

deepIDM: Designing Inquiry with AI

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The astronomical clock in the Cathedral of Our Lady of Strasbourg in Alsace, France, is one of the most famous timekeepers in the world. At various times throughout the day, wooden apostles parade on a ledge above the clock, bowing to a figure of Christ, as a rooster crows. This show, like other human-like machine automata, seeks to represent human life through mechanical replication. Ancient Greek, Byzantine, Egyptian, and Chinese civilizations also created these mechanical human displays with gears and counterweights to represent human beliefs, practices, and desires. Such machines, as with the Strasbourg astronomical clock, mediate human spirituality and reveal divine order through human craft. But at various times (as in the Reformation), humans have recoiled from the mystery of these mechanical spectacles and stripped machines of their connections to humans to reposition them as neutral tools—a shift that may echo in our present debates about AI.

AI and the Arc of History

Of late, humans have increasingly taken charge of machines, positioning them to function in the service of human progress. Inventions like the mechanical loom, steam engine, light bulb, penicillin, and computers helped us master nature and soften life's harsh edges. Yet from time to time, new technologies have brought us back to the moments of wonder once inspired by spiritual clocks and other mystical machines like ancient automata. For example, the telescope decentered and humbled

humanity, and electrified communication rewired how we connect and reshape our sense of self and community. Now, artificial intelligence is expanding human consciousness and extending the reach of our creative and intellectual being. We're now pondering whether AI is just another machine designed to make life more comfortable by taking on otherwise bothersome tasks, or whether it's redefining what it means to think, create, and learn, and reshaping the human experience. This AI moment harkens back to



Credit: Zairon / Wikimedia Commons

**The Astronomical Clock of the
Cathedral of Our Lady, Strasbourg**

those times when machines conveyed mystery and signified something more than just being a tool for efficiency. For social studies educators, this moment demands both curiosity and responsibility. We're at a moment where the question is no longer whether AI will shape teaching and learning, but how and how much.

AI and Humans

Within the current stew of speculation about AI lurks something that is perhaps more magical—harkening back to the era of spiritual machines, when

humans stretched their consciousness and made meaning through the devices they created. In this view, AI becomes part of our thinking apparatus, not just a tool but a partner in cognition. David Chalmers calls it Reality+—the notion that with AI we can extend our intellectual and physical capabilities for the betterment of humanity.¹ Ray Kurzweil pushes further, envisioning a singularity where humans and machines merge into a greater, more powerful entity.² Yet alongside these grand claims are voices of hesitation, like Yuval Noah Harari, who cautions that while AI inevitably changes us, it does not necessarily make us more—or less—human.³ Seen through these overlapping visions, AI emerges as both an imaginative extension of the human mind and a mirror that forces us to reconsider the boundaries of intellect, consciousness, and humanity's future.

AI in Social Studies

Much has been written (and very quickly we might add) about how AI is impacting education and specifically social studies. Christopher Clark and Cathryn van Kessel's recent book, *Social Studies Education: Tools for Thoughtful Practice with Generative Artificial Intelligence*, is a fine example.⁴ This edited work is the first collection to focus specifically on generative AI in social studies. The book addresses topics such as ethics, equity, multilingual learners, and AI literacy, encouraging a "technoskeptical" stance that

balances curiosity with critical evaluation. Michael and Ilene Berson have explored how generative AI—particularly tools like ChatGPT—can be integrated into social studies education to enhance teaching and learning while addressing ethical and instructional challenges. Their work emphasizes AI's potential to support tasks such as lesson planning, rubric-based grading, real-time student feedback, and analysis of primary sources, while also noting risks like misinformation and academic integrity concerns.⁵

deepIDM

With all this in mind, we've been developing a tool and thinking partner called *deepIDM* (<https://c3teachers.org/deepidm>)—a suite of AI chatbot tools to help educators create inquiry-based instructional materials using the Inquiry Design Model (IDM). *deepIDM* aims to enhance teacher learning by offering a set of custom-built GPTs (Generative Pre-Trained Transformers) that assist with each stage of the inquiry design process—from selecting content and framing compelling questions to developing supporting questions and locating sources. Grounded in principles of recursive and dialogic design, the *deepIDM* project leverages AI not as a content generator but as a thinking partner that encourages iterative exploration, disciplinary thinking, and pedagogical reflection. Ultimately, the goal is to build teachers' capacity to design high-quality inquiries while advancing new

possibilities for AI-human collaboration in education.

