AI Literacy for Citizen Participation

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The question of how to prepare citizens for an AI-saturated world has become one of education's most urgent challenges. Yet beneath the apparent consensus that "AI literacy" matters lies a conceptual battlefield where competing visions of what it means to understand artificial intelligence vie for dominance. These definitional disputes are not mere academic exercises—they shape who gets to participate meaningfully in decisions about AI's role in society, who benefits from its deployment, and who bears its risks.

The stakes become clear when we consider that AI literacy frameworks are emerging simultaneously from UNESCO offices, Silicon Valley boardrooms, university research centers, and grassroots educator networks. Each brings different assumptions about what citizens need to know, different theories of change, and crucially, different ideas about the relationship between technical understanding and democratic participation. As documented in [7], these frameworks range from narrow technical competencies to expansive critical capacities, each implying radically different educational futures.

[7] AI Literacy: A Framework to Understand, Evaluate, and Use Emerging Technology

This conceptual muddle matters because AI literacy initiatives are rapidly scaling without resolution of fundamental questions. The [15] framework acknowledges that "diverse stakeholders have varied perspectives on what AI literacy entails," yet proceeds to offer its own synthesis without fully grappling with why these differences exist or what they mean for democratic governance of AI systems. Meanwhile, schools, universities, and workplace training programs are making consequential decisions about curriculum, assessment, and resource allocation based on particular—often implicit—definitions of AI literacy.

[15] Empowering Learners for the Age of AI

The Definitional Muddle: What Do We Mean by AI Literacy?

The term "AI literacy" has proliferated across educational discourse with remarkable speed but little definitional clarity. A systematic examination reveals at least three dominant conceptual approaches, each carrying distinct assumptions about the relationship between individual capability and collective agency. The comprehensive review in [26] identifies this fragmentation, noting how definitions range from "basic operational skills" to "critical evaluation of AI's societal implications,"

[26] Towards an AI-Literate Future: A Systematic Literature Review

with most frameworks attempting an uneasy synthesis.

The first approach treats AI literacy as primarily a technical competency—understanding how machine learning works, recognizing AI applications, and developing skills to interact effectively with AI tools. This perspective, often favored by technology companies and workforce development initiatives, emphasizes functional knowledge that enables productive use of AI systems. It asks: Can individuals prompt effectively? Do they understand basic concepts like training data and pattern recognition? Can they identify when they're interacting with AI? While valuable, this approach risks reducing literacy to mere tool proficiency, overlooking the power relations embedded in AI systems.

The second approach expands literacy to encompass critical and ethical dimensions. As detailed in [6], this perspective distinguishes between "functional literacy" (using AI tools), "critical literacy" (evaluating AI's impacts), and "rhetorical literacy" (understanding AI discourse). This tripartite framework recognizes that meaningful participation requires not just operational skills but the capacity to question AI systems' design choices, data sources, and social effects. It asks different questions: Who benefits from this AI application? What values are encoded in its algorithms? How might it reshape social relations?

[6] AI Literacy in K-12 and Higher Education in the Wake of Generative AI

The third approach, emerging from educational research, positions AI literacy as fundamentally pedagogical—concerned less with AI itself than with how AI transforms learning and thinking. [22] reveals through bibliometric analysis that educational frameworks increasingly focus on "AI-enhanced pedagogical practices" and "learner agency in AI-mediated environments." This perspective recognizes that AI doesn't just require new skills; it fundamentally alters what it means to learn, create, and know.

[22] Navigating the landscape of AI literacy education: insights from a

These definitional differences matter because they lead to vastly different educational interventions. A technical literacy framework might prioritize coding exercises and system architecture diagrams. A critical literacy framework might emphasize case studies of algorithmic bias and surveillance capitalism. A pedagogical framework might focus on metacognitive strategies for learning alongside AI. The review of language education applications in [3] demonstrates how these different conceptualizations play out in practice, with some programs teaching AI as a tool for language learning while others teach critical analysis of AI's role in linguistic imperialism.

[3] AI and Digital Literacy in Language Education: A Systematic Review on

What's missing from these definitional debates is attention to power—who gets to define AI literacy, whose knowledge counts as

literacy, and how these definitions distribute opportunity and risk across society. The proliferation of frameworks without convergence suggests we're witnessing not just conceptual confusion but a struggle over the meaning and purpose of AI education itself.

