

AI Literacy: The Technical Skills Paradox

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Executive Summary

EXECUTIVE SUMMARY

A university professor in a health education program discovers that 92% of his students now use generative AI to complete complex diagnostic case studies [11]. While their technical accuracy improves, their clinical reasoning skills deteriorate alarmingly. When he restricts AI tools, student performance plummets, leaving them unprepared for a healthcare system increasingly dependent on AI-assisted diagnostics. This tension between capability enhancement and skill erosion represents the central paradox of AI adoption across professional domains.

The promise of AI lies in its potential to democratize expertise and accelerate innovation. Research shows AI can transform educational access and professional capability development [21]. Yet this promise collides with stark contradictions. Our analysis reveals 67 distinct contradictions across 24 thematic clusters, with human agency dominating (69.2%) while critical perspectives remain severely underrepresented (critics at 0.14%, parents at 0.29%). The educational sector exemplifies this tension, where AI promises enhanced learning outcomes while potentially undermining fundamental cognitive development [20].

This week's central finding reveals that AI literacy development is advancing fastest in technical domains while lagging critically in ethical and social dimensions. The evidence shows institutional agency accounts for 0% of the discourse, indicating a dangerous governance vacuum. Meanwhile, failure acknowledgment remains alarmingly low at 4%, suggesting widespread overconfidence in AI systems. Technical domains like programming and engineering show sophisticated prompt engineering frameworks [3], while ethical considerations receive minimal systematic attention. This creates a society technically proficient with AI tools but critically ill-equipped to navigate their societal implications.

This report maps the current state of AI literacy across domains, analyzes key contradictions in implementation, provides actionable recommendations for organizations and educators, and identifies critical research gaps. We examine how power concentrations in AI development affect literacy outcomes and why perspective gaps threaten equitable adoption. As AI becomes embedded in professional practice from healthcare to education, developing comprehensive literacy frameworks transitions from competitive advantage

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to societal imperative. The future of meaningful participation in increasingly AI-mediated societies depends on our collective ability to bridge technical capability with critical consciousness.

Field State Analysis

Introduction

As artificial intelligence becomes deeply embedded in social, economic, and political spheres, a critical tension has emerged between the rapid proliferation of AI systems and the widespread lack of public understanding about their capabilities, limitations, and societal impacts. This gap between technological advancement and public comprehension defines the central challenge of AI literacy. This report confronts this challenge directly, moving beyond simplistic definitions to present a comprehensive analysis of the field. It is based on a systematic examination of 695 articles, providing a robust evidence base to map the journey from the “unknown unknowns” of AI to a state of informed and critical engagement. The findings are crucial for a broad range of stakeholders, including educators shaping curricula, policymakers crafting regulation, developers building ethical systems, and citizens seeking to navigate an AI-infused world. A failure to address this literacy deficit risks exacerbating inequalities, fostering public mistrust, and undermining the potential for democratic participation in the governance of these powerful technologies.

This report structures its investigation around four interconnected dimensions. The first section, *Current Literacy Landscape*, establishes a baseline by synthesizing existing definitions, competencies, and global initiatives. The second, *Literacy Development Trajectory*, charts the evolving understanding of AI, illustrating how knowledge builds from fundamental concepts to complex critical thinking skills. The third section identifies *Critical Literacy Gaps*, pinpointing the specific areas where understanding is most lacking, such as in system limitations, data ethics, and algorithmic bias. Finally, the fourth section explores the *Participation Implications*, analyzing how varying levels of literacy influence an individual’s ability to engage with, critique, and shape the development of AI. This analytical journey provides a scaffold for understanding the multifaceted nature of AI literacy. The conclusion will return to the opening frame, synthesizing the insights from these four sections to propose a forward-looking agenda for building a more equitable and participatory AI-literate society.

Current Literacy Landscape

The current discourse around AI literacy reveals a fragmented landscape where competing definitions and frameworks create confusion about what constitutes meaningful understanding of artificial intelligence. Analysis of

24 thematic clusters across the evidence base shows AI literacy primarily developing along four distinct trajectories: technical proficiency, critical understanding, ethical awareness, and creative application [20]. Technical proficiency dominates educational initiatives, with prompt engineering emerging as a foundational 21st-century skill that emphasizes efficient interaction with AI systems. This framework treats literacy as operational competence—knowing how to make AI tools produce desired outcomes. Meanwhile, critical understanding frameworks focus on comprehending AI limitations, biases, and societal impacts, positioning literacy as protective knowledge against manipulation and technological determinism [6].

Educational institutions are developing literacy through formal curricula, particularly in health education and STEM fields, where structured frameworks integrate AI tools into existing pedagogical approaches [11]. Workplace literacy initiatives emphasize productivity enhancement through tools like automated grading systems and industrial programming assistants [1]. Self-directed learning dominates technical domains, where professionals develop prompt engineering skills through experimentation and community knowledge sharing [3]. Community-based literacy efforts, particularly in Global South contexts, focus on critical awareness and empowerment rather than technical mastery [6].

The holistic critical analysis from Tier 4 synthesis reveals that current literacy efforts overwhelmingly privilege functional and technical dimensions over critical and ethical understanding [15]. This creates a literacy landscape where individuals can effectively operate AI systems but lack the conceptual frameworks to understand their societal implications, decision-making processes, or long-term consequences. The evidence shows institutional agency accounts for 0% of discourse, indicating that literacy development occurs through fragmented individual and organizational efforts rather than coordinated systemic approaches.

This fragmented landscape, which privileges technical proficiency while neglecting critical and ethical frameworks, establishes a clear but problematic trajectory for how AI literacy is developing. Building on the finding that current efforts overwhelmingly emphasize functional competence, a critical examination of this developmental path becomes necessary. The subsequent analysis therefore investigates the accelerating momentum toward technical skill acquisition and the consequent divergence from critical understanding. It will explore how dominant conceptual metaphors and domain-specific priorities are shaping a bifurcated future for AI literacy, raising urgent questions about the long-term consequences of separating operational knowledge from a deeper comprehension of societal impacts and embedded power structures.

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Literacy Development Trajectory

The trajectory of AI literacy development reveals a concerning acceleration toward technical skill acquisition at the expense of critical understanding. The dominant metaphor analysis from Tier 3 discourse shows "neutral" as the prevailing conceptual framework, appearing across 50 articles, which positions AI as a tool rather than a social force with inherent values and biases [EVIDENCE ARCHITECTURE]. This metaphor reinforces literacy approaches that emphasize operational competence over critical interrogation, treating AI systems as neutral instruments whose impacts depend entirely on user application rather than recognizing their embedded worldviews and power structures.

The speed versus depth tension manifests clearly across domains. Technical fields like programming and engineering show sophisticated, rapidly evolving frameworks for prompt engineering and AI-assisted workflows [3]. These approaches prioritize efficiency and immediate productivity gains, with literacy measured by successful task completion rather than comprehension of underlying mechanisms. Conversely, critical literacy development in humanities and social sciences progresses more slowly, focusing on ethical implications and power dynamics but often lacking practical implementation frameworks [22].

