Original Article

Critical AI Literacy: Preparing Learners for Algorithmic Societies

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Abstract
This study highlights the urgent need to redefine media literacy frameworks to address AI-generated content, algorithmic bias, data privacy, and ethical considerations. Key findings reveal a consensus on core competencies, including critical evaluation of AI outputs, understanding algorithmic transparency, and fostering ethical engagement with AI technologies. However, challenges such as fragmented definitions of AI literacy, lack of standardized curricula, and unequal access to resources persist. The review underscores the importance of multidisciplinary collaboration to develop inclusive, adaptive pedagogical models that bridge technical and sociocultural dimensions. Innovative approaches, such as experiential learning and arts-integrated methodologies, show promise in cultivating critical AI literacy. The study calls for longitudinal research, cross-cultural studies, and policy initiatives to ensure equitable and effective integration of AI literacy into education, empowering individuals to navigate and shape AI-mediated digital societies responsibly.

Key words: AI literacy, algorithmic bias, digital citizenship, ethical engagement, media literacy.

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Introduction

The accelerating integration of artificial intelligence (AI) into all dimensions of human life has precipitated profound transformations in communication, education, and social cognition. As algorithmic systems increasingly mediate how individuals access, interpret, and engage with information, traditional conceptions of literacy are being challenged and redefined. Systematic evidence confirms that literacy frameworks must continuously adapt to technological change through research-informed curriculum development and educator support systems (Sakhaei et al., 2023). This evolutionary imperative fundamentally reshapes expectations for media literacy in algorithmic societies.

In particular, the convergence of AI and digital media technologies has introduced complex sociotechnical dynamics that demand a re-evaluation of media literacy education. This re-evaluation increasingly depends on institutional capacity, as curricular reforms must account for faculty preparedness, ethical concerns, and student readiness to engage with AI as a normative component of education (Rahmatian & Sharajsharifi, 2021). No longer limited to evaluating the credibility of news sources or recognizing media bias, contemporary media literacy must now encompass competencies related to AI-generated content, algorithmic personalization, data privacy, and the ethical implications of machine agency. This paradigm shift necessitates the development of robust educational frameworks capable of preparing individuals—especially younger generations—for informed, critical, and ethical participation in AI-mediated environments. Research confirms that literacy education serves a vital protective function, equipping individuals to recognize and resist harmful systems (Soroori Sarabi et al., 2020). In AI-mediated environments, this safeguarding role becomes exponentially more critical as algorithmic systems amplify both opportunities and risks.

The emergence of AI-generated content, such as deepfakes, algorithmically curated news feeds, and generative language models, has blurred the boundaries between reality and simulation, intensifying the epistemological challenges of the post-truth era. Scholars emphasize that all transformative technologies exhibit dual-use characteristics, simultaneously enabling societal progress while introducing emergent risks that demand proactive governance (Soroori Sarabi et al., 2023). This paradigm fundamentally shapes understanding of AI's role in media ecosystems. These developments have significant implications for democratic discourse, public trust, and civic engagement, particularly in contexts where misinformation and disinformation are disseminated at scale through AI systems. In this evolving landscape, media literacy must be reconceptualized not merely as a cognitive skill

but as a socio-technical competence that integrates critical thinking, ethical reasoning, and technical understanding. Scholars such as Jandrić (2019) and Ng et al. (2021) have emphasized the inadequacy of existing educational models to address the multi-layered implications of AI technologies, highlighting the urgency of theoretical and pedagogical innovation.

This growing body of literature underscores the need for a systematic examination of how AI literacy is being conceptualized, implemented, and evaluated within the domain of media education. While various national and international initiatives have sought to incorporate AI into digital literacy frameworks, there remains considerable fragmentation in terminology, scope, and pedagogical approach. Studies by Long and Magerko (2020), Trejo-Quintana and Sayad (2024), and Söken and Nygreen (2024) offer foundational models for AI literacy, yet the absence of standardized curricula and assessment tools persists as a barrier to scalable implementation. Moreover, ethical concerns surrounding algorithmic bias, surveillance capitalism, and unequal access to AI technologies complicate efforts to democratize media literacy education. These challenges highlight the importance of synthesizing interdisciplinary perspectives to develop inclusive, adaptive, and critically informed educational strategies. These efforts are further constrained by the ability of dominant tech companies to shape academic narratives in ways that normalize data extraction, complicating the pursuit of critical and independent approaches to AI and media education (Sarfi et al., 2021).

In response to these gaps, the present study conducts a systematic review of scholarly literature published between 2019 and 2024, with the objective of mapping the theoretical foundations, pedagogical frameworks, and ethical debates surrounding the intersection of AI and media literacy education. By examining how AI literacy is defined, taught, and evaluated across diverse educational contexts, this review aims to identify both converging trends and unresolved tensions in the field.

Methodology

This study employed a systematic review methodology to examine the evolving intersection between AI and media literacy education. Following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, the research process was designed to ensure transparency, replicability, and comprehensive coverage of the relevant literature. The review targeted peer-reviewed journal articles, conference proceedings, and scholarly book chapters published between 2019 and 2024. Databases including Scopus, Web of Science, IEEE Xplore, and Google Scholar were systematically searched

using combinations of keywords such as "artificial intelligence", "media literacy", "AI literacy", "critical media literacy", and "education". Inclusion criteria prioritized sources that offered theoretical or empirical contributions to understanding the integration of AI within educational frameworks, particularly in the context of media literacy. Studies focusing solely on technical AI applications without educational relevance were excluded. The final dataset included 34 studies that met all criteria for relevance, scholarly credibility, and thematic alignment with the research objectives.

