

# Learning Systems

*Artificial Intelligence Use Cases*

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# Introduction

Generative artificial intelligence (GenAI) advancements have prompted both excitement and concern about how AI could be used in education. From streamlining administrative tasks to personalized resources for students with learning differences to reimagining staffing models, AI offers a spectrum of possibilities. However, its integration requires careful consideration of both potential benefits and inherent risks.

This three-part series, developed through consultations with experts and practitioners, aims to take a holistic approach, analyzing the opportunities, risks, and considerations surrounding AI in education in the following ways:

## Foundations

### The Landscape of Artificial Intelligence in K-12 Education

*An introductory guide exploring AI developments, capabilities, potential impacts, and current usage.*

## Considerations

### Opportunities and Challenges of Artificial Intelligence-Enhanced Education

*A deep dive into the broader ecosystem, including technology platforms, policy landscapes, and stakeholder experiences.*

## Applications

### Artificial Intelligence Use Cases

*An outline of how AI could potentially be used in education, detailing opportunities and risks for each use case.*



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# Key Takeaways

## Insights From the Learning Systems Series

The education sector has an opportunity to shape its future as GenAI technology is developing. Proactive planning allows thoughtful integration of AI's potential benefits to carefully address its challenges and prepare for emerging capabilities. To help education stakeholders navigate this complex and evolving landscape, Bellwether offers the following recommendations to build strong capacity, resilient infrastructure, and thoughtful design.

## Building Strong Capacity

To safely and effectively incorporate AI, the education sector must invest in the development of knowledge, skills, and diversity of leaders and contributors. **Capacity-building effort is not just beneficial — it is critical.** While these efforts require a meaningful investment of time, talent, and resources, without them, the education sector faces barriers to progress. Even though capacity-building around AI may not rise to high urgency for individual organizations, funders and policymakers can and should incentivize the system so that there is meaningful progress over time.

### 1. Strengthening AI literacy.

Administrators, teachers, students, and families alike need to build understanding of AI's capabilities, limitations, and implications so that communities can make informed decisions about AI and effectively choose where to (and not to) integrate AI into learning environments. AI literacy also extends into the thoughtful teaching of AI — what students should know and be able to do related to being prepared for the workforce of the 2030s.

### 2. Enabling the development of policies and guidelines.

Comprehensive and flexible policies and guidelines are essential to wider AI adoption but have been slow to develop, notably at the federal and state levels. As of August 2024, approximately half of states have yet to provide AI guidance. State and local education leaders would benefit from collaboration opportunities, including with industry leaders, as they develop and refine their policies.

## Building Strong Capacity *(continued)*

<b>3. Bridging educators, developers, and researchers.</b>	<p>Currently, there is a gap between teams building AI tools and education practitioners. Fostering strong partnerships, especially in development and design stages, can ensure AI tools are safe, effective, and relevant for education purposes, aligned with pedagogical principles, and grounded in research about how students learn. Partnerships will increase the likelihood of well-designed solutions, thereby enabling the realization of AI's transformative potential in education.</p>
<b>4. Expanding sectorwide capabilities.</b>	<p>The rapid advancement of AI in education has surfaced a significant gap between current capabilities and needed expertise. To bridge this chasm, the sector needs to expand capacity across the entire educational ecosystem, addressing needs such as data privacy, ethical implementation, procurement, and other challenges surfaced throughout this three-part series. This expansion can take multiple forms: Existing education organizations can develop AI competencies, AI experts from other sectors can be encouraged to apply their knowledge to educational contexts, and new organizations can be established to address emerging needs. Addressing these gaps in the education sector is crucial for developing comprehensive, education-specific AI solutions that incremental improvements in existing structures may not be able to achieve.</p>
<b>5. Diversifying voices at the table.</b>	<p>Degree attainment data suggest that the current AI field is not yet reflective of the diverse students and educators across the country. Diversification of voices involved in AI-related dialogues and decisions can promote more inclusive AI solutions that benefit all students. This includes conversations with and among AI developers, solution builders, and researchers as well as authentic engagement with diverse educators, students, and families who will be most impacted by decision-making processes.</p>

# Building Resilient Infrastructure

In the excitement of thinking about how AI can be used, there is the potential to overlook the importance of a robust, secure, and nimble infrastructure. **Strong data and research not only enhance the quality of AI outputs but also serve as a crucial safeguard, particularly in protecting sensitive student data.** Investing in resilient infrastructure is essential for realizing AI's benefits while mitigating its risks, ensuring that enthusiasm for innovation is matched by a commitment to security and quality.

<b>6. Robust data infrastructure.</b>	Implementing AI widely throughout a system or organization will require a secure, high-quality data infrastructure. This includes ensuring data quality and usability, system interoperability, robust security measures, well-planned change management processes, and reliable internet connectivity.
<b>7. More quality datasets and new benchmarks.</b>	To enhance the quality of AI outputs, there is an opportunity to develop more high-quality, education-specific datasets for fine-tuning AI models for tailored uses. Additionally, establishing education benchmarks for AI tools can incentivize and align the market around quality and effectiveness.
<b>8. Continued research and learning.</b>	Ongoing research is needed to understand what works and what does not work in AI-enhanced education. By continuously evaluating the impact of AI tools and methodologies and building from existing learning science research, developers can refine their approaches and ensure that AI enhances learning outcomes for all students.

# Building Thoughtful Design

As developers create AI tools for education, it is important to prioritize purposeful design that considers the diverse needs of all students while maintaining the essential role of human interaction. **Thoughtful design goes beyond technological capabilities, focusing on clear educational objectives and research-based approaches.**

## 9. Purposeful, inclusive, and research-backed AI design.

As opposed to leading with the technology, AI tools must be designed with a clear purpose. From the early stages of product development, tools designed for widespread adoption should consider the needs of all students, inclusive of students with learning differences and multilingual learners. The lower barriers to entry to create AI tools also offer the opportunity to develop highly tailored tools that can focus on the unique needs of specific groups of students. Tools should also be grounded in learning sciences research to increase the likelihood they will improve student outcomes.

## 10. Intentional human-AI relationship.

It is important to recognize both the opportunities and limitations of AI and human cognition. While AI can be transformative, educators and students must also nurture human skills through deep learning experiences, opportunities for critical thinking, and authentic human interactions so that AI amplifies — not detracts from — meaningful learning experiences.

As stakeholders look to incorporate AI into education, they should leverage past insights for future innovation. While AI presents new opportunities in education, the valuable lessons from prior innovation attempts must not be overlooked. Innovation lies not just in the technology but notably in its change management, implementation, and long-term sustainability. This approach to AI integration in education demands significant effort and resources, but it is essential for creating an educational ecosystem that leverages AI's potential while prioritizing student needs and learning outcomes.





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# Overview

GenAI in education presents a wide array of potential applications, impacting students, families, educators, schools, and systems. Each use case brings its own set of nuanced considerations, including effects on student learning, teacher effectiveness, market dynamics, business models, and potential risks. The following vignettes illustrate the potential impact of AI in education, both positive and negative.