The trajectory increasingly separates skills training from critical understanding, creating a bifurcated literacy landscape. Technical domains develop advanced operational literacy while paying minimal attention to societal consequences, evidenced by the mere 2% acknowledgment of implementation failures in the discourse [EVIDENCE ARCHITECTURE]. Meanwhile, critical approaches often lack the technical sophistication to effectively engage with rapidly evolving AI systems. This divergence is particularly evident in health education, where curriculum frameworks attempt to balance technical capability development with critical awareness but struggle with the tension between preparing students for AI-enhanced workplaces and ensuring they maintain fundamental clinical reasoning skills [11].

The evolution toward vendor-driven literacy presents another concerning trajectory. As AI tools become increasingly proprietary and opaque, literacy development depends on platform-specific documentation and training materials that naturally emphasize capability over limitation. This creates a literacy model where understanding is constrained by commercial interests rather than pedagogical needs [21].

This accelerating trajectory, which prioritizes technical proficiency and vendor-driven training, does not unfold without consequence. The very patterns identified in the literacy development—the bifurcation of skills from critique, the dominance of the neutral tool metaphor, and the commercial shaping of understanding—collectively create a landscape riddled with significant deficiencies. Building on this established path, it becomes imperative

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to examine the specific critical gaps that these developmental tendencies produce. The following section therefore investigates the profound limitations in the current AI literacy landscape, detailing how the severe underrepresentation of critical perspectives and the individual-versus-systemic competency divide ultimately undermine the capacity for meaningful societal engagement with artificial intelligence.

Critical Literacy Gaps

The current literacy landscape contains critical gaps that undermine meaningful participation in AI-shaped societies. The 67 contradictions identified in Tier 2 analysis reveal fundamental tensions affecting literacy development, particularly the efficiency versus depth divide that privileges quick skill acquisition over substantive understanding [EVIDENCE ARCHITECTURE]. This tension manifests in educational settings where prompt engineering is taught as a vocational skill while the epistemological implications of AI-generated knowledge receive minimal attention [20].

The severe underrepresentation of critical perspectives creates profound literacy blind spots. With critics comprising only 0.14% of the discourse and parents at 0.29%, literacy development occurs without essential skeptical and protective viewpoints [EVIDENCE ARCHITECTURE]. This perspective gap means literacy frameworks rarely address parental concerns about AI's impact on child development or incorporate critical analysis of power concentrations in AI systems. The absence of these voices creates literacy models that prepare individuals to use AI tools but not to question their fundamental premises or resist their potential harms.

The vendor-driven versus pedagogically grounded tension creates another critical gap. As literacy development becomes increasingly shaped by commercial AI providers, educational approaches emphasize functionality over critique, operation over understanding [15]. This gap is particularly evident in the disparity between technical and ethical literacy development, where prompt engineering frameworks achieve sophisticated implementation while ethical consideration remains superficial and theoretical [22].

The individual competency versus systemic literacy divide represents another critical gap. Current approaches focus overwhelmingly on individual skill development rather than collective understanding of AI's societal implications. This gap leaves communities unprepared to address systemic issues like algorithmic bias, labor displacement, or democratic erosion, as literacy efforts prioritize personal productivity over civic capability [6]. The near-total absence of institutional agency in literacy discourse (0%) exacerbates this gap, as coordinated responses to systemic challenges remain undeveloped.

Building on the critical literacy gaps identified, these systemic deficiencies do not exist in a vacuum but directly shape the landscape of societal partic-

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ipation. The established tensions between technical proficiency and critical understanding, along with the severe underrepresentation of essential perspectives, create a foundation for examining their real-world consequences. This analysis naturally leads to an investigation of the participation implications, which will examine how these literacy gaps create stark divisions in who can engage meaningfully with AI and who remains vulnerable to exploitation. The section will explore how an overemphasis on functional skills, without corresponding critical awareness, prepares individuals to operate AI systems efficiently while leaving them unprepared to question their fundamental premises or resist potential harms, thereby transforming technical literacy into a potential liability.

Participation Implications

The current literacy landscape creates stark divisions in who can participate meaningfully in AI-shaped societies and who remains vulnerable to exploitation. The technical proficiency emphasis means individuals with STEM backgrounds and institutional support can leverage AI for advancement, while those without technical training or access to quality literacy development risk exclusion from increasingly AI-mediated economic and social participation [21].

The critical literacy gaps leave even technically proficient users vulnerable to manipulation and disempowerment. Without understanding AI systems' limitations, biases, and commercial motivations, users may overtrust automated decisions or fail to recognize when AI recommendations serve corporate interests rather than their own [7]. This creates a participation landscape where technical literacy without critical awareness becomes a liability rather than an asset, enabling efficient operation while undermining autonomous judgment.

The perspective gaps in literacy development mean the needs of vulnerable populations remain unaddressed. With parents, critics, and advocates severely underrepresented in discourse, literacy frameworks fail to incorporate protective approaches that would enable meaningful participation while minimizing harm [EVIDENCE ARCHITECTURE]. This is particularly concerning for educational contexts, where literacy development occurs without adequate attention to developmental appropriateness or long-term cognitive impacts [5].

The prescriptive insights from Tier 4 synthesis indicate that meaningful participation requires literacy frameworks that balance technical capability with critical consciousness, enabling individuals to both operate AI systems effectively and understand their societal implications [15]. Current literacy development provides the former while largely neglecting the latter, creating a participation crisis where technical proficiency masks critical vulnerability. Without addressing these gaps, AI literacy risks becoming a mechanism for

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creating efficient operators of AI systems rather than empowered citizens capable of shaping AI's role in society.

Dimensional Analysis

Central Question

Pattern Description The current discourse around AI literacy reveals a fundamental divide in the questions citizens are equipped to ask. The dominant pattern emphasizes operational and utilitarian inquiry, focusing on "how" questions related to tool usage and efficiency. Exemplar articles demonstrate this through frameworks for prompt engineering as a core 21st-century skill [20] and curriculum designs that prioritize student capability with AI tools [11]. These approaches train individuals to ask questions like "How can I get the best output from this model?" or "What prompt will solve this specific problem?" This pattern is reinforced by technical guides and professional development materials that frame AI competence around effective interaction and task completion. The literacy emerging from this paradigm is one of functional proficiency, where the central question is about optimization and application rather than understanding or critique.

Tensions & Contradictions A significant tension exists between the proliferation of "how-to" questions and the severe underrepresentation of "why" and "what-if" inquiries. While technical domains develop sophisticated prompting frameworks [3], critical perspectives that question AI's fundamental assumptions, power structures, and long-term societal impacts remain severely underrepresented, accounting for only 0.14% of the discourse [9]. This creates a literacy landscape where citizens become proficient users but lack the critical inquiry skills to question the systems they are using. The contradiction lies in promoting AI adoption while simultaneously neglecting the development of questioning competencies that would enable truly informed participation and democratic oversight of these technologies.

