The Future of Learning: Balancing Human Connection and Artificial Intelligence

How AI Might Reshape Teaching: A New Era for Education

In 1913, the great inventor Thomas Edison boldly declared, "Books will soon be obsolete in schools." He believed motion pictures would replace traditional texts and teachers within a decade. Over a century later, his prophecy remains unfulfilled.

In 1984, educational psychologist Benjamin Bloom introduced the "2 sigma problem," observing that one-to-one tutoring produced pupil performance that was two standard deviations above those in traditional classroom settings. Despite decades of effort, no educational method has yet consistently matched the effectiveness of personalised tutoring in a cost-effective way. This enduring gap underscores the profound impact and usefulness of human interaction in education.

The latest purported educational revolution comes from generative AI, with innovations such as Khanmigo; a chatbot that claims to summon the wisdom of historical figures, guide essay writing, and even tutor pupils in maths. This offers a potential new solution to the 2-sigma problem, so do we now stand on the cusp of an AI-driven transformation, with the landscape of teaching and learning poised to change dramatically, with every child educated by an all-knowing, automated tutor?

Many, especially those companies with a financial stake in AI products, certainly believe so.

Yet history suggests that a more modest and gradual improvement is likely. Education, after all, is a very human, very delicate balancing act between efficiency and quality. And, as Mr Wielenga has written "*Positive relationships between staff and pupils is something we believe is a strength of the school, and I believe it is one of the reasons why pupils continue to be successful in their studies*". AI cannot, as yet, react and change with how a pupil is feeling on that given day, to ensure that their needs are met.

The Current Model: A Persistent Legacy

For centuries, education has adhered to a familiar structure: attend lessons, be taught a topic, complete homework, take a test, and then move on. While the details of what is done in each of these steps has changed significantly as education research has developed, particularly over the last 10 years with the introduction of evidence-based initiatives like interleaving of work, and ensuring that pupils respond to feedback, this core framework has remained unchanged.

In theory, AI offers a new paradigm. It can personalise learning, adapting lessons to the individual, simulating the one-on-one attention that we know is so effective. Imagine an AI tutor that diagnoses a child's weaknesses, tailors instruction to their needs, and works tirelessly until the problem is resolved. Sounds ideal.

But the reality is less dazzling. Generative AI, for all its promise, still makes mistakes. These might be mere "teething troubles," but there is no guarantee they will be resolved. And even when the technology works perfectly, the biggest hurdle is not technical, it is motivational, and very human.

EDtech tools often shine in controlled environments, where pupils are engaged and use them as intended. However, in the real world, most pupils struggle to stay motivated when studying alone. A chatbot, no matter how clever, cannot replicate the charisma of a teacher who inspires a reluctant

learner, or the peers that keep pupils engaged and learning in a lively classroom. And let's face it; talking to robots feels sterile and uninspiring.

We also need to remember that one-to-one instruction, whether delivered by a human or a bot, isn't always superior. Closer reading of Bloom's work highlights that combining 1:1 tutoring with classroom teaching yields the best outcomes. This is because group learning generates its own magic: lively discussions, debates, and the synthesis of diverse ideas. These collaborative moments are essential not just for academic understanding but for personal growth. Every day, children come to school with two fundamental questions: *How do I do this?* and *Who am I?* Classrooms, buzzing with interactions, friendships, and the human touch, help answer both. Time spent with chatbots, however, can only address the former.

As I highlighted last week, parents have voiced legitimate concerns about the integration of AI in education. These include fears that it may encourage shortcuts and plagiarism, undermine critical thinking and creativity, reduce teacher engagement, and contribute to the spread of bias and misinformation. However, I believe that by thoughtfully and deliberately incorporating AI into our teaching, we can move closer to achieving the "2 sigma" effect, without compromising the personal interactions and one-to-one attention that are the hallmarks of Independent schooling. In the words of Professor Rose Luckin, we should aim to "learn fast, act slowly," ensuring that our approach is innovative, but informed and measured.

Calculators Then, AI Now: The Shifting Landscape of Education

Nervousness over the introduction of AI into education has many echoes over the debates from the 1970s about calculators. Early resistance centred on fears that calculators would erode fundamental mathematical skills; parents and teachers worried that pupils would become overly reliant on these devices, losing the ability to perform basic calculations. Yet, by the late 1970s, attitudes shifted, as the benefits of calculators became apparent. Pupils were more engaged in learning, as calculators freed them from tedious arithmetic sums, slide rules and log tables, and allowed them to focus on higher-order problem-solving. Today, calculators are an integral part of mathematics education, enabling pupils to tackle complex problems with confidence.