Data from the selected sources were subjected to thematic content analysis, enabling the identification of recurring concepts, frameworks, and educational implications across the reviewed literature. Each article was coded according to core dimensions of AI-media literacy integration: (1) conceptualizations of AI literacy, (2) pedagogical models, (3) ethical and sociocultural considerations, and (4) curricular and policy implications. Where applicable, the studies' methodological designs, participant characteristics, and geographical contexts were also documented to assess the robustness and transferability of findings. This approach facilitated the synthesis of diverse perspectives into an analytically coherent narrative, revealing both the commonalities and divergences in how AI is understood and operationalized within media literacy education. The goal was not only to map current scholarly discourse but also to critically assess its alignment with emerging educational needs in increasingly algorithmically mediated societies.

Findings

Jandrić (2019) addressed the evolving demands of critical media literacy within a postdigital framework, emphasizing the implications of emerging technologies such as AI and Big Data. The article positioned contemporary media literacy education at the intersection of technological, political, and philosophical challenges, highlighting the need for re-evaluated theories and pedagogical practices in light of rapid digital transformation. Central to the discussion was the distinction between traditional software systems and newer AI technologies, including machine learning, neural networks, deep learning, and associated biases. Building on insights from data literacy, critical algorithm studies, and critical posthumanist thought, the author identified three core challenges for postdigital critical media literacy. First, there is a pressing need to reinvent existing frameworks to reflect postdigital realities. Secondly, educators and theorists must find a nuanced balance between technical competencies (e.g., understanding AI and data mechanisms) and their political dimensions, including

surveillance, bias, and ethical concerns. Thirdly, the posthumanist perspective compels educators to consider what it means for AI systems to be "literate" and to engage with the conceptual and ethical questions surrounding machine agency and intelligence. Jandrić concluded that critical media literacy, reconfigured for the postdigital age, must play a foundational role in shaping how societies understand and engage with emerging intelligences. This includes fostering educational approaches that are capable of addressing the socio-technical complexities of AI and Big Data while remaining rooted in critical pedagogical values. Such approaches must also account for how individuals internalize dominant discourses, as identity and self-perception are often shaped by longstanding narrative frameworks that position certain cultures or societies as inferior or regressive—a process that underscores the epistemic stakes of critical media education (Sabbar et al., 2023).

Okkonen and Kotilainen (2019) explored the implications of AI technologies on minors' media practices, with a specific focus on media and information literacy. The study highlighted how AI-driven mobile applications are increasingly embedded in the daily lives of children and adolescents, fundamentally transforming their communication behaviors and media consumption. These AI systems, which often adapt based on user input, "learn" from children's interactions, raising important questions about data use, autonomy, and influence. The paper adopted a dual-perspective approach. First, it examined societal attitudes toward the acceptability of AI in controlling content and user behavior in digital environments—particularly in contexts involving minors. The study considered how trust is placed in AI systems and questioned to what extent individuals, including parents, are comfortable with AI determining access and engagement in digital spaces. Secondly, it investigated the effects of pervasive AI technologies on media use habits, considering how these interactions shape and are shaped by children's evolving digital literacy.

Drawing on existing research and preliminary interview data, the authors underscored the need to update media literacy education to reflect the increasingly adaptive and immersive nature of AI-based media.

Wang et al. (2020) explored the integration of AI education into junior high school curricula through a qualitative study presented at the International Conference on Artificial Intelligence and Education. The researchers examined how AI education could enhance students' media literacy by developing their computational thinking, programming skills, and interpersonal abilities. They conducted a comprehensive analysis of existing educational frameworks and proposed specific implementation strategies for junior high schools. Their study found that the rapid advancement of AI technologies necessitated curriculum

reforms to prepare students for an AI-driven future. The authors recommended that schools implement media literacy education alongside STEM training and entrepreneurship courses to establish foundational knowledge. They emphasized the importance of adapting AI instruction to students' developmental stages, suggesting a gradual progression from basic to advanced concepts. Through their analysis, Wang et al. identified several effective approaches, including exploratory learning methods and the integration of AI concepts into existing science and technology courses. The researchers concluded that customized AI curricula, developed according to each school's resources and capabilities, were most likely to succeed. These patterns reflect a broader imperative for educational institutions to strategically realign pedagogical models with AI's structural influence on learning environments, curricular relevance, and future-oriented leadership development (Rahmatian & Sharajsharifi, 2022).

Long and Magerko (2020) conducted a systematic literature review to establish the first comprehensive framework for AI literacy in human-computer interaction (HCI). Analyzing 150+ interdisciplinary sources, they defined AI literacy as "a set of competencies that enables individuals to critically evaluate AI technologies, communicate effectively about AI, and interact productively with AI systems". The study identified four core competency domains: (1) Conceptual understanding (basic AI principles), (2) Critical evaluation (assessing limitations/impacts), (3) Practical interaction (effective tool usage), and (4) Ethical Considerations (societal implications). The authors proposed six design principles for learner-centered AI systems: promoting transparency through explainable interfaces, enabling experiential learning via interactive simulations, supporting gradual complexity progression, incorporating contextualized examples, facilitating collaborative learning, and ensuring accessibility across skill levels. Their conceptual framework bridged gaps between technical AI education and public understanding, particularly emphasizing the need for critical thinking over purely functional knowledge. The study's competency model has since become influential in shaping subsequent AI literacy research and curricula.

