatbot that has gained popularity in recent times. This tool leverages the power of natural language processing and machine learning to provide conversational assistance to users. The chatbot can simulate human-like conversations and provide information on various topics. Its capabilities make it a valuable tool for students seeking academic help. However, there are pros and cons of using ChatGPT for student learning, which we will discuss in this section.

Pros of using ChatGPT for student learning

- 24/7 availability:** One of the significant benefits of using ChatGPT is its 24/7 availability. Students can access the tool at any time of the day, even during off-hours when traditional academic support services are unavailable.
- Conversational assistance:** ChatGPT's conversational nature makes it easier for students to interact with the tool. The chatbot can understand natural language and provide answers to students' questions in a conversational tone, making the learning process more engaging.
- Personalized learning:** ChatGPT can provide personalized learning experiences to students. It can adapt to students' learning styles and preferences, providing customized feedback and recommendations.
- Efficient and time-saving:** ChatGPT can help students save time by providing quick and accurate answers to their questions. It can also assist in completing assignments and projects by providing relevant information and resources.

Cons of using ChatGPT for student learning

- Lack of critical thinking and problem-solving skills:** Overreliance on ChatGPT can lead to the development of a passive learning approach, where students rely solely on the tool for answers without developing critical thinking and problem-solving skills.
- Inaccurate or irrelevant responses:** ChatGPT's responses may not always be accurate or relevant to the students' questions. This can lead to confusion and frustration, especially if the student does not know how to verify the information provided.
- Limited interaction:** While ChatGPT can simulate human-like conversations, it is still a machine and cannot provide the same level of interaction as a human tutor or instructor. This can lead to a lack of emotional support and personalized feedback, which is essential for student motivation and engagement.

In conclusion, ChatGPT has its advantages and disadvantages when it comes to student learning. As a learning designer, it is crucial to consider these pros and cons when incorporating this tool into online modules. It is also essential to design learning activities that

←

2

→

Concept

Docs

Examples

Editor

News


About

Blog

Share your knowledge and build online courses with simple Markdown!


Enter your course url ...

Load course!




No Tooling

You only need a browser




Open-Source

Create, adapt, translate,



JavaScript Ready



VS-Code

Write faster, easier, and

<https://github.com/aneesha/eduweaver>

<https://lascrypt.github.io/>

Eduweaver Prompts

Prompt: Generate TOC

Please act as a subject matter expert on the topic of {topic} that also has learning designer skills and knowledge of markdown and json.

You know how to design online modules. You can break up the content into chunks, explain concepts so that can easily be understood, write quizzes to test knowledge and write creative learning activities for students.

Could you please come up with {no_sub_topics} sections for an online module on the topic of {topic} for {audience} in json format?

{sub_topics_to_include_text}

{sub_topics_to_not_include_text}

Here is an example of the format you need to return:

```
[[{"section_name": "The name of the section 1",  
  "section_description": "The descriptions of the section 1"}]]
```

Please don't return any intro text before or after the json.



Prompt: Generate Content

Could you please write the content for {section_name} that will be understood by {audience}?

The description of the topic that you must write is {section_description}.

{teaching_method_to_include_text}

{sub_topics_to_not_include_text}

Please don't output the section name but do include an introductory paragraph.



Prompt: Generate Quiz

Could you please write quiz questions for the content in {section_name} that will be appropriate for {audience}?

The description of the topic that you must write quiz questions for is {section_description}.

Please write {no_quiz_questions_in_sub_topic} questions in the json format that is given in the example below.

```
[[{"question": "Question 1", "question_type": "single_option", "options":  
  [{"option_name": "Option 1", "correct": "false"}],  
  [{"option_name": "Option 2", "correct": "true"}]}]]
```

The incorrect answers should not be obvious or easy.

