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Digital Literacy vs Artificial Intelligence Literacy: Conceptual Distinctions and Educational Implications for Indian Education system

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Abstract

The rapid expansion of artificial intelligence (AI) in education has created a need to distinguish AI literacy from conventional digital literacy. Although digital literacy equips learners to access, evaluate, create, and communicate information through digital technologies, AI literacy requires additional conceptual, technical, critical, data-related, and ethical competencies. This paper examines the conceptual differences and interrelationship between these two forms of literacy and analyses their implications for the Indian education system. Using a conceptual and analytical research design, the study reviews relevant scholarly literature, educational policies, curriculum materials, and international frameworks. The analysis indicates that AI literacy involves understanding the basic functioning of AI systems, interacting effectively with AI tools, formulating appropriate prompts, critically evaluating AI-generated outputs, recognising bias and misinformation, protecting personal data, and addressing ethical concerns such as privacy, accountability, transparency, academic integrity, and human agency. The paper proposes a five-dimensional framework comprising conceptual understanding, technical and interactional competence, data literacy, critical evaluation, and ethical and social awareness. It further highlights the need for age-appropriate curriculum reforms, comprehensive teacher preparation, authentic assessment methods, multilingual learning resources, and equitable access to AI-enabled education. The study concludes that AI literacy should not be treated merely as an extension of digital literacy. Instead, it should be recognised as a distinct but complementary educational competency essential for developing informed, responsible, critical, and future-ready learners in accordance with the goals of the National Education Policy 2020 and Viksit Bharat 2047.

Keywords: Digital Literacy, Artificial Intelligence Literacy, AI in Education; Conceptual Distinction, Indian Education System, AI Education; Digital Competencies, AI Competencies, Educational Technology, Critical Thinking.



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1. Introduction

Rapid proliferation of Artificial intelligence has resulted in systemic changes in social, economic, professional and educational world. Artificial intelligence-based applications are being used widely for retrieval of information, generating of text, interaction, customized learning, evaluation, recommendatory, translation and decision-making tasks. Thus, the Institution are now preparing learners not just for a digital but for a society where interaction between humans and an intelligently computational system would be commonplace. It is in this context of transformation and change that India's educational reform movement has aligned very strongly with National Education Policy (NEP) 2020, that emphasizes technology integration, digital education, critical thinking, innovation, interdiscip

linary learning and equipping students with the future ready skills that the changing society demand. The subsequent policy environment has fostered a greater focus on emerging technologies like artificial intelligence. Similarly, this article highlights the integration of technology to align with the 'Viksit Bharat 2047' vision and the NEP 2020. However, a conceptual issue remains, as it is crucial to ask: is AI literacy merely an extension of digital literacy, or does it constitute a distinct domain of skills? Digital literacy primarily encompasses the ability to use digital devices, platforms, networks, and digital information effectively and responsibly; navigate virtual spaces; communicate via digital media; search for and evaluate information; protect personal data; and utilize digital tools productively.

In contrast, AI literacy requires a different set of skills, understandable at a basic level appropriate for one's age, such as how AI systems function; awareness that AI-generated data can be incorrect, incomplete, or useless; the ability to craft effective prompts and commands; the capacity to comprehend information intelligently and effectively with AI's assistance; the role of data; and an understanding of ethical, social, and psychological impacts.

Therefore, this distinction is not merely a matter of semantics; equating AI literacy with digital literacy risks underestimating the competencies required to use artificial intelligence intelligently and responsibly. This paper seeks to address this conceptual ambiguity by examining the differences between digital literacy and AI literacy and exploring their implications for school education in India.

2. Need and Significance of the Study

Five primary factors justify the critical role of the divergence between digital literacy and AI literacy:

2.1 Rapid advancements in generative AI

The widespread integration of generative AI tools alters the way students work with technology. This form of AI differs from traditional digital technologies in that it is capable of generating texts, images, code, explanations, Summaries and so on. Consequently students require Skills above operating digital devices.