## AI can have positive impacts ...

### **Maya, Grade 10 Student**

Maya, a student in grade 10 with dyslexia, uses an AI-powered reading assistant. The tool has knowledge of Maya's individualized education program (IEP), and Maya's teacher enables the tool to adapt text presentation in real time, adjusting font size and spacing and even providing contextual definitions. It also offers audio support, reading aloud when Maya struggles with a word. This personalized approach has significantly improved Maya's reading comprehension and confidence, allowing her to engage more fully with grade-level content.

### **Mr. Z, Special Education (SPED) Administrator**

Mr. Z, a SPED administrator, collaborates with his team to analyze district data to develop a presentation to the school board. Using AI cuts the analysis time from two months to two days, allowing Mr. Z and his team to dedicate more time to brainstorming solutions.

## ... or can cause unintentional harm.

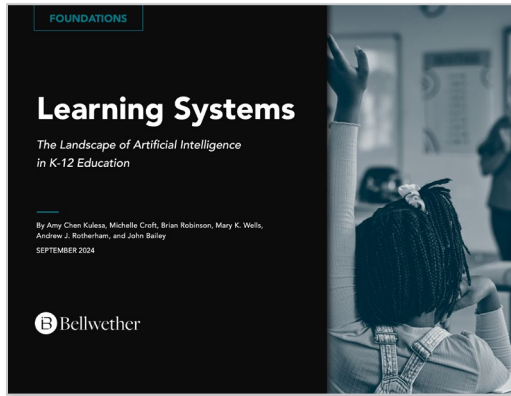
### **Alex, Grade 8 Student**

Alex, a student in grade 8, becomes overly reliant on an AI writing tool for his essays. While his grades improve, he stops developing his own writing skills. The AI's suggestions, though grammatically correct, lack personal voice and creativity. Alex's teacher notices a decline in his ability to structure arguments independently and express original ideas, raising concerns about the long-term impact on his critical thinking and writing skills.

### **Ms. J, High School History Teacher**

Ms. J, a high school history teacher, relies heavily on AI-generated quizzes and assessments. While this saves her time, the AI struggles to create questions that adequately assess higher-order thinking skills. The assessments often focus on rote memorization rather than critical analysis. Over time, Ms. J's students become proficient at fact recall but struggle with historical analysis and interpretation.

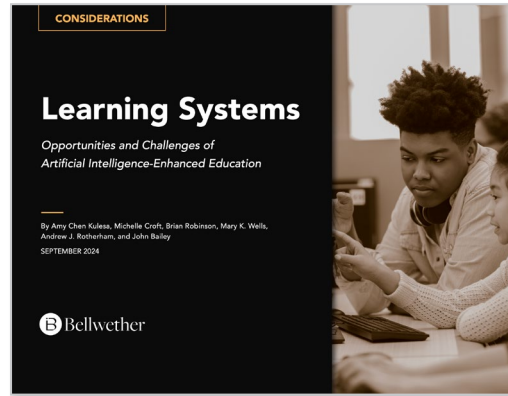
# This report is part **three** in a series that looks holistically at AI's impact on learning systems in education.



## Foundations

### The Landscape of Artificial Intelligence in K-12 Education

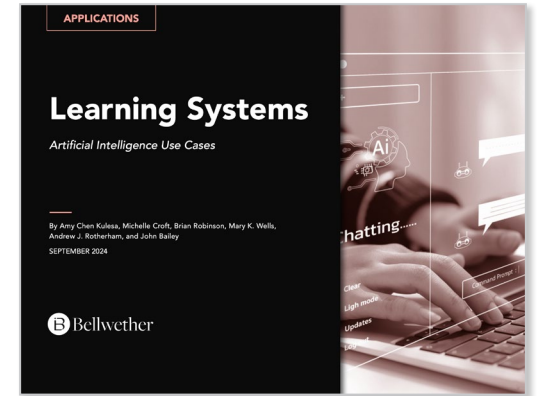
*An introductory guide exploring AI developments, capabilities, potential impacts, and current usage.*



## Considerations

### Opportunities and Challenges of Artificial Intelligence-Enhanced Education

*A deep dive into the broader ecosystem, including technology platforms, policy landscapes, and stakeholder experiences.*



## Applications

### Artificial Intelligence Use Cases

*An outline of how AI could potentially be used in education, detailing opportunities and risks for each use case.*



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# Current AI tools and applications span many aspects of schooling.

**1. Personalized Learning, Tutoring, and Advising**

**2. Educator Sustainability and Effectiveness**

**3. Assessments**

For each use case, the following section includes overviews, considerations, example applications, and a *Bellwether Take*.

**4. Information and Intervention**

**5. Administrative and Operational Efficiency**

**6. New School Models**

# AI holds promise for enhancing personalized learning, though implementation challenges remain.

## Current Challenge

*Traditional education often employs a one-size-fits-all approach, providing the same experience to all students regardless of individual needs, strengths, and interests.*

Personalized learning has the potential to increase student achievement ...

... However, implementing personalized learning has been challenging.

A 2015 RAND\* study on the effectiveness of personalized learning found that:

- Students at schools implementing personalized learning strategies made greater progress in math and reading achievement over a two-year period compared to their peers in other schools.
- The greatest gains were at the elementary level.
- A greater proportion of students with lower beginning achievement levels experienced larger growth rates than peers, especially in math.
- The definition of personalized learning varies, resulting in a proliferation of approaches and difficulty for measurement.
- Implementation is complicated, often requiring reframing the learning process, using significant data, and changes to structures (e.g., grading and schedules).
- Practitioners are often not provided with sufficient training and follow-through to implement with fidelity.
- Past efforts to personalize learning through technology have been hampered by limitations in predetermined pathways and static content.

# Personalized learning tools can be fully automated or toggle between AI and a human.

## Automated

AI algorithms and software handle all or most aspects of tailoring the educational experience to individual students, providing customized content, assessment, and feedback with minimal direct human intervention. Key features:

- **Adaptive Platform:** Automatically adjusts difficulty and content based on real-time analysis of student interaction.
- **Real Time:** Provides instant personalized feedback and guidance.
- **Automated Assessments:** Administers and grades assessments, offering immediate next steps.

*Examples include: Duolingo Max, Khanmigo, and Pearson.*

## AI-Human Hybrid

Toggles between AI technology and a human (can be in-person or virtual). AI tools assist educators by providing data, recommending next steps, and automating routine tasks. Delivery of instruction can be fully led by the educator or shared. Key features:

- **Educator-Assisted Adaptive Platform:** AI suggests content and strategies, but educators oversee the process, which may include tech-based or educator-led activities.
- **Data Analytics:** AI provides analytics, helping educators identify tailored intervention.