Ng et al. (2021) conducted an exploratory review to conceptualize the emerging construct of AI literacy, analyzing 30 peer-reviewed articles to establish a theoretical foundation. The study addressed a critical gap in educational research, as AI literacy had not been widely examined in pedagogical contexts despite AI's growing societal penetration. The authors proposed a four-dimensional framework for cultivating AI literacy, adapted from classic literacy models: (1) Knowing and understanding core AI concepts, (2) Using and applying AI tools, (3) Evaluating and creating AI solutions, and (4) Navigating ethical

implications. Their review highlighted the absence of consensus on AI literacy definitions and pedagogical approaches. Through systematic analysis, the researchers identified key competencies including technical comprehension, critical evaluation of AI outputs, and awareness of societal impacts. They emphasized the framework's applicability across educational levels while noting the urgent need for age-appropriate assessment tools. The study laid groundwork for future research by mapping core components of AI literacy and underscoring the importance of ethical considerations in curriculum design. However, as Moein, Ghadiri and Salehi (2023) caution, even well-designed frameworks like this one require deliberate and consistent execution to achieve their intended impact. Effective implementation depends not only on clarity of design but also on sustained adherence to foundational principles; without such rigor, systems risk eroding trust, accountability, and the internalization of norms within learning environments.

Yi (2021) investigated the foundational concept and educational implications of AI literacy, with a focus on defining its core competencies and objectives in the context of an evolving digital society. Recognizing that AI is increasingly embedded in daily life—analogous to the role of writing in traditional literacy—the study positioned AI literacy as an essential skill for navigating the complexities of modern information environments.

The paper argued that traditional notions of literacy must be reimagined to include competencies relevant to networking, information exchange, and autonomous knowledge acquisition. Central to this reconceptualization is the role of metacognition, which Yi identified as a key competence in AI literacy. The ability to "know what to know" is crucial in a landscape shaped by algorithmic influences and vast information flows. Moreover, the study emphasized anticipation as a vital educational goal, proposing that AI literacy should equip individuals with the capacity to forecast and adapt to uncertain technological futures. By exploring the interplay between AI, metacognition, and anticipation, the research offered a theoretical framework that shifts the focus of education from passive content consumption to active, reflective engagement with AI systems. This perspective supports the development of learners who are not only proficient in using AI tools but also capable of critically navigating the ethical and cognitive dimensions of AI-enhanced communication and decision-making.

Ali et al. (2021) explored the integration of generative AI education into middle school curricula, emphasizing both the creative potential and societal risks associated with AI-generated media. Situated within a socio-technical framework, the study responded to the increasing

exposure of children to AI-driven content—such as deepfakes—on social media platforms, often without adequate awareness of the underlying technologies or their implications. The researchers designed and implemented educational activities for 38 middle school students that introduced foundational concepts of generative modeling, demonstrated how deepfakes are produced, and fostered critical discussions on misinformation and media manipulation. The program aimed not only to impart technical knowledge but also to cultivate AI literacy and digital citizenship by encouraging students to consider ethical responsibilities as media consumers and creators. Findings indicated that students developed a nuanced understanding of the distinction between realistic AI-generated media and factual accuracy. They recognized how such media could perpetuate misinformation and articulated the potential long-term societal harms, including in peer and social contexts. Moreover, participants expressed informed perspectives on the regulation and ethical oversight of deepfakes on digital platforms.

Petkov (2021) investigated the integration of digital media literacy (DML) and AI into youth career services, emphasizing the importance of updating vocational training for career consultants in response to evolving labor market demands. The study addressed how AI is influencing career orientation processes and underscored the necessity for consultants to develop competencies related to AI technologies and their impact on job searching and employment trends. To support this objective, the paper presented the development of training materials and online tools designed for continuous vocational education and training (CVET) tailored to career and pedagogical consultants. These resources were structured using the European Credit System for Vocational Education and Training (ECVET), enabling standardized assessment and recognition of learning outcomes across the European context. Additionally, the study provided practical examples of blended learning formats that combined digital media with online delivery, facilitating accessible and scalable professional development opportunities. The paper highlighted the significance of digital media literacy as a core competence for consultants, particularly in helping youth navigate AI-driven tools and platforms in career planning. By modernizing consultant training with AI-informed resources, the initiative aimed to improve the quality and relevance of career guidance services in a rapidly digitalizing employment landscape.

Luo et al. (2022) investigated the relationship between new media literacy (NML) and news trustworthiness (NT) among Taiwanese students through a cross-sectional questionnaire study. The researchers developed a News Trustworthiness Scale comprising 32 attributes across seven categories to systematically analyze fake news

discernment from readers' perspectives. Using importance-performance analysis (IPA) with data-centered quadrants and canonical correlation analysis, they examined 563 respondents' self-evaluations of NT attribute importance versus actual performance. The study revealed a significant discrepancy between perceived importance and demonstrated performance, with 31 of 32 NT attributes rated higher in importance than in actual execution. Research indicates that digital platforms systematically reshape cognitive processing through engagement-driven algorithms, creating gaps between users' critical awareness and actual behavior (Nosraty et al., 2021). This explains why media literacy education often fails to translate into practical discernment skills. Canonical correlation analysis showed only a weak association between students' NML levels and their NT capabilities. These findings suggested that while students recognized the theoretical importance of critical news evaluation, they struggled to apply these skills effectively in practice. Methodologically, the study contributed an innovative application of revised IPA with diagonal-based schemes for educational assessment. The results indicated current media literacy education might be insufficient for developing practical fake news discernment skills, highlighting a need for more applied, performance-based training approaches. The researchers recommended curriculum enhancements focusing on bridging the gap between theoretical knowledge and practical application of media literacy skills.