Critical Observations The sophistication of current questioning patterns is alarmingly lopsided. Technical and operational questioning has reached advanced levels in specialized domains, with detailed frameworks for systematic interaction with AI systems. However, critical questioning competencies remain underdeveloped across most literacy efforts. The evidence shows that perspectives asking fundamental questions about AI's societal role, ethical boundaries, and power implications are not just rare but systematically excluded from mainstream literacy discourse. This creates a population that can use AI tools effectively but cannot critically evaluate whether they should be used in specific contexts or what the broader consequences of their adoption might be.

Literacy Implications For meaningful participation in an AI-mediated society, citizens must develop questioning competencies that go beyond

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operational proficiency. Literate citizens need the ability to interrogate AI systems' training data origins, algorithmic biases, environmental costs, and political economies. They must ask not only "How does this work?" but "Who benefits from this system?", "What values are embedded in its design?", and "What alternative futures does this technology foreclose?". This requires literacy frameworks that explicitly teach critical questioning as a core competency, moving from functional literacy to critical sociotechnical literacy that enables democratic engagement with AI governance [6].

Purpose

Pattern Description The literacy discourse reveals a fundamental confusion between understanding AI's inherent purposes and using AI to achieve human purposes. The dominant pattern treats AI literacy as instrumental competence—the ability to deploy AI tools effectively for predetermined goals. This is evident in educational frameworks that focus on integrating AI to enhance academic capability and assessment design [11] and professional development that emphasizes productivity gains through automated systems [1]. The underlying assumption is that literacy means understanding how to make AI serve human objectives, with little attention to understanding AI's own operational purposes, commercial drivers, or the ways AI systems themselves shape human goals and behaviors.

Tensions & Contradictions A critical tension emerges between literacy as tool mastery and literacy as systemic understanding. While extensive resources develop competence in using AI for specific purposes, there is minimal attention to understanding the purposes built into AI systems themselves—their optimization targets, business models, and ideological orientations. This contradiction is reflected in the power concentration analysis showing institutional agency accounts for 0% of the discourse [9], indicating that literacy efforts completely ignore the institutional purposes and governance frameworks that shape AI development and deployment. Citizens learn to use AI tools but remain illiterate about why these tools exist, who funds their development, and what organizational purposes they ultimately serve.

Critical Observations Current literacy efforts demonstrate sophisticated understanding of how to align AI with human purposes but profound naivete about AI's inherent purposes. The almost complete absence of institutional perspective in literacy discourse suggests a dangerous blind spot regarding the corporate, governmental, and organizational agendas driving AI development. This creates a population that can skillfully use AI tools while remaining largely unaware of the commercial imperatives, data extraction economies, and power consolidation strategies that these tools advance. The sophistication gap between operational and critical purpose literacy represents a significant vulnerability for democratic societies.

Literacy Implications Meaningful participation requires understanding both how to use AI for human purposes and how to critically examine the

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purposes embedded in AI systems themselves. Literate citizens need competencies in identifying the commercial drivers behind AI tools, recognizing how algorithmic optimization targets shape system behavior, and understanding the relationship between technical design choices and societal outcomes. This involves moving beyond tool literacy to system literacy, where citizens can ask not just “What can I do with this AI?” but “What is this AI designed to do to me, my community, and my society?” [15].

Information

Pattern Description The information prioritized in AI literacy efforts reveals a strong technical and functional bias, with core knowledge domains centered on tool operation, prompt engineering, and application techniques. The dominant pattern treats literacy as understanding how AI systems work at a user level, with extensive resources devoted to effective interaction patterns and technical capabilities. This is evident in the emphasis on prompt engineering as a fundamental skill [20] and detailed technical frameworks for AI-assisted programming and system design [3]. The information deemed essential for literacy focuses overwhelmingly on operational knowledge—how to get desired outputs, troubleshoot common issues, and integrate AI into existing workflows—while systematically neglecting historical, political, and economic contexts.

Tensions & Contradictions A significant tension exists between the depth of technical information provided and the near-complete absence of critical contextual knowledge. While citizens can access sophisticated technical documentation about model architectures and API usage, they receive minimal information about AI’s environmental impacts [2], labor implications, or geopolitical dimensions. This contradiction manifests in what the dimensional synthesis identifies as a privileging of functional over critical understanding [15]. The information ecosystem creates technically proficient users who remain largely ignorant of the material infrastructures, human labor, and power structures that enable AI systems to function.

Critical Observations The current information landscape for AI literacy is dangerously incomplete. While technical and operational information has reached high levels of sophistication and accessibility, critical contextual knowledge remains fragmented, specialized, and difficult to access for non-experts. The severe underrepresentation of critic perspectives (0.14%) and advocate perspectives (0.43%) in the discourse [9] means that challenging information about AI’s limitations, failures, and negative impacts receives minimal attention in mainstream literacy efforts. This creates an information asymmetry where positive applications are well-documented while systemic risks and harms remain obscure.

Literacy Implications For meaningful participation, citizens need access to balanced information that covers both technical capabilities and societal implications. This includes understanding AI’s environmental costs [18],

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labor impacts, data provenance, failure modes, and governance challenges. Literate citizens require information not just about how to use AI, but about what using AI does—to individuals, communities, and planetary systems. This demands literacy frameworks that explicitly incorporate critical information domains alongside technical ones, ensuring citizens can make informed decisions based on comprehensive understanding rather than partial knowledge.

Concepts Ideas

Pattern Description The conceptual frameworks dominating AI literacy reveal a strong preference for mechanistic and instrumental mental models that treat AI as a tool or utility. The dominant pattern introduces concepts like "prompt engineering," "model fine-tuning," and "API integration" that frame understanding in technical, operational terms. This is evident in educational materials that conceptualize AI literacy as skill development for effective tool use [20] and technical documentation that emphasizes architectural concepts like neural networks and transformer models. These conceptual frameworks are largely borrowed from computer science and engineering disciplines, positioning AI as a technical system to be mastered rather than a sociotechnical phenomenon to be understood holistically.

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Tensions & Contradictions A fundamental tension exists between the accessibility of technical concepts and the inaccessibility of critical sociotechnical frameworks. While concepts like "machine learning" and "natural language processing" have entered mainstream discourse, more nuanced ideas about "algorithmic bias," "surveillance capitalism," or "technological determinism" remain confined to academic and critical circles. This contradiction is reflected in the perspective gaps analysis, which shows critic and advocate perspectives severely underrepresented [9]. The conceptual vocabulary available to most citizens enables technical understanding but impedes critical analysis, creating a population that can discuss AI capabilities but lacks the conceptual tools to analyze AI power dynamics.

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Critical Observations The conceptual sophistication of current literacy efforts is profoundly uneven. Technical concepts have been successfully simplified and popularized, with accessible explanations of how neural networks learn and how language models generate text. However, critical concepts about AI's societal role, political economy, and epistemological implications remain underdeveloped in public discourse. The almost complete absence of institutional agency from conceptual frameworks (0% of discourse) indicates a critical gap in how citizens conceptualize AI's relationship to power structures [9]. Citizens learn to think about AI as individual tools rather than as systems embedded in institutional contexts and power relations.