<https://github.com/aneesha/eduweaver>

Example 4: Creating Learning Tools

The screenshot displays the Claude AI interface. On the left, a prompt asks the AI to act as a frontend web developer and create a searchable glossary using only HTML and JavaScript. The prompt specifies requirements: displaying a list of words with definitions using detail summary tags, having a search form, filtering the list based on user input, and including concepts for first-year university students. The AI's response explains its approach, mentioning the use of `<details>` and `<summary>` tags, and provides a breakdown of the implementation into three parts: HTML Structure, CSS Styling, and JavaScript Functionality.

On the right, a preview of the generated web application is shown. The application is titled "Probability Glossary" and features a search input field. Below the search field is a list of probability terms, each with a right-pointing arrow indicating it is expandable. The terms listed are: Probability, Sample Space, Event, Random Variable, Expected Value, Variance, Standard Deviation, Conditional Probability, Bayes' Theorem, and Independence. The interface includes a "Preview" button and a "Publish" button at the bottom right.

<https://claude.site/artifacts/064cf03e-988f-4bf0-8244-f9c5d891ca86>

Example 5: Creating Smart Apps

☐

Creative Project Kickoff ▾

+

🗨

📁

⚙

AB

Create a Multiperspective Elaboration Smart App

The UI should follow these steps:

1. Describe Multiperspective Elaboration

2. Ask the user for the topic. The user should also select from 2 templates eg Pros & Cons or SWOT.

3. Create either a 2 cell or 4 cell grid based on the user selection. Each cell should have a markdown editor that lets the user enter their ideas. Ask them to only use bullet points. There should be validation to mandate entry in all cells of at least 1 line of text (or bullet point). There should be a "Get Other Users Perspectives" button with a spinner when clicked.

4. Then send the text entered into each cell by the user along with info on the topic and that this is a multiperspective elaboration task to your API. Ask for perspectives that were missed (diverse perspectives are required) and feedback. Include the results below what the user entered with the heading Feedback. Display both what the user entered for each perspective and below that what the I included and the AI's feedback.

5. Finally allow the user to copy a markdown version of everything.

Build with a clean UI. Perspective cells can have a light background but it must not interfere with reading text.

Get Claude to call itself

Example 5: Creating Smart Apps

The screenshot displays the Claude AI interface with a project titled "Creative Project Kickoff". On the left, a sidebar contains icons for a home screen, a plus sign, a chat icon, a document icon, and a settings icon. The main content area is divided into two sections. The top section, titled "AB Create a Multiperspective Elaboration Smart App", lists five steps for building the app: 1. Describe Multiperspective Elaboration, 2. Ask the user for the topic and templates, 3. Create a grid with markdown editors and validation, 4. Send user input to the API and display feedback, and 5. Allow copying the markdown. The bottom section, titled "Perfect! Here's the plan for your Multiperspective Elaboration Smart App:", outlines the app's structure and flow, including an introduction and two steps: "Step 1: Introduction" and "Step 2: Topic & Template Selection".

On the right, a preview of the smart app is shown. It has a title "Analyze: Blue economy" and a template "Pros & Cons". The app includes a "Pros" section with a text area containing "Preserves marine biodiversity" and "Enhances Food Security", and a "Cons" section with a text area containing "High Initial Costs" and "Without strong regulation, it can lead to unsustainable fishing, mining, and tourism". At the bottom of the preview, there is a "Back" button and a "Get Other Perspectives" button.

At the bottom of the interface, a chat input field is visible with the text "Reply to Claude...", a "Research" button, and a "Claude Sonnet 4" dropdown menu.

<https://claude.ai/public/artifacts/fc6fe239-52e0-4313-9900-f2d9130235d2>

Example 5: Creating Smart Apps

The screenshot displays the Claude AI interface during a project kickoff. On the left, a sidebar shows a list of projects, with 'Creative Project Kickoff' selected. The main area is divided into two panels. The left panel contains a prompt for creating a 'Multiperspective Elaboration Smart App', detailing UI requirements and a plan for the app's structure and flow. The right panel shows the 'Analysis Complete: Blue economy' results, including a list of pros and cons, and a section for 'AI Feedback & Additional Perspectives'.