Frameworks in Competition: Technical Skills vs Critical Understanding

The landscape of AI literacy frameworks reveals a fundamental tension between approaches that prioritize technical competency and those emphasizing critical understanding. This isn't merely a pedagogical debate—it reflects deeper disagreements about AI's role in society and education's purpose in preparing citizens for that role. UNESCO's comprehensive [16] exemplifies the attempt to bridge these approaches, offering both practical guidance for using AI tools and frameworks for understanding their societal implications, yet the tension remains unresolved.

[16] Guía para el uso de IA generativa en educación e investigación

The technical skills approach finds its clearest expression in frameworks emerging from industry partnerships and workforce development initiatives. These frameworks typically organize AI literacy around concrete competencies: understanding machine learning basics, crafting effective prompts, recognizing AI-generated content, and using AI tools for productivity. The appeal is obvious—such skills have immediate application in educational and professional contexts. They promise to make individuals "AI-ready" for a rapidly changing economy.

However, the critical understanding approach, championed by educational researchers and civil society organizations, argues that technical skills without critical context risk creating sophisticated users who remain fundamentally disempowered. The [12] from the European Schools system demonstrates this more expansive vision, embedding technical competencies within broader frameworks addressing transparency, equity, and democratic participation. It insists that understanding how to use AI is inseparable from understanding its social construction and political economy.

[12] Cadre pour l'utilisation pédagogique de l'intelligence artificielle

The competition between these frameworks becomes particularly visible in recent large-scale initiatives. The [23] developed by OECD attempts a synthesis, proposing cross-curricular integration that includes both functional skills and critical perspectives. Yet even this ambitious framework struggles with the practical question: How much technical knowledge do citizens really need? The framework's connection to PISA assessment suggests a move toward standardization, but standardizing what—technical proficiency or critical capacity?

[23] New AI Literacy Framework to Equip Youth in an Age of AI

This tension manifests differently across educational levels and contexts. The [5] reveals how frameworks for younger students tend to emphasize foundational concepts and ethical reasoning, while post-secondary frameworks increasingly focus on discipline-specific applications. This developmental progression makes pedagogical sense but risks establishing a pipeline where critical perspectives give way to instrumental applications as students advance.

[5] AI Literacy Framework for Primary & Secondary Education—OECD-EC

The systematic review in [25] provides crucial evidence about how this framework competition plays out in practice. The review finds that implementations focusing primarily on technical skills show faster adoption rates and clearer learning outcomes, while those emphasizing critical understanding face challenges in assessment and scalability. This creates a problematic incentive structure where the measurable trumps the meaningful.

[25] Systematic Review of Artificial Intelligence in Education: Trends

Perhaps most revealing is what these competing frameworks share: an assumption that AI literacy is primarily an individual attribute rather than a collective capacity. Whether focusing on technical skills or critical understanding, most frameworks imagine a literate individual who can navigate AI systems independently. This individualistic framing obscures questions about collective agency, democratic governance, and the social infrastructures needed to contest AI's power. The frameworks compete on what individuals should know but agree that the solution lies in individual knowledge.

The Democracy Gap: What Current Approaches Miss

The most glaring omission in current AI literacy frameworks is their failure to address how citizens can meaningfully participate in democratic governance of AI systems. While frameworks proliferate around individual skills and critical thinking, they largely sidestep the question of collective action and political agency. This democracy gap becomes starkly apparent when examining AI's role in shaping public discourse and electoral processes.

The controlled experiment described in [4] provides disturbing evidence of this gap's consequences. The "Capture the Narrative" wargame demonstrated how AI-powered bot swarms could shift electoral outcomes by 15-20% through coordinated misinformation campaigns. Notably, traditional media literacy proved insufficient—participants with high conventional digital literacy still struggled to identify and counter AI-generated manipulation. This suggests that current frameworks, focused on individual discernment, miss the systemic nature of AI-mediated information warfare.

[4] AI can swing elections. Here's why digital literacy is critical

The crisis extends beyond elections to everyday democratic deliberation. [30] found that AI bots now constitute up to 75% of traffic during breaking news events, fundamentally altering the information environment within which citizens form political opinions. The speed and scale of AI-generated content overwhelms individual critical faculties, yet our literacy frameworks continue to emphasize personal skills rather than collective responses.

[30] World-first social media wargame reveals how AI bots can swing elections

Real-world events underscore these experimental findings. Analysis in [10] documented how AI-generated imagery proliferated during international conflicts and natural disasters, often outpacing fact-checkers and authentic documentation. The "liar's dividend"—where the mere possibility of AI manipulation undermines trust in all media—emerges as a fundamental challenge to democratic discourse that individual literacy cannot address.