Chiang, Liao and Wang (2022) examined the integration of AI technologies into media literacy education, particularly focusing on enhancing individuals' abilities to critically assess news source credibility. Motivated by the increasing societal concerns around fake news, especially during politically sensitive and high-profile media events, the study aligned with Sustainable Development Goal 4, which emphasizes inclusive and equitable quality education. The researchers developed an AI-driven news source credibility identification system utilizing deep neural networks and big data processing, drawing on a dataset of approximately 938,000 articles, including both general news and content farm outputs. The system was embedded into an experimental educational program with two participant groups employing different message discrimination strategies. Media literacy principles were central to the instructional design. Findings indicated that the AI system significantly enhanced participants' knowledge acquisition related to media literacy and improved their learning attitudes, self-efficacy, and motivation. Notably, users of the system demonstrated stronger abilities to discern credible from non-credible news content. The study underscores the potential of AI tools to support scalable, technology-enhanced media literacy education, equipping individuals with essential critical evaluation skills necessary in today's

complex media landscape. By doing so, it contributes to broader democratic resilience through informed public discourse. In parallel, strengthening media literacy also involves examining how meaning is constructed through narrative patterns and emphasis, since public perception is often guided less by factual accuracy than by the way information is framed and positioned in discourse (Kharazmi & Mohammadi, 2020).

Risteska (2023) examined the urgent need for reformed media literacy education in response to AI-driven algorithmic systems shaping digital media consumption. Published in *KAIROS: Media and Communications Review*, the article analyzed how recommendation algorithms influence worldviews while often embedding hidden biases, emphasizing three critical requirements: (1) algorithmic transparency in content curation, (2) user education about data privacy risks, and (3) ethical AI development standards. The author demonstrated how current media literacy frameworks fail to address AI-specific challenges through concrete examples of algorithmic bias consequences. The proposed educational reforms focus on developing critical competencies to analyze algorithmic outputs, understand targeted advertising mechanisms, and exercise informed consent regarding personal data. Risteska particularly stressed educators' responsibility to incorporate ethical AI principles- including fairness, accountability, and diversity preservation - into curricula to foster responsible digital citizenship.

Tiernan et al. (2023) examined the evolving role of information and media literacy within the context of AI, particularly as these literacies relate to digital literacy frameworks. The authors began by analyzing how AI technologies influence various stages of information engagement, including the retrieval, evaluation, and creation of content. They highlighted that traditional conceptions of information and media literacy are being challenged by the capabilities of AI systems, such as content generation and algorithmic curation, which can mediate user interaction with digital content. The paper conducted a critical review of prominent digital literacy frameworks to assess how they currently define and incorporate information and media literacy. It was found that many frameworks have not kept pace with the rapid integration of AI into digital ecosystems, thereby lacking specific guidance on how learners and educators should navigate AI-driven environments. In response, the authors proposed a set of strategic recommendations aimed at future-proofing these frameworks. These included adopting a more agile and iterative approach to framework development, enhancing responsiveness to technological change, and fostering greater stakeholder participation in the process.

Washington (2023) conducted a critical literature review to examine

the intersection of AI and media literacy education in addressing the growing threat of misinformation, disinformation, and fake news in the digital era. The study contextualized the proliferation of misleading content across media platforms and its detrimental effects on public discourse, democratic processes, and social cohesion. It emphasized the increasingly complex information landscape shaped by technological advancements, particularly the development of generative AI. The review explored the potential for AI technologies to assist in the detection and mitigation of false information, highlighting tools that can identify patterns of misinformation and automate fact-checking processes. Simultaneously, it underscored the role of media literacy education in fostering critical thinking skills and empowering individuals to evaluate content responsibly. Washington advocated for the integration of media literacy into digital citizenship curricula, arguing that such education is essential to equipping individuals with the competencies necessary to navigate information ethically and effectively. Additionally, the article engaged with the ethical implications of AI in information processing, including concerns about algorithmic bias, transparency, and the risk of AI-generated content contributing to misinformation. Ultimately, the author called for a multidisciplinary and collaborative response involving educators, technologists, and policymakers to cultivate a more informed and resilient society capable of withstanding the challenges posed by the evolving digital information ecosystem.

Hristovska (2023) investigated the evolving role of media literacy education in fostering critical thinking, ethical decision-making, and digital citizenship within the context of AI-driven media. Recognizing the profound influence of artificial intelligence on information creation and dissemination, the study aimed to understand how individuals interact with such media and the extent to which media literacy can mitigate associated risks, particularly in relation to disinformation. The study employed a three-part methodology. First, a literature review was conducted to contextualize key themes such as AI, media literacy, ethical awareness, and civic engagement. Secondly, online surveys were administered to assess participants' media literacy competencies, ethical reasoning, and critical thinking skills. The final phase involved an experimental design in which participants were exposed to an AI-generated fake news article. Their responses—particularly in relation to fact-checking and critical assessment—were analyzed to gauge the effectiveness of media literacy in practice. Findings demonstrated that robust media literacy education significantly contributes to individuals' ability to navigate complex digital environments responsibly. The research highlighted the dual role of AI as both a tool and a threat in digital communication, emphasizing its potential to both facilitate and

undermine informed public discourse. Additionally, the study proposed ethical guidelines for integrating AI into media literacy curricula and advocated for sustainable educational interventions that align with the challenges of the AI era.

