



CHEPP

The Center for
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and Practice

AI IN HIGHER EDUCATION: A PRIMER FOR HIGHER EDUCATION POLICYMAKERS AND LEADERS

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Introduction

A greater understanding of AI's components, defining features, and how it operates is critical to making informed decisions about its use. This primer provides an overview of key AI definitions and capabilities as well as a glossary of key terms (see Sidebox 1) to help practitioners, leaders, and policymakers understand the implications of AI.

This primer is part of CHEPP's AI in higher education research series, [*How AI is Reshaping Higher Education: Learner-Centered Insights for Policymakers and Practitioners*](#). In addition to this primer, the series includes [*AI in Higher Education: Teaching and Learning – Applying a Learner-Centered Lens to AI Integration*](#) and [*AI in Higher Education: Infrastructure and Operations – Key Enablers of AI Strategies*](#). The report on teaching and learning provides a detailed overview of how AI is being thoughtfully integrated into teaching and learning in higher education and how universities and colleges must play a critical role in that process. The report on infrastructure and operations details how technical infrastructure, leadership, and processes across institutions of higher education are critical to advancing intentional applications of AI.

Three Types of AI

There are three overarching types of AI (i.e., narrow AI, general AI, and superintelligent AI). Although it may seem that AI has already significantly transformed today's world, we are actually in the early stages of AI development that experts are calling narrow AI, which is capable of performing specific programmed tasks. Developers expect AI advancements to continue, which would theoretically lead to general AI and superintelligent AI (definitions of these types are provided below).

- **Narrow AI (ANI)** is designed to perform specific tasks and cannot perform tasks outside of its programmed tasks (Lenovo, n.d.). It is less costly than other types of AI and easier to integrate into current systems (Lenovo, n.d.).
- **General AI (AGI)** can reason and learn and is capable of performing any task akin to human intelligence (Russell & Norvig, 2022). While general AI does not exist as of the writing of this paper, research and development efforts are underway.
- **Superintelligent AI (ASI)** exceeds human intelligence in its ability to solve problems, show emotional intelligence, and exercise creativity (Russell & Norvig, 2022). As of the writing of this paper, superintelligent AI appears not to be achievable (Russell & Norvig, 2022).

The Basic Operating Model for Narrow AI Applications and Tools

The current operating model for narrow AI tools and applications relies on two key types of "core brains" that power their data processing requirements. **Large language models (LLMs)** are very large neural networks that process vast amounts of data, often relying on large data centers (physical buildings using massive amounts of power to process data on equipment). The other type of core brain power is known as **small language models (SLMs)**, which use smaller sets of data and fewer resources which may be in-house at an organization rather than in large data centers. SLMs are trained to perform specific tasks using their particular small sets of data. The underlying technologies that enable narrow AI tools to operate are **neural networks** (also known as deep learning). Neural networks are a type of machine learning algorithm that drives AI innovations by processing data according to a layered structure of interconnected nodes, which makes **natural language processing (NLP)** possible. NLP is a type of machine learning that manipulates, interprets, and comprehends human language to communicate.

Types of Narrow AI Tools

Within the existing landscape of narrow AI applications, several types of tools are often easily confused or misunderstood. They are generative AI, agentic AI, and chatbots or virtual assistants.

- **Generative AI** reactively responds to prompts to generate content based on LLMs (Russell & Norvig, 2022).
- **Agentic AI** operates proactively to complete a complex series of multi-step tasks with the help of multiple agents, using LLMs or SLMs, long-term and contextual memory, and the ability to plan and adapt to changing conditions (Russell & Norvig, 2022).
 - **AI agents** can also act discretely to perform specific tasks using LLMs or SLMs in conjunction with external tools that they are connected to via application programming interfaces (APIs) with short-term memory (Russell & Norvig, 2022).
- **Chatbots/virtual assistants** use conversational AI supported by natural language processing to create human-like conversations (IBM, n.d. (a)). Chatbots were in use prior to the availability of LLMs but can now be powered by them for different needs.