A defining feature of *deepIDM* is its deliberate focus on helping teachers think deeply about the content they teach. While many AI tools in education focus on efficiency—generating ready-made lessons or surface-level ideas—*deepIDM* resists this shortcut. Instead, its custom GPTs are designed to prompt iterative engagement with disciplinary content, encouraging educators to linger, explore tensions, complexities, and multiple perspectives before settling on the lesson design. By guiding teachers through recursive dialogue, *deepIDM* fosters the kind of intellectual design work that is too often compressed or skipped in the rush to get ready for the next day's lesson plan. An emphasis on the exploration of disciplinary content as the foundation of inquiry design ensures that the resulting lessons are not just well-structured, but rich in disciplinary substance—giving students authentic opportunities to wrestle with the big ideas that define social studies.

deepIDM includes 6 stages, carefully mapped on the 10-step Inquiry Design Model (IDM) process (see Figure 1 on p. 302). IDM is an approach to creating inquiry-based instructional materials rooted in compelling questions and exercises that help students build knowledge toward making an argument.⁶ At its core, IDM organizes the lesson design process into a sequence: starting with an interesting content

topic, a compelling question that invites argument and supporting questions that guide the investigation of content and concepts. Each supporting question is paired with formative tasks and sources that give students opportunities to analyze and interpret. The process culminates as students construct an argument grounded in evidence, sometimes accompanied by opportunities to take action. When designing an inquiry, the process weaves through the elements of inquiry with close attention to content and iterations that account for student learning outcomes early in the design process. By structuring inquiry design around the 10

steps of IDM, teachers are able to honor student agency and ensure that the intellectual rigor of social studies is accessible and engaging. But inquiry design is hard work. This is where *deepIDM* is positioned as a partner, helping to structure inquiry design and extend our capacity to take on its most complex challenges.

Learn more about *deepIDM* at <https://c3teachers.org/deepIDM>.

deepIDM Design Features

Our work on *deepIDM* is iterative and exploratory, reflecting this moment in time as AI advances continue to stretch our imagination. Our process in building *deepIDM* began with

establishing design parameters, features, and structure to support teachers to create inquiry-based instructional materials. In this process, we settled on three key design features: (1) engaging in dialogue with AI, (2) weaving content and pedagogy together, and (3) revisiting inquiry ideas as a regular design practice.

Engaging in Dialogue with AI

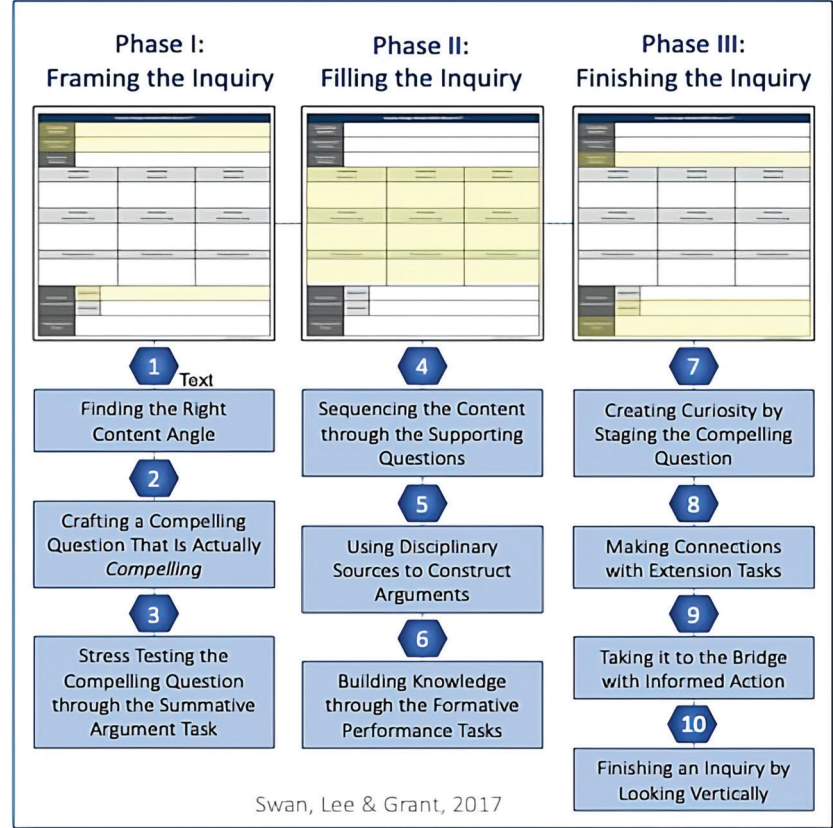
deepIDM prompts human users and the AI agent to engage in dialogue through supportive and authentic interactions. We designed the chatbot to interact in a measured way, with something we came to refer to as intellectual humility. You have probably had an experience with generative text chatbots where the responses to your prompts are overwhelming, consisting of long replies that may be hard to process and can slow down and even chill dialogue. Here is an example of a typical interaction with ChatGPT.

