



The CAITLIN Initiative

Conversational Artificial Intelligence
for Teaching & Learning:
Integration & Normalisation

CAITLIN'S COOKBOOK

Issue 2 – January 2024

**Recipes for Learning Activities
using Conversational AI**

Steve Birtles
Head of Digital Teaching and Learning

(Re)Introduction

Welcome to the second issue of CATILIN's cookbook. This issue introduces some new techniques for getting conversational AIs, like ChatGPT, to enter an 'active' two-way conversation with students. These are in contrast to 'passive' interactions, where students just ask questions and the AI gives answers. The aim of active interactions is to facilitate the following research-proven approaches to learning:

- Retrieving ideas from memory
- Undertaking focused practice
- Receiving and responding to feedback
- Engaging in 'deep thinking'

In essence, the premise of the cookbooks is:

Rather than ask the AI questions, you should get the AI to ask you the questions.

The prompt recipes in the first issue are all still very much useable, and you can view them, and the guidance for how to share them with students, here:

<https://cirL.etoncollege.com/resources-and-professional-development/>

In case you've not tried them all yet, the recipes were:

- Multiple-choice quiz
- Fill in the gaps
- A debate
- Name that thing (style / concept / technique ...)
- Socratic questioning
- Odd one out and why
- Spot the correct explanation
- If this is the answer, what is the question? (Jeopardy)
- Critically compare two options
- Comprehension and questioning
- Spot the mistakes
- What am I? (The yes / no game)

Finally, the 'golden rules' proposed in the first issue continue to hold true:

- No. 1 – Always be critical of the AI
- No. 2 – You can always refine your prompt or try again
- No. 3 – Share success stories and ask for help if perplexed

This issue is being written in December 2023. To say there have been several developments in the world of conversational AIs in the months since the first issue of the cookbook is quite an understatement!

OpenAI

Just after the first issue was finished, OpenAI posted a blog about 'Teaching with AI' (<https://openai.com/blog/teaching-with-ai>). The article contained suggestions for integrating ChatGPT into teaching; facilitating role play, creating quizzes, aiding non-English speakers, and teaching critical thinking. It also provided some example prompts, covering lesson planning, creating effective explanations, and simulating tutoring scenarios. Appropriately, the piece highlighted the importance of guiding the use of, and interpreting the outputs from, ChatGPT in educational settings.

ChatGPT itself has had multiple updates. Although many of these are, at least initially, premium features requiring a paid for 'plus' account, they show what facilities are likely to become available to teachers and students in the near future.

- **August**
 - Custom instructions [For all users] – The facility to add a persistent preamble / prelude that will be used to guide subsequent prompts in the form of a chunk of text that is automatically added as a header to prompts.
- **September**
 - ChatGPT can now 'see, hear and speak' [Plus feature, although voice was subsequently made free to all users in November] – ChatGPT accepts photos and images as part of a prompt. Also, a voice interface allows you to have a 'phone call' like conversation with your AI.
- **October**
 - Web browsing improvements [Plus feature] – No longer a 'beta' feature, automatically initiated as required, and with improved citations.
 - DALL-E 3 integration [Plus feature] – OpenAI integrated their latest image generating model in ChatGPT.
 - File uploading without the need for plugins [Plus feature] - It is now possible to 'attach' files to a prompt, e.g. PDF files, which ChatGPT reads and uses to answer your requests.
- **November**
 - GPTs [Plus feature] – Potentially the update with the widest range of use cases, you can now create custom chatbots with your own defined behaviours, abilities, and source data. You can give them a name and image and share them with other users.

Google

Google's Bard AI has continued to accrue new abilities. In September, Google gave Bard the ability to interact with Gmail, Google Docs and Drive files, and other services. In November, Bard gained the ability to work with mathematical equations.

