

# AI in Education

## Excitement, Caution, and Avoiding Cognitive Atrophy

By *Stephen Romanoff*

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[Babbageidea.com](https://babbageidea.com)

### Introduction

Artificial intelligence has exploded onto the scene faster than anyone expected. The promise it provides is real and profound. AI can save teachers time, reduce administrative burdens, personalize instruction, and open doors for students who learn unconventionally. For many, it feels like a revolution that can finally make education more adaptive, inclusive, and efficient.

Excitement alone is not enough. Every major leap in human progress from the printing press to the industrial revolution to the rise of the internet carried both promise and peril. Each reshaped how societies learned, worked, and communicated. When handled wisely, these transformations expanded opportunity and accelerated discovery. When handled carelessly, they deepened inequality, replaced craftsmanship with conformity, and eroded the very skills that once defined human capability and interaction.

The printing press democratized knowledge and sparked the desire for education and literacy, but early pamphleteers unintentionally distorted truth while believing they were promoting knowledge. The industrial revolution created unheard of scale and opportunities but devalued craftsmanship in favor of mass production and cost reduction. Architectural beauty eventually gave way to brutalism and efficient use of space. The digital revolution connected the world but fractured attention and rewired how humans think and interact.

AI now stands at the same threshold, but its speed and scale are unmatched. The way schools and teachers integrate it today will shape how students think for the rest of their lives. The stakes are higher than most realize. If AI is introduced carelessly or used as a shortcut for thinking, the effects could ripple across a generation. This is not a matter of short-term innovation. It is a long-term responsibility. We must get it right.

## The Role of the Teacher

AI should be seen as an enhancement to human effort, not a replacement for it. Teachers remain the moral and intellectual compass of the classroom. AI can analyze data, generate text, and automate grading, but it cannot replace empathy, judgment, or the ability to connect on a human level and inspire a desire to learn and grow.

This process starts with educating teachers to understand both the potential and the shortcomings of AI. When teachers know how AI fails, they can guide students to use it wisely. The goal should be to use AI to amplify creativity and reduce friction in workflows, not to remove the effort that leads to learning. Human effort must remain at the center of teaching. Learning is like building muscle; growth only happens under tension. In weightlifting, progress comes from adding resistance, heavier weights and more repetitions. The muscle strengthens because it is challenged. Education works the same way. Intellectual growth depends on the tension between curiosity and confusion, between not knowing and the determination to understand. When students wrestle with why an equation works, or why an idea makes sense, they are doing the mental equivalent of lifting weights. The struggle is not a barrier to learning; it is the very process that creates it.

If we allow AI to remove that tension to provide every answer, solve every problem, and smooth every difficulty we rob students of the cognitive resistance that builds strength. Without struggle, there is no growth. Without questioning, there is no understanding. The role of AI should be to *spot* the lifters form, not to *lift* the weight.

To use AI responsibly, we must acknowledge its limitations. AI can recognize patterns but often misses meaning. It can appear confident even when it is completely wrong. Most importantly, it can make thinking feel unnecessary and lead to cognitive atrophy, which leads to degradation in educational standards for students and will lead to an entire generation dependent and reliant on AI. When students rely on AI for answers, they skip the struggle that develops reasoning, resilience, and creativity. That struggle is not a flaw in learning; it is the foundation of it. Without it, curiosity fades, and dependence grows. Recognizing these limits does not make AI less useful, it makes it safer and more honest.

## Educating the Educators

Responsible AI use begins with teacher literacy. Before students ever use AI tools, teachers must understand what they are working with. This includes how AI generates



information, what biases may exist in its data, and how to identify misleading outputs. This is why we at Babbage are excited to help foster this new age in education. While we may seem like skeptics, and Debbie downers, we are still extremely excited about the potential impact that it will have on the teachers' daily workflows, and the student's ability to learn in adapt in a changing world.

Professional development should train educators to use AI as an assistant, and enhancement to current workflows and duties, not a replacement. This all begins with dialog and verification. Teachers must put thought into every prompt, challenge every response, and validate the logic behind every answer. Teachers must encourage responsible use of AI with the students and show why using it as a shortcut will inhibit their abilities in the future and stunt their mental development. Talk openly about when and why they use AI themselves; this transparency models responsible behavior and builds trust in the learning process by aligning teachers and students in the use of AI. If teachers lead with understanding and knowledge, AI becomes a tool for precision and inspiration rather than confusion and dependency.

### **Students and the Socratic Classroom**

AI can be a valuable partner in exploration if it is used to expand inquiry rather than replace it. A classroom that uses AI responsibly should feel more like a conversation than a transaction. Any prompt from a student should yield a follow up question rather than supplying the answer directly, prompting the student to think how to answer the question, and this will yield more questions that will naturally lead the student to correct answer by way of conversational progression and learning. This example is the best and highest use for AI in education outside of neurodivergent use cases for unconventional learning.

Students should be encouraged to question AI, to test its answers, and to use it as a starting point for deeper thought. The Socratic method is about asking questions, challenging assumptions, and reasoning through dialogue, and should remain at the heart of learning. The goal is to make learning and education richer, more reflective, and more personal. It should spark creativity and curiosity. Allowing students to learn at their own pace and level.

### **The Generational Risk**

The most serious risk of AI in education is not technological. It is cognitive. Overreliance on AI tools can weaken critical thinking and diminish curiosity. When students

no longer have to think through problems or write in their own words, the mind becomes passive. This erosion will not happen overnight, but over time it could create a generation less capable of analysis, empathy, and independent judgment. As stated before, this will stem from how teachers and schools integrate and interact with AI. It will be nearly impossible to limit access to it, so the goal should be to embrace it with control.

The risks in poor implementation in the corporate world is measured in lost dollars and cratered shareholder value, but the risk in poor implementation in education, is a cognitively and creatively bankrupt generation of students. This will follow them as they enter college, and then into the job market. The folly of improper implementation will show devastating effects for decades to come. We ride a very fine line, and we have the moral obligation to our children and future society to **DO THIS RIGHT THE FIRST TIME!**

### **A Framework for Responsible Implementation**

The path forward starts with teachers. They must be the first to understand AI, its strengths, and its limits. Schools should set clear expectations for when and how AI can assist instruction. Every use of AI should be transparent, so students and parents know when it is part of the learning process, and why. AI should be paired with human collaboration, not used in isolation. Assignments should combine human reasoning, discussion, and reflection with AI-generated ideas or feedback. Schools should also monitor more than just grades. They should observe whether students remain curious, engaged, and able to reason independently. Enhanced SEL tools must be developed with this goal in mind. Just with the rise of social media, and the growing mental health crisis, there will be similar effects due to AI, just more aligned with cognitive degradation instead of stunted social skills, and mental tolls.

### **Conclusion**

AI's promise in education is both inspiring and sobering. It can empower teachers, personalize learning, and unlock creativity. It can also weaken attention, flatten curiosity, and blur the line between understanding and imitation. The outcome depends entirely on how we implement it. AI should not make learning easier; it should make it deeper. It should not replace thinking; it should provoke it. The responsibility for getting this right rests with every educator, policymaker, and developer involved in shaping how AI enters the classroom. The next generation's capacity to think critically, curiously, and creatively depends on it.