This evolution did not occur overnight. It took nearly two decades for calculators to be fully integrated into curricula and for a consensus to form about their appropriate use. Similarly, AI's integration into education will likely follow a gradual path; initially met with anxiety and perhaps scepticism, it will eventually be embraced as teachers discover ways to harness its potential to enhance learning, and parents see its positive effect on their lives, and the learning of their children.

AI's trajectory will mirror the calculator's in another important way: it will redefine what is valuable to teach. Just as calculators shifted the focus in mathematics from rote computation to conceptual understanding, AI will encourage teachers to prioritise creativity, critical thinking, and problem-solving. However, this shift may turn out to be a double-edged sword, as it risks removing focus from the evidence-based practices that have proven effective in raising attainment over the last 20 years; this is the continuing tension that teachers will need to manage.

Rethinking Pedagogy

AI challenges traditional assignments, but it also opens doors to innovative teaching methods. Rather than resisting AI, teachers can design tasks that harness its capabilities.

This will be around:

- Critical Engagement: Pupils could use AI to draft essays but then critique and improve the output, fostering analytical skills. For example, a History assignment might ask pupils to evaluate an AI-generated essay on the causes of World War I, identifying strengths, weaknesses, and areas for improvement. This not only engages pupils in critical thinking but also deepens their understanding of the material.
- Accountability: Allowing pupils to use AI tools but hold them accountable for the accuracy and quality of the final work. In a Chemistry class, pupils might use AI to help design an experiment but would need to explain their methodology and interpret the results independently.
- Prompt Engineering: Pupils can be taught how to interact effectively with AI by giving precise instructions and iteratively refining responses. For instance, a language class might include a unit on crafting effective AI prompts, helping pupils develop skills they can use in academic and professional settings.

Prompt engineering, the skill of crafting effective inputs for AI, is becoming more and more useful; is not difficult but requires thoughtful engagement. Schools need to explicitly teach this, as by treating AI as a collaborative partner, pupils can learn to direct it toward meaningful outcomes, an invaluable skill in the AI-driven workforce. As an example, a pupil preparing for a debate might ask AI to generate arguments for and against a particular position, then evaluate and refine those arguments based on their own research and insights, in much the same way as an analyst looking at new markets for their business will use it to help make the best-informed decision.

The Role of AI in Active Learning

I believe that AI's greatest potential lies in facilitating active learning. Lessons that rely on passive activities like rote note-taking will become increasingly obsolete in an AI-rich environment. Instead, classrooms will become spaces for collaboration, problem-solving, and skill application as learning becomes more dynamic, interactive, and tailored to individual pupil needs, fostering deeper engagement and critical thinking. This will lead to more one-on-one interactions with their teacher.

Flipped classrooms, where pupils learn foundational material at home and engage in active problem-solving in class, will thrive with AI's support. Consider a Biology class using a flipped model. At home, pupils might use an AI tutor to learn about photosynthesis. The AI tutor could adapt the content to each pupil's needs, providing additional explanations or practice problems as needed. When pupils arrive in class, they would already have a solid understanding of the basics, allowing them to engage in activities like designing experiments or analysing real-world data to actively embed their learning.

AI tutors, like Khan Academy's Khanmigo, already tailor content to individual learners and analyse performance patterns to provide targeted support. For instance, a pupil struggling with fractions might receive additional practice problems and explanations, while a more advanced pupil might be challenged with real-world applications. AI can even answer the perennial question, "Why am I learning this?" by helping pupils to connect concepts to their interests and future goals.

Preparing for an AI-Integrated Future

To adapt, we must equip pupils with AI literacy and critical thinking skills. Understanding AI's strengths and limitations will help pupils become effective "*humans in the loop*," leveraging AI's capabilities while applying their own expertise. This requires robust subject knowledge, as critical thinking and problem-solving depend on a well-connected base of information stored in long-term memory; therefore memorisation, deliberate practice, and thoughtful skill-building remain essential. While AI excels at summarising, coding, and retrieving facts, pupils will continue to need foundational skills and knowledge to evaluate AI-generated content, solve novel problems, and engage deeply with complex ideas.

For example, a pupil writing a research paper on climate change might use AI to generate an outline or locate relevant studies, but would still need to synthesise the information and present a coherent argument. This is where teachers need to be careful with AI; it won't change the fundamental business of teaching, but we can use it to make our time with pupils more effective. Properly used, it will be another step on the journey to making our teaching better.