*Examples include: Carnegie Learning and Thinkster.*

# Though not always in the form of one-on-one tutors, many tools use AI to personalize for a more specialized purpose.

Here, specialization incorporates personalized learning models and tools, and broadly tailors instruction or support to a student’s individual needs.

Subjects	Student Groups	Holistic Development
<p><b>Reading and Writing</b> Grammarly, LitLab, NoRedInk, Quill, QuillBot</p> <p><b>Math</b> ALEKS, Carnegie Learning’s MATHia</p>	<p><b>SPED and Special Needs</b> Be My Eyes, NaturalReader, SLAIT, Speechify</p> <p><b>Multilingual Learners</b> ELSA AI, FLOW</p>	<p><b>Mental Health</b> Bloom, Woebot Health</p> <p><b>Postsecondary Pathways</b> Careerdekho AI, FutureFit AI, Stemuli</p>



# AI has promise for more tailored instruction for students with disabilities.

## LitLab.ai

### “Bombard the Deficit”

- **Identify Skills:** AI offers promise to help teachers identify skills where students need more support.
- **Create Materials:** Teachers can use that information to create opportunities for students to practice those specific skills.

## conker

### Assessments

- **Formative:** AI allows students to demonstrate their learning in different modalities as part of the learning process.



## Expert IEP

### Parent Engagement

- **IEP:** Tools to help parents better understand or personalize and optimize their child’s IEP.

### Scaffolding Grade-Level Content

- **Audio or Glossaries:** Technology can more easily embed accessibility tools like audio or glossaries so students are presented with grade-level text with additional support.
- **Interest:** Teachers can create materials that are aligned with student interest, lessening the barrier to entry to the new content.

“The key to all of these uses is to ‘have models that are trained and understand all learners.’”

—Josh Clark, Landmark School

# Using AI for personalized learning can be transformational but should be done with caution.

## Opportunities

- Demand for high-quality, real-time, and adaptive education technology.
- Driven by the broader market investments in AI, there is meaningful momentum and capital in this area, especially in the private sector.
- When done well, personalized learning can:
  - Accelerate student learning.
  - Strengthen engagement by tailoring to students' interests.
  - Expand access for areas with educator shortages (e.g., SPED, STEM, and/or rural).
  - Target support for students with different learning needs (e.g., SPED and English learners).

## Challenges

- AI currently does not mitigate implementation and change management challenges.
- Student motivation and engagement may vary while using tools; AI does not address behavioral or classroom management issues.
- There is not yet robust research and data on the effectiveness of AI-powered personalized learning and tutoring programs, especially for academically struggling students.
- Given the low cost and barrier to create custom GPTs and prompts, there could be a proliferation of materials with varying quality.
- To ensure quality, the enhanced security, quality checks, memory, and user interface to make content and tools are costly.
- AI may limit human-facing interactions and relationship development.
- Reliance on AI tools may limit students' independence to develop specific skills.



## ***Bellwether Take: Personalized learning is taking off quickly but may not meet expectations.***

- Driven by capital investments, personalized learning, tutoring, and advising are poised to take off fast.
- Many effective efforts build on top of existing tools in schools or are “wrappers” around big tech’s large language models (LLMs).
- AI’s capabilities are smarter, more powerful, and more human-like than prior technology, though existing challenges remain (e.g., complex implementation and change management, difficult sales channel, hard to decipher quality).
- Although the costs of launch and initial content creation have dropped significantly, there remain maintenance costs such that in the long term, this sector may be predominantly privately funded if closed models dominate the market. Nonprofits may play more niche roles and/or sustain via partnerships with large technology companies.
- When building and adopting personalization tools, it is essential to fine-tune the models by incorporating different datasets and quality benchmarks and to offer thoughtful change management and proactive guidance for use and misuse to limit the risk of loss of human connection.

# Educator sustainability continues to cause challenges for teachers and districts.

**Current Challenge**

*Teachers are essential in education, but many teachers find the work to be unsustainable, contributing to staffing shortages.*

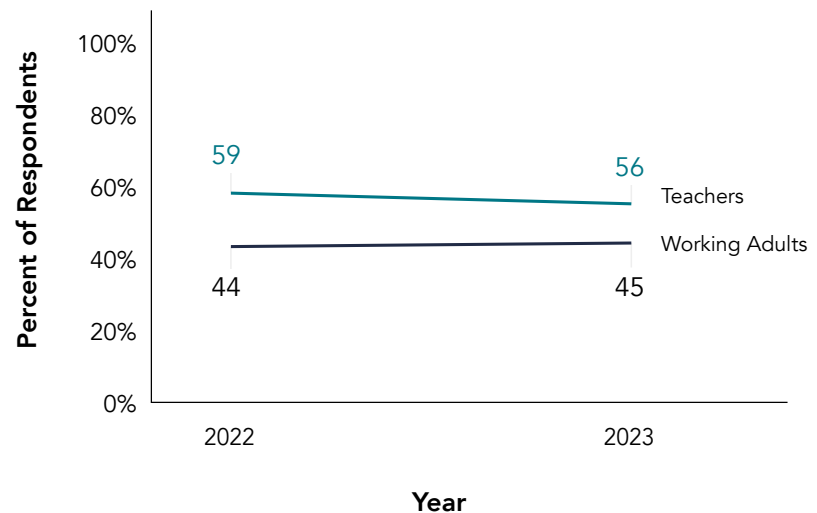
Teaching has become unsustainable for some, and teachers report higher levels of burnout compared to other workers.

**54%** of teachers planning to leave the field say that hours worked beyond the school day is a factor in their decision-making.

**52%** of teachers report two or more indicators of negative well-being (e.g., frequent job-related stress or depression).

**37%** of public schools reported operating with at least one teaching vacancy in the 2023-24 school year.

## Well-Being of Teachers and Working Adults: Burnout



# AI tools have the potential to create a more sustainable and higher-quality work environment for teachers.

## Brisk Teaching

### Routine Tasks

- Tools such as Brisk Teaching can help teachers with routine tasks such as writing emails, newsletters, or letters of recommendation.



### Time-Consuming Instructional Tasks

- Similar AI tools can save teachers time in grading and providing feedback, particularly for open-ended responses.
- AI tools can generate or rewrite text based on student needs, such as content leveling or providing practice on certain spelling patterns.
- Lesson planning and curriculum can be more easily aligned with the state's standards.
- Playlab's Project Launcher helps students select a project topic and create a feasible project plan.

## TeachFX

### Professional Improvement

- TeachFX allows teachers to upload audio of their class and receive feedback specifically on what types of strategies encourage student discussions.
- Teachers may benefit from the opportunity for more frequent feedback that is not tied to their formal evaluation process.

## Although AI can contribute to educator sustainability and effectiveness, several challenges remain.

### Opportunities

- Save teachers time on routine tasks.
- Prioritize the tasks or activities where teacher expertise has the greatest impact.
- Ability to more closely align content with specific student needs/interests and the state's standards.
- Opportunity to more easily communicate to parents in multiple languages.
- Opportunity for teachers to receive informal feedback to improve their instruction.