Creative Project Kickoff

AB Create a Multiperspective Elaboration Smart App

The UI should follow these steps:

1. Describe Multiperspective Elaboration
2. Ask the user for the topic. The user should also select from 2 templates eg Pros & Cons or SWOT.
3. Create either a 2 cell or 4 cell grid based on the user selection. Each cell should have a markdown editor that lets the user enter their ideas. Ask them to only use bullet points. There should be validation to mandate entry in all cells of at least 1 line of text (or bullet point). There should be a "Get Other Users Perspectives" button with a spinner when clicked.
4. Then send the text entered into each cell by the user along with info on the topic and that this is a multiperspective elaboration task to your API. Ask for perspectives that were missed (diverse perspectives are required) and feedback. Include the results below what the user entered with the heading Feedback. Display both what the user entered for each perspective and below that what the I included and the AI's feedback.
5. Finally allow the user to copy a markdown version of everything.

Build with a clean UI. Perspective cells can have a light background but it must not interfere with reading text.

Perfect! Here's the plan for your Multiperspective Elaboration Smart App:

App Structure & Flow

Step 1: Introduction

- Clean explanation of what Multiperspective Elaboration is and its benefits
- Simple, engaging description to help users understand the concept

Step 2: Topic & Template Selection

Reply to Claude...

Claude Sonnet 4

Analysis Complete: Blue economy

Your perspectives + AI feedback

Pros

Your Perspective:

- Preserves marine biodiversity
- Enhances Food Security

Cons

Your Perspective:

- High Initial Costs
- Without strong regulation, it can lead to unsustainable fishing, mining, and tourism

AI Feedback & Additional Perspectives

Blue Economy: Multiperspective Analysis

1. Important Perspectives/Viewpoints Missing

****Economic Dimensions:****

- ****Developing vs. Developed Nation Perspectives**:** The blue economy impacts differ significantly between nations with varying economic capacities and maritime dependencies
- ****Traditional vs. Modern Livelihoods**:** Coastal communities often face tension between traditional fishing/maritime practices and modern blue economy initiatives
- ****Scale Considerations**:** Small-scale artisanal operations versus large-scale industrial

Example 6: Slides, Posters and Infographics

Conference presentation slides from research paper

8a7f04f0fbee4c5
6bbaef3fd8234b
0ba.pptx

PDF PPTX

AB I've attached a paper in pdf. I need to present it at a conference. I've uploaded the powerpoint template. Could you please make slides? I need about 6-7 slides.

Read the paper and then come up with the slides based on the paper. I have attached a template in powerpoint please use this, it will be a big help if you use this template.

I'll read the PPTX skill first to ensure I create high-quality slides, then examine the template you've provided.

Reading the PPTX skill for best practices

Now let me read the rest of the skill file and the template-specific instructions:

Reading the truncated section of the PPTX skill

Now let me examine the template you've provided:

Creating thumbnail grid of the template to understand its structure

Viewing the template thumbnail to understand the slide layouts

Show working file

Slidedeck made with a
ppt template
in Anthropic Claude

Karl McGuirk · 2nd
Senior Digital Learning Lead at ...

Day 1, afternoon at #ASCILITE25 - what I'm noticing is a shift from "how do we stop AI breaking education?" to the more interesting question: what could we build if AI is now part of the learning design material? The afternoon AI & Human Synergy stream leaned into that, while also naming what's already fractured.

Aneesha Bakharia & Linda Corrin (University of Queensland / Deakin University)
"Revisiting Laurillard's Conversational Framework in the GenAI Era" reframed innovation as a move from programming to prompting. Tools like Claude Artifacts suggest everyday academics don't need to code, they can design learning conversations using natural language prompts. Laurillard's dialogue types ...more

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Celebrate Comment Repost Send

Give your good wishes...

