



EBOOK

AI IN EDUCATION





Artificial Intelligence tools have rapidly gained popularity amongst both students and staff. Although they have the potential to enhance learning and streamline teaching, they aren't without their downsides.

In this guide, we explore the benefits, challenges, practical applications and ethical considerations of using AI in education.

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WHAT IS AI IN EDUCATION?

In very recent years, Generative AI has taken the whole world by storm. Within education, there are promises that it will revolutionise traditional teaching methods and student learning experiences.

Generative AI refers to a subset of Artificial Intelligence that generates new and unique content in the form of text, image, video and/or sound based on a prompt by understanding and drawing patterns from large datasets. Within education, Generative AI can potentially create learning material, generate personalised feedback and craft interactive learning experiences whilst catering to diverse student needs.

However, it has also been the subject of a lot of scepticism, with growing concern from educators and families that it may be used by students to cheat or complete their assignments for them. This would negate the importance of deep engagement with learning material to create long-lasting knowledge in students' brains.

Recommended reading:

- [The use of AI in schools](#)
- [Use of artificial intelligence in education delivery and assessment](#)
- [Generative artificial intelligence \(AI\) in education](#)

WHAT ARE THE BENEFITS OF AI IN EDUCATION?

Generative AI provides many possibilities for educators. According to [insights from the Department for Education](#), these tools are a great help for analysing and organising information quickly and creating materials. Here are some ways this could have a positive impact in education...

Reducing teacher workload

When harnessed effectively, Generative AI may help streamline tasks, helping [lighten the workload for teachers](#) and allowing them to redirect this time towards their teaching practice.

Whether it's writing multiple-choice questions, creating a quick worksheet or putting together a concise summary of learning material, AI can act as a valuable assistant for educators in time-consuming but necessary tasks. A [recent study](#) found that using AI to support lesson planning resulted in a time saving of 31% with no corresponding decrease in the quality of the lesson plans.

Of course, depending on the context, Generative AI tools' output may not be on par with human output – they often lack the creativity, nuance and expertise that a teacher has. It also requires careful final checks and fine-tuning to ensure mistakes don't make their way into learning material. This '[teacherness](#)' – the ability to simultaneously evaluate content appropriateness, pedagogical effectiveness, and learner accessibility – remains beyond GenAI's current capabilities.

Helping with Retrieval Practice

One standout advantage of Generative AI is its ability to generate questions for independent Retrieval Practice. For example, students can spend a substantial amount of time [coming up with questions for their flashcards](#), eating into the



time they could spend using them to practise retrieval. Generative AI tools could make preparation time for [Retrieval practice activities](#) more efficient.

However, while more complete findings are still pending, early research offers valuable insight into potential pitfalls of using AI for independent Retrieval Practice. For instance, [a recent study involving student groups](#) revealed that those who actively generated their questions and answers performed better compared to those who answered pre-provided questions, showcasing the importance of student engagement in the learning process.

One challenge to keep in mind arises when students or AI tools like ChatGPT attempt to generate questions without a clear understanding of what defines a good question. A teacher is likely to spot errors that a student using ChatGPT independently may not. To ensure high-quality output, it's crucial to input high-quality prompts, too – this may require teaching students how to prompt effectively before they can do it independently.

For Retrieval Practice to be effective, it's also important to achieve the optimal balance between difficulty and success. This necessitates a deep comprehension of students' knowledge gaps that a Generative AI tool will not have. While ChatGPT can help generate questions, solely relying on it for personalised and targeted Retrieval Practice may lack the nuanced insights and tailored approaches that only a teacher can bring.

Creating innovative ideas

[In a recent intriguing study](#), researchers set out to investigate whether AI surpasses human creativity in generating original ideas. The experimental setup asked the question “What product could you offer to college students for under \$50?” to three groups, respectively made up of:

- Humans
- A basic iteration of ChatGPT
- An enhanced version of ChatGPT that received top-tier prompts



They came up with 400 unique ideas. Interestingly, participants rated both versions of ChatGPT as outperforming the human group in idea creativity, with a remarkable 87.5% of the top 40 ideas generated during the study originating from the ChatGPT groups, showcasing the AI's prowess in idea generation.