AI for Teachers and Teaching

AI will therefore enhance the effectiveness of teachers. They will use AI to easily and quickly create active learning experiences, ensuring that each pupil is engaged and challenged appropriately. For instance, an English teacher might use AI to generate discussion prompts tailored to different reading levels, allowing all pupils to participate meaningfully in a class discussion. Here too teachers will rely on their expertise to interpret and refine AI's contributions, as this aforementioned English teacher would need to tailor the content to their pupils' needs after AI has done the bulk of the work.

One of the key benefits of AI is that it levels the playing field; we are all really good at certain parts of our jobs, but not the best at other parts. For example, AI is less creative than the most creative people, but much more creative than most people. So, most people can use AI to be more creative, even though it won't get near the best (yet!). This means that AI can help all teachers address their weaknesses, levelling the playing field across the school, and therefore increasing the benefit for all pupils. This is particularly useful in middle management, where a Head of Department who struggles with data analysis might use AI to identify trends in pupil performance, while a Head of Year could use AI to boost their creativity by providing lots of ideas for pupil socials.

AI and the Teacher's Role: What Should We Hold On To?

A key benefit of AI is its ability to handle the "no joy" parts of any job, tasks that are important but often time-consuming and repetitive. However, in education, this introduces a tension, as much of a teacher's work is deliberately time-intensive. Tasks like writing reports and marking require careful thought, and the time spent on them is part of what gives them value. To write an effective report, a teacher must understand the pupil's strengths, challenges, and how to give feedback that truly resonates. Similarly, meaningful comments on a piece of work rely on knowledge of the pupil's past performance and progress. The fact that these tasks take time is, in many ways, the point.

AI-generated reports and feedback will likely be of high quality, perhaps even better, than that which teachers can produce within their time constraints. AI could provide detailed, targeted feedback on tasks like the first draft of History coursework, often more comprehensively than a teacher could manage in

the limited time they have available. This raises an important question: if AI can improve the quality of these tasks, is it wrong **not** to use it?

While these time-consuming tasks are meaningful when completed by teachers, AI can perform them quickly and, in some cases, more effectively. Does the reduced time investment make the work less valuable, even if it is technically better? Moreover, if AI frees up teachers to spend more time working one-on-one with pupils or creating personalised resources, this could lead to improved pupil outcomes.

Is this a trade-off our educational community is prepared to make?

AI in the Classroom: Enhancing, Not Replacing, the Human Touch

The '*co-intelligence*', the partnership between humans and AI (first written about by Ethan Mollick in 2023), could narrow performance gaps and elevate overall educational quality. Like calculators before it, AI will shift the focus of education, enabling us to prioritise creativity, critical thinking, and problem-solving, while not forgetting that these can only exist on the solid foundation of knowledge, purposeful practice, and repetition. While AI cannot replace the nuanced judgment and empathy of a skilled teacher, it can amplify their effectiveness, enabling them to focus, and spend more time on, what they do best: inspiring and guiding their pupils. AI can lighten the burden of marking and provide targeted support to struggling pupils, freeing teachers to focus on the human aspects of their role. In this future, technology doesn't supplant the classroom; it enriches it.

Edison's dream of a revolution was premature in 1913, and those preaching that AI will change education completely in the near future are similarly premature. The excitement around AI in education is based on the assumption that more individual instruction is always better, but the magic of learning lies as much in connection with others as in comprehension of material. If we are to harness AI's potential, we must remember this truth: education is as much about building people as it is about teaching content. AI is already changing education, and its impact will continue to grow. While there will be challenges, the careful and thoughtful integration of AI, in consultation with the whole school community, ultimately promises to enhance teaching and learning.

The path forward will not be without obstacles, but history shows that education adapts and thrives in the face of technological change. By integrating AI thoughtfully and strategically, without losing sight of the key areas of teaching that make novice pupils into experts, we can create a more dynamic, inclusive, and effective educational system for our pupils. This will ensure that they are not only better prepared for the future, but also have the knowledge and skills needed to shape it.

Disclaimer: I used AI to help me write this essay.

My process involved dictating my thoughts as a "stream of consciousness" into ChatGPT. I then asked it to summarise these ideas into different areas, which helped me group them effectively before I started writing. Two or three times, I used it to help me finish a sentence when I knew what I wanted to say but could not quite work out how to express it. I found it most useful when I asked it to provide me with ten different options for each subheading, allowing me to choose the one I liked best!