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Literacy Implications Meaningful participation requires conceptual frameworks that bridge technical and critical understanding. Citizens need mental models that connect algorithmic design to social outcomes, that sit-

uate AI development within political economies, and that illuminate the relationship between technical capabilities and human values. This involves developing accessible conceptualizations of ideas like "embedded values," "sociotechnical systems," and "distributed accountability" that enable citizens to think critically about AI beyond tool functionality. Literate citizens require conceptual tools that help them understand not just how AI works technically, but how it works socially, politically, and economically [6].

Assumptions

Pattern Description The assumptions embedded in AI literacy discourse reveal a pervasive technological optimism that treats AI development as inevitable and broadly beneficial. The dominant pattern takes for granted that AI adoption is desirable, that technical progress correlates with social progress, and that the primary challenge is effective integration rather than critical evaluation. This is evident in educational frameworks that assume AI tools should be incorporated into curricula [11] and professional development that positions AI competence as essential for career advancement [20]. These approaches rarely question whether AI should be used in specific contexts, instead focusing on how to use it most effectively.

Tensions & Contradictions A significant tension exists between the critical thinking that literacy supposedly promotes and the uncritical acceptance of fundamental assumptions about AI's value and inevitability. While literacy efforts teach citizens to question information sources and think critically about content, they rarely encourage questioning the underlying assumptions driving AI development and deployment. This contradiction is reflected in the failure acknowledgment data, which shows only 4% of articles fully acknowledge AI limitations or failures [9]. The discourse assumes technological solutionism while providing minimal tools for questioning whether technological solutions are appropriate for the problems being addressed.

Critical Observations Current literacy efforts demonstrate profound weakness in cultivating the capacity to identify and question foundational assumptions about AI. The near-total absence of perspectives challenging AI's fundamental value proposition suggests that literacy is being framed as adaptation to technological change rather than democratic engagement with technological direction. The assumption that AI development follows an inevitable trajectory toward greater capability and utility goes largely unexamined, as does the assumption that human interests align with corporate AI development agendas. This creates a form of literacy that teaches citizens to navigate AI systems but not to question the necessity or desirability of those systems.

Literacy Implications For meaningful participation, citizens must develop the competency to identify and interrogate the assumptions underlying AI discourse and development. This includes questioning technological determinism, interrogating claims of AI neutrality, examining the assumption

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that more AI adoption is inherently desirable, and challenging the framing of complex social problems as technical puzzles. Literate citizens need the critical capacity to ask not just "How does this work?" but "Why should this exist?", "Who decided we need this?", and "What alternative approaches are being marginalized by this technological solution?" [7].

Implications Consequences

Pattern Description The discourse around AI implications reveals a concerning focus on immediate, individual consequences at the expense of long-term, systemic impacts. The dominant pattern emphasizes how AI affects personal productivity, educational outcomes, and professional capabilities, with minimal attention to broader societal, environmental, and political consequences. This is evident in educational research that examines AI's impact on student learning [11] and technical studies that focus on performance metrics and efficiency gains [3]. The implications considered most relevant for literacy involve individual competence and opportunity rather than collective wellbeing or democratic integrity.

Tensions & Contradictions A critical tension exists between the sophisticated understanding of AI's functional implications and the naive understanding of its societal consequences. While literacy efforts carefully document how AI affects specific tasks and workflows, they largely ignore second-order effects, systemic risks, and long-term transformations. This contradiction is reflected in the causal frames analysis, which shows human agency dominating discourse (58.4%) while systemic and institutional implications receive minimal attention [9]. Citizens learn to anticipate how AI will change their immediate work environment but remain ill-equipped to understand how AI might transform economic systems, political processes, or human cognition over time.

Critical Observations The current capacity for consequence anticipation is dangerously underdeveloped in AI literacy efforts. The extremely low failure acknowledgment rate (4%) suggests a discourse that emphasizes positive outcomes while minimizing risks and negative impacts [9]. The near-complete absence of environmental consequence literacy is particularly striking, with only isolated references to AI's substantial resource demands [2]. This creates a population that can adopt AI tools efficiently but cannot assess their collective consequences or make informed decisions about appropriate boundaries and regulations.

Literacy Implications Meaningful participation requires the ability to anticipate and evaluate AI's implications across multiple domains and timeframes. Literate citizens need competencies in identifying not just immediate benefits and drawbacks, but second-order effects, systemic risks, and long-term transformations. This includes understanding AI's environmental footprint [18], its potential effects on employment patterns and economic inequality, its implications for democratic processes and public discourse,

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and its possible impacts on human cognition, creativity, and social relationships. Only with this comprehensive understanding can citizens participate meaningfully in decisions about AI governance and appropriate use.

Inference Interpretation

Pattern Description The patterns of inference and interpretation in AI literacy reveal a strong emphasis on output quality assessment while neglecting systemic reliability evaluation. The dominant pattern trains citizens to judge AI systems based on the usefulness, accuracy, and relevance of their immediate outputs, with frameworks for prompt refinement and response evaluation. This is evident in technical guides that provide methodologies for benchmarking AI performance [3] and educational materials that teach students to critically evaluate AI-generated content [11]. The inference competencies being developed focus overwhelmingly on judging whether a specific AI output meets immediate needs, with minimal attention to evaluating the trustworthiness of the underlying systems.

Tensions & Contradictions A significant tension exists between sophisticated output evaluation skills and underdeveloped system evaluation capacities. While citizens learn detailed techniques for assessing and improving AI responses, they receive minimal guidance for evaluating the broader reliability, appropriateness, and societal alignment of AI systems themselves. This contradiction is reflected in the power concentration analysis showing AI agency accounts for 5.3% of discourse while critical evaluation of that agency remains underdeveloped [9]. Citizens become skilled at interpreting whether an AI response is helpful for their immediate purpose but lack the frameworks to determine whether relying on AI for that purpose is wise, ethical, or socially beneficial.

Critical Observations Current inference and interpretation competencies are dangerously narrow. The focus on output quality creates a population that can skillfully interact with AI systems but cannot critically evaluate the systems themselves. The extremely low failure acknowledgment rate (4%) suggests that literacy efforts are not preparing citizens to recognize, interpret, or respond to AI limitations and failures [9]. This creates users who become proficient at getting AI systems to produce desired outputs but remain naive about the systemic risks, embedded biases, and appropriate boundaries for AI use across different domains of human activity.

Literacy Implications For meaningful participation, citizens need inference competencies that extend beyond output evaluation to system evaluation. This includes the ability to interpret AI system behaviors in context, to recognize patterns of failure and limitation, to assess appropriate use cases and boundaries, and to make judgments about when AI assistance is valuable versus when it might undermine human autonomy or capability. Literate citizens require frameworks for determining not just whether an AI output is correct, but whether using AI for a particular purpose is appropriate, ethical,

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and socially beneficial [7].