This highlights the potential of Generative AI to not only produce a greater quantity but also a higher quality of ideas. The implications of these findings are particularly relevant for tasks demanding originality and creativity.

Providing feedback

When it comes to providing personalised feedback to students, Generative AI prevails in terms of speed and quantity, but does it hold up in terms of quality compared to human evaluators? [According to a recent study](#), human-generated feedback beat AI-generated feedback across most scenarios, but not by much. This hints at the potential for the technology to bridge this gap in the near future, especially when speed is a priority. Notably, AI performed better than humans [when it came to criteria-based feedback](#), where it can be more objective and detailed.

However, feedback also plays an important part in building relationships, rapport and trust between teachers and students and another study warns that reliance on AI-generated feedback may have a detrimental impact on the ability of teachers to meet individual students' needs.

Recommended reading:

- [Is Generative AI helping or harming students?](#)
- [PISA 2022 results: Unlocking the potential of AI in education](#)
- [Transform your teaching with ChatGPT – Teaching with ChatGPT](#)

HOW TO EFFECTIVELY USE AI IN EDUCATION?

The [Department for Education has highlighted](#) the pressing issue of teacher workload and recognises the potential of Generative AI in streamlining non-student-facing tasks to free up teachers' time. Actively engaging with the education sector and experts, they are exploring AI-powered solutions to reduce the burden on teachers effectively. Working alongside the Chiltern Learning Trust and the Chartered College of Teaching, they have recently published [support materials](#) to help schools and colleges use AI effectively.

However, a crucial aspect emphasised by the DfE is the significance of possessing foundational knowledge to fully leverage Generative AI's capabilities. They advocate for clear writing skills, a deep understanding of the subject matter and the ability to validate outcomes against specific criteria when [crafting high-quality prompts](#).

In essence, the efficacy and dependability of AI-generated content rely heavily on educators' expertise and discernment. By combining your judgement and subject knowledge with the power of Generative AI, you can harness its full potential to streamline tasks and enhance productivity in educational settings.

Recommended reading:

- [Using AI in education settings: support materials](#)
- [An introduction to the use of generative AI tools in teaching](#)
- [Using AI in education](#)

7 DIFFERENT APPROACHES TO USING AI (WITH PROMPTS)

One thing that chat-based Generative AI tools excel at is taking on an assigned role. [Recent research](#) has identified ways to exploit this quality, listing seven approaches to get AI to fulfil a specific role in the classroom to enrich the learning experience.

1. AI as a mentor: Providing feedback

[Feedback is fundamental for student growth](#), yet tailoring constructive criticism individually can be demanding. AI can streamline feedback processes by offering immediate responses, analysing learning patterns, and providing tailored recommendations, particularly in areas like grammar and spelling.

2. AI as a tutor: Customising instruction

Delivering personalised instruction to each student is challenging. AI can step in as a tutor, leveraging vast data analysis capabilities to identify student strengths and weaknesses. By tailoring lessons, recommending supplementary material and fostering independent learning, AI can enhance understanding and promote deeper exploration.

3. AI as a coach: Enhancing Metacognition

Coaches play a vital role in cultivating [metacognitive skills](#), which involves reflecting on past experiences and effectively fostering behavioural changes in response. AI can facilitate metacognitive exercises, helping students derive meaning from past performance and broadening their contextual understanding.

4. AI as a teammate: Encouraging collaboration

[Collaborative intelligence](#) thrives on teamwork and collective problem-solving. AI can act as a teammate, encouraging collaboration, stimulating discussions and challenging assumptions to foster a sense of shared achievement among students. AI can also act as a “devil’s advocate,” challenging students to question their assumptions and consider alternative viewpoints.

5. AI as a student: Leveraging teaching opportunities

[The Protégé Effect](#) emphasises the power of teaching others for better understanding, [one of the most potent learning methods](#). Students can teach AI by explaining concepts, identifying inaccuracies and reinforcing their own knowledge through teaching, ultimately enhancing their grasp of the subject matter.