### Challenges

- AI outputs may require tailoring such that they may not save substantial time, absent fine-tuning.
- Although AI tools are consistent when grading according to a rubric, AI-generated written feedback may be inconsistent across students, unless there has been fine-tuning.
- AI may limit students' ability to practice important skills and cause students to devalue writing as a tool to communicate with others.
- Services offering teacher feedback are currently limited in scope with unknown quality.
- Equitable access is crucial to avoid widening existing gaps.



## ***Bellwether Take:* Educator sustainability and effectiveness have high near-term potential with relatively limited risks.**

- Educator-facing tools have time-saving opportunities for educators and are generally accessible for most teachers; although the tools do not yet provide teachers with the “perfect” lesson plan or assignment, they do provide good first drafts for teachers to refine.
- Without intervention, educators will likely adopt AI-powered productivity tools as the technology becomes more ubiquitous and weaved in throughout existing tools. However, this transition will likely widen gaps, as educators most interested in innovation and educators in well-resourced communities are more likely to be early adopters.
- Fear of job elimination is likely to complicate the adoption of some AI teacher-facing tools, even if they are primarily for productivity and time-saving purposes. Some educators may perceive these tools as the first step down a path of shifting the number of teachers required, teachers’ role, use of time, and staffing structures.
- Greater long-term opportunities exist for AI to bring new talent, level up talent, or transform staffing structures. These more complex changes also require training, capacity-building, and change management where technology plays a key role, though it would be insufficient alone.

## Assessments offer valuable information, but the scores are not consistently used.

### Current Challenge

*Student assessments are often restricted to what is easily measurable.*

Although multiple-choice tests are efficient, there is interest in moving toward other types of tests.

Less than two-thirds of teachers use assessment data within their classrooms.

- The U.S. Department of Education is encouraging states to investigate “innovative approaches that can lead to more authentic student learning.”
- In New Hampshire, parents and educators valued the state’s performance assessment, but due to the administrative burden could not scale the test statewide.

**60%** of teachers report using assessment data “to plan, modify, and evaluate their instructional program.”

**56%** of teachers report using assessment data to personalize learning for students.

This limited use suggests that teachers may need different types of assessment data.

These different types of assessments have the potential to more easily measure critical thinking skills than current tests.



# AI tools are expanding opportunities to quickly assess different types of skills.



## Problem-Solving

- The Organisation for Economic Co-operation and Development's Programme for International Student Assessment (PISA) is administered to 15-year-olds worldwide to measure their ability to use "reading, mathematics, and science knowledge and skills to meet real-life challenges."
- For 2025, PISA plans to include an AI chatbot that would allow students to ask simple questions about a topic in an effort to better measure problem-solving instead of student background knowledge.



## Images and Videos

- In the health care sector, Google trained its Med-Gemini to evaluate medical images and video, including head and neck CT scans. The model was able to accurately classify nearly three-fourths of the cases, even when presented with abnormal images, suggesting that image- and video-based AI assessments of student work is possible.



## Voice

- Curriculum Associates is integrating a voice AI engine (SoapBox Learning) that "caters to the unique speech patterns of children" into its i-Ready system. The tool is designed to support early literacy and language fluency.

The shifts in measurement capabilities and modalities have the potential to improve screening tools for students with potential learning differences.

## AI tools are expanding opportunities to improve reading screening assessments.

	<b>Stanford University</b> <i>Rapid Online Assessment of Reading</i>	<b>Harvard University</b> <i>EarlyBird</i>
<b>Grade Levels</b>	K-12	Pre-K to grade 2
<b>What It Measures</b>	Foundational reading skills, including phoneme, word, and sentence decoding.	Phonological awareness, oral language comprehension, sound symbol correspondence, naming speed.
<b>Administrative Time</b>	Varies depending on the assessment, can range from five to 15 minutes.	Varies by age and time of year, with each subtest taking a few minutes.
<b>Administrative Mode</b>	Web browser	Tablet
<b>Other Administrative Information</b>	Can integrate with school rostering systems (e.g., Clever).	Can be administered at home.

AI researchers are also experimenting with natural language screeners that take into account different dialects.

## While allowing for different types of assessments, several challenges remain.

### Opportunities

- Extend the types of content or skills that may be assessed.
- More opportunities to evaluate original student work via image or video analysis.
- Potential for earlier screening and intervention.
- Faster scoring and reporting.
- May save educator time, enabling greater time dedicated to high-impact work.

### Challenges

- Tools may introduce inequities if students are unfamiliar with how to use them.
- Some aspects of student work, such as creativity or originality, may not be adequately evaluated.
- The challenges with bias in the underlying models may be exacerbated.
- Tools require trust-building and change management to implement, especially if the tools lack, or are limited in, transparency.



## ***Bellwether Take:* Classroom-based assessments have the most potential to benefit.**

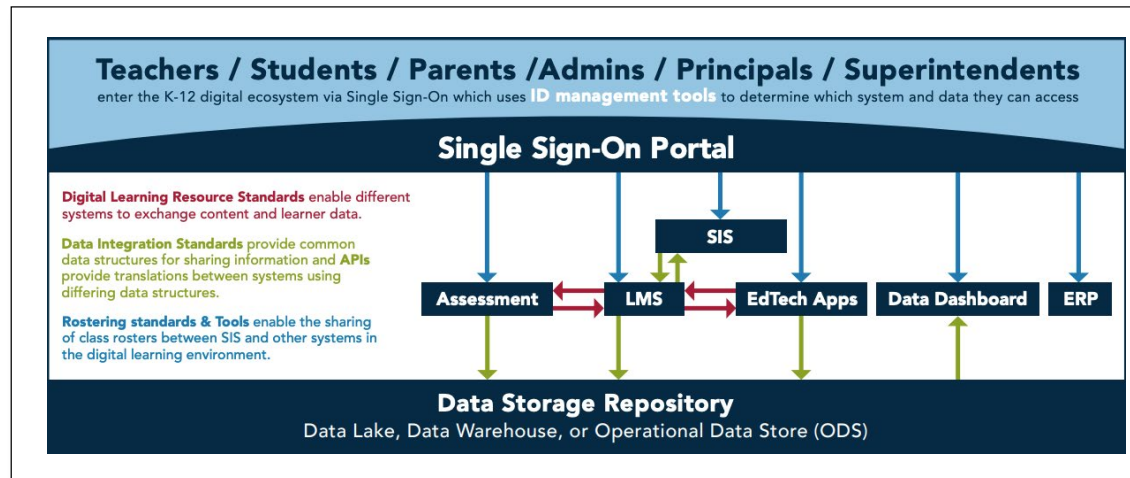
- Near-term improvements to assessments such as item development and scoring of open-ended items have the greatest opportunity to improve the quality of classroom-based assessments, which have been historically lower in quality.
- While AI may fast-track some content creation, current safety and quality checks need to remain in place to mitigate bias and ensure accuracy, especially for high-stakes summative assessments.
- Extensions into other content areas will have less of an impact. The area with the greatest potential is states that are adopting a Portrait of a Graduate describing different types of competencies for high schoolers. These states are interested in measuring different types of student competencies that would be more appropriately measured through portfolios or examples of student work. Given federal assessment and accountability laws, these assessments likely would not be used for federal accountability purposes.
- Long-term, these advances in technology also have the potential to increase the quality of current screening tools.