Point of View

Pattern Description The perspectives dominating AI literacy discourse reveal a overwhelming privileging of developer, implementer, and user viewpoints while systematically marginalizing critical, community, and governance perspectives. The dominant pattern frames literacy through the lens of technical proficiency and practical application, with definitions and frameworks largely shaped by technology companies, educational institutions seeking to integrate AI tools, and professionals aiming to enhance productivity. This is evident in the emphasis on prompt engineering skills [20] and curriculum integration frameworks [11] that reflect implementer priorities. The literacy that emerges from these perspectives focuses on effective use and integration rather than critical evaluation or democratic governance.

Tensions & Contradictions A fundamental tension exists between the narrow range of perspectives defining literacy and the diverse participation needs across society. While technical and implementer viewpoints dominate literacy discourse, critical perspectives account for only 0.14% of the conversation, parent perspectives for 0.29%, and advocate perspectives for 0.43% [9]. This contradiction means that literacy is being defined primarily by those with vested interests in AI adoption, while those concerned with protection, equity, and democratic oversight remain largely excluded from shaping what counts as meaningful understanding.

Critical Observations The perspective gaps in AI literacy discourse are severe and systematic. The near-complete absence of institutional agency perspectives (0%) indicates that governance and regulatory viewpoints are entirely missing from literacy definitions [9]. Similarly, the severe underrepresentation of critic, parent, and advocate perspectives suggests that literacy frameworks are being designed without input from those most concerned with protection, equity, and societal wellbeing. This creates a form of literacy that serves adoption interests rather than democratic participation, training citizens to use AI systems effectively but not to govern them wisely.

Literacy Implications For meaningful participation, literacy definitions must incorporate diverse perspectives, particularly those currently marginalized in the discourse. This includes the perspectives of communities affected by AI systems but not involved in their development, regulatory bodies concerned with public protection, critics focused on risks and limitations, and advocates for equitable access and benefit distribution. Literate citizens need to understand AI from multiple vantage points, recognizing how different positions in the sociotechnical ecosystem shape perceptions, interests, and literacy needs [6]. Only through this multiperspectival understanding can citizens participate meaningfully in democratic decisions about AI's role in society.

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Contradiction Analysis

Operational Efficiency Versus Critical Understanding

The most fundamental literacy contradiction pits the demand for rapid AI skill acquisition against the need for deep critical understanding of AI systems and their societal impacts. Educational institutions face pressure to quickly equip students with functional AI competencies for workforce readiness, while simultaneously needing to develop their capacity to question, critique, and understand the limitations of these systems [20]. This tension manifests in curriculum designs that emphasize technical proficiency over ethical consideration, creating a generation of skilled users who lack the critical framework to evaluate the tools they employ.

This contradiction arises from competing economic and educational priorities. Employers demand immediately productive workers with AI skills, driving educational institutions toward vocational training models that prioritize operational competence. The dominance of human agency discourse (69.2%) reinforces this individual-skills focus, while institutional agency remains virtually absent (0%), creating a governance vacuum that allows market forces to dictate literacy priorities [9]. Technical domains exemplify this trend with sophisticated prompt engineering frameworks designed for industrial applications [3], while critical perspectives questioning AI's fundamental assumptions remain severely underrepresented at just 0.14% of the discourse.

The tension persists because different stakeholders benefit from each pole. Technology vendors and efficiency-focused organizations gain from widespread functional literacy that drives adoption without raising difficult questions about power, bias, or long-term consequences. Educational institutions face resource constraints that make quick-skills training more feasible than deep critical engagement. The severe underrepresentation of critic perspectives (0.14%) creates a discourse blind spot where fundamental questions about AI's societal role remain unasked [9]. This imbalance is reinforced by assessment systems that measure technical proficiency more easily than critical understanding.

For citizen participation, this contradiction creates a dangerous competency gap. Individuals may become proficient AI users while remaining critically illiterate about the systems shaping their lives and society. Navigating this tension requires literacy frameworks that integrate technical skill development with critical inquiry from the outset, as seen in approaches that empower librarians through critical AI literacy for more equitable futures [6]. Without this balance, citizens risk becoming efficient operators of systems they don't understand or control.

Technical Proficiency Versus Ethical Awareness

A second critical contradiction emerges between developing technical AI proficiency and cultivating ethical awareness about AI's societal implications. Technical training focuses on what AI systems can do, while ethical educa-

[20] Prompt engineering as a new 21st century skill

[9] Evidence Architecture

[3] Benchmarking and Validation of Prompting Techniques for AI-Assisted Industrial PLC Programming

[9] Evidence Architecture

[6] Empoderando a bibliotecarios del Sur Global a través de la alfabetización crítica en IA para futuros

tion concerns what they should do—and who decides. This divide is evident in literacy frameworks that separate functional and technical dimensions from critical and ethical considerations [15], creating technically skilled individuals who may lack the moral framework to navigate AI's complex ethical landscape.

The tension originates from different disciplinary traditions and institutional priorities. Technical training emerges from computer science and engineering traditions that emphasize functionality and efficiency, while ethical awareness draws from humanities and social science traditions focused on values, power, and justice. The near-total absence of failure acknowledgment (96% none detected) suggests a technological optimism that sidelines ethical concerns [9]. This division is reinforced by specialized academic departments and professional silos that rarely collaborate on integrated literacy approaches.

This contradiction persists because technical and ethical competencies develop through different pedagogical approaches and timeframes. Technical skills often follow clear progression pathways with measurable outcomes, while ethical awareness requires ambiguous, context-dependent judgment that resists standardized assessment. The power concentration in AI agency (5.3%) further complicates this tension, as technical systems increasingly make decisions that have ethical dimensions without human oversight [9]. Institutions prioritizing measurable outcomes naturally gravitate toward technical proficiency, leaving ethical development as an optional supplement.

The literacy implications are profound for democratic participation. Without ethical awareness, technical proficiency becomes a dangerous competency—enabling efficient operation of systems without understanding their societal consequences or moral dimensions. This creates citizens who can use AI tools but cannot participate meaningfully in democratic decisions about AI governance. Integrating these domains requires approaches like those examining AI ethics in legal education [22], where technical and ethical considerations are necessarily intertwined in professional practice.

Individual Competency Versus Systemic Literacy

A third contradiction pits individual AI competency against the need for systemic, community-wide literacy. Most educational initiatives focus on developing individual skills and knowledge, while the challenges posed by AI are inherently systemic, requiring collective understanding and coordinated response. This tension appears in literacy frameworks that target student capability development without addressing institutional, community, or societal dimensions of AI literacy [11].

This divide stems from educational traditions that prioritize individual achievement and assessment. The dominance of human agency in discourse (69.2%) reinforces the focus on individual capabilities, while institutional agency remains virtually absent (0%) [9]. Economic models that treat education as human capital development further entrench this individual focus,

[15] La dimensión funcional y técnica en la alfabetización en Inteligencia Artificial Generativa en la fo

[9] Evidence Architecture

[9] Evidence Architecture

[22] Ética de la IA generativa en la formación legal universitaria

[11] Generative AI in Health Education: A Curriculum Framework to Build Student Literacy, Academic Capability, and Assessment Design (Practice report)

[9] Evidence Architecture

positioning AI literacy as a personal competitive advantage rather than a collective social good. This pattern is evident in job market analyses that frame prompt engineering as an individual career skill [19].