[10] What to know about AI-generated content spiking amid news events

Current frameworks also fail to prepare citizens for AI's role in shaping policy options before they reach public debate. While teaching people to identify deepfakes matters, it doesn't address how AI systems increasingly determine which problems receive attention, which solutions seem feasible, and which voices get heard. The technocratic framing of AI governance—where decisions happen in corporate boardrooms and technical standards bodies—remains largely invisible in literacy frameworks that focus on downstream user interactions.

The inadequacy of individualistic approaches becomes clear when considering power asymmetries. As documented in [21], meaningful AI governance requires "trust-building mechanisms" and "shared decision-making structures" that go far beyond individual literacy. The report's emphasis on collective processes—stakeholder engagement, participatory design, community oversight—points toward what AI literacy frameworks miss: the organizational and political capabilities needed for democratic control.

[21] Making AI work for schools - Brookings

The [28] analysis from the Benton Institute argues that AI literacy must include "understanding and advocating for AI policies and regulations." Yet most frameworks treat policy engagement as an advanced topic, if at all, rather than a fundamental component. This reflects a broader pattern where AI literacy imagines citizens as users and consumers rather than as political actors capable of shaping AI's development and deployment.

[28] What Digital Literacy Looks Like in the Age of AI

This democracy gap has material consequences. Communities lack the conceptual tools to resist extractive AI deployments. Workers struggle to collectively bargain over algorithmic management. Citizens cannot meaningfully consent to smart city initiatives they cannot interrogate. The frameworks prepare individuals to adapt to AI but

not to govern it.

Whose Literacy Counts? Power and Perspective in AI Education

The question of who defines AI literacy reveals profound power dynamics shaping educational futures. Current frameworks emerge predominantly from three sources—technology companies, government agencies, and elite educational institutions—each bringing particular interests and blind spots to their conceptualizations. This matters because definitional power translates directly into material resources, curricular mandates, and ultimately, whose ways of knowing AI are validated or marginalized.

The corporate capture of AI literacy becomes explicit in initiatives like [9], which frames AI education primarily through economic competitiveness and workforce productivity. The article's DEEP framework—Design, Execute, Embed, Progress—presents literacy as alignment with corporate AI adoption, measuring success by productivity gains rather than democratic empowerment. This economistic framing pervades many frameworks, reducing citizens to human resources requiring optimization.

[9] AI's $15 trillion prize will be won by learning, not just technology

Google's influence appears clearly in [10], which reports survey data showing 85% of students already using generative AI while positioning Google's tools as solutions. The framing of students and teachers as "super users" implies that more intensive AI use equals greater literacy—a definition that serves platform interests while obscuring questions of dependency, deskilling, and data extraction. The article celebrates time savings without interrogating what capabilities might atrophy when AI handles increasing cognitive load.

[10] Learners and educators are AI's new 'super users'

The partnership described in [10] illustrates how AI companies shape global literacy agendas through strategic educational partnerships. While providing needed resources to under-resourced educational systems, such initiatives also establish particular AI platforms as default educational infrastructure, potentially limiting how teachers and students imagine alternatives. The initiative's focus on "responsible AI use" defines responsibility within existing systems rather than questioning those systems' fundamental premises.

[10] Anthropic and Teach For All launch global AI training initiative for educators

Academic resistance to these framings appears in [24], which documents faculty organizing against imposed AI adoption. The article reveals how "refusal" itself becomes a form of literacy—understanding AI well enough to reject its claimed inevitability. This perspective, rooted in critical labor analysis, recognizes that AI literacy includes

[24] Refusing AI in Higher Education | AAUP

the capacity to "organize collectively for intellectual freedom." It challenges frameworks that position AI adoption as politically neutral upskilling.

The systematic analysis in [19] provides crucial evidence about whose perspectives are missing. The report finds significant gaps between how students actually use AI and how frameworks imagine they should use it. Students develop pragmatic literacies—learning to verify AI output, manage cognitive offloading, maintain authentic voice—that rarely appear in formal frameworks. This suggests that official literacy frameworks may be solving for the wrong problems.

[19] Les étudiants et l'usage de l'IA générative

Cultural and linguistic power dynamics further complicate the landscape. The [17] analysis from francophone contexts reveals how Anglo-American frameworks often assume technological contexts and educational values that don't translate. The Quebec government's [18] offers an alternative vision grounded in different assumptions about collective responsibility and public education's role.

[17] Intelligence artificielle générative et éducation scolaire

[18] L'utilisation pédagogique, éthique et légale de l'intelligence artificielle

The absence of student voice in framework development is particularly striking. While frameworks proliferate about what young people should know, initiatives rarely include youth as co-designers. The [8] advisory exemplifies how child development experts and advocacy groups attempt to fill this gap, but their protective stance often precludes recognizing children's own developing AI literacies and agency.