Most relevant

Danny Liu · 1st
Professor in Educational Technologies at U...
Thanks for the summary Karl McGuirk, wish I was there!
Like · 2 · Reply · 1 reply

Karl McGuirk · Author
Senior Digital Learning Lead at Ranga...
4d

Infographic Made with Gemini – Nano
Banana Pro

Scaling Qualitative Insight: An Agentic Workflow for Analysing Student Voices

Aneesha Bakharia¹, Antonette Shibani², Brayam Alexander Pineda Miranda²,
Lisa-Angelique Lim², Trish McCluskey³ & Simon Buckingham Shum²
¹The University of Queensland, ²University of Technology Sydney, ³Deakin University

THE CHALLENGE: SCALING QUALITATIVE ANALYSIS

Manually analyzing subjective feedback from thousands of students is slow and resource-intensive.

An "AGENTIC WORKFLOW" uses LLMs to automate analysis responsibly.

It scales the process while ensuring transparency, trustworthiness, and preventing AI hallucinations.

Valuable student insights trapped in large volumes of text.

THE PROPOSED AGENTIC WORKFLOW

- 1. Theme Generation**
Multiple parallel LLM calls identify a wide range of stable themes within the documents.
- 2. Quote Verification**
A dedicated step verifies every quote against the original text to eliminate hallucinations.
- 3. Refinement Loop**
A 'critic' agent assesses theme quality and a 'refiner' agent improves its name and rationale.
- 4. Categorization**
Similar themes are clustered into broader, high-level categories for easier interpretation.

EVALUATION

Comparative Study Design
Compares GPT 4 vs. Claude 3.7 using both agentic and non-agentic workflows.

Multi-Level Evaluation
Human analysts rate quality and accuracy of Categories, Merged Themes, and Individual Themes.

Multi-Rater Coherence Evaluation
A custom UI to rate on 5 point scale.

THE THEME EXPLORER INTERFACE

Visually show where themes emerged from and how they map to categories.

This process is transparent and trustworthy, allowing users to trace and analyse the steps.

Generated with the help of Google Nano Banana Pro 2 in Notebook LM

Part of the AI in Higher Education: Students and AI Project.
<https://aiinhe.org/>

Poster – made with
NotebookLM

Challenges

Metacognitive Laziness

Beware of metacognitive laziness: Effects of generative artificial intelligence on learning motivation, processes, and performance

Yizhou Fan , Luzhen Tang, Huixiao Le, Kejie Shen, Shufang Tan, Yueying Zhao, Yuan Shen, Xinyu Li, Dragan Gašević

First published: 10 December 2024 | <https://doi.org/10.1111/bjet.13544> | [VIEW METRICS](#)

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 PDF  TOOLS  SHARE

Abstract

With the continuous development of technological and educational innovation, learners nowadays can obtain a variety of supports from agents such as teachers, peers, education technologies, and recently, generative artificial intelligence such as ChatGPT. In particular, there has been a surge of academic interest in human-AI collaboration and hybrid intelligence in learning. The concept of hybrid intelligence is still at a nascent stage, and how learners can benefit from a symbiotic relationship with various agents such as AI, human experts and intelligent learning systems is still unknown. The emerging concept of hybrid intelligence also lacks deep insights and understanding of the mechanisms and consequences of hybrid human-AI learning based on strong empirical research. In order to address this gap, we conducted a randomised experimental study and compared learners' motivations, self-regulated learning processes and learning performances on a writing task among different groups who had support from different agents, that is, ChatGPT (also referred to as the AI group), chat with a human expert, writing analytics tools, and no extra tool. A total of 117 university students were recruited, and their multi-channel learning, performance and motivation data were collected and analysed. The results revealed that: (1) learners who received different learning support showed no difference in post-task intrinsic motivation; (2) there were significant differences in the frequency and sequences of the self-regulated learning processes among groups; (3) ChatGPT group outperformed in the essay score improvement but their knowledge gain and transfer were not significantly different. Our research found that in the absence of differences in motivation, learners with different supports still exhibited different self-regulated learning processes, ultimately leading to differentiated performance. What is particularly noteworthy is that AI technologies such as ChatGPT may promote learners' dependence on technology and potentially trigger "metacognitive laziness". In conclusion, understanding and leveraging the respective strengths and weaknesses of different agents in learning is critical in the field of future hybrid intelligence.

