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Using AI to transform adaptive teaching at A level

Jack and Thomas describe the benefits of 'promptcraft' when using ChatGPT, showing how a detailed prompting strategy can provide adapted learning resources to maximise the learning potential of all students.

The impact Artificial Intelligence (AI) will have upon education is one of the most important issues facing educators, but this has not been fully reflected in the wider public debate. At the moment education risks being the 'Cinderella' of the AI story, present but not seen (Seldon and Abidoye, 2018), but this is something we must change, and quickly. The AI revolution has only increased in momentum since Seldon and Abidoye wrote of this challenge, with Large Language Models such as ChatGPT becoming more popular and powerful in the last 18 months.

Building on the articles of Alice Griffiths (2023) and James Hickman and Rajeet Ghosh (2024), we wanted to investigate whether we could use AI to improve the quality of our adaptive teaching. While the term 'differentiation' has declined in popularity in recent years (Eaton, 2022), we would argue it is still a core element of good teaching (Battersby, 2002) which should be at the heart of effective adaptive learning. We have adopted Lambert and Balderstone's definition of differentiation, which sees it as a 'planned process of intervention in the classroom designed to maximise learning potential based on individual needs' (Lambert and Balderstone, 2012, p. 205). We wanted to see if rather than making geography teachers redundant, AI could transform our teaching – without the need for a fairy godmother! This article focuses on methods we have developed for using AI to aid the process of 'planned intervention'.

You only get what you give

When using ChatGPT and other AI platforms, it is important to realise the quality of the response you receive will only ever be as good as the prompt you give. In this regard, the future of teaching may not rely just upon good pedagogical understanding but also one's skills at 'promptcraft' – the ability to ask AI the correct questions to stimulate the response you want (Fitzpatrick *et al.*, 2023). From our experience there are two fundamentals you should bear in mind when developing your 'promptcraft'. Firstly, it is advisable to be as specific as possible when prompting ChatGPT. As you will see from the examples we provide later, we include the following information when prompting:

1. Give ChatGPT information regarding the subject and topic being studied, along with the age of the students you are teaching. We also include the specific awarding body and qualification if appropriate.
2. Explain to ChatGPT the task to be created. The more information you provide the better the response will be. Tasks should include the subject-specific content to be covered, the length of time students are expected to take for the task, the resources available to them, and the style the work should be presented as – PowerPoint presentation, written report, etc.
3. The final component of our prompt is to ask the AI to target their responses at the students and to adapt the tone appropriately, creating either a formal task or a more light-hearted one – such as a pirate-inspired treasure hunt.

Our second fundamental is relevant once the prompt has been entered and the response has been carefully read. Hopefully the response is exactly as desired, but often this will not be the case straight away. Ask the AI to make changes to the task and use the chatbot to develop an 'editing conversation'. This may take time, but it is worth it because once the desired outcome has been achieved, the AI on that chat thread will be conditioned to replicate the process over and over again.

Creating differentiated tasks

We used Bloom's taxonomy because it develops both low-order cognitive skills (LOCS) – remembering, understanding, applying – and high-order cognitive skills (HOCS) – analysing, evaluating and creating (Anderson and Bloom, 2014). This approach is not without its critics, and we accept that learning is not the implied linear path from LOCS to HOCS (Agarwal, 2019). However, it still provides a useful framework for adaptive teaching.

Using the 'promptcraft' technique, we asked ChatGPT to create a range of tasks based on the taxonomy (Figure 1). The suggested tasks provide an excellent starting point for preparing a lesson, but are far from flawless. The main issue was that the timings provided for each activity would not allow students, especially at A level, to tackle the topic in any real depth. The pace expected by the timings would be too demanding and could prove to be self-defeating. Subsequently we adapted the suggested assignment, focusing on three tasks instead of attempting all six, with the remaining three being set for homework. Alternatively, we could have started an editing conversation, asking it to make modifications so that it better suited our needs. We have found this method to be particularly useful.