User: I need to develop a lesson on the American Revolution. Do you have some ideas to help me get started?

ChatGPT: Here's a structured set of starting points for designing a lesson on the American Revolution that you can adapt for different grade levels and teaching contexts....

Note: What came next was a 500-word bulleted list of rambling ideas.

Figure 1. The Design Path for IDM



When pushed further, tools like ChatGPT will do all of the work for you—for example, churning out a full-blown inquiry designed with IDM, if you want. Needless to say, ChatGPT is not being particularly helpful here. Educators who are not responsible for the thinking that goes into lesson design are likely to shortcut in other ways. This may ultimately undermine our capacity to support students to reach our shared goals.

As we are all learning, the ways we prompt AI are important, so we carefully built a prompt structure into *deepIDM* to guard against the tendency of AI chatbots to do the work for us. *deepIDM* scaffolds teachers' experiences with lesson planning. Here's an example from *deepIDM*. After saying you want to develop a Content Angle (step 1 in the IDM process, see Figure 1 on p. 302), the process begins with a clear and direct prompt.

deepIDM: Alright—before we narrow toward a content angle, can you tell me the topic or standard you've got in mind? That'll give us a place to explore the tensions, contradictions, or unexpected pieces that could make it rich.

User: OK, I would like to focus on the American Revolution.

deepIDM: Got it – the American Revolution is a rich starting point. When you think about it, are

you more drawn to the political ideals and declarations, the military conflict, the social changes and limits, or maybe the global connections?

User: I am most interested in political ideals and declarations. The American Revolution pushed ideas about the rights of man to the forefront of colonists' consciousness.

deepIDM: Focusing on the political ideals and declarations opens up a lot of possible tensions. One we might surface right away is the gap between the rhetoric and the reality—the lofty language of liberty, equality, and rights versus who actually benefited from independence.

This type of crisp and focused exchange is hardwired into *deepIDM*. As the interaction unfolds, we programmed *deepIDM* to respect teacher designers, gently pushing them to think deeply—thinking *with* us and not for us.

Weaving Content and Pedagogy

A second design feature of *deepIDM* supports teachers to consider content and pedagogy alongside one another as they design the inquiry. This feature enables that special purview of teacher intellectual expertise, pedagogical content knowledge (PCK). Building from Lee Shulam's seminal work on PCK,⁷ *deepIDM* aims

to provide teacher designers with recursive experiences with content and pedagogy, leveraging what they already know and gently pushing them to expand and blend their knowledge toward the PCK amalgamation that forms the intellectual basis of good inquiry design.

To demonstrate this, we will use another example focusing on the American Revolution. For this specific example, we asked the Content Angle GPT to help us develop a content angle centering around media literacy and the American Revolution. The conversation unfolded like this:

User: I would like to develop a content angle around the American Revolution through the lens of media literacy.

deepIDM: That's an intriguing pairing—American Revolution as a historical topic, and media literacy as a conceptual lens.

Before we move too quickly:

Do you see *media literacy* here as about **how information circulated in the 1770s** (pamphlets, newspapers, rumors), or more as a **modern comparative lens** (how we evaluate sources now vs. then)?

User: I would like to investigate a modern comparative lens (how we evaluate sources now vs. then).

deepIDM: Perfect—that opens up some rich terrain for students. With a comparative lens, you’re setting up a tension:

Then: Colonists sorting through pamphlets, broadsides, tavern talk, newspapers—each with bias, persuasion, and limited verification.

Now: Students navigating social media, misinformation, algorithms, and questions of credibility.

After being asked if we would like to sketch a possible content angle around that theme, we developed the following:

Content angle (draft):

Moments of political change—like the American Revolution—depend on how people judge what information to trust. Pamphlets and newspapers then, like social media now, shaped belief, spread rumors, and raised questions of credibility.