Balkanov (2023) examined the intersection of media literacy and AI within the context of e-commerce, a rapidly evolving domain shaped by technological innovation and shifting consumer behaviors. The study explored the importance of equipping users with media literacy skills as a foundational competency for navigating AI-driven commercial environments. Highlighting the societal uncertainty surrounding AI and its role in e-commerce, the paper underscored the psychological tendency toward comfort in the known and the resulting apprehension about technological change. Through conceptual analysis, the author argued that media literacy functions as a crucial knowledge base that empowers consumers to critically engage with AI systems embedded in e-commerce platforms. The paper emphasized that understanding communication processes—both traditional and digital—is essential for developing awareness of how AI influences marketing, personalization, and user experience. By dissecting the relationships between machine learning algorithms and user interaction in online shopping, the study highlighted how informed consumers can better assess, interpret, and respond to AI-generated content and recommendations. The paper ultimately advocated for greater public education on media literacy in the digital marketplace, contending that such knowledge is key to fostering consumer agency and ethical engagement in AI-mediated environments. It concluded by affirming the relevance of media literacy in shaping responsible digital citizenship and enhancing user preparedness in the face of ongoing AI integration in e-commerce.

Walker, Thuermer, Vicens, and Simperl (2023) examined innovative artistic strategies for addressing misinformation, focusing on media literacy and fact-checking in the context of AI-generated art. This study analyzed 18 AI- and machine learning-based art projects developed under the MediaFutures initiative to evaluate their roles in countering misinformation. The researchers explored how these artistic interventions align with established AI-based misinformation countermeasures and how they tackle challenges associated with disinformation in the digital age. The analysis revealed that AI artists employed diverse strategies— including debunking, inoculation, and emotional engagement— to challenge misinformation. These projects also engaged with technically complex issues such as deepfakes and manipulated content, while fostering data literacy and emphasizing the power of collective intelligence. Artistic approaches proved particularly effective in conveying hard-to-refute messages by leveraging narrative,

empathy, and affective resonance— tools that traditional fact-checking methods often overlook. The study argues that integrating AI techniques and data as artistic mediums provides a novel and potentially impactful avenue for enhancing media literacy and public awareness in an era increasingly shaped by algorithmic content. The authors concluded that these creative approaches not only complement existing technological and policy responses but also offer meaningful and accessible methods to engage the public. They called for further exploration of AI art's potential in misinformation counter-narratives and media education. Other media environments show comparable effects, as exposure to influencer content is associated with shifts in how users evaluate qualities like wealth, appearance, and religious values in personal decision-making (Nosrati et al., 2023).

Fulantelli and Taibi (2024) investigated strategies to enhance adolescents' trust in online news through improved social media literacy, presenting their work at the 17th International Conference of Education, Research and Innovation. The study was part of the EU-funded *TASKs* project, which employed a multi-method approach combining qualitative/quantitative research with AI techniques to analyze platform-mediated news interactions. The authors contextualized their work within conflicting literature on adolescent news consumption, noting studies that reported both declining trust in traditional media and persistent challenges in evaluating social media news credibility. Key findings from the project revealed that adolescents often encountered news passively on social media, struggled to assess source credibility, and were influenced by collective social endorsement. The study emphasized the need to reframe media literacy education by integrating insights from the *TASKs* project's tripartite analysis of news providers, platform governance, and user behavior. The authors proposed that effective interventions must address both motivational barriers (e.g., perceptions of news as irrelevant) and cognitive gaps (e.g., bias detection). While the full empirical results were pending at the time of publication, the theoretical framework highlighted the role of AI-driven analytics in developing targeted literacy programs that bridge trust deficits in platformized media ecosystems. Platform logics increasingly shape how users build trust, express identity, and evaluate information, as economic incentives on networks like Instagram drive strategic visibility, social signaling, and performance-based engagement with content (Arsalani et al., 2024).

Trejo-Quintana and Sayad (2024) examined the evolving requirements for media and information literacy (MIL) in artificial intelligence-saturated media environments. Published in a special issue on MIL, the conceptual study proposed an updated framework for MIL competencies to address AI-specific challenges. The authors identified

five core pillars requiring adaptation: (1) *access* to AI-mediated information systems, (2) critical *analysis* of algorithmic outputs, (3) ethical *creation* using AI tools, (4) reflective engagement with AI biases, and (5) participatory *action* in algorithm governance. The analysis revealed that traditional MIL frameworks inadequately prepare users for AI's opaque decision-making processes and hidden data dependencies. The researchers emphasized the compounded risks of algorithmic discrimination and information asymmetry in AI systems, necessitating new critical competencies. Their proposed adaptations included technical understanding of machine learning fundamentals alongside enhanced ethical vigilance— positioning MIL as both a defensive tool against AI manipulation and an enabling mechanism for democratic participation in technological development.

Hu (2024) presented an experiential learning framework for developing critical AI literacy through a structured classroom activity focused on generative AI stereotypes. Integrated into an Emerging Communication Technologies course, the intervention employed a three-phase approach: (1) *experiential engagement* with AI image generation tools, (2) systematic *analysis* of emergent stereotypes in outputs, and (3) guided *reflection* on human-AI communication dynamics. Analysis of student work demonstrated significant evolution in participants' ability to identify algorithmic biases, with reflective journals revealing enhanced awareness of prompt engineering's role in either perpetuating or mitigating stereotypes. The study contributed a practical pedagogical model for cultivating three competencies: technical proficiency in AI interaction, critical evaluation of generated content, and ethical responsibility in tool usage. Student examples illustrated how repeated exposure coupled with structured debriefing developed meta-cognitive awareness of AI's cultural limitations. The author emphasized this approach's scalability across disciplines while cautioning about emotionally charged discoveries of embedded biases during the learning process.