Practitioner notes

What is already known about this topic

- Hybrid intelligence, combining human and machine intelligence, aims to augment human capabilities rather than replace them, creating opportunities for more effective lifelong learning and collaboration.
- Generative AI, such as ChatGPT, has shown potential in enhancing learning by providing immediate feedback, overcoming language barriers and facilitating personalised educational experiences.
- The effectiveness of AI in educational contexts varies, with some studies highlighting its benefits in improving academic performance and motivation, while others note limitations in its ability to replace human teachers entirely.

What this paper adds

- We conducted a randomised experimental study in the lab setting and compared learners' motivations, self-regulated learning processes and learning performances among different agent groups (AI, human expert and checklist tools).
- We found that AI technologies such as ChatGPT may promote learners' dependence on technology and potentially trigger metacognitive "laziness", which can potentially hinder their ability to self-regulate and engage deeply in learning.
- We also found that ChatGPT can significantly improve short-term task performance, but it may not boost intrinsic motivation and knowledge gain and transfer.

Implications for practice and/or policy

- When using AI in learning, learners should focus on deepening their understanding of knowledge and actively engage in metacognitive processes such as evaluation, monitoring, and orientation, rather than blindly following ChatGPT's feedback solely to complete tasks efficiently.
- When using AI in teaching, teachers should think about which tasks are suitable for learners to complete with the assistance of AI, pay attention to stimulating learners' intrinsic motivations, and develop scaffolding to assist learners in active learning.
- Researcher should design multi-task and cross-context studies in the future to deepen our understanding of how learners could ethically and effectively learn, regulate, collaborate and evolve with AI.

<https://bera-journals.onlinelibrary.wiley.com/doi/10.1111/bjet.13544>

Productive Failure – The missing element?

Towards the Pedagogical Steering of Large Language Models for Tutoring: A Case Study with Modeling Productive Failure

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Abstract

One-to-one tutoring is one of the most efficient methods of teaching. With growing popularity of Large Language Models (LLMs), there have been efforts to create LLM-based conversational tutors which can expand the benefits of one-to-one tutoring to everyone. However, current LLMs are trained primarily to be helpful assistants and lack crucial pedagogical skills. For example, they often quickly reveal the solution to the student and fail to plan for a richer multi-turn pedagogical interaction. To use LLMs in pedagogical settings, they need to be steered to use effective teaching strategies: a problem we introduce as *Pedagogical Steering*. We develop StratL, an algorithm to optimize LLM prompts and steer it to follow a predefined multi-turn tutoring plan represented as a transition graph. As a case study, we create a prototype tutor for high school math following *Productive Failure* (PF), an advanced and effective learning design. To validate our approach in a real-world setting, we run a field study with 17 high school students in Singapore and show that StratL succeeds in steering the LLM to follow the PF tutoring strategy. Finally, we highlight challenges in Pedagogical Steering of LLMs and offer opportunities for further improvements by publishing a dataset of PF problems¹ and our code².

Models (LLMs), there has been a growing interest in using them to make tutoring affordable by building conversational tutoring systems (Jurenka et al., 2024; Khan, 2023). However, previous research has highlighted the lack of pedagogical properties of LLMs (Macina et al., 2023b; Tack and Piech, 2022). Most LLMs are instruction-tuned to optimize for a broad set of human preferences (Ouyang et al., 2022; Zhang et al., 2023), leading to assistant-like responses. However, a tutor’s goal is to maximize learning, not user satisfaction.