Table 1. Examples of Different AI Tool Applications in Higher Education

Use Case	Type of Narrow AI	Tool Example
Create an FAQ section to help students understand how the financial aid process works at the institution.	Generative AI	ChatGPT
Develop related infographics, videos, or podcasts on the financial aid process at the institution.	Generative AI	NotebookLM
AI assistants help learners access Wi-Fi, navigate dining options, or schedule appointments.	AI agents	AI student services assistant (Mangan, 2025)
Autonomous systems verify student credentials, notify students about missing forms, and check for eligibility.	Agentic AI	Admissions document verification agent (Schroeder, 2026)
Assist learners in a course by answering questions about course material, sending reminders for upcoming assignments, and offering study tips.	Chatbots/ virtual assistants	Academic chatbot (National Institute for Student Success, 2024)

Sidebox 1. Glossary of AI Terminology Used in This Report

- **Agentic AI:** In response to objectives, agentic AI proactively plans and executes multiple steps through multiple agents to achieve goals (Russell & Norvig, 2022).
- **AI agents:** Discrete agents that perform tasks and achieve goals on behalf of a user or entity (Russell & Norvig, 2022).
- **Chatbot:** A virtual assistant that simulates human-like conversations through a computer program and natural language processing (IBM, n.d. (a)).
- **Cognitive offloading:** Using technology and external tools to reduce cognitive demand (Risko & Gilbert, 2016).
- **Conversational AI:** Technologies that people can talk to by using natural language processing, machine learning, and large amounts of data (IBM, n.d. (a)).
- **Data center:** A facility designed to support AI operations, which require a combination of high energy consumption, massive data throughput, and high computational power.
- **Deanonimization:** The process of matching de-identified data with publicly available data to identify individual information.
- **Epistemic agency:** Taking responsibility for one's own learning and intellectual advancement (Muukkonen et al., 2009).
- **Generative AI:** In response to prompts, generative AI reactively creates content in a single response based on training from massive amounts of data.
- **Grounding:** The process of ensuring AI tools and their data models rely on accurate, up-to-date, and fact-based information (Microsoft, n.d.).
- **Hallucinations:** Inaccurate, false, or misleading information presented by AI due to data biases, insufficient data, or false assumptions made by the algorithm (Google Cloud, n.d.).
- **Knowledge graph:** The representation of the relationships between real-world objects, concepts, and events; they are used to complement machine learning to reduce the reliance on large datasets.
- **Large language models (LLMs):** Very large neural networks that are trained on large amounts of data.
- **Machine learning:** A type of artificial intelligence that learns using algorithms and data to gradually improve accuracy through iterative testing.

Sidebox 1. Glossary of AI Terminology Used in This Report (continued)

- **Mechanistic interpretability:** A novel approach to decoding, analyzing, and understanding how and why neural networks operate (Cloud Security Alliance, 2024).
- **Natural language processing (NLP):** A type of machine learning that manipulates, interprets, and comprehends human language to communicate.
- **Neural network:** Also known as deep learning, neural networks are a type of machine learning algorithm that drives AI innovations by processing data according to a layered structure of interconnected nodes.
- **Predictive AI:** AI that uses both machine learning and statistical analysis to forecast outcomes, impacts, or conclusions (IBM, n.d. (b)).
- **Prescriptive AI:** AI that uses both machine learning and statistical analysis to provide instructions on what steps to take to achieve a specified outcome (Marr, 2024).
- **Self-healing:** AI systems that can continuously monitor, detect and predict anomalies, then remediate them (Slagg, 2025).
- **Small language models (SLMs):** Using smaller sets of data and fewer resources, small language models are trained to perform specific tasks.
- **Walled garden:** A closed dataset that's controlled by a single entity and limited in its access and interactions with other data systems.
- **Workslop:** Creating the illusion of good work, workslop is content generated by AI that looks good but lacks the substance to advance good work.

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Contributors

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