

The Four Approaches to AI in Education

The landscape of AI in education can seem like a maze of promises and jargon. Breaking it down, there are four main types of AI systems in schools today, each with its strengths and challenges.

01

Generative AI LLMs

The Content Creator

Generative AI, or Large Language Models, such as ChatGPT and similar tools excels at drafting quizzes, lessons, explanations, translations, and other instructional materials on demand. They're useful for planning, but not for driving intervention fidelity.

Potential Benefits

Quick content generation for overburdened teachers.

Risks

Risks include hallucinations, plagiarism, misinformation, and the added workload for teachers who must fact-check and adapt the content for instructional use.

Key Limitation

More content ≠ better learning. Generative AI adds tools, but it doesn't address the pedagogical or motivational needs of students.

02

Adaptive Learning AI

The Difficulty Adjuster

Many adaptive educational systems adjust the difficulty of assignments based on students' answers, but often target shallow levels of "mastery."

Potential Benefits

Scaffolds learning at an individualized pace.

Risks

Allows students to progress with as little as 70–80% accuracy, leaving critical learning gaps unaddressed.

Key Limitation

Provides surface-level personalization while ignoring deep-rooted struggles like motivation or engagement.

03

Agentic AI

The Autonomous Actor

Agentic AI claims to empower students to drive their own learning through AI-determined goals and pacing.

Potential Benefits

Independence for students who excel at self-direction.

Risks

Removing human judgment from learning decisions leads to inequities and confusion about student vs. machine agency.

Key Limitation

Undermines the trust and intrinsic motivation required for genuine learning, all while bypassing critical educator oversight.

04

Human-Centered AI

The Learning Conductor

Human-Centered AI takes a fundamentally different approach. Rather than replacing teachers with digitized curriculum and chatbots or merely generating content, it orchestrates personalized learning supported by academic experts.

Potential Benefits

- ✓ **Mastery-focused Progression:** Prevents students from advancing with gaps.
- ✓ **Motivation + Academics:** Addresses both academic and motivational needs.
- ✓ **Preserved Teacher Agency:** Reduces planning/monitoring workload while educators guide goals, motivation, and relationships.
- ✓ **High-Fidelity Implementation:** Promotes consistent, data-driven cycles across classrooms, schools, and districts.

Key Advantage

Grounded in decades of learning and motivation science and scaling the benefits of one-on-one tutoring (Bloom's 2 Sigma Effect), Human-Centered AI makes measurable growth for each student feasible at scale—transparent, accountable, and educator-guided.

Comparing AI Approaches in Education

| Dimension | Generative AI (The Content Creator) | Adaptive AI (The Difficulty Adjuster) | Agentic AI (The Autonomous Actor) | Human-Centered AI (The Learning Conductor) |
|------------------|---|---|--|---|
| Primary Function | Produces content (essays, quizzes, lessons) | Adjusts task difficulty based on answers | Sets goals/pacing with AI autonomy | Orchestrates learning across mastery, motivation, and personalization |
| Mastery | No mastery standard; content not validated | Advances students at ~70–80% accuracy, leaving gaps | Leaves mastery undefined; relies on student self-direction | Requires high levels of mastery before advancement; designed to close learning gaps |
| Motivation | No direct impact on engagement | Minimal support for student motivation | Shifts responsibility to students; may harm confidence | Integrates motivational supports—celebration, persistence, and personal relevance |
| Equity | Risks widening gaps: <ul style="list-style-type: none"> • Plagiarism • Misinformation • Hallucinations | Inconsistent outcomes; gaps compound over time | Creates inequities between self-directed vs. struggling learners | Designed to ensure equitable access by scaling individualized support across diverse learners |
| Teacher Workload | Increases teacher workload: <ul style="list-style-type: none"> • Fact-checking • Adaptation | Reduces some manual work but adds oversight burden | Reduces teacher oversight—risks undermining trust | Supports teachers by automating progress tracking while preserving teacher agency |
| Student Outcomes | Variable; often shallow | Incomplete growth; “Swiss cheese” foundations | Unpredictable, inequitable results | Stronger foundations through mastery and motivation; outcomes depend on implementation quality |
| Key Limitation | More content ≠ better learning | Surface-level personalization | Misplaced agency; removes teacher judgment | Still emerging; effectiveness varies based on design and fidelity of use |
| Key Advantage | Speed of content creation | Individual pacing | Independence for advanced learners | Holistic approach—aligns mastery, motivation, and equity while reinforcing teacher-led learning |