[8] AI Toys are NOT Safe for Kids

Indigenous and Global South perspectives remain almost entirely absent from mainstream frameworks, despite these communities often experiencing AI's extractive impacts most acutely. The frameworks assume technological contexts—reliable internet, device access, English proficiency—that exclude much of the world's population. They imagine literacy developing in formal educational settings rather than through community knowledge systems or resistance movements.

Beyond Individual Skills: AI Literacy as Collective Capacity

The individualistic focus of current AI literacy frameworks fundamentally misunderstands the challenge. While personal skills matter, meaningful agency in an AI-saturated world requires collective capacities that no individual can possess alone. This shift from individual to collective literacy demands new frameworks that recognize knowledge as socially distributed and agency as organizationally embedded.

The comprehensive analysis in [2] provides a compelling example of why collective capacity matters. The report documents how making AI educational tools accessible requires coordinated action across

[2] AI and Accessibility in Education

technology developers, educators, administrators, and disability communities. No individual's literacy, however sophisticated, can ensure equitable AI deployment—it requires institutional knowledge, policy frameworks, and sustained advocacy. The report's three-level implementation roadmap explicitly acknowledges this collective dimension.

Collective AI literacy manifests in several critical ways. First, communities need shared vocabularies and conceptual frameworks that enable democratic deliberation about AI systems. The participatory approach described in [1] shows how bringing together diverse stakeholders—students, teachers, parents, community members—generates more robust understanding than any individual perspective could achieve. Their framework positions literacy not as individual knowledge but as community capacity for "collaborative meaning-making."

[1] A Data-Centered Approach to Education AI - Stanford HAI

Second, organizations require institutional literacies that transcend individual expertise. [29] identifies key collective capacities: shared governance structures, evaluation protocols, and feedback mechanisms that no single administrator could implement alone. The framework's emphasis on "community engagement" and "stakeholder alignment" recognizes that institutional AI literacy means coordinating diverse knowledge and interests toward collective goals.

[29] What's Missing From Your School's AI Adoption Plan? A Roadmap for

Third, democratic AI governance demands civic infrastructures that current frameworks ignore. The analysis of educators' experiences in [27] reveals how individual teachers struggle with AI integration absent supportive institutional contexts. Teachers report needing not just personal skills but professional communities, policy guidance, and collective bargaining power to shape AI's educational role.

[27] We asked teachers about their experiences with AI in the classroom

The emerging model of collective literacy recognizes that understanding AI means understanding power relations, institutional logics, and systemic effects that exceed any individual's grasp. [20] from the European Schools demonstrates this approach, establishing not just individual competencies but institutional principles, collective responsibilities, and accountability mechanisms. The framework treats AI literacy as embedded in organizational culture rather than residing in individual minds.

[20] Lignes directrices pédagogiques pour légales et l'utilisation

This collective approach also reveals why technical and critical literacies prove insufficient when separated from organizational capacity. Communities might understand AI's risks intellectually but lack the institutional mechanisms to act on that understanding. Workers might recognize algorithmic exploitation but need collective bargaining frameworks to contest it. Citizens might identify biased AI systems but require civic organizations capable of sustained advocacy.

The implications for education are profound. Rather than focusing solely on individual skill development, AI literacy initiatives must build collective capacities: teaching collaborative investigation of AI systems, developing shared evaluation criteria, creating democratic governance mechanisms, and fostering solidarity across different ways of knowing AI. This doesn't diminish the importance of individual understanding but situates it within broader social capabilities.

Most radically, collective AI literacy recognizes that some essential knowledge about AI systems can only emerge through organized resistance and contestation. Communities discovering discriminatory algorithms through coordinated testing, workers documenting algorithmic management through collective data gathering, students organizing against surveillance technologies—these represent forms of literacy that no curriculum can teach but that democratic AI governance requires.

Mapping Forward: Toward Democratic AI Literacy

The path toward democratic AI literacy requires fundamental reimagining of what literacy means in an age of artificial intelligence. Rather than simply adding AI content to existing educational frameworks, we need approaches that recognize how AI transforms the very nature of knowledge, agency, and democratic participation. This demands moving beyond both narrow technical training and abstract critical thinking toward concrete practices of collective investigation, contestation, and governance.