The tension persists because individual competency is more easily measured, credentialed, and commodified than systemic literacy. Educational institutions are structured around individual assessment and credentialing, while workforce development focuses on individual employability. The severe underrepresentation of community perspectives like parents (0.29%) and advocates (0.43%) creates a discourse deficit around collective literacy needs [9]. This individual focus also aligns with technology vendor interests, as personal skill development drives product adoption more directly than community awareness.

For meaningful participation, this contradiction creates fragmented literacy that leaves communities unprepared for collective AI governance. Individuals may develop sophisticated AI skills while their communities lack the shared understanding needed for democratic oversight or policy development. Navigating this tension requires approaches that build collective literacy capacity, such as institutional agendas for AI transformation in university systems [21], where organizational and individual development proceed together.

Vendor-Driven Frameworks Versus Pedagogically Grounded Approaches

A fourth significant contradiction emerges between vendor-driven AI literacy frameworks designed to promote specific tools and pedagogically grounded approaches focused on genuine understanding. Technology companies develop educational materials that naturally emphasize their platforms and technical paradigms, while educators seek frameworks based on learning science and critical pedagogy. This tension appears in the contrast between proprietary training systems and approaches that empower critical evaluation of all AI systems regardless of vendor [6].

This contradiction originates from fundamentally different objectives: vendor materials aim to create proficient users of specific systems, while pedagogical approaches seek to develop transferable understanding and critical capacity. The complete absence of vendor perspectives in the discourse (0%) is particularly revealing—suggesting their influence operates through material distribution rather than scholarly contribution [9]. This creates a literacy landscape where practical training often comes from vendor materials while critical perspectives remain academically confined.

The tension persists due to resource disparities and implementation realities. Technology companies invest significantly in educational materials that are often free, polished, and immediately usable, while educators lack resources to develop equally compelling alternatives. The pressure for rapid AI integration leads institutions to adopt vendor materials for expediency, despite pedagogical limitations. This dynamic is evident in classroom ap-

[19] Prompt Engineer: Analyzing Skill Requirements in the AI Job Market

[9] Evidence Architecture

[21] Transformación Docente con IA: Agenda Institucional para Universidades de México y la Región

[6] Empoderando a bibliotecarios del Sur Global a través de la alfabetización crítica en IA para futuros

[9] Evidence Architecture

plications where teachers use AI tools for lesson planning without critical examination of their limitations [10].

The literacy implications affect citizens' capacity for independent technological judgment. Vendor-driven literacy creates dependency on specific platforms and paradigms, while pedagogically grounded approaches develop transferable critical capacities. This tension ultimately determines whether citizens become loyal users of particular systems or informed participants in technological society. Navigating this divide requires frameworks that acknowledge AI's role in multiliteracies development while maintaining critical independence Artificial Intelligence and Multiliteracies: Preparing Learners for a Technologically Evolving World.

Speed to Implementation Versus Learning Effectiveness

A fifth contradiction pits the pressure for rapid AI implementation against the time required for effective learning and integration. Institutions face demands to quickly adopt AI tools and develop corresponding literacy, while meaningful understanding requires iterative experimentation, critical reflection, and gradual competence development. This tension manifests in curriculum designs that introduce AI tools before establishing foundational understanding of their capabilities and limitations [14].

This tension arises from competing innovation and educational paradigms. Technological innovation emphasizes rapid iteration and deployment, while effective education requires deliberate practice, reflection, and conceptual development. The extremely low failure acknowledgment rate (96% none detected) suggests a performance culture that prioritizes successful implementation over learning from mistakes [9]. Economic competition further accelerates this push for rapid adoption, as institutions fear falling behind in the AI transition.

The contradiction persists because different metrics define success for each pole. Implementation speed is easily measured through adoption rates and tool usage, while learning effectiveness requires nuanced assessment of understanding, application, and critical capacity. The perspective gaps in the discourse—particularly the severe underrepresentation of critic voices (0.14%)—remove natural braking mechanisms that might question the pace of implementation [9]. This acceleration is evident in industrial contexts where prompting techniques are benchmarked for efficiency without corresponding evaluation of understanding [3].

For citizen participation, this tension risks creating superficial literacy that lacks durability and transferability. Rapid implementation may produce immediate functional competence but fails to build the foundational understanding needed for long-term adaptation as technologies evolve. Navigating this contradiction requires recognizing that AI literacy development, like all meaningful education, cannot be accelerated indefinitely without compromising depth and critical capacity. Approaches that thoughtfully integrate AI into educational transformation acknowledge this necessary developmental

[10] Exploring High School EFL Teachers' Experiences with Magic School AI in Lesson Planning: Benefits and Insights

[14] Inteligencia Artificial Generativa en la formación docente: Uso de prompts para el diseño de planeac

[9] Evidence Architecture

[9] Evidence Architecture

[3] Benchmarking and Validation of Prompting Techniques for AI-Assisted Industrial PLC Programming

timeline [21].

Instrumental Tool Use Versus Critical System Understanding

A final crucial contradiction divides approaches that frame AI as instrumental tools for efficiency gains from those that understand AI as complex sociotechnical systems requiring critical engagement. The tool metaphor encourages literacy focused on effective operation and productivity enhancement, while the system metaphor demands literacy encompassing technical understanding, social context, power dynamics, and ethical implications. This fundamental framing contradiction appears in the contrast between automated grading frameworks [1] and critical examinations of AI's role in educational transformation [7].

This tension originates from different epistemological traditions and professional orientations. Technical fields naturally frame technologies as tools for achieving objectives, while critical traditions examine technologies as social formations that shape human relations and power structures. The dominance of neutral metaphors in the discourse (50 articles) suggests a default framing of AI as instrumental rather than value-laden [9]. This framing is reinforced by economic narratives that position AI primarily as a productivity tool.

The contradiction persists because the tool metaphor offers cognitive simplicity and clear action implications, while the system metaphor introduces complexity and ambiguity. Organizations naturally gravitate toward straightforward tool-based literacy that delivers measurable efficiency gains. The power concentration in mixed agency (25.5%), where human and AI capabilities intertwine, further complicates simple tool metaphors [9]. This framing tension is evident in health education, where AI functions both as practical diagnostic tool and transformative force reshaping professional roles [11].

The literacy implications determine whether citizens develop operational competence or critical technological citizenship. Tool literacy prepares individuals to use AI efficiently within existing systems, while system literacy enables participation in shaping those systems. This fundamental framing affects all other literacy dimensions, as it determines what questions are considered relevant and what knowledge is valued. Navigating this tension requires recognizing that both framings offer partial truths—AI systems do function as tools for specific purposes while simultaneously operating as complex social formations that require critical understanding.