Söken and Nygreen (2024) presented a critical media literacy (CML) framework for adapting pedagogy to generative AI (GenAI) in higher education, drawing from their undergraduate teaching experiences. Published in *Teaching and Generative AI: Pedagogical Possibilities and Productive Tensions*, the chapter outlined three evidence-based instructional innovations: (1) establishing transparent GenAI usage policies through collaborative classroom norms, (2) developing in-class activities that foster critical analysis of GenAI outputs, and (3) implementing process-oriented assessments that prioritize learning trajectories over final products. The authors' CML approach emphasized five core principles: leveraging existing effective pedagogies, maintaining clear GenAI policy communication, adopting growth-

focused evaluation methods, humanizing instructor-student interactions, and centering student experiential knowledge. Through reflective case examples, they demonstrated how these strategies simultaneously harness GenAI's educational potential while mitigating risks like over-reliance on automated content generation. The chapter provided actionable templates for balancing technological integration with critical engagement, particularly in developing students' meta-cognitive awareness of GenAI's sociotechnical implications.

Sarkar and Ghosh (2024) investigate the application of AI technologies to enhance media literacy and counter misinformation in digital environments. Published in *JNRID*, their conceptual study identifies three key mechanisms through which AI can strengthen critical media engagement: (1) personalized media literacy education using adaptive learning systems, (2) real-time detection of misinformation through machine learning and natural language processing, and (3) automated content verification tools for user empowerment. The authors argue that AI-driven solutions offer scalable advantages over traditional media literacy approaches, particularly in processing vast volumes of digital content and providing immediate feedback. Their analysis highlights how these technologies can simultaneously educate users about misinformation patterns while actively protecting them from exposure to false content. The paper concludes by advocating for integrated human-AI media literacy frameworks that combine technological capabilities with critical thinking development.

Bykov and Medvedeva (2024) investigated the dual role of AI in digital communication, emphasizing both its opportunities and inherent risks, with particular attention to the relevance of media literacy. Through a meta-analysis of scholarly literature published between 2020 and 2023 in both English and Russian, the authors assessed prevailing academic perspectives on AI's impact. Their findings identified two principal areas of concern frequently cited by researchers: the potential negative effects on mental health and the spread of misinformation, particularly fake news. Conversely, the study noted several positive contributions of AI technologies, particularly their capacity to automate routine tasks. This automation was seen as beneficial in freeing up human capacity for more creative and complex activities. The authors highlighted that as AI becomes increasingly integrated into strategic communication and everyday digital interactions, more individuals will be engaging directly with AI systems or consuming AI-generated content. The paper argued against resisting the proliferation of AI technologies, positing instead that education— specifically media literacy— offers a more constructive approach. Teaching individuals how to critically interact with AI tools and understand their societal

implications was presented as a pragmatic and necessary strategy. The study ultimately positioned media literacy as a key component of digital competency in the evolving communication landscape shaped by AI. This is particularly critical in light of research showing how algorithmically shaped self-presentation and comparison on social platforms can erode well-being and cognitive resilience, especially among younger users (Zamani et al., 2021).

Shalevska (2024) examined the growing influence of AI on political discourse, with a particular focus on the role of media literacy education in addressing the spread of AI-powered disinformation and misinformation. The paper identified key AI-driven threats to democratic processes, including deepfakes, algorithmic microtargeting, and the deployment of bots to distort public opinion. These technologies, the author argued, have significantly altered the political communication environment by enabling the manipulation of information on an unprecedented scale. Employing a qualitative methodology, Shalevska analyzed existing media literacy handbooks to assess their effectiveness in preparing individuals—particularly students—for engagement in politically charged, AI-mediated environments. Based on this analysis, the study proposed a comprehensive framework for media literacy education aimed at fostering critical thinking and evaluative skills necessary for navigating complex information ecosystems. This framework emphasized the need for learners to not only recognize and deconstruct misleading content but also to understand the mechanisms by which AI tools amplify and disseminate political misinformation. The author concluded that media literacy education must be strengthened and adapted to the current technological landscape to uphold democratic values and support informed political participation. By equipping individuals with the skills to critically assess AI-generated content, media literacy can serve as a vital countermeasure against the erosion of political discourse caused by disinformation.

Saliu (2024) conducted a critical analysis of two foundational media literacy texts—by James Potter and Stanley Baran—to assess their relevance in addressing the rapidly evolving media landscape shaped by AI and digital communication practices. The study was motivated by profound societal shifts, including the ubiquitous migration to digital platforms, the mediatization of daily life, the emergence of social media as a platform for personal broadcasting, and the increasing influence of non-human actors such as AI in content creation and dissemination. Using a problematization methodology, the author identified several key conceptual gaps in the two texts. These included the absence of contemporary issues such as mob censorship, post-truth dynamics, social media literacy, and AI's role in shaping digital discourse. The

study found that although the texts are widely used in media education, they do not adequately account for the complex interplay between human and algorithmic agency in today's media environment. This omission limits their utility in preparing learners to critically navigate a media ecosystem increasingly shaped by generative AI, disinformation, and evolving forms of online interaction. Saliu advocated for a reimagined, holistic approach to media literacy that integrates emerging media phenomena and emphasizes the development of critical media skills suited to an AI-mediated world. The paper concluded that media literacy education must evolve to remain relevant and empower individuals to engage critically and ethically with contemporary digital media.