In this example, *deepIDM* helped us combine content and pedagogy by focusing the content angle around students comparing media literacy skills and lessons from the American Revolution to modern times. By focusing the content angle on what students already know about the American Revolution in order to compare historical media literacy practices to those used in modern times, *deepIDM* prompted us to think about how students might

show what they already know while pushing them to consider how early American media may be impacting the world around them today.

Revisiting Inquiry Ideas as a Regular Design Process

A third feature of *deepIDM* enables a constant revisiting of the ideas teachers are exploring in their inquiry design. Returning to ideas throughout the design process helps teachers deepen their ideas and strengthen their inquiry design. This is an intentional and purposeful process where designers are asked to push further in their work and move their thinking forward. Returning to our previous example, here’s how *deepIDM* prompted the revision of inquiry ideas in the design process.

User: The content angle I am working on is the following—“*Moments of political change—like the American Revolution—depend on how people judge what information to trust. Pamphlets and newspapers then, like social media now, shaped belief, spread rumors, and raised questions of credibility.*”

deepIDM: Great, thanks for sharing that. This content angle is rich with disciplinary tension and contemporary resonance. Before we move to drafting a compelling question, a couple of quick prompts to help you think aloud: What’s pulling you toward this angle? Is it

the information ecosystem, questions of credibility, how revolutions are fueled, or something else?

User: I think my students will be interested in this content and what you called the “information ecosystem.” It feels relevant and should open up space for my students to dig into the history of the American Revolution using authentic documents while staying connected to our present experiences with media sources.

deepIDM: That’s a strong pedagogical instinct—and you’re grounding it in both disciplinary content and contemporary experience. That’s a powerful combination.

As the dialogue continued, we moved toward developing a compelling question, but all along our *deepIDM* thinking partner continued to have us revisit our emerging thinking about the inquiry we were designing.

Conclusion

The interplay of these three design features will help to keep teachers using *deepIDM* engaged and responsible for our thinking. Through the dialogic structure of *deepIDM*, the ongoing support for building PCK, and the consistent revisiting of the ideas emerging, *deepIDM* is positioned to help teachers plan better, not quicker, and to deliberate

and think deeply as they build high-quality inquiry lessons that represent our human qualities. We see *deepIDM* as a thought partner that may have some of those mystical qualities of ancient automata. AI appears to us as if it can “think” for itself. We are often amazed by the quality of responses that tools like ChatGPT provide. Perhaps you are as well. The mystery that these experiences evoke push some of us to better understand how generative text AI works (and doesn’t work), others may marvel at AI and work to make best use of it, and we know some may recoil. Regardless, we are all tangled up with these machines and will need to continue making sense of our relationship with AI. The *deepIDM* project emerges at a pivotal moment, where artificial intelligence is transforming how we think, create, and learn. As we move forward, it will be important to step back and think about the implications,

opportunities, and challenges of bringing AI into such a deeply personal and intellectual activity as designing an inquiry. We hope that *deepIDM* will help teachers do just that. ■

Notes

1. David J. Chalmers, *Reality+: Virtual Worlds and the Problems of Philosophy* (Penguin UK, 2022).
2. Ray Kurzweil, *The Singularity is Nearer: When We Merge with AI* (Penguin, 2024).
3. Yuval Noah Harari, *Nexus: A Brief History of Information Networks from the Stone Age to AI* (Random House, 2024).
4. Christopher H. Clark and Cathryn Van Kessel, *AI in Social Studies Education: Tools for Thoughtful Practice with Generative Artificial Intelligence*, Research and Practice in Social Studies Series (Teachers College Press, 2025).
5. Ilene R. Berson and Michael J. Berson, “AI in K-12 Social Studies Education: A Critical Examination of Ethical and Practical Challenges,” International Conference on

Artificial Intelligence in Education, pp. 101–112 (Springer Nature Switzerland, 2024); Ilene R. Berson and Michael J. Berson, “The Democratization of AI and Its Transformative Potential in Social Studies Education,” *Social Education* 87, no. 2 (2023): 114–118.

6. Kathy Swan, John K. Lee, and S. G. Grant, *Inquiry Design Model: Building Inquiries in Social Studies* (National Council for the Social Studies, 2018).
7. L. S. Shulman, “Those Who Understand: Knowledge Growth in Teaching,” *Educational Researcher* 15, no. 2 (1986b): 4–14.



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