# AI tools can help school systems better leverage existing data.

**Current Challenge**

*Districts and school networks collect large amounts of data, but the data is not easily usable.*

Creating such a system is challenging, as **65%** of surveyed districts have not defined “data governance goals and objectives,” which are essential for accurate data to inform decision-making.



This figure illustrates the various data systems that must “talk” with one another for districts to leverage collected data.

# When systems are integrated, there are opportunities to better use the data.

## doowii

### Integrating Data Systems

- Doowii connects data from multiple sources and allows users to use natural language prompts for data analysis.



### Early Warning Systems

- PowerSchool's risk analysis is an early warning system that creates a predictive model specific to the user's school district.
- The system integrates prior and current year attendance, behavior, assessments, and coursework data.



### Communicating With Families

- Mesquite Independent School District in Texas built its AYO platform to tailor learning by offering students suggestions for new opportunities as well as other engagement tools.
- The district added "Family Activity Suggestions," which suggests activities that align with a student's skills, interests, and location.

## While technology may facilitate better use of data, several challenges remain.

### Opportunities

- Ability to make data-informed decisions using a variety of data sources already collected.
- Broadens access to data analyses that may help teachers leverage interventions.
- May allow data and technology teams to focus on proper data use instead of compiling and analyzing the data.
- Can more easily communicate information with families.

### Challenges

- Some of the data, such as behavior or medical data, are sensitive, requiring attention to data access and privacy rules.
- Requires robust data security and infrastructure.
- Unclear if all learning products have the technical features to allow for integration, such that it may continue to be a subset of the data.
- Without transparency in model designs, chances the data can be misinterpreted or misused and/or families and key stakeholders may not trust the information or intervention.



## ***Bellwether Take: AI may provide the most benefits to school systems that are already data savvy.***

- AI tools to improve school data and information systems have promise in a number of areas, but they may require an already well-resourced and data-savvy school system to properly implement them, given the high cost to set up systems, house the data, and run the queries.
- AI systems rely on quality data to inform the models. Although there are newer AI tools to help clean data, users must commit to building a strong data infrastructure.
- As of now, current tools do not incorporate full integration of all products due to varying compatibility and security standards across the platforms. For the data that is commonly housed, school systems will need greater data privacy safeguards.
- For a school system with an already robust data team, these tools may help reallocate staff member time to help educators better understand and use the data instead of creating data files from multiple datasets and analyzing the data. However, in less data-savvy school systems, having only the AI tool for analysis increases the risk of error in overinterpreting analyses. These risks can be particularly substantial if the school has adopted an early warning system that incorrectly identifies students as at-risk.
- Large existing Learning Management Systems (LMS) and Student Information Systems (SIS) are likely to dominate this area, given the amount of existing data housed on those platforms and their system connectivity to other datasets.



# Teachers and school leaders spend significant portions of their time on administrative tasks.

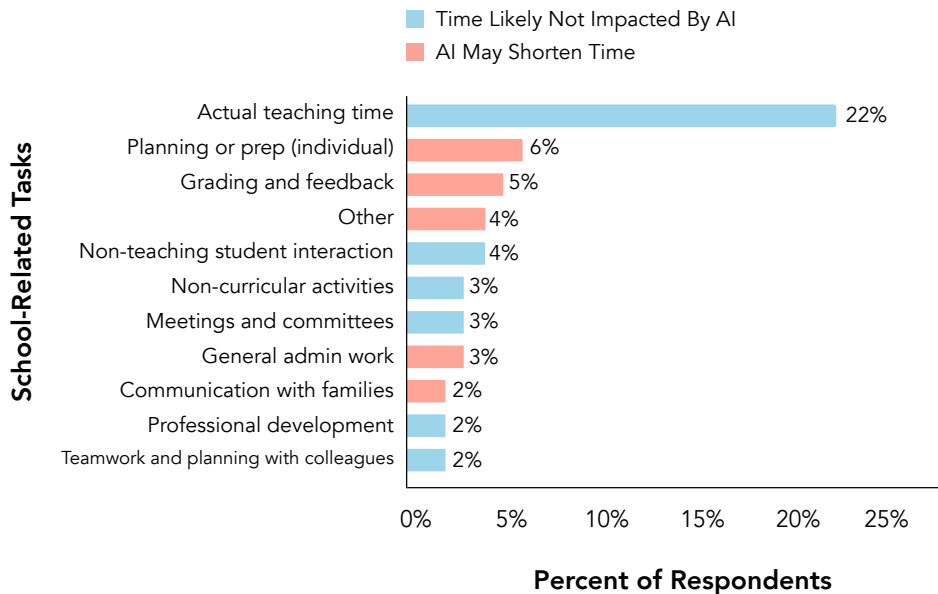
## Current Challenge

*Time required for administrative and operational tasks often takes away from other valuable activities, such as relationship-building, tailoring instruction, and supporting students with learning differences.*

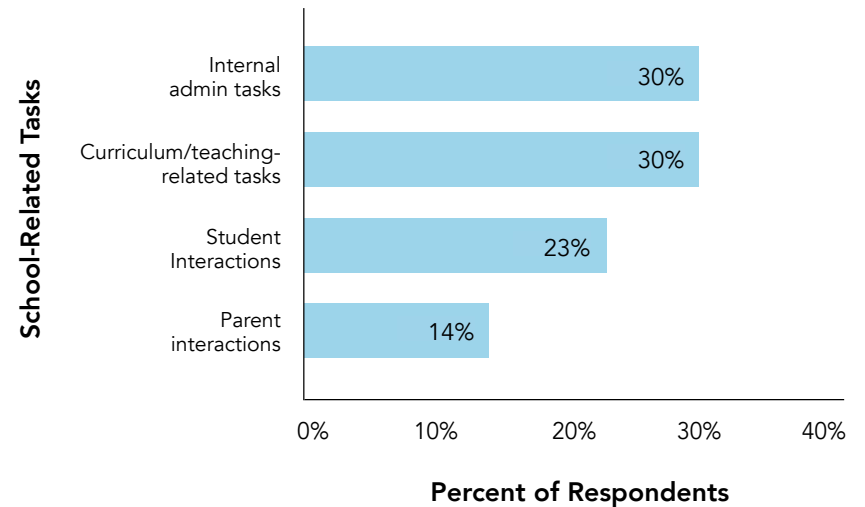
Teachers spend approximately 20 hours per week on tasks that could be improved by AI.

Similarly, leaders spend significant time on admin and curriculum tasks.