This example supports the conclusions made by Hickman and Ghosh, namely that AI should be treated as an important part of a teacher's resources but is no substitute for our personal knowledge of students' learning needs (Hickman and Ghosh, 2024). However, it is important not to let the pursuit of the perfect be the enemy of the good, and appreciate that the tasks provided a solid foundation within a matter of seconds.

Input prompt

You are an A level geography teacher, preparing a topic on 'unsuccessful' areas to 16-year-old students. Create a set of tasks that follow Bloom's taxonomy. The tasks should be based on the following learning objective: 'Understand the causes of the spiral of decline and the associated characteristics of less successful areas using the American Rust Belt as an example.' Students will have an hour to complete the task and will have access to the internet for research. Their work should be presented as a written document on a word processor. Ensure all instructions are aimed at the students and are formal in tone.

ChatGPT's response

Geography assignment: The American Rust Belt and the spiral of decline

Learning objective: By the end of this task, you will understand the causes of the spiral of decline and the associated characteristics of less successful areas, using the American Rust Belt as an example.

Duration: 1 hour

Instructions

You will be exploring the concept of the 'spiral of decline' through the lens of the American Rust Belt. Your findings will be presented as a structured word document. Follow the steps outlined below, adhering to Bloom's taxonomy, to guide your research and analysis.

1. **Remembering** (10 minutes)
- Task: List the states traditionally considered part of the American Rust Belt. Find out what the term 'Rust Belt' refers to and why this region earned its name.
- Resources: Use the internet to search for basic information about the Rust Belt, including its geographical boundaries and the origin of its name.

2. **Understanding** (10 minutes)
- Task: Summarize the historical significance of the Rust Belt in the context of the American economy. Explain in your own words why this area was once prosperous and what industries were most prominent.
- Resources: Look for historical data and articles that detail the economic boom in the Rust Belt and its role in American industrial history.

3. **Applying** (10 minutes)
- Task: Identify and describe at least three major factors that led to the Rust Belt experiencing decline. How did these factors contribute to the spiral of decline?
- Resources: Search for economic analyses, scholarly articles, and documentaries that discuss the decline of the Rust Belt.

4. **Analysing** (10 minutes)
- Task: Examine the impact of the Rust Belt's decline on its cities and populations. Consider the social, economic, and environmental consequences. Provide examples of at least two cities within the Rust Belt that have been affected.
- Resources: Use case studies, census data, and news reports to gather information on the current state of Rust Belt cities.

5. **Evaluating** (10 minutes)
- Task: Critically evaluate the efforts made to revitalize the Rust Belt. What strategies have been employed, and how successful have they been? Discuss any ongoing challenges these areas face.
- Resources: Look for articles, government reports, and academic papers on regeneration projects in the Rust Belt, their outcomes, and any criticisms.

6. **Creating** (10 minutes)
- Task: Propose your own solution(s) for addressing the challenges faced by the Rust Belt. Your solutions should aim at stopping or reversing the spiral of decline. Be creative and consider the feasibility of your proposals.
- Resources: Reflect on the information you've gathered and use your understanding of economic and social revitalization strategies to inform your proposals.

Presentation of work

- Compile your findings and analyses into a well-structured document. Include a brief introduction and conclusion, and organize your content according to the tasks above.
- Ensure your document is clear, concise and free of spelling and grammatical errors. Use headings for each section corresponding to the tasks outlined.
- Cite any sources you refer to or quote directly to support your analysis.

Submission

Submit your completed document via the designated platform, or by email, as instructed by your teacher, no later than the end of the designated hour.

Using ChatGPT to improve student access to higher level resources

Developing students' academic skills and resilience has become a central theme in the delivery of contemporary geography curriculums, taking on increasing emphasis after the COVID-19 pandemic and more recently the emergence of consumable AI. In our experience, students are reluctant to engage with more challenging academic literature, which can have a negative impact on their ability to develop effective synoptic capabilities and prevents higher level contextual understanding of geographical concepts.