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2.2 Shifting Nature of Knowledge

Even though AI offers rapid responses too many query The nature of these responses are not guaranteed to be correct and thus students must have sophisticated critical-evaluation skills.

2.3 New Ethical Issues Arising with AI

New issues relating to Privacy, surveillance, bias, misinformation, IP, Academic integrity, Transparency and Accountability arise with the use of AI.

2.4 The Readiness of Teacher

Unlike digital education platforms, AI-enabled tools are not merely instructional devices. Teachers must not only possess proficiency in digital technologies but also skills to asses, Select, Integrate and critique AI-enabled tools.

2.5 Risk of an emerging AI divide

AI poses the risk of creating a new kind of divide. It could further widen the "digital divide" (the disparity in access to devices).

An "AI digital divide" could emerge due to inequalities in access to superior AI tools, instructors capable of teaching AI, computing power, and AI training. The Paper highlights equity as a key issue and emphasizes the need for educational institutions to "prevent the widening AI divide."

3. Objectives of the Study

The paper seeks to pursue the following objectives.

- Understanding the conceptual distinction between digital literacy and Artificial Intelligence (AI) literacy.
- Assessing key areas of AI literacy from the perspective of school education.
- Understanding how AI literacy is impacting Indian education.
- Understanding how AI literacy influences curriculum and teaching methodologies.
- Understanding teacher preparedness for AI readiness.
- Understanding how AI-ready assessments function.
- Understanding the challenge of equity in fostering AI-ready individuals.
- Developing a conceptual framework for integrating AI-ready literacy into the Indian school curriculum.

5. Research Methodology

5.1 Research Design

A conceptual and analytical research design was used in this study. The study utilized a blend of the techniques of theoretical analysis, narrative literature review and the study of educational policies and guidelines.

Various sources of literature and research were consulted and reviewed critically in a descriptive manner so as to gain relevant insights, theories and emerging research issues and gaps that relate to the current investigation into the topic. Education policies and guidelines and other associated documents were explored so as to understand the policies.



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5.2 Information Sources

The literature and documents utilized for conceptual analysis includes educational policy documents, national curriculum and learning materials relevant to AI, internationally aligned frameworks and reports on digital literacy, literature relating to digital literacy and AI literacy in education, relevant scholarly literature in the selected time period on digital literacy and AI literacy (as specified in source paper) The learning materials specifically cited by the source paper includes, NEP 2020, NCERT guidelines and SCERT AI curriculum and learning materials and international frameworks for AI literacy associated with OECD, UNESCO and ETS Research Institute etc.

5.3 Methodology of Analysis

The learning materials, policy and literature is thematically analyzed for, conceptual characteristics of digital literacy, conceptual characteristics of AI literacy, common and unique competencies, educational implications, policy and implementation needs, equity issues and ethical concerns.

6. Conceptualizing Digital Literacy

Digital literacy can be described generally as the ability to use digital technologies in an effective, critical, safe and responsible way. It also refers to the ability to: operate devices.

Use online environments

Search and retrieve information. Evaluate information. Communicate in digital ways. Create content.

Be secure in a digital space

Protect data. Be an active user in the online environment. The above description has some emphasis on practical, responsible usage of digital device, online services, and internet based digital resources, and security.

Digital Literacy provides a necessary basis of learning in education and society today. Unfortunately, the development of AI places Additional demands, not currently captured by most digital literacies.

7. Conceptualizing AI Literacy

AI Literacy can be thought of as being able to understand, engage, critique, and use AI intelligently and responsibly.

An AI-literate student would be someone who knows how to:

- Understand general concepts related to AI.
- Be aware of typical use of AI.
- Understand basic functions of algorithm and data.
- Engage with AI tools effectively.
- Learn to appropriately ask the right questions of AI.
- Critically evaluate the AI generated answer.
- Identify possible misrepresentations and ‘hallucinations’ (see the ‘Digital Literacies and their role’ slide).