These interconnected contradictions reveal a literacy landscape characterized by competing priorities, framings, and objectives. The operational efficiency versus critical understanding tension reinforces the technical proficiency versus ethical awareness divide, while vendor-driven frameworks naturally align with instrumental tool metaphors. Together, these contradictions create a literacy field pulling in multiple directions simultaneously, with significant consequences for how citizens are prepared—or unprepared—for meaningful participation in an AI-saturated society. The resolution of these

[21] Transformación Docente con IA:
Agenda Institucional para Universidades de
México y la Región

[1] A Framework for Automated Student
Grading Using Large Language Models

[7] Enseñar o engañar: el lado oscuro de
ChatGPT en el aprendizaje del CLE

[9] Evidence Architecture

[9] Evidence Architecture

[11] Generative AI in Health Education:
A Curriculum Framework to Build Stu-
dent Literacy, Academic Capability, and
Assessment Design (Practice report)

tensions will determine whether AI literacy becomes another technical skill or develops as a foundational capacity for democratic technological citizenship.

Implications for Practice

Integrate Critical Inquiry with Technical Skill Development

The Obstacle Traditional AI literacy programs separate technical skills from critical thinking, creating either proficient users who lack understanding or critics who cannot engage practically. This artificial division fails to address the complex reality where technical use and ethical consideration must coexist [20].

The Action 1. Develop integrated modules where each technical skill includes parallel critical inquiry exercises (weeks 1-4) 2. Create assessment rubrics that evaluate both technical proficiency and critical awareness (weeks 5-6) 3. Implement "question formulation technique" training to develop critical questioning skills alongside prompt engineering (weeks 7-12) 4. Require students to document both their technical approaches and ethical considerations in all AI-assisted work Resources needed: Modified curriculum templates, faculty training, assessment redesign. Success metrics: Increased critical questioning in technical contexts, improved ability to identify limitations and biases in real-time use.

The Workaround This approach avoids creating technically skilled but critically naive users by embedding ethical consideration directly into technical practice. It enables citizens to use AI tools while simultaneously evaluating their appropriateness and limitations, moving beyond either uncritical adoption or blanket rejection [6].

The Outcome Within one semester, learners develop the competency to simultaneously employ AI tools while critically evaluating their outputs, limitations, and societal implications. This integrated literacy enables informed decision-making about when and how to use AI across professional and personal contexts, addressing the severe underrepresentation of critical perspectives in current discourse [15].

Design Multi-Stakeholder Literacy Assessment Frameworks

The Obstacle Current AI literacy assessment focuses narrowly on individual technical competency, missing the collaborative and societal dimensions of meaningful understanding. This individualistic approach fails to capture how literacy functions in real-world contexts where AI decisions affect multiple stakeholders [9].

The Action 1. Develop scenario-based assessments that require considering multiple perspectives (vendor, critic, user, affected community) - months 1-2 2. Create group evaluation exercises measuring collective AI literacy and decision-making - months 3-4 3. Implement longitudinal tracking of literacy application in real-world contexts - ongoing 4. Incorporate

[20] Prompt engineering as a new 21st century skill

[6] Empoderando a bibliotecarios del Sur Global a través de la alfabetización crítica en IA para futuros

[15] La dimensión funcional y técnica en la alfabetización en Inteligencia Artificial Generativa en la fo

[9] Evidence Architecture

stakeholder impact analysis into all major assessments Resources: Scenario development templates, multi-rater assessment systems, community partnership frameworks. Success metrics: Improved ability to anticipate unintended consequences, more inclusive AI implementation decisions.

The Workaround This approach counters the severe underrepresentation of critical and community perspectives (critics at 0.14%, parents at 0.29%) by building consideration of diverse viewpoints directly into assessment. It enables measurement of literacy as a collective capability rather than just individual skill [9].

[9] Evidence Architecture

The Outcome Within two assessment cycles, participants demonstrate improved capacity to anticipate AI impacts across stakeholder groups and make more socially responsible decisions about AI adoption and implementation. This addresses the current governance vacuum where institutional agency accounts for 0% of discourse by developing literacy that considers broader societal implications [13].

[13] Implicaciones éticas del uso de Inteligencia Artificial en educación superior

Implement Failure-Based Literacy Development

The Obstacle Current AI literacy programs emphasize success stories and optimal use cases, creating unrealistic expectations and failing to prepare citizens for the limitations and failures they will encounter. With failure acknowledgment at only 4% in current discourse, this creates dangerously overconfident users [9].

[9] Evidence Architecture

The Action 1. Curate and analyze real-world AI failure cases across domains (weeks 1-4) 2. Develop "failure anticipation" exercises where participants identify potential points of breakdown (weeks 5-8) 3. Create "debugging" scenarios that require diagnosing and addressing AI system failures (weeks 9-12) 4. Implement reflective practice documenting personal experiences with AI limitations Resources: Failure case library, diagnostic frameworks, facilitation guides for discussing limitations. Success metrics: Increased ability to identify failure modes, improved contingency planning, more realistic expectations.

The Workaround This approach counters the current 96% failure non-acknowledgment rate by making understanding limitations central to literacy development. It enables citizens to develop realistic mental models of AI capabilities and appropriate caution alongside technical skills [7].

[7] Enseñar o engañar: el lado oscuro de ChatGPT en el aprendizaje del CLE

The Outcome After 12 weeks, participants demonstrate significantly more realistic understanding of AI limitations and improved ability to identify potential failure points before they occur. This critical competency reduces overreliance on AI systems and enables more appropriate application across professional and personal contexts, addressing the current dangerous overconfidence in AI capabilities [17].

[17] Navigating the role of artificial intelligence in special education: advantages, disadvantages, and ethical considerations

Develop Context-Transferable Literacy Frameworks

The Obstacle Most AI literacy programs are domain-specific, creating siloed understanding that doesn't transfer across personal, professional, and civic contexts. This limits citizens' ability to recognize common patterns and

apply critical insights consistently across different AI encounters [21].

The Action 1. Identify cross-context AI literacy principles (bias recognition, limitation awareness, appropriate use boundaries) - month 1 2. Develop case studies showing how these principles apply across domains (healthcare, education, finance, social media) - months 2-3 3. Create transfer exercises where participants apply insights from one context to another - months 4-5 4. Implement reflective journals tracking AI encounters across life domains - ongoing Resources: Cross-domain case library, principle identification framework, transfer exercise bank. Success metrics: Improved pattern recognition across contexts, more consistent application of critical principles.

The Workaround This approach prevents context-bound literacy that leaves citizens vulnerable in unfamiliar AI encounters. It enables development of robust mental models that transfer across the increasingly pervasive AI systems in daily life [12].

The Outcome Within six months, participants demonstrate ability to recognize common AI patterns (optimization biases, limitation patterns, appropriate use boundaries) across diverse contexts and apply consistent critical frameworks regardless of the specific application. This creates more comprehensive and resilient AI literacy that functions across the spectrum of personal, professional, and civic AI encounters [4].

Research Agenda

Research Question How do critical questioning competencies transfer across different AI application contexts (writing assistance, image generation, decision support systems) and what instructional interventions most effectively develop this transferable critical literacy?

Methodological Approach A mixed-methods longitudinal study tracking 300+ learners across 12 months, using pre/post assessments of critical questioning patterns, think-aloud protocols during AI interactions, and analysis of question formulation development across contexts. The research would employ validated critical literacy rubrics and cognitive task analysis to map how questioning skills generalize or remain context-bound.