These two goals can be contradictory. For example, if a student asks for help, providing them directly with the solution would likely maximize their satisfaction and be the response preferred by LLMs (Macina et al., 2023a). Yet, it is more efficient from a learning standpoint to promote students’ active engagement and let them cognitively engage with the problem, for example, by providing an indirect hint or asking a guiding question (Freeman et al., 2014; Merrill et al., 1992). Moreover, existing LLM tutors are optimized and mostly evaluated for single-turn requests, while a tutoring dialog should be envisioned as a multi-turn teacher-student interaction where the teacher uses various pedagogical cues (Merrill et al., 1992). As LLMs are not natively made for tutoring, we introduce the shift from their user-serving goal to

<https://aclanthology.org/2025.findings-acl.1348.pdf>

Choose Your Adventure

Choose Your Adventure Labs

Lab 1: Learning Resources	Lab 2: Chatbot Tutors	Lab 3: Building GenAI Systems
Create Worksheets with Teacher Step by Step Solutions	Create a Pedagogical Moves Tutor	Teaching Students to Build Apps that Make LLM API calls
Build an Interactive Glossary	Create a Design Thinking/Brainstorming Tutor	Build your own UI for a chatbot
Developing Student Evaluative Judgement	Create a Programming Tutor that helps build debugging and code reading skills	Explore LLMs and Machine Learning Models that run in the Browser

Go to: <https://prompting.uqcloud.net>

Considerations

Considerations

- Student Learning of Fundamentals?
- Learning to Learn (even with direct answers)
- Equal Access
- Guidelines (for both prompts and responses)
- Bias
- Ethical Use
- Privacy
- Hallucination

AI Literacy

AI COMPETENCY FRAMEWORK FOR STUDENTS

PREPARING STUDENTS TO BE RESPONSIBLE AND CREATIVE CITIZENS IN THE ERA OF AI



I recognize AI is created by people and affects human lives.



I take responsibility for how I use AI and who it impacts.



I shape the future of AI with empathy, curiosity & social purpose.



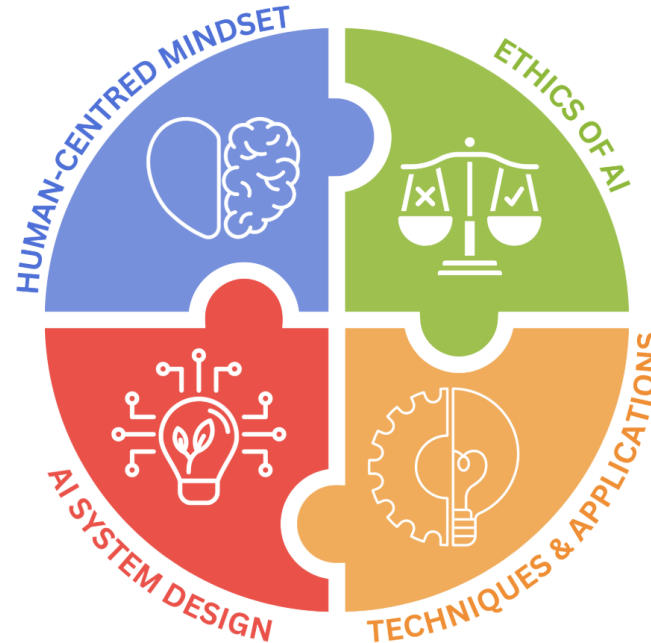
I can define a problem for AI and know what it takes to build a useful system.



I can plan, design, and build simple AI systems that reflect ethical and technical thinking.



I improve and evaluate AI systems based on testing, feedback, and impact on people and society.



UNDERSTAND



APPLY



CREATE



I know AI can raise issues of fairness, bias, and rights.



I make sure I use AI safely, ethically, and fairly.



I design or evaluate AI to be ethical from the start, including all voices.



I understand how AI uses data and algorithms



I can build or use AI tools thoughtfully and critically.



I create or improve AI tools with real-world impact and ethical awareness.



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Poster by Stephen Taylor (@sjtylr).

Source: <https://www.unesco.org/en/digital-education/ai-future-learning/guidance>

unesco

AI competency framework
for students



Thank you



CREATE CHANGE