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- Be aware of bias and discrimination.
- Protect privacy and security, and ensure they take appropriate security actions and protections.
- Be aware of the societal impacts of AI, including ethical concerns and potential negative implications.
- Use AI in responsible and transparent ways.

As you can see the above has some focus on the power of algorithms, the need to critically question AI generated response, ask effective prompts and respond through being skilled in data, with appropriate ethical consideration.

8. Digital Literacy and AI Literacy: Conceptual Distinction

Dimension	Digital Literacy	AI Literacy
Primary focus	Digital technologies and environments	Artificial intelligence systems
Basic competency	Operating and navigating digital tools	Understanding and interacting with AI
Information	Finding and evaluating information	Evaluating AI-generated information
Technology	Using existing technologies	Understanding how AI-enabled technologies function
Data	Basic digital data awareness	Understanding the role and implications of data in AI
Critical thinking	Evaluating digital information	Evaluating AI outputs, limitations and bias
Interaction	Human–technology interaction	Human–AI interaction
Ethics	Digital citizenship and safety	AI ethics, bias, privacy, accountability and responsible use



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Creation	Creating digital content	Creating, prompting, evaluating and refining AI-assisted outputs
Risk	Cyber security, misinformation and privacy	Bias, hallucination, algorithmic opacity, automation and AI misuse
Educational requirement	Digital competency	AI-specific conceptual, critical and ethical competency

Table -1 This distinction illustrates that while AI literacy is directly linked to digital literacy, the two cannot simply be equated. Going far beyond the basic use of digital devices, AI literacy involves understanding the specific systems that generate AI outputs, as well as recognizing potential points of failure and inherent biases, the ethical dimensions of working with AI, and the necessity for truly "meaningful" interaction between humans and AI.

9. A Five-Dimensional Model of AI Literacy

Based on the Conceptual flow of the source paper, the framework of AI literacy could be structured in five interrelated dimensions:

9.1. Conceptual AI literacy

Learners should possess age-appropriate knowledge of topics such as Artificial Intelligence, machine learning, algorithms, generative AI, automation, data, the application of AI technology, and the limitations of AI. The goal is not to turn every student into an expert coder, but rather to equip them with enough understanding to become informed citizens.

9.2. Technical and Interactional AI literacy

This will be about actual interaction with an AI application, it can range from – appropriate use of AI tools, effectively writing a prompt, choosing the correct AI application, refining AI's answers, understanding its limitations in simple terms, using AI responsibly in their learning journey.

9.3. Data Literacy

Since AI systems rely heavily on data: what data is, how it is collected and used, how data impacts AI answers, data quality, privacy, consent, and responsible usage.

9.4. Critical AI Literacy

Perhaps, The most important differentiator between digital literacy and AI literacy. Students would need to asking – was the AI answer correct? What evidence backs it up? Could it have unintended bias? What information has been missed? Did the AI understand the nuance of my query? Should



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the AI output be fact checked by me/ a human being? The emphasis would be on epistemic responsibility as opposed to simply trusting AI answers.

9.5. Ethical and Social AI literacy

These deals with the external consequences of AI: fairness, discrimination, privacy rights, accountability, transparency, intellectual property, academic integrity, misinformation and dissemination, Hu-man autonomy, and societal impacts (e.g., automation of workforce)

10. Implications for Indian Educational System

10.1 Curriculum Reform: AI Literacy as Explicit Subject Matter

AI Literacy should become explicit parts of the curriculum; they should not be automatically derived from the broader discourse of digital literacy. These concepts should be progressively inserted in a grade-by-grade fashion depending on the age and development of learners:

- **Primary Levels** Emphasis can be put on basic intelligent technology awareness, safe usage, simple pattern recognition and decision making activities and responsible digital behavior.
- **Upper-primary Levels** A gentle introduction to AI Concepts, data literacy and patterns, usage of simple applications and critically thinking about technology including basic ethical questions of technology.
- **Secondary Levels** Students could delve into machine learning concepts, algorithms, generative AI, effective prompt design, identifying and refuting AI misinformation, biases, privacy issues, academic integrity and responsible applications of AI technologies.

