# Executive Summary

Generative artificial intelligence (GenAI) is rapidly entering education systems worldwide, raising expectations of more personalised learning, enhanced teaching practices, and more efficient system management. The *OECD Digital Education Outlook 2026* draws on the best available empirical research, design experiments, and expert insights to explore where GenAI shows promise, and how education stakeholders can steer its effective and responsible adoption.

Evidence shows that GenAI can scale personalised learning support, enhance feedback quality, and automate parts of assessment. But this convenience can come at a cost. When students depend too heavily on GenAI, metacognitive engagement – the mental processes and effort that turns answers into understanding – drops. This results in a misalignment between task performance and genuine learning (chapters 1 and 2).

While some studies show both improved student outputs and learning, others do not, particularly when tools provide direct solutions rather than supporting true learning processes. Effectively integrating GenAI into teaching and learning may require that teachers encourage student agency and emphasise process, such as how students think and learn, rather than student output. Hybrid systems that combine GenAI with explicit pedagogical models, such as structured tutoring strategies or evidence-centred assessment design, show more promise than general-purpose chatbots (chapter 2).

## Enhancing student learning with generative AI

One of the most striking uses for GenAI is tutoring. Unlike the rigid dialogue trees of traditional AI tutors, GenAI can hold flexible, personalised conversations, adapting explanations and language to individual learners' needs. Some AI tutors use methods like Socratic questioning to develop subject knowledge, critical thinking and reflection. The evidence is still emerging, but prototypes show promise (chapter 3).

Beyond one-on-one tutoring, GenAI is supporting collaborative learning. Studies identify four main roles: acting as an information hub, generating personalised materials to support group work, providing feedback to teachers, and acting as a peer contributor in group tasks. While evidence so far is limited, some studies find small-to-medium improvements in subject learning and large ones in critical thinking and teamwork (chapter 4).

GenAI may also support creativity. Evidence suggests it is most beneficial when used slowly, to support iterative exploration and reflection as opposed to churning out instant content (chapter 5). In this sense, it can also undermine creativity by reducing original thought. Importantly, GenAI has the potential to support students in places with limited digital infrastructure. A large-scale experiment in rural Brazil showed that even with intermittent connectivity and minimal equipment, AI could provide feedback and guidance. Small language models running offline on mobile devices represent a promising avenue for GenAI to bridge digital divides, despite their technical limitations (chapter 6).

## Augmenting teachers' performance with generative AI

GenAI promises to drastically change the way teachers work in other ways too, including boosting productivity and the quality of teaching. It can already quickly write summaries, design exercises and even offer real-time tutoring support. But there is a risk that overreliance on GenAI could lead to the loss of skills and teaching expertise. A conceptual framework on how humans and AI can work together offers three paths: replacement, complementarity and augmentation. Replacement of some tasks should be assessed carefully to avoid loss of teacher-student interactions. Complementarity is better, pairing human judgment with machine efficiency. But the most effective approach is augmentation through

collaborative engagement. In this model, teachers and AI work in tandem, critiquing and refining each other's outputs. This iterative process offers the greatest potential for improved instructional quality while preserving professional judgement (chapter 7).

One of the key issues at the moment is that most tools are designed for general use. Off-the-shelf chatbots rarely align with curricula. That is why some argue for purpose-built educational GenAI systems. These tools can be co-created with teachers and students, giving educators control over how machines behave and how students interact with them (chapter 8). For example, this could enable teachers to set the level of "hallucinations" of the tools and give feedback on their student GenAI interactions.

Several GenAI tools are already being used to support teachers, especially in the higher education context. For example, some AI teaching assistants can help teachers, teaching assistants, and students across a wide range of instructional tasks while allowing human oversight. Students rated one such tool as comparable to human teacher assistants in clarity, accuracy and professionalism, though weaker in motivation and developmental guidance (chapter 9).

Other early evidence suggests that educational GenAI tools can improve online tutoring quality, especially for less experienced teachers. Research also highlights the benefits of AI-generated teaching materials and analytics for effective classroom dialogue. Yet motivation, relationships, and social-emotional learning remain inherently human responsibilities (chapter 10).

## Improving system and institutional management

GenAI is also streamlining system and institutional management, enabling new forms of classification and recommendations. At the institutional level, GenAI is already reshaping administrative tasks. Embedding-based models can map equivalencies between courses and programmes, making tasks like admissions, career guidance and curriculum analytics faster and more accurate. Large-scale pilots demonstrate high predictive accuracy and efficiency gains, although human AI collaboration remains a must (chapter 11).

Beyond feedback, high-stakes standardised assessment is another field where GenAI promises changes. It can generate exam items at scale and design more authentic tasks, such as interactive writing and speaking tasks that mimic real-life communication. By teaming up with AI, teachers can achieve significant productivity gains (chapter 12). GenAI's impact on research is also notable. In natural sciences, it accelerates everything from hypothesis generation to experimental design. The technology is already changing how education research is performed and will potentially improve education systems' outcomes (chapter 13). For example, AI-generated synthetic datasets simulating real education datasets could expand research possibilities and feedback into policy and practice.

Ultimately, when designed with strong pedagogy and a human-centred approach, GenAI can do far more than help students complete tasks. It has the potential to deepen student learning, improve teaching practice and streamline institutional management and research. But these benefits come with risks. Overreliance risks turning students into passive consumers and teachers into supervisors. To unlock GenAI's full potential, education must move beyond generic chatbots towards purpose-built tools for education. The thoughtful integration of general-purpose GenAI tools will be essential – for realising the full learning benefits of GenAI and developing students' GenAI literacy for their future careers. The challenge for policymakers is to ensure that GenAI is a learning partner and not a learning shortcut.

 