### Teachers' Hours Per Week Spent on Tasks



### Average Percentage of Time Public School Principals Spent Per School Year on School-Related Tasks



## AI tools can ease some administrative tasks; however, thoughtful human checks are needed to ensure quality.

### Operations

- AI can ease operational processes such as developing a master schedule or bus routes.
- For example, Timely uses AI to optimize school schedule creation, enabling leaders to set criteria, automate schedules, and monitor equity metrics (e.g., demographics and teacher load).

### Reporting

- AI-powered tools can support reporting and writing (e.g., develop first drafts, proofread and provide feedback).
- For example:
  - MagicSchool AI and Brisk have tools to ease IEP writing.
  - Organizations such as Grantable, Fundwriter, and Granted AI support fundraising.

### Financial Planning

- Theoretically, AI could be used for strategic and financial planning; however, early use cases have had varied results.
- In Nevada, an AI model was used to take numerous input data to generate a “grad score” for each student to determine funding. The model lacked transparency and ultimately eliminated more than 200,000 students from eligibility.

# AI can improve administrative and operational efficiencies if used with care.

## Opportunities

- AI can save time for some administrative and operational tasks, especially those that are repetitive.
- Effective use of the tool may free up time for more strategic activities.
- There is potential for cost savings from improved efficiencies.
- Real-time data processing and reporting may drive more data-informed decision-making.

## Challenges

- Over-reliance on AI systems may lead to lower-quality results and/or exacerbate inequities.
- Thoughtful change management and stakeholder engagement are still essential for success.
- Handling student data with AI tools increases the need for robust data privacy and security.
- Ensuring transparency in how AI algorithms make decisions is important for maintaining trust.



## ***Bellwether Take: AI-enhanced back-office applications have near-term efficiency potential.***

- Given the challenging fiscal environment in the education sector (e.g., federal COVID-19 pandemic funding sunseting in September 2024 and declining enrollment in major urban centers), cost savings leveraging AI in administrative and operational areas may be a promising approach for large districts/systems without significant political risk.
- However, similar conditions such as robust infrastructure and processes, implementation, and change management are required for success.
- Transparency and the use of AI for resource allocation and consequential decisions should be approached with caution.

# There is growing demand for new and innovative school models.

## Current Challenge

*Current school models remain largely traditional, often not responsive to student needs and the changing environment.*

Students, families, and educators are dissatisfied with public education.

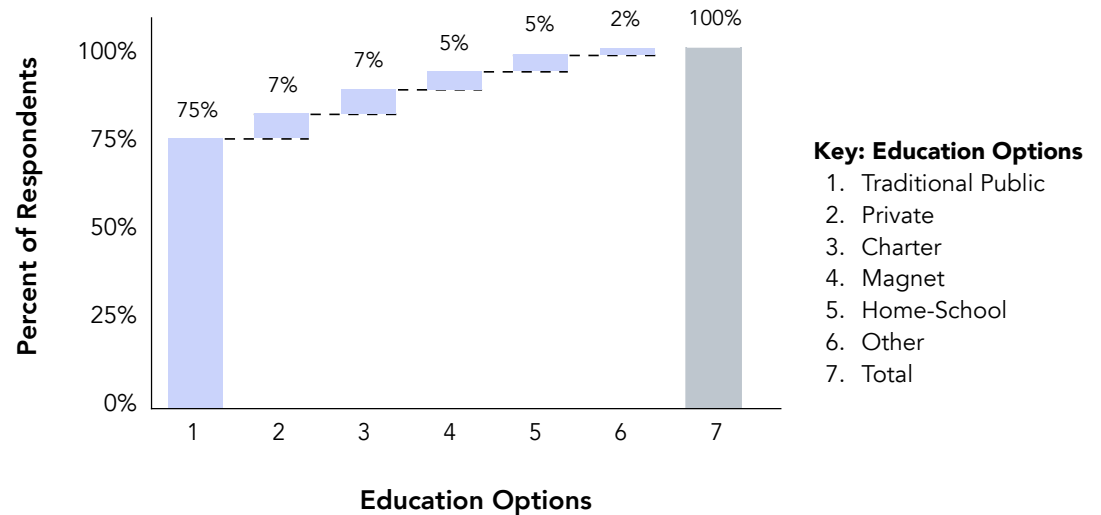
The demand for choice or alternative education options continues to grow.

**70%** of teens say “all” or “most” of their classmates are bored in class.

**51%** of U.S. adults say “the country’s public K-12 education system is generally going in the wrong direction.”

**82%** of teachers say “the overall state of public K-12 education has gotten worse in the last five years.”

**Student Enrollment in Education Options, By Type**



# AI innovation is emerging across school types, with the potential for AI to lower some barriers.



## Traditional Public: Seckinger High School (Georgia)

- Launched in 2022, Seckinger High School is a Gwinnett County Public School in Buford, Georgia, with the capacity to serve 2,800 students across grades 9-12.
- The high school developed and uses an AI Framework across all content areas; the AI Framework is weaved throughout curriculum and practices.
- While educators and students do use AI tools, the model emphasizes AI-relevant logic and way of problem-solving and is not heavily focused on technology.



## Private: Alpha (Texas, Florida)

- Alpha began as a private school in Austin, Texas, which incorporates the AI-powered 2hr Learning platform to personalize learning such that its K-12 students spend just two hours a day on academic mastery and the remainder of the day on life skills workshops.
- Alpha students score in the top 2% or better nationally, and 96% of students say they want additional time in school.
- Now with five campuses across the country, Alpha is looking to expand into public charter schools to increase access to its programs.



## Additional Support for Students in Title I Districts and Networks

- Paloma leverages AI to equip families to deliver 15 daily minutes of at-home instruction.
- Paloma includes instructional videos, learning activities, and AI-personalized decodable books and word problems.

## Microschools and Home-Schools

- Over time, AI-powered tools may lower the barriers for microschoools and home-schools by making it faster and more accessible to create content and complete administrative tasks.

## Although technology may mitigate some barriers for new school models, challenges remain.

### Opportunities

- New school models provide greater choice for students and families.
- There is potential for new models to increase engagement, flexibility, and relevance to real-life applications.
- Some new models may be more cost effective.
- Successful innovation in new school models may influence changes in the traditional system.

### Challenges

- Proliferation of school types may be challenging to research, measure, and monitor success.
- The wide range may result in varied or lack of accountability and outcomes.
- New school models may be difficult to scale with quality, facing similar growth challenges and limitations to current models.
- Equitable access is crucial to avoid widening existing gaps.



## ***Bellwether Take: Transformation of whole school models presents long-term opportunities.***

- Of the use cases, new school models are currently the least explored area; although pockets of grassroots educators are leveraging AI in innovative ways, whole school transformations are limited.
- However, there is long-term opportunity to incorporate AI as an additional member of a holistic student support team and/or lower barriers to launching new schools or programs.
- Innovations in new school models are likely to start in areas outside of traditional public schools and charter schools, such as microschoools, home-schools, and education savings account-funded supplemental learning programs, due to regulatory and accountability considerations.
- When considering AI as part of new school designs, it is important to proactively define and monitor metrics for success, manage and mitigate implementation obstacles, and address traditional barriers such as facilities, teachers unions, and systems' resistance to change and new school models.