With effective 'promptcraft', AI can enable teachers to make resources, ranging from newspaper articles to high level academic articles, far more accessible to students. For example, we copied an article from the *Guardian* (Stratton and Travis, 2011) analysing the content of David Cameron's 2011 'Broken Britain' speech into ChatGPT with an instruction to provide an appropriate synopsis. While the outcome provided a useful generic overview of the article (in itself an effective adaptive teaching tool), it needed further modification to make it more relevant to our geographic focus. An 'editing conversation' based on determined criteria between the teacher and ChatGPT can train the AI to produce variations on the outcome. This provides a great opportunity to ask the AI to adapt the summary to fit the particular learning objective.

Similarly, ChatGPT can be used to differentiate vertically within the curriculum. Similarly, ChatGPT can help support the spiral curriculum model, which requires revisiting complex geographical issues in an accessible manner (Ireland and Mouthaan, 2020), by modifying language and making core content accessible to students, and in turn, building confidence in their ability to engage with academic literature.

Figure 1: Prompt and response entered into ChatGPT.

AI is a powerful tool for teachers to engage with to help students develop confidence with academic literature. Yet the role of the teacher as facilitator, interpreter and critic remains pertinent. While AI can provide a useful synopsis, a critical analysis and an evaluation of the provided information, the role of the teacher still remains key. For example, it is the teacher who facilitates and encourages student interpretation of the subtleties of an article's genesis, motives and agendas, while simultaneously developing students' ability to provide a contextual appreciation of the article's true aims.

Differentiated questions

Having facilitated improved access to academic literature, an effectively 'conditioned' AI can be used to provide differentiated questions. Again, the quality of the prompting strategies becomes paramount in shaping the AI's response into one where the questions it poses are appropriate for the students' learning. Whatever method is chosen, perseverance through 'editing conversations' is crucial in getting to the desired outcome. Utilising the same article about 'Broken Britain' (Stratton, 2011), ChatGPT provided a series of questions which enabled students to draw out the key information from the article and engage with it on a range of levels, stretching and challenging accordingly (Figure 2).

The questions in Figure 2 outline the pivotal role of the teacher in the application of such resources. With students who find HOCS challenging it may be unwise to present questions over-emphasising analytical and evaluative skills relating to a complex article. Equally, with AI's limited awareness of classroom logistics, the teacher must ensure that the tasks can be completed within specific time frames. ChatGPT's results are a starting point and often require the nuanced interpretation of a teacher to make them effective for the intended audience.

Conclusion

AI is not going to suddenly disappear. As Hickman and Ghosh (2024) infer, geography teachers will not become redundant, but they need to 'buy-in' to integrating AI into their planning and teaching – to cultivate promptcraft. When considering just the narrow topic of AI and adaptive teaching, we have found that the potential benefits for both students and teachers are too large to ignore. TG

Figure 2: Input and ChatGPT responses to the Stratton article.

Input prompt

You are a teacher of A level geography, teaching the Edexcel A level geography (2016) course to a group of 16-year-old students. The lesson is entitled 'Broken Britain and the 2011 London riots'. Students have read the following article:

Insert article – *The Guardian*, 16 August 2011, by Alan Travis and Allegra Stratton – *David Cameron on riots: broken society is top of my political agenda.* (Available online at https://www.theguardian.com/uk/2011/aug/15/david-cameron-broken-britain-policing).

Create five questions based on the article. Questions must prompt students to identify the following:

- The causes of the London 2011 riots.
- What is meant by 'Broken Britain'?
- The suggested response to the riots.
- There must also be a progression in thinking skills (as outlined by Bloom's Taxonomy) in the questions.

ChatGPT response

1. Knowledge: what event triggered David Cameron's speech about 'Broken Britain' and the London 2011 riots?
2. Comprehension: According to Cameron, what are some of the underlying societal issues he attributes to the London 2011 riots?
3. Analysis: What specific policies or initiatives does Cameron mention as part of his response to the riots, and how do they aim to tackle the root causes?
4. Synthesis: Can you identify any patterns or commonalities among Cameron's proposed solutions to the issues he identifies as contributing to 'Broken Britain'?
5. Evaluation: Do you agree with Cameron's assertion that the London 2011 riots were not about race, government cuts or poverty? Why, or why not?

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