11. Pedagogical transformation: From Passive Consumers to Active Learners

Just as the education systems shifted from passively transmitting knowledge to facilitating learning through active involvement, now, the curriculum also needs to incorporate more active forms of learning with AI in a project based learning approach Students should get an opportunity to “compare and contrast between the responses of human vs AI; identify, detect, and correct human errors in AI outputs; examine, explain, and propose solutions to algorithmic bias; design guidelines for responsibly using AI; scrutinize information produced by AI; develop innovative solutions for community issues; solve complex real-world problem through responsible AI engagement, etc.. These activities promote learning about the subject in a hands-on and applied manner”. These learning experiences would help students become critical and resourceful users of AI”. The source paper also cited transformative pedagogy through projects as one of the major implications.

12. Teacher Education and Professional Training

It would be impossible to have AI literate students in class if Teachers aren't AI Literate too. A holistic approach to preparing teachers for this new era includes the integration of the following into teacher programs:- Fundamental concepts of artificial intelligence, -Teaching and learning with AI -Prompt Engineering -Critical analysis of AI -Ethical AI use - Student data protection practices - Use of AI in assessments, academic integrity issues, equitable access to technology and



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information. Training should not be limited to mere “how to use tool”-based sessions. The source paper explicitly noted comprehensive teacher preparation as one of the most prominent educational implications, emphasizing “training needs that go beyond tool usage to focus on pedagogy and ethics in decision making about AI integration”.

13. AI Literacy Assessment Framework

Traditional methods, such as standard written exams, will not suffice to gauge the depth of AI literacy. Instead, 'authentic' assessment activities are required, such as project-based assessments, tasks involving the evaluation of AI outputs, prompt engineering challenges, reflective journaling, case studies, analysis of ethical scenarios, portfolios of work created using AI, and group problem-solving exercises. This approach helps determine whether students truly understand the subject matter or possess only a superficial or performative grasp of it. According to the source paper, effective assessment of AI literacy necessitates the development of new assessment methods specifically designed to evaluate the skills associated with AI literacy.

For instance, rather than merely testing the ability to recall facts, teachers could provide students with AI-generated content containing errors related to various concepts. Students could then be evaluated based on how effectively they identify, correct, and explain those errors.

The source paper explicitly recommends developing specialized assessment methods to evaluate AI literacy skills.

14. Equity and the emerging ‘AI Divide’

"The AI dividend, just as technology in general, could exacerbate rather than mitigate existing educational disparities." (UNICEF) The benefits from AI-enabled education would not accrue evenly to all children. Disparities would likely increase for students who have better access to the internet, digital devices, and advanced AI tools but lack even basic electricity, well-trained instructors, or high-quality content.

Moreover, access for learners who are disadvantaged (disabled, socio-economically challenged, geographically isolated, girls, ethnic or religious minorities, etc.) to AI related tools.

These calls for proactive and inclusive approach of AI implementation: establishing an equitable access to adequate infrastructure (internet connectivity); ensuring affordability of technology and data; supporting multilingual AI applications and content; promoting accessibility features for differently abled persons; assisting rural and disadvantaged schools to adopt AI; ensuring effective teacher training for all stakeholders. The source paper identifies equity as a central issue to be addressed by the policymakers and an effective AI policy must also address the threat of creating further disparity on ‘AI Divide’.

15. Ethical Considerations

Ethical literacy must underpin AI literacy. Students and teachers must grasp that AI is not impartial. AI outputs can have defects due to the input data, the design, training or deployment method of AI.



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Several ethical issues stand out.

Privacy: Students must be taught the dangers of submitting personal information into AI systems.

Bias: AI systems have a capacity to mirror or strengthen the biases found within the input data or the system design.

Transparency: AI system inputs do not always render clear reasons for their outputs, transparency might not always be guaranteed.