6. AI as a simulator: Facilitating practice

AI simulations provide controlled environments for students to practice acquired skills, engage in role-playing scenarios and tackle ethical dilemmas. By bridging theory with practical application, AI simulations enhance learning outcomes and [reduce cognitive load](#).

7. AI as a tool: Reinforcing comprehension

AI tools offer a versatile platform for students to test their understanding independently. By utilising AI to check comprehension, students can enhance their learning efficacy and explore complex concepts, reinforced by the practice of asking insightful questions to reinforce understanding.

Recommended reading:

- [7 approaches to using AI in the classroom \(with prompts\)](#)
- [Embracing artificial intelligence in the classroom](#)
- [AI prompt writing for ELT Teachers: 7 ingredients of a successful prompt](#)

HOW CAN STUDENTS EFFECTIVELY USE AI?

There is no doubt that students are using AI with a recent report suggesting that 8 out of 10 pupils in the UK use AI tools in their school work. This same report found that fewer than half of pupils can identify AI misinformation. AI has the ability to both help and harm student learning, so how can we support students to work more effectively with AI?

One solution lies in crafting quality prompts. Here are some valuable tips to empower your students to engage more effectively with AI, and receive better output in return.

1. **Know your audience** – Tailoring prompts to suit your audience is crucial. Consider factors like age, subject, language preferences (English vs. American English) and background to personalise the learning experience effectively.
2. **Define AI's role** – Clearly clarify the AI's role as an expert. Define its identity, responsibilities and areas of expertise with precision to maximise its assistance.
3. **Provide clear task instructions** – Outline the task clearly, including the desired learning outcomes, specific instructions and expected output size. Additionally, offer relevant supporting materials for the AI to reference.
4. **Ask follow-up questions** – Foster engagement by posing follow-up questions. This promotes deeper comprehension and refinement of the AI's responses, enhancing the learning experience.
5. **Emphasise task importance** – Interestingly, research indicates that attributing significance to tasks by stating they are “really important” and emphasising the AI to be certain



about its output can lead to improved results and a positive learning journey. Using phrases like “take a deep breath” can even further enhance outcomes.

Recommended reading:

- [Tips and tricks for prompt writing](#)
- [AI prompts for effective learning](#)

WHAT ARE THE TRAPS TO AVOID WHEN USING AI IN EDUCATION?

An inherent challenge with AI lies in its ability to swiftly generate work that appears credible on the surface. However, the point of learning doesn't just lie in what students produce, but in the process of how they did it.

The goal is to nurture knowledge-hungry learners capable of critical thinking, creativity and self-assessment. We strive to cultivate [resilience](#) and time management skills, steering students [away from procrastination](#) and towards efficient learning practices.

Relying solely on AI mirrors the “just Google it” mindset of the past couple of decades, where [quick answers overshadowed deep understanding](#). As discussed in this [review chapter](#), our brains still need knowledge in an age of AI. AI thrives when integrated with existing knowledge about a subject, allowing educators to identify errors, create meaningful prompts and foster enriched learning experiences.

Several recent studies have shown although this ‘cognitive offloading’, that is outsourcing thinking to an AI, might increase short term performance it will be to the detriment of long term learning. For example, [a recent MIT study](#) found that after using ChatGTP to write an essay, an astonishing 83% of participants couldn't remember a single quote from what they had just written. [Another study](#) found that students who used ChatGTP during revision did worse on a subsequent assessment compared with those who revised without access to AI.

By bypassing the essential journey of knowledge acquisition and jumping straight to evaluating AI-generated outcomes, we



risk depriving students of the foundational learning experiences crucial for their growth and development.

Recommended reading:

- [Examples of AI misuse in education](#)
- [Artificial Intelligence in Education is here: Pitfalls to avoid](#)
- [Avoiding the traps and pitfalls of Artificial Intelligence development](#)

CAN WE DETECT AI IN STUDENT WORK?

Recent collaborative research efforts from universities worldwide have delved into the realm of using technology to identify AI use in students' assignments, homework, and coursework.