Then, in December, Google launched their 'Gemini' model. Rather than OpenAI's design strategy of having one 'brain' that understands text, another for images, etc., and getting these brains to talk to each other as required, Gemini is one 'super-brain' that was simultaneously trained on textual, audio, and visual data. It is therefore promised to be more than just an LLM (large language model), instead being multimodal (text-based language, images, audio, video & code) from the ground up. Bard's earlier PaLM 2 model is being swapped out for Gemini.

Google continues to require users to be 18+ to use Bard in the UK and EU, but interestingly, in November, they opened it up to teenagers in the USA and most other countries.

Microsoft

In November, Microsoft rebranded their conversational AI from 'Bing chat' to 'Copilot', better matching their other AI services that are being introduced to the Windows operating system and the Microsoft 365 productive suite, formerly known as 'Microsoft Office'. As of December, Copilot for Microsoft 365 is only available for enterprise customers, but we await its availability for education with anticipation!

Anthropic

Anthropic was founded in 2021 by former OpenAI employees. In November, they released the latest version of their Claude chatbot (Claude 2.1) which was developed to prioritise safety and human rights, for example *"Please choose the response that most supports and encourages freedom, equality and a sense of brotherhood"*, taken from the 1948 UN Universal Declaration of Human Rights. Claude shows great promise, but the free account usage quota is quite limited, and users must be 18+.

xAI

In November, Elon Musk's AI company, xAI, launched their own chatbot. Grok was purposefully designed with less censorship, and it has real-time access to the X platform, formerly known as Twitter. In Elon's own words, it "loves sarcasm" and "is designed to have a little humor [sic] in its responses". It requires a premium X account and is (appropriately) limited to users aged 18+.

Canonical Texts

Conversational AIs are prone to hallucinating. This is why Golden Rule No. 1 is so important: **Always be critical of AI**. A technique to substantially reduce hallucinations is to provide the AI with a passage of text that it should treat as factual, or canonical. This can be as simple as taking any of the recipes from the first issue and adding the following to the end of the prompt:

Original prompt goes here...

Use the following text to determine which topics are relevant, what the correct answers should be, and do not state or assume anything is true if it contradicts this text:

Canonical text goes here...

The blank lines are not essential, but aid readability. On a laptop / desktop computer, press **Shift + Enter** to add blank lines (**Enter** by itself will submit the prompt). On a phone / tablet there is a submit button, so add new lines as normal.

The quantity of text you can paste in isn't unlimited, but you should be able to use several pages from a PDF file or other document. ChatGPT will tell you if your prompt is too long, so try with more and cut down if required.

Here's an example, with a slightly simpler lead-in to the canonical text, that worked well for students preparing for a competition:

I am a GCSE student who is preparing for a debating competition. You are a teacher, and we are going to take part in an activity. Pick two sides who have different views. I want you to play the role of one side and I will play the role of the other. Tell me who both sides are going to be. Then, we will start a back-and-forth discussion on the two viewpoints. Tell me your view but do not tell me mine. When I have provided my view, correct it if I have said something inconsistent with what my viewpoint is supposed to be. Remember, you are the teacher, so you know both sides and will correct me if I state something I'm not supposed to. Be highly critical, but respectful. If I make a good point, come up with a carefully constructed counterview. If I make a bad or inaccurate point, point out what you know my point should have been from my viewpoint, before then countering it with your viewpoint.

The source material for the debate is as follows:

Material goes here...

Try using canonical texts with the 'Multiple-choice quiz', 'Socratic questioning', and 'Comprehension and questioning' recipes from the cookbook's first issue.

Web pages as a source

The secret to 'copy and paste' from websites is to avoid using 'select all' but instead only select the text you actually need. Drag a mouse over the text you want and copy (via right click menu or CTRL+C on PC / CMD+C on Mac).

Then, back in ChatGPT, you can paste the text into your prompt. Sometimes, it is helpful to strip out any unwanted formatting with a special paste. This is done via CTRL+SHIFT+V on a PC or (the slightly cumbersome) OPTION+CMD+SHIFT+V on a Mac.