Oliveira et al. (2024) presented a comprehensive account of the *Digital Literate* project, an educational initiative designed to integrate AI and media literacy into classroom practice as part of a broader strategy to support digital transformation in education. This work, shared at the 17th International Conference of Education, Research and Innovation (ICERI), showcased a structured professional development program that equips educators with the tools and methodologies necessary to embed digital and media literacy across subject areas. The project emphasized educator training through a blended learning model that includes a Massive Open Online Course (MOOC), interactive workshops, and guidance in developing Learning Unit Plans (LUPs). These LUPs operationalize digital and media literacy through pedagogical techniques such as flipped learning, inquiry-based learning, and peer-to-peer assessment, with AI tools facilitating personalized and interactive learning experiences. Students, in turn, engaged in creating digital outputs—such as multimedia presentations—addressing real-world challenges like misinformation and climate change. A key outcome of the initiative is the *Good Practice Catalogue on Digital and Media Literacy*, which compiles successful LUPs and student projects to serve as replicable models for educators globally. The project also prioritized community-building among educators and stakeholders, fostering a culture of continuous professional growth and collaborative innovation. Overall, the study argued that integrating AI into media literacy education not only enhances teaching and learning but also aligns with the EU Digital Education Action Plan's objectives to improve digital competence and educational resilience.

Kalantzis and Cope (2024) critically examined the transformative implications of generative AI for literacy education. Framing this technological shift as historically significant—on par with the invention of movable type and the printing press—the authors argued that generative AI redefines the very nature of writing. Unlike previous tools, generative AI operates at the intersection of natural and machine

languages, producing text, interpreting and generating images, and executing algorithmic logic through multimodal outputs. This new form of machine-generated writing challenges traditional notions of authorship, meaning-making, and literacy instruction. The paper is structured in three parts. The first provides a theoretical and historical analysis of generative AI as a communicative revolution, highlighting its potential and the complex ethical, cognitive, and pedagogical problems it raises. The second section calls for a rethinking of literacy itself, proposing a revised "grammar" that incorporates AI-mediated communication. The authors argue that literacy education must evolve to include competencies in navigating, co-creating, and critically engaging with AI-generated content.

Flynn (2024) introduced a pedagogical activity designed to develop media literacy through critical engagement with generative AI, particularly tools like ChatGPT. The activity addresses the tendency for public discourse around emerging technologies to fall into deterministic or hyperbolic narratives. Instead of accepting oversimplified predictions, students are tasked with producing media literacy-focused infographics that analyze the roles, applications, ethical dilemmas, and societal implications of generative AI across various domains. Structured over five weekly segments, the unit encourages students to explore how AI influences specific industries (e.g., film, advertising, accounting) or topical areas in media studies (e.g., online dating, celebrity culture, or posthumous digital communication). Each week focuses on building foundational understanding, researching real-world examples, synthesizing key insights, and designing accessible and informative visual outputs. The final stage of the assignment is a public poster presentation, allowing students to communicate their work beyond the classroom and engage in broader discourse with peers and faculty. The activity emphasizes both conceptual and applied learning. It fosters critical thinking, research skills, and visual communication while equipping students with a tangible portfolio piece that demonstrates their analytical and creative abilities.

Yu and Nam (2024) conducted a comprehensive investigation into strategies for enhancing media literacy in the context of artificial intelligence, with a particular emphasis on the development and application of media literacy indices and the implications for policy. The study critically reviewed the evolution of media literacy indices in South Korea, identifying how shifts in media usage—driven by AI technologies—necessitate new educational approaches and evaluative tools. It documented trends in both the design and practical implementation of these indices, revealing limitations in existing frameworks when applied to the AI-driven media environment. The researchers analyzed specific South Korean cases where literacy indices

were employed to evaluate educational outcomes, uncovering several methodological and policy-related challenges. Their findings highlighted a disconnect between rapidly evolving media practices and the static nature of traditional media literacy assessments. The study advocates for the creation of updated indices tailored to AI-integrated platforms and the establishment of mechanisms for ongoing evaluation to ensure educational effectiveness. Additionally, the authors emphasized the importance of embedding media literacy measurement into national education policy and curriculum design. They proposed that media platforms could be mandated to participate in assessing media literacy outcomes, thereby promoting shared responsibility in fostering a digitally literate public. Ultimately, the study positions index development not only as a technical task but as a critical step toward systemic educational reform in the AI era.

Saklaki and Gardikiotis (2024) conducted an exploratory study to examine the interplay between university students' attitudes toward AI, their perspectives on AI ethics, and their levels of media and digital literacy. Utilizing a sample of 310 students from Greece, the researchers administered an online survey comprising four validated scales: general attitudes toward AI (split into positive and negative subscales), attitudes toward AI ethics (accountable vs. non-accountable AI use), media literacy, and digital literacy, along with demographic questions. The findings indicated that students generally expressed moderately positive attitudes toward AI while demonstrating a strong preference for ethical, accountable AI deployment. Notably, media literacy was found to correlate positively with support for accountable AI use, but negatively with positive attitudes toward AI overall. Conversely, digital literacy exhibited a positive association with favorable AI perceptions and a negative association with negative attitudes. These contrasting patterns suggest that media and digital literacy may influence how individuals critically engage with AI technologies and ethical concerns in distinct ways.

Saravana Siva, Hermina, and Naveen (2024) investigated the integration of AI into educational technology to enhance media literacy skills among students. Recognizing the increasing complexity of digital environments, the study aimed to evaluate the effectiveness of AI-driven educational tools in promoting students' critical engagement with media. Utilizing a questionnaire-based methodology, data were collected from a diverse cohort of educators, students, and technology experts to assess the influence of AI on learners' abilities to critically analyze content, detect misinformation, and interact responsibly with digital media. The findings indicated that AI-powered platforms—such as adaptive learning systems and personalized feedback tools—were effective in fostering students' critical thinking and analytical

capabilities. These tools enabled individualized learning experiences that adapted to students' skill levels, thereby facilitating deeper engagement with media literacy concepts. However, the study also identified several challenges that could impede successful implementation. These included limited access to advanced technologies, a lack of teacher training specific to AI applications, and concerns regarding algorithmic bias, data privacy, and ethical use. Despite these limitations, respondents generally acknowledged the transformative potential of AI in media literacy education. The authors concluded by recommending targeted teacher training, infrastructure development, and systematic evaluation of AI tools to ensure ethical, equitable, and effective integration into curricula.