Shockingly, [study findings revealed](#) that current AI detection tools are only accurate 68% of the time, suggesting they are unreliable and prone to misdiagnosing human-written content as AI-generated, and vice versa. In [another recent study](#), human markers only detected 6% of the AI-generated submissions that had been mixed with student-generated one. Even more concerning, the AI entries score half a grade higher than student entries on average.

In light of these limitations, the ability to pinpoint AI usage in students' work remains a complex and uncertain task, even stumping experts in the field. Editors from prestigious linguistics journals struggled with [a mere 38.9% success rate](#) in identifying AI-generated writing, emphasising the intricate nature of detecting AI influence.

Given the challenges in effectively detecting AI use, teachers are left with limited options:

1. **AI ban** – While initially appealing, an outright ban on AI may prove impractical and unenforceable, potentially depriving students of the benefits of personalised learning experiences and valuable skill development.
2. **Encouraging AI usage** – The cautious promotion of AI warrants attention. Despite its advantages, a lack of comprehensive understanding raises concerns about [potential misuse](#). Schools must tread carefully when it comes to AI adoption without proper guidance to prevent unintended consequences.
3. **Adapting to AI integration** – Embracing AI demands structured guidance on how students and staff can use it responsibly to minimise errors and optimise benefits. By



adapting to AI, schools can empower students to leverage its capabilities effectively while navigating potential pitfalls.

In navigating the complexities surrounding AI detection and integration in educational settings, it is crucial to strike a balance between leveraging AI's educational potential and ensuring students receive optimal benefits from its utilisation. Teachers play a pivotal role in guiding students towards responsible AI usage, fostering a supportive environment that maximises learning opportunities while mitigating risks associated with AI incorporation.

Recommended reading:

- [ChatGPT and Beyond: How to handle AI in schools](#)
- [Educational technology: Digital innovation and AI in schools](#)
- [More teachers are using AI detection tools: here's why that might be a problem](#)

PROTECTING STUDENTS, STAFF AND DATA WHEN USING AI

In navigating the landscape of data protection, student and staff safety, and responsible usage of Generative AI, the Department for Education articulates crucial considerations to uphold security. Here are the key points outlined in their policy statement:

Data protection

Understanding the [data privacy implications](#) of utilising Generative AI tools is paramount to ensure compliance with data protection laws and safeguard personal and special category data. Transparency with data subjects, especially students, is essential to inform them about the processing involved with AI tools.

Intellectual property

Schools and colleges must adhere to regulations safeguarding personal data and intellectual property, such as students' work. It's imperative to obtain appropriate consent or copyright exemptions before using such assets to train Generative AI models.

Cyber standards

Reviewing and bolstering cybersecurity measures is crucial to mitigate potential risks posed by Generative AI on cyber threats. Schools and colleges can refer to the cyber standards for guidelines on enhancing security protocols.

Recommended reading:

- [How to write your school's AI policy \(with examples\)](#)
- [Generative AI in education: The government guidance, explained](#)
- [Protecting your school's data in the age of AI](#)

THE FUTURE OF AI IN EDUCATION

If its current trajectory is anything to go by, Generative AI is here to stay in education. It is crucial that we understand how to work with it and implement it in a safe and effective way. Students need a comprehensive curriculum that helps them become discerning users of modern technology and understand its societal impact. This entails teaching them about the constraints, credibility, potential biases and structuring of information that come with Generative AI.

To achieve this, the Department for Education suggests the following strategies:

- Guiding students, particularly young learners, in identifying and using appropriate resources to enhance their educational journey.
- Advocating for the use of age-appropriate tools, potentially including the integration of Generative AI in select contexts.
- Discouraging over-reliance on a limited array of tools or sources.

Furthermore, the Department underscores its commitment to collaborating with experts to explore and address the implications of Generative AI and emerging technologies. Additionally, they pledge support to primary and secondary schools in delivering a robust computing curriculum to children up to the age of 16, ensuring they are equipped to navigate the digital landscape effectively and responsibly.

Recommended reading:

- [Is education ready for artificial intelligence?](#)
- [Use of AI in education: deciding on the future we want](#)
- [How educators can help future learners outwit the robots](#)

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