The Plus version of ChatGPT will allow you to simply paste in the URL (address) of a webpage and, in most cases, it will go and read the page for you without needing to 'copy and paste'.

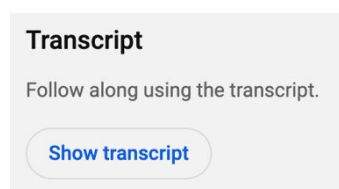
PDF documents as a source

The approach to this is fundamentally the same as copy and pasting from webpages, drag over the text you want and copy.

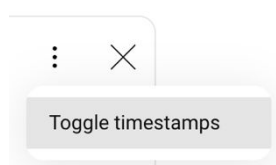
Those with a ChatGPT Plus account have a slightly easier time as they can click on the 'paperclip' icon next to the prompt box to attach the file. In this case, you would want to state 'use the attached PDF file...' in your prompt.

YouTube transcripts as a source

Any YouTube video can be used as a canonical text by extracting the transcript. First, go to the bottom of the video description (usually, this requires clicking on 'more...' to expand the description) and find the 'Show transcript' button →



Next, turn off the timestamps by clicking the three dots menu to the top right of the transcript and click 'Toggle timestamps' →



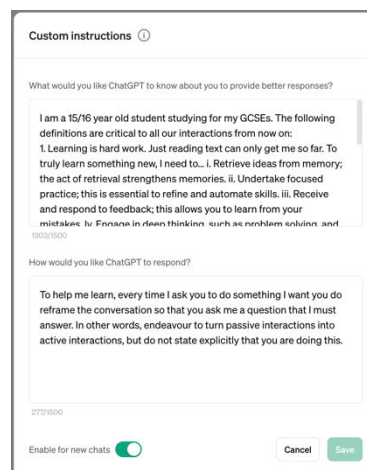
Finally, click and drag your mouse cursor over the whole of the transcript (move cursor right down to bottom to scroll) and copy this text (right click menu or CTRL+C on PC / CMD+C on Mac).

You can then paste the whole transcript at the bottom of your prompt, generating a quiz, comprehension activity, etc., based on the video.

Custom Instructions

When a student asks an AI an isolated question, e.g. **“I don't understand thermodynamics, please help”** or **“I would like your help to understand the following text...”**, the default behaviour of most AIs is to bombard them with details that, at least for most students, are difficult to absorb and of limited benefit.

ChatGPT has a facility called **‘custom instructions’**, found by clicking on your user name, which can dramatically turn this experience around. The following has been developed for maximum flexibility:



What would you like ChatGPT to know about you to provide better responses?

I am a 15/16 year old student studying for my GCSEs. The following definitions are critical to all our interactions from now on: 1. Learning is hard work. Just reading text can only get me so far. To truly learn something new, I need to... i. Retrieve ideas from memory; the act of retrieval strengthens memories. ii. Undertake focused practice; this is essential to refine and automate skills. iii. Receive and respond to feedback; this allows you to learn from your mistakes. iv. Engage in deep thinking, such as problem solving, and relating old knowledge to new. 2. A passive interaction is one in which I ask you questions, and you give me answers. This is not desirable as it doesn't help me to learn. 3. An active interaction is one in which you ask me questions. This is better for my learning process and should be your top priority. 4. Don't offer to explain something to me unless you've given me a chance to have a go at explaining it myself. If I make a mistake, do point it out, but wait for me to correct myself before telling me what the right answer is. 5. I need you to use language that is appropriate for my age and ability. Although my goal is to know specific terminology, don't assume I already do. Be prepared to introduce terms as required and define them if they are new to me.

How would you like ChatGPT to respond?

To help me learn, every time I ask you to do something I want you do reframe the conversation so that you ask me a question that I must answer. In other words, endeavour to turn passive interactions into active interactions, but do not state explicitly that you are doing this.