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# A Closer Look

Research indicates that **“teachers matter more to student achievement than any other aspect of schooling.”** Even with AI advancements, educators remain the cornerstone of student success. Educators’ judgment and human connection are essential elements in the learning process, even as their role potentially evolves.

Given the additional complexities surrounding student-facing AI applications — including safety concerns, data privacy challenges, limited efficacy evidence, and other potential risks — **many practitioners and ed tech providers are strategically focusing their initial efforts on educator-facing AI tools.** This approach allows for the development and refinement of AI applications in an environment with fewer high-stakes risks, while still potentially yielding significant benefits.

In light of this, the following section takes a closer look at **the educator’s experience.** It explores how AI may enhance various facets of educators’ professional experiences across three key domains: academics, culture, and talent development. This exploration includes currently available technologies, emerging innovations, and potential future applications.

# AI has the opportunity to impact various academic, culture, and talent activities of an educator.

<b>Academics</b>	<b>Culture</b>	<b>Talent</b>
Curriculum and Instruction Assessments Data and Intervention	School Culture Nonacademic Skill Building	Training (Pre-Service and Ongoing Professional Development)

# AI can ease lesson planning and feedback on existing materials or transform the modality of learning.

## Curriculum and Instruction

## Examples

Current Capabilities		
<b>Emerging Innovations</b>	<p><i>Improve the efficiency of current content creation and learning processes.</i></p> <p><b>Generate or improve upon lesson plans:</b> Create or enhance lesson plans aligned with standards and student needs.</p> <p><b>Customize and differentiate content:</b> Tailor materials to individual or groups of students by interest, growth areas, and/or levels.</p> <p><b>Automated feedback and grading:</b> Streamline grading processes and provide affirming and adjusting feedback to strengthen student learning.</p>	<p>Brisk Teaching ChatGPT Claude Google Classroom MagicSchool AI</p>
<b>Future Possibilities</b>	<p><i>Scaffolded access for students with learning differences.</i></p> <p><b>Text-to-speech and speech features:</b> Support students with reading differences and students who are blind or visually impaired; AI can more efficiently and effectively interpret different dialects or accents.</p> <p><b>Multimodal features:</b> Increase accessibility, as tools like Alchemie are grounded in the Universal Design for Learning approach and use AI to allow users to interact with web-based apps in different modalities.</p> <p><i>Deepen individualized learning experiences and expand learning access.</i></p> <p><b>Interest-based collaborative projects:</b> AI agents with memory of student interactions can match students with similar interests and/or complementary skills, create hands-on and engaging learning experiences, and continuously assess progress via video, image, and/or audio inputs.</p>	<p>Duolingo Max SoapBox Labs</p>

# AI can make it easier for teachers to create more opportunities for students to demonstrate learning.

## Assessments

## Examples

Current Capabilities		Examples
Emerging Innovations	<p><i>Identify specific knowledge or skill gaps.</i></p> <p><b>Leverage multi-tagging:</b> Multi-tagging is a process of adding metadata to assessment items to reflect different aspects of a question (e.g., two-step problem that also measures fractions). Vendors are exploring how to better use data to understand specific student misconceptions and knowledge gaps.</p>	
Future Possibilities	<p><i>More flexibility in how students demonstrate knowledge.</i></p> <p><b>Offer more student choice in assessment:</b> Advancements in audio, images, and video may allow for students to have greater choice in how they demonstrate their learning, such as allowing students to submit handwritten work or an oral response to an open-ended item.</p> <p><b>Embedded assessments:</b> Opportunities for assessments can be more seamlessly embedded into instruction.</p>	<p>Snorkl SoapBox Labs</p>

# AI holds promise for better leveraging data to plan intervention.

## Data and Intervention

## Examples

<p><b>Current Capabilities</b></p>	<p><i>Enhance data use.</i></p> <p><b>Generate data analysis:</b> Use AI tools to easily analyze student data or use tools to summarize data patterns and trends.</p> <p><b>Identify misconceptions:</b> More easily detect if students are consistently missing certain types of items.</p> <p><b>Connected data systems:</b> Create a more holistic view of a student via multiple sources of data.</p>	<p>ChatGPT Claude PowerSchool</p>
<p><b>Emerging Innovations</b></p>	<p><i>Dynamic grouping of students.</i></p> <p><b>Synthesize and manipulate data across systems:</b> Enterprise-level tools can interface across numerous documents and create synthesis and analysis (AI is embedded in the user experience).</p> <p><b>Grouping students:</b> Use real-time data to allow for grouping of students.</p>	<p>BoxAI Dropbox</p>
<p><b>Future Possibilities</b></p>	<p><i>Better leverage data to allow for earlier intervention.</i></p> <p><b>Predictive models:</b> Use historical and real-time student data to predict future performance and allow for earlier intervention.</p>	

# To strengthen school culture, AI can streamline communications and ultimately better connect humans.

## School Culture

<b>Current Capabilities</b>	<p><i>Improve information and communications channels.</i></p> <p><b>Written messages and reports:</b> Generate communication materials rapidly from numerous AI tools.</p> <p><b>Information platforms:</b> Streamline communications with students and families, lowering the barrier to data and information.</p>
<b>Emerging Innovations</b>	<p><i>Greater visibility and matching of students with their interests and needs.</i></p> <p><b>Culture dashboards:</b> Generate dashboards from quick survey pulse checks throughout the school year to provide visibility into individual and group interests, passions, and supports.</p> <p><b>AI-enabled mentorship and peer programs:</b> Match students with mentors or peer support based on data related to interests, strengths, and preferences.</p>
<b>Future Possibilities</b>	<p><i>AI serving as an assistant or adviser.</i></p> <p><b>Community events:</b> Integrate technology into event support via AI agents that automate event-planning tasks, including scheduling, bookings, communications, and reminders to students and families.</p> <p><b>Recommended interventions:</b> Generate intervention recommendations to support classroom management and relationship development, where AI can provide objective data and insights to promote consistency and fairness in supporting students.</p>