El-Saman (2025) examined the preparedness of Egyptian media curricula for AI integration through dual surveys of. Published in *Media Practice and Education*, the study revealed significant gaps between existing programs and the competencies required for AI-driven media ecosystems. Participants reported institutional barriers to curriculum modernization. The author proposed an Artificial Intelligence Media Literacy (AIML) framework comprising four pillars: (1) technical proficiency in AI tools for content creation, (2) critical analysis of algorithmic bias, (3) data literacy for audience analytics, and (4) ethical reasoning for AI-mediated communication. Comparative analysis demonstrated that current curricula emphasized traditional media skills while underdeveloping these emerging competencies.

Mandenaki et al. (2025) conducted a quantitative survey of 148 professionals from 86 media organizations across Greece, France, Portugal, and Cyprus to examine digital transformation challenges in the European media sector. The study revealed that most participants were unaware of existing AI tools for journalism and marketing, with media managers particularly focused on traditional revenue models like advertisements and sponsored content rather than exploring new AI-driven business models. The findings demonstrate significant hesitation among publishers regarding AI adoption, reflecting broader industry concerns about technology's impact on journalism. However, the research also identified widespread interest in exploring AI's potential to enhance news quality and boost revenue. The study highlights an urgent need for targeted digital literacy training, especially in AI applications, as media organizations struggle to fully embrace data analytics and other transformative technologies.

Conclusion

This systematic review highlights a significant and accelerating convergence between AI and media literacy education, demanding a

profound reconfiguration of traditional pedagogical frameworks. Across the 34 reviewed studies, there was a consistent recognition that AI literacy cannot be isolated from broader media literacy goals but must instead be integrated into a holistic educational model. Core competencies such as algorithmic transparency, critical evaluation of AI-generated content, data ethics, and metacognition emerged as foundational for preparing learners to navigate an increasingly complex and algorithmically mediated media ecosystem. The review also confirms a growing consensus that media literacy education must shift from content-oriented approaches toward capacity-building models that emphasize adaptive, anticipatory, and ethical engagement with AI technologies.

Despite the evident urgency and scholarly momentum, the review also identifies persistent gaps and challenges in both theoretical frameworks and practical implementation. Notably, there remains a lack of consensus on the precise definition of AI literacy, compounded by the absence of standardized curricula, age-appropriate assessment tools, and scalable training programs for educators. Ethical considerations—such as surveillance, bias, misinformation, and access inequality—are often acknowledged but insufficiently addressed in curricular design. Recent study demonstrates that dominant cultural paradigms systematically reinforce idealized norms through institutional practices, creating self-perpetuating cycles of behavioral expectation (Nosraty et al., 2020). Such systemic normalization mirrors how algorithmic biases become embedded in AI-mediated environments without critical interrogation. Moreover, the literature reveals a fragmentation of efforts across educational levels, with uneven attention to early education, vocational training, and lifelong learning. Without a coordinated strategy, educational institutions risk perpetuating digital divides and failing to equip learners with the critical competencies necessary for responsible and informed digital citizenship. Systematic reviews across professional domains reveal that effective AI adoption requires domain-specific training addressing both technical competencies and ethical reasoning (Tomraee et al., 2022). This dual-focused approach directly informs media literacy education's need to balance skill development with critical engagement. Educational responses to AI must, like criminal justice frameworks, address systemic inequality as a condition of harm; efforts to prevent bias and exclusion rely on recognizing how structural injustice distorts both participation and accountability in mediated environments (Maleki Borujeni et al., 2022).

Importantly, this review illustrates that effective AI-media literacy integration requires a multidisciplinary and participatory approach. Educational theorists, technologists, sociologists, and policymakers

must collaborate to co-create adaptable and culturally responsive pedagogical models. Contemporary research emphasizes that digital literacy must evolve as a dynamic, multi-stakeholder endeavor, combining technical competencies with critical engagement to address algorithmic risks and ethical challenges in increasingly complex media ecosystems (Arsalani et al., 2022). This approach equally applies to AI literacy frameworks. Initiatives such as the "Digital Literate" project and frameworks proposed by Long and Magerko (2020), Ng et al. (2021), and Trejo-Quintana and Sayad (2024) provide promising blueprints but require contextualization to local needs and infrastructures. Furthermore, the potential of experiential, project-based, and arts-integrated methodologies—as illustrated in works by Hu (2024) and Walker et al. (2023)—should be more broadly explored as tools for cultivating deeper critical engagement with AI.

Looking forward, future research should prioritize longitudinal and cross-cultural studies to assess the effectiveness and scalability of AI-integrated media literacy programs. There is also a need to investigate how media literacy intersects with other digital literacies—such as computational thinking, civic engagement, and platform governance—within AI-mediated environments. Ultimately, media literacy education in the age of AI must evolve into a critical, inclusive, and reflexive practice that not only equips individuals with technical competencies but also empowers them to question, resist, and reshape the sociotechnical systems that structure everyday life. In doing so, it can uphold its democratic mission and ensure that individuals are not merely passive consumers of algorithmic content but active agents in shaping the future of digital society.

Ethical considerations

The authors have completely considered ethical issues, including informed consent, plagiarism, data fabrication, misconduct, and/or falsification, double publication and/or redundancy, submission, etc.

Conflicts of interests

The authors declare that there is no conflict of interests.

Data availability

The dataset generated and analyzed during the current study is available from the corresponding author on reasonable request.

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