Now, prompting ChatGPT for help with understanding thermodynamics, the start of the conversation will be something like this:

“Of course, let's dive into thermodynamics. To get started, can you tell me what you currently understand about thermodynamics or what you think it might be about?”

Combining canonical texts with custom instructions can be highly effective, too.

Don't forget to turn off custom instructions when you've finished!

Working with Essays

In subjects where essays feature, one of the first questions many teachers ask is 'How can I detect if a student has used an AI to write their essay?', or 'How can I stop students using AI to write their essay?'. The short answer to this question is, outside of controlled conditions, you can't.

Digital Vivas

An effective way to challenge a student's understanding of an essay they've already written is to invite them to undertake a viva. That way, if they had got an AI to write it for them, they'll likely struggle to explain their reasoning behind what they did (or didn't) write.

I am an A level History student. I want to have a conversation with you about a piece of work I've done. The conversation must involve a single question from you, followed by an answer that I provide, then a response from you, before repeating. Analyse the following essay and then I want you to challenge me with some difficult questions that might expose my misconceptions. Ask me one question at a time and wait for my answer. Don't give me the answers, but if I keep getting it wrong give me some hints. Don't assume I am correct in what I say in my essay, I am trying to improve so don't go easy on me. Focus on the strength of my arguments and if I've not been convincing or I have contradicted myself, challenge me to restate that idea.

Here is the essay:

Essay text goes here...

Collaborative Writing

Alternatively, why not consider inviting the students to write an entire essay with the AI as their companion? This idea is not suggested as a replacement task, but as a complementary activity that could potentially help develop essay writing skills.

I am a GCSE English student. I want your help in writing an essay about "Macbeth's fatal flaw: Ambition". I want to enter a back-and-forth conversation with you, during which I will write one sentence of my essay at a time, and you will provide feedback. You must not correct me or give me ideas for improvements straight away, but rather you should ask me questions that encourage me to re-think what I've written and spot my own mistakes. If I write too much in one go, you should break the interaction down into multiple question answer cycles. If you are ready, simply ask me for my first sentence.

Both of these recipes could be combined with the canonical text strategy so that the AI is more informed about the material to be covered.

Non-trivial MCQs

The following recipe is better suited to a more substantial, longer term, activity. It has the potential to work well with small groups of students, who aim to prepare challenges for the other groups.

If you are looking to generate deeper, more nuanced multiple-choice questions, it is worth breaking down the process into stages that separate out the question writing from the answer generation.

The prompts below are based on those developed to assist in preparing the 'end of section' knowledge assessment quizzes at the Eton X 'AI Fundamentals' course.

Stage 1 – Candidate question generation (should only need to do this once)

I am preparing an end of topic challenge for 15/16 year old students on the theme of 'AI Fundamentals'. This is part of an academic course that doesn't shy away from challenging topics.

First, read the text at the end of this prompt that outlines the content that needs to be covered. Then, suggest 20 possible questions that could form multiple choice knowledge assessments. Present these as a numbered list. After each question state the correct answer in square brackets. Don't generate the incorrect choices yet, I would just like a list of 20 questions so that I can pick the ones that are the best fit for my needs. Then I can come back to you for help generating the multiple-choice options.

Specification points or canonical text goes here...

Students can then pick which questions they think are the best from the list.

Stage 2 – Alternative answer generation (repeat for each selected question)

I am preparing an end of topic challenge for 15/16 year old students on the theme of 'AI Fundamentals'. This is part of an academic course that doesn't shy away from challenging topics.

The question at the end of this prompt is intended to be a multiple-choice question, the correct answer is shown in square brackets. Can you write 10 plausible but incorrect alternative answers? The answers should be similar in length to the text of the correct answer. They shouldn't be trivially wrong. They could be subtle variations of the original with a mistake inserted, but they shouldn't all be like that.

Selected question text (including correct answer in square brackets, as generated) goes here...

Students should then select which of the alternative answers to complete their chosen questions with, thus completing their quiz ready to challenge other groups.