# AI can help educators in building student nonacademic skills.

## Nonacademic Skill Building

## Examples

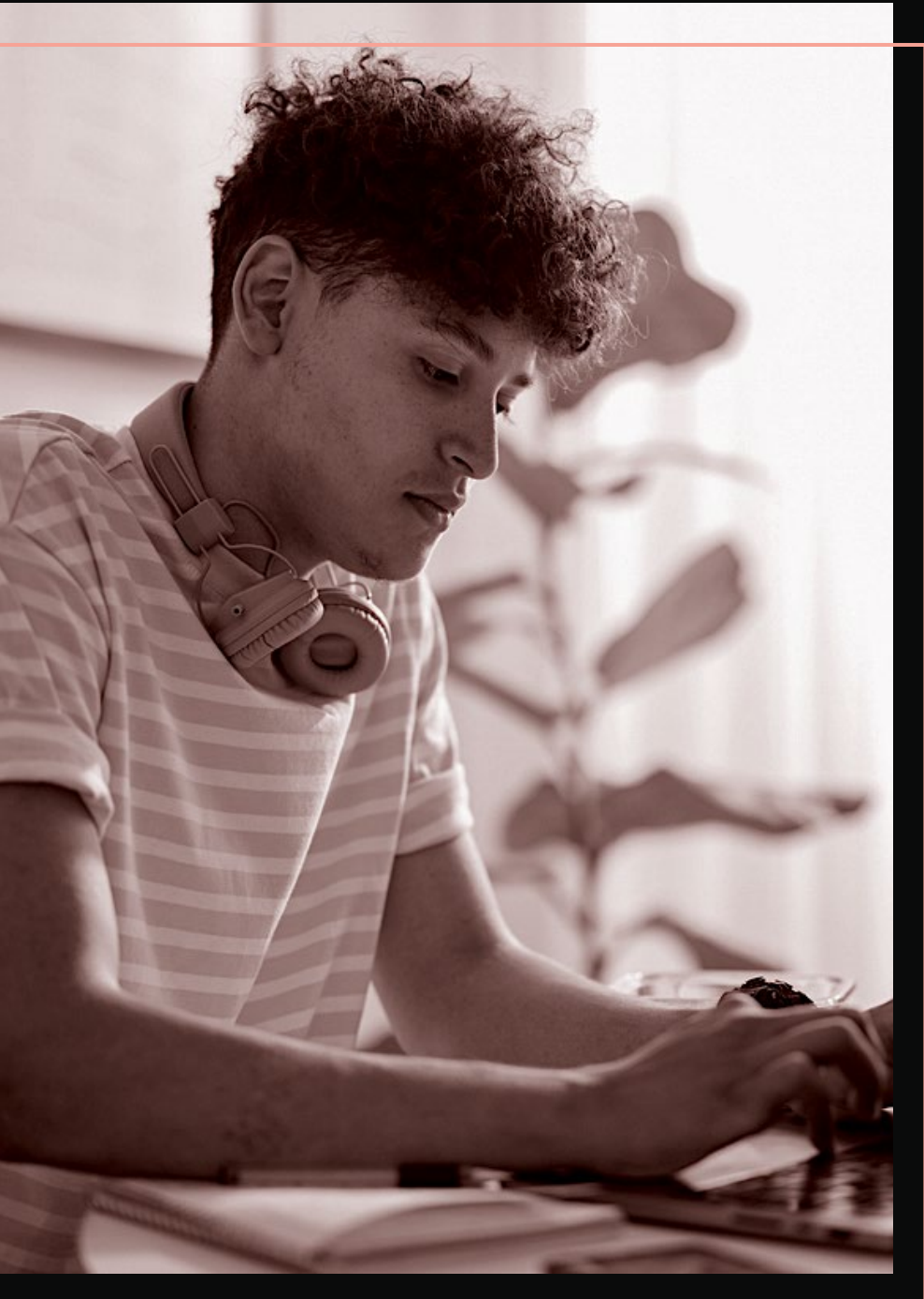
<b>Current Capabilities</b>	<p><i>Provide students opportunities to practice their nonacademic skills.</i></p> <p><b>Communication skill chatbots:</b> Simulate conversations via AI chatbots, giving students the opportunity to practice their verbal and written communication skills.</p> <p><b>Small group facilitation:</b> AI tools can help students work together in small group collaborative settings.</p>	OKO
<b>Emerging Innovations</b>	<p><i>Scaffolded access for students with learning differences.</i></p> <p><b>Personalized schedules, attention monitoring, and prompts:</b> Use AI as a tool to provide breaks, varied activities, and reminders to help students maintain focus.</p> <p><i>Provide students opportunities to further refine their nonacademic skills.</i></p> <p><b>Small group assignments:</b> Use AI to help with grouping students into small groups based on interests, skills, or needs.</p> <p><i>Mental health support.</i></p> <p><b>Mental health chatbots:</b> Use AI to offer students 24/7 mental health support.</p>	
<b>Future Possibilities</b>	<p><i>Provide students opportunities to further refine their nonacademic skills.</i></p> <p><b>Just-in-time feedback:</b> Use AI to provide feedback based on audio and video inputs that can allow students greater opportunities to practice and receive feedback on their nonacademic skills.</p>	



# Just as AI has the potential to transform student learning experiences, it can similarly impact how educators learn.

## Training (Pre-Service and Ongoing Professional Development)

<b>Emerging Innovations</b>	<p><i>Multimodal feedback and simulations.</i></p> <p><b>Feedback based on video or audio input:</b> AI can provide educators with strategies and recommendations; current tools are of varying quality or focus only on a narrow set of instructional objectives, though the capabilities exist for greater impact.</p> <p><b>Personalized courses:</b> For example, Coursera embeds AI-powered recommendations, resources, and content. AI also assists in course creation to help author training content.</p>
<b>Future Possibilities</b>	<p><i>AI serving as a just-in-time coach.</i></p> <p><b>Virtual reality simulations:</b> AI coaching can replicate complex classroom scenarios, incorporate student data, and provide recommendations to help educators practice instructional moves in a realistic but digital environment.</p>



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Today, most AI uses and capabilities are efficiency plays. In the longer term, AI has the potential to transform learning experiences to be more individualized, dynamic, and engaging.

There is also potential for AI to broaden and diversify the educator talent pipeline and role; rather than replacing teachers, there is an opportunity to make the teaching profession more sustainable, relationship-driven, and creative.

However, any long-term illustrative use cases need to first minimize bias, inaccuracy, and misinformation in the underlying GenAI models. Investments in data, development of quality tools, and capacity-building are necessary foundations for safe, effective, and equitable uses. ✨



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# Interviews

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## About Bellwether

Bellwether is a national nonprofit that exists to transform education to ensure systemically marginalized young people achieve outcomes that lead to fulfilling lives and flourishing communities. Founded in 2010, we work hand in hand with education leaders and organizations to accelerate their impact, inform and influence policy and program design, and share what we learn along the way. For more, visit [bellwether.org](http://bellwether.org).

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Bellwether works with organizations and leaders who share our viewpoint-diverse commitment to improving education and advancing equity for all young people — regardless of identity, circumstance, or background. As part of our commitment to transparency, a list of Bellwether clients and funders since our founding in 2010 is publicly available on our website. An organization's name appearing on our list of clients and funders does not imply any endorsement of or by Bellwether.

Similarly, examples of tools, companies, and nonprofits featured in this three-part AI analysis do not imply any endorsement of or by Bellwether for specific products or services.

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