

# ARTIFICIAL INTELLIGENCE IN EDUCATION: KEY CONCEPTS AND USES

Artificial Intelligence (AI) encompasses a broad range of technologies designed to emulate human intelligence. These technologies include reasoning, pattern recognition, and learning from experience. The integration of AI into education has garnered significant attention, beginning with Machine Learning (ML) and more recently with the rise of Large Language Models (LLM) and Generative AI (GEN). These AI-based systems can "learn," improving their processing over time based on past outcomes with minimal human intervention. Although ML, LLM, and GEN are transforming education by personalizing learning experiences and automating administrative tasks, AI is not limited to these models. It spans various other forms, each contributing uniquely to enhancing human capabilities in the completion of specific tasks. As educators embrace AI-enabled technologies, understanding the main types of AI and how they interrelate is crucial. AI and other emerging technologies are continually transforming education. By situating AI within the broader context of human knowledge and development, we can explore its evolution, future possibilities, and constraints in schools.

## AI USE CASES AND CONTEXTS

### DETERMINING EDUCATIONAL CONTEXT

AI tools can be used for a variety of applications. Careful consideration should be given to the specific use case, if confidential data is being collected or inputted, and what data is expected or intended to be produced.

When generative AI is used, additional consideration should be given to if any confidential information has been or will be used to train the model, if data inputs may be incorporated into training data, and if you can explain how the tool produces the resulting information.

### AUTOMATED GRADING AND FEEDBACK

Systems can grade multiple-choice tests and essays, providing detailed feedback on student performance.

**Value of AI:** Reduces the time teachers spend on grading, allowing them to focus on instruction and student support. May aid with consistency and objectivity in grading. Tools should be designed to comply with student privacy laws and output reviewed by the teacher for risk of bias.

Types of AI:



### STUDENT MONITORING

Integrated systems assist schools in monitoring students' network and device activity to preemptively detect threats to student safety, comply with state and federal regulations, respond to community concerns, and identify at-risk students. This includes monitoring activity on school-issued devices, accounts, and district internet connections.

**Value of AI:** These systems analyze the student data for indicators that the system has determined may be concerning, with some systems flagging content for human review.

Types of AI:



### CURRICULUM DEVELOPMENT

These systems analyze educational trends and outcomes to help educators design effective curricula to meet current educational standards and student needs. They can generate educational content such as quizzes, worksheets, and reading materials tailored to the curriculum.

**Value of AI:** Provides a resource to help ensure that the curriculum is relevant, up-to-date, and effective in achieving educational goals

Types of AI:



### INTELLIGENT TUTORING SYSTEMS

AI-powered tutors can offer one-on-one tutoring sessions, provide tailored explanations, answer questions, and create practice problems. They can analyze student data to create customized learning plans, explanations, and study materials tailored to individual strengths, weaknesses, and learning styles.

**Value of AI:** Provides students with additional support outside of classroom hours, helping to reinforce concepts through an interactive and engaging learning experience.

Types of AI:



### SCHOOL SECURITY

Schools utilize facial recognition and advanced video analytics to monitor and control access, identify unauthorized visitors, and detect suspicious activities. These systems can automate lockdowns, detect weapons, send real-time alerts, and provide continuous surveillance with predictive capabilities.

**Value of AI:** Systems provide improved safety by enabling faster, more accurate responses to potential threats, ensuring a secure learning environment.

Types of AI:



## PREDICTIVE VS GENERATIVE

### PREDICTIVE

Predictive AI uses algorithms to identify patterns and forecast outcomes based on historical and real-time data. By identifying patterns in large datasets, predictive AI models enable educators to make accurate, informed predictions on various scenarios, ranging from school business operations to student outcomes.

### GENERATIVE

Generative AI creates new content, such as text, images, audio, or other data, by learning patterns from existing data. Unlike traditional AI models that are focused on classification or prediction, generative AI models can generate novel outputs that resemble the data they were trained on.