The framework emerging from [14] points toward key elements of this transformation. Its emphasis on "multi-domain integration" recognizes that AI literacy cannot be confined to computer science classes but must permeate all areas of learning and civic life. More importantly, its focus on teacher agency suggests that democratic AI literacy develops through practice, not just instruction—through actually shaping AI's role rather than merely adapting to it.

[14] Empowering Educators: What the New AI Literacy Framework Means for

Democratic AI literacy would center several principles absent from current frameworks. First, it would treat understanding power as fundamental, not supplementary. Who controls AI systems? Who profits from their deployment? Who bears their risks? These questions would be starting points, not advanced topics. Students would learn to trace AI supply chains, map corporate ownership, and identify decision-making structures. They would understand AI not as neutral technology but as embodying particular interests and values.

Second, it would prioritize collective investigation over individual

assessment. Rather than testing whether individuals can identify AI-generated content, education would focus on how communities can collectively probe AI systems, document their effects, and share findings. The participatory methodologies emerging in [11] hint at this approach, though still within individualistic framings. Democratic literacy would go further, teaching coordinated inquiry as a fundamental skill.

[11] Building AI Knowledge: A New AI Literacy Curriculum from Quill + aiEDU

Third, it would include concrete practices of governance and contestation. Understanding AI democratically means knowing how to file algorithmic bias complaints, organize platform boycotts, demand algorithmic audits, and participate in technology assessment. It means learning how standards bodies work, how to intervene in procurement processes, and how to build alternative systems. These practical capabilities matter more than abstract knowledge about neural networks.

Fourth, it would validate multiple ways of knowing AI. Current frameworks privilege formal, technical knowledge while marginalizing experiential, embodied, and community-based understanding. Workers who experience algorithmic management, communities targeted by predictive policing, artists whose work trains generative models—all develop crucial knowledge about AI that rarely appears in official curricula. Democratic AI literacy would create mechanisms for surfacing and systematizing these diverse knowledges.

The international collaboration described in [13] offers hope, showing how global dialogue can generate more inclusive frameworks. The consultation process revealed themes—"healthy skepticism," "learner agency," "cultural relevance"—that point toward more democratic conceptualizations. Yet even this inclusive process must grapple with who gets invited to dialogue and whose concerns shape final frameworks.

[13] Del borrador al diálogo: Cómo la comunidad educativa mundial está dando

Implementing democratic AI literacy faces substantial obstacles. Existing power structures benefit from narrow, individualistic frameworks that position citizens as users rather than governors of AI. Educational institutions, increasingly dependent on technology partnerships, may resist frameworks that encourage critical investigation of their own AI adoptions. Assessment regimes struggle to measure collective capacities and political agency. Most fundamentally, democratic AI literacy threatens the claimed inevitability of current AI trajectories.

Yet the alternatives are untenable. As AI systems shape ever-more crucial social functions—from education to healthcare to democratic deliberation itself—the capacity for collective governance becomes essential. The choice is not whether to develop AI literacy but what

kind of literacy serves democratic ends. The frameworks we choose today will determine whether future generations encounter AI as subjects to be governed by it or citizens capable of governing it.

The work of building democratic AI literacy has begun in scattered sites—classrooms where students investigate algorithmic bias, communities mapping surveillance systems, workers documenting platform labor conditions. These practices point toward a literacy that is active rather than passive, collective rather than individual, political rather than merely technical. They suggest that understanding AI democratically means not just knowing about it but organizing to shape it.

The frameworks emerging from these struggles will look different from the tidy competency lists and learning objectives that dominate current discussions. They will be messier, more contested, more explicitly political. They will recognize that in a world where AI shapes the conditions of knowledge itself, literacy cannot remain neutral. They will prepare citizens not just to use AI or critique it, but to participate in determining its role in human futures.

This is the challenge of our moment: to develop forms of AI literacy adequate to democratic life. It requires courage to move beyond safe technical training toward the contentious work of building collective capacity for governance. It demands recognizing that the most important knowledge about AI may come not from those who build it but from those who must live with its consequences. Most fundamentally, it requires faith that democratic participation remains possible even as AI systems grow more complex and powerful—that collective human agency can still shape technological futures.

The mapping offered here suggests directions rather than destinations. Democratic AI literacy remains more aspiration than achievement, more question than answer. But in tracing the inadequacies of current frameworks and pointing toward alternatives, we can begin the essential work of ensuring that AI serves democratic life rather than subverting it. The contested terrain of AI literacy is where this struggle plays out. The definitions we choose, the frameworks we build, and the practices we develop will determine whether artificial intelligence enhances human agency or diminishes it. The choice remains ours—but only if we develop the collective capacities to make it.

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