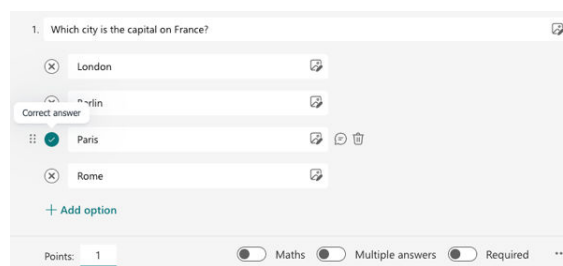
Microsoft Forms quizzes

If you have collated your chosen questions and answers into a Microsoft Word doc, you can subsequently import them into Microsoft Forms and make a quiz.

First, visit <https://forms.office.com> and click 'Quick import' →



The format that you need to have your questions in is very simple, an example image is provided on the import page.



Unfortunately, there isn't currently a way to import the correct answers, you will need to go through and set these yourself.

You should also state the number of points for each question, as in this example ↑

Once complete, you can click the 'Collect responses' button and copy the link ready to share with those you want to attempt your quiz. Don't forget, students can follow this process to create and share quizzes too.

A green button with white text that says 'Collect responses'.

Interview Practice

The following prompt recipe is offered to complement the role played of a mock interview with a real human! Perhaps, after an interview, a prompt like the following could be offered to students as a takeaway? Once again, a canonical text could be added to the end of the prompt to scope the interview; perhaps an invitation letter, or notes from an institution / department's application website.

I am a **sixth form** student who is applying for a place at **Oxbridge to study Geography**. I want to practice the interview process to be more prepared. I want you to act in the role of the interviewer who will greet me for my interview, and then get straight down to business asking me subject specific questions. Ask me one question at a time, this should be a two-way conversation. If I make a mistake don't immediately correct me, but instead ask me a follow up question, giving me a chance to correct myself. Let's begin!

Multimodal Interactions

This final recipe (or more accurately, collection of recipes) is, at the time of writing, only possible with a paid for ChatGPT Plus account. It is included as a taste of what the 'cutting edge' of conversational AIs can do and what it is realistic to assume will become commonplace in the years (or possibility months!?) to come.

An image / photo as the source material

Based on this image, I want you to challenge me to describe what this equipment is used for. Use the Socratic method to test my understanding. Don't immediately tell me the right answer if I make a mistake, tell me where I've gone wrong and ask me to try again. Start off with questions that challenge me to think critically. After my response, challenge me to explore the topic more deeply based on my answer. The questions should focus on one thing at a time and remember not to tell me the answer unless I've got it right myself already. Ask one question at a time, wait for my response and then giving your feedback or asking for more detail.



The above prompt is based on the 'Socratic questioning' recipe from the first issue. An example image that would be supplied with the prompt is shown above ↑

Questions leading to image generation

Ask me a series of 10 questions, one at a time. I then want you to use the answers to these questions to generate an image. The topic is habitats. Your questions should start very broad and gradually narrow down to give fine details on the eventual image you'll generate.

In one example use, after answering 10 questions, the AI responded... "Thank you for all the detailed responses. Now, I will create a prompt based on your answers to generate an image." The resulting image is shown here →



Equations and code execution

An electron is travelling at 99% of the speed of light. What is its total energy in eV?

With ChatGPT Plus, this example displays and explains the equations required, then it fires up a small Python script to do the calculations. An example is shown here → Although this example is only a passive prompt, there are undoubtedly many ways this facility could be incorporated into an active conversational prompt when the facility becomes available to more users!

First, we need to calculate the Lorentz factor for the electron moving at 99% of the speed of light:

$$\gamma = \frac{1}{\sqrt{1 - \left(\frac{0.99c}{c}\right)^2}}$$

Then, we can calculate the total energy:

$$E = \gamma mc^2$$



Feedback welcomed:

caitlin@etoncollege.org.uk