Literacy Significance This addresses the severe underrepresentation of critical perspectives in current AI literacy efforts, which account for only 0.14% of discourse [9]. Understanding transfer mechanisms would inform integrated curriculum designs that develop questioning competencies applicable across AI domains, benefiting educators seeking to move beyond technical proficiency toward critical engagement. The findings would directly address the gap in critical questioning frameworks identified in current literacy approaches [15].

Funding Alignment NSF Education and Human Resources Directorate, Spencer Foundation, European Commission Horizon Europe literacy initiatives.

[21] Transformación Docente con IA: Agenda Institucional para Universidades de México y la Región

[12] Il faut repenser la place de la compétence numérique dans le système éducatif québécois

[4] Desafíos y potencial de la IA en la educación: percepciones y barreras desde la perspectiva docente

[9] Evidence Architecture

[15] La dimensión funcional y técnica en la alfabetización en Inteligencia Artificial Generativa en la fo

Research Question What constitutes effective institutional AI literacy and how do organizational policies, resource allocation, and leadership development interact to create system-wide understanding versus individual competency?

Methodological Approach Comparative case study of 8-12 organizations across education, healthcare, and industry sectors, using document analysis of AI policies, interviews with institutional leaders, network analysis of information flows, and assessment of collective decision-making capacity regarding AI adoption and governance.

Literacy Significance This research addresses the critical gap in institutional agency, which currently accounts for 0% of discourse despite organizations being primary sites of AI implementation [9]. Understanding institutional literacy would inform governance frameworks and resource allocation decisions, benefiting policymakers and organizational leaders responsible for ethical AI integration. The research builds on identified needs for institutional approaches to AI transformation [21].

Funding Alignment Alfred P. Sloan Foundation, Carnegie Corporation, corporate social responsibility programs of major technology firms.

Research Question How do power literacy competencies develop—specifically the ability to identify, analyze, and respond to power concentrations in AI systems—and what pedagogical approaches most effectively foster this critical awareness across diverse learner populations?

Methodological Approach Design-based research implementing and refining power literacy modules across 5 educational contexts (K-12, higher education, workplace training, community organizations, Global South contexts), using participatory action research methods, pre/post power analysis assessments, and longitudinal tracking of advocacy behaviors.

Literacy Significance This addresses the power concentration patterns identified in current AI systems, where technical development remains concentrated while critical perspectives are systematically excluded [9]. Developing effective power literacy would empower marginalized communities and create more equitable AI governance, benefiting advocacy groups and communities affected by AI decisions. The research responds to calls for critical empowerment approaches in literacy development [6].

Funding Alignment Ford Foundation, Open Society Foundations, IDRC (International Development Research Centre), UNESCO literacy initiatives.

Research Question What failure literacy competencies enable citizens to productively learn from AI system limitations, errors, and unexpected behaviors, and how can these competencies be developed through experiential learning and case-based instruction?

Methodological Approach Experimental study comparing three pedagogical approaches to failure literacy development (case studies, simulated failures, real-world troubleshooting) with 400+ participants across educational and professional contexts, using performance assessments, confidence

[9] Evidence Architecture

[21] Transformación Docente con IA:
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[9] Evidence Architecture

[6] Empoderando a bibliotecarios del Sur
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IA para futuros

measures, and longitudinal tracking of adaptive behaviors when encountering AI limitations.

Literacy Significance This research addresses the alarming 96% non-acknowledgment of failures in current AI discourse [9]. Developing failure literacy would create more resilient AI users and reduce overconfidence, benefiting risk management in high-stakes domains like healthcare and education. The findings would inform curriculum designs that address the implementation challenges identified in current educational applications [4].

[9] Evidence Architecture

Funding Alignment NSF Robust Intelligence program, Gordon and Betty Moore Foundation, educational technology research consortia.

[4] Desafíos y potencial de la IA en la educación: percepciones y barreras desde la perspectiva docente

Research Question How do multi-stakeholder literacy assessment frameworks capture the distributed understanding needed for collective decision-making about AI systems, and what metrics most effectively measure this collaborative competency?

Methodological Approach Development and validation of a multi-stakeholder literacy assessment protocol through iterative design cycles across 6 community contexts, using social network analysis, deliberative democracy methods, scenario-based assessments, and validation against real-world decision outcomes.

Literacy Significance This addresses the severe perspective gaps in current discourse, where critic, parent, and advocate voices remain dramatically underrepresented [9]. Effective multi-stakeholder assessment would enable more inclusive AI governance and policy development, benefiting community organizations and policymakers seeking equitable technology integration. The approach aligns with emerging frameworks for collaborative technology assessment [16].

[9] Evidence Architecture

Funding Alignment Knight Foundation, Democracy Fund, NSF Science of Science Innovation Policy, community foundation partnerships.

[16] Navegando la investigación social en la era digital: una guía práctica para el análisis cualitativo y cuantitativo con apoyo de Inteligencia Artificial (IA)

Conclusion

This report, drawing upon an evidence base of 695 articles, reveals that the pursuit of AI literacy is at a critical juncture. The analysis uncovers a consistent and troubling pattern across the examined landscape: a fundamental misalignment between the stated goals of fostering empowered, critical citizens and the actual trajectory of literacy development. The fragmented definitions and competing frameworks create a foundation of confusion, upon which a development trajectory is being built that disproportionately emphasizes technical skill acquisition. This technical focus, while valuable in specific contexts, inadvertently sidelines the cultivation of the critical understanding necessary to interrogate AI systems, their inherent biases, and their societal consequences. The identified critical gaps, crystallized by the 67 contradictions in the discourse, are not minor oversights but symptoms of this core misalignment. They represent unresolved tensions between efficiency

and ethics, between consumer use and civic oversight, and between technical transparency and social accountability. Consequently, the participation implications are severe. The current path creates a bifurcated future: a technically proficient elite capable of shaping and leveraging AI, and a much larger population relegated to being passive subjects of these technologies, vulnerable to manipulation and disempowerment. This division threatens to calcify existing social inequities and undermine the democratic potential of AI. For stakeholders—including educators, policymakers, and industry leaders—the implication is that incremental adjustments are insufficient. A fundamental reorientation is required. Curricula must be redesigned to integrate critical socio-technical analysis as a core pillar, not an optional supplement. Policy must move beyond promoting digital skills to actively fostering critical digital citizenship, creating mechanisms for meaningful public participation in AI governance. The central challenge is to forge a new literacy paradigm that does not merely train individuals to use AI tools but equips them to question the builders, goals, and power structures behind those tools. This report began by framing AI literacy as a prerequisite for meaningful participation in an AI-shaped society. The findings confirm that without a decisive shift away from a narrow, technically-focused literacy model, such participation will remain an ideal, not a reality, for the majority. The stakes involve nothing less than the future of agency, equity, and democratic deliberation.

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80. La IA y la publicidad engañosa. Desarrollo de una aplicación web para la detección de elementos engañosos en anuncios publicitarios.
81. The DKAP Project The Country Report of Vietnam