Academic integrity: Over-reliance on generative AI raises questions about plagiarism, the authorship of generated works, the originality of output, and the validity of assessments.

Human agency: AI's role should always support, not replace or inappropriately substitute human judgment or learning.

16. Policy implications

The disparity between digital literacy and AI literacy gives rise to a number of policy-relevant issues within India. First, AI literacy must be explicitly conceptualized within all Indian school-level curriculum frameworks and policy directives. Second, AI literacy should not be imposed on all students at all ages; it must cater to developmental stages.

Third, pre-service teacher-training institutions must implement AI literacy within their training curriculum, with pre-service training playing a key role.

Teacher education requires innovation in integrating AI literacy within teacher-training methods and curricula. Fourth, school and national policy documents about AI integration must establish guiding ethical principles concerning privacy, bias, transparency, academic integrity and its sensible deployment. Fifth, implementation policy needs an equal opportunity index-integrating AI within the school system mustn't lead to the broadening of existing educational disparities.

17. Proposed conceptual framework

A conceptual framework encompassing the required AI literacy components should be outlined so that its application to Indian education becomes readily apparent, presented through 5 interrelated domains: Conceptual understanding, Technical and Interactional Competence, Data Literacy, Critical evaluation, Ethical and Social Awareness; all driven through the cross-cutting principles of equity, ethics, and human agency; targeting that every learner, both student and teacher, can become a fully equipped student or teacher-leader that can engage critically, ethically and imaginatively in any environment enhanced by or reliant on AI. The output desired is that the student be well-informed, and not simply technologically skilled but truly an AI-literate learner.

18. Discussion

The initial conceptual analysis highlights the overlaps and crucial differences between digital and AI literacy. It indicates that although they have many elements in common Digital literacy implies that one is competent in the effective use of digital devices to facilitate understanding, decision-making and participation in society, while AI Literacy means possessing the ability to develop a deep understanding of computational decision-making and learning through algorithms;



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understand the risks posed by such systems (bias, uncertainty etc.); critically assess AI generated output, prompting it to generate human relevant and acceptable learning and to use these systems and interfaces with integrity and ethics.

The distinction between digital literacy and AI literacy is amplified due to the rise of Generative AI technologies. Conventional digitally-enabled devices are static in functionality and predictable. Generative AI, however, is an emergent form of technology: the outputs of generative AI, when correctly prompting an information or creative artifact with the appropriate prompting data, are constantly transforming, and its unpredictable qualities makes the aspect of critically assessing its credibility exceptionally critical. Hence, instead of replacing digital literacy with AI literacy; the two need to work in tandem. Digital literacy enables the question: 'how does one safely interact with and deploy technology?'. Conversely, AI literacy further expands to knowledge of how AI operates, interacts with humans, its inherent potentials/limitations. Its potentiality to assist or impede human capacity needs to be nurtured by educational institutions worldwide.

19. Recommendations

- Explicit definition and documentation of AI Literacy for school-level education and within various formal and informal curricula-specifically highlighting AI literacy not to be treated as simply an appendage to digital literacy but a standalone and unique competency.
- Focus on differentiation and progressive complexity. Developing age and ability appropriate curricula at different stages of learning;
- Integrate and enhance the role of teachers in providing AI literacy instruction-critical components of teacher education both in pre-service and in-service teacher professional development.
- Integrate assessment techniques and rubrics into a framework that measures critical evaluation and not merely familiarity with tool functionality.
- Developing guidelines related to ethical AI education; including aspects like intellectual property rights/copyright, privacy of data input, responsible usage, accountability and impact in the educational setup.
- Ensuring the accessibility and equitable integration of all learners.
- Promotion of multilingual resources pertaining to AI education, recognizing India's diverse linguistic context.
- Establishing policies for iterative policy-making that acknowledges the rapidly evolving nature of AI technology and its implication for the educational sector; and regular review and feedback loops built into this cycle.

20. Conclusion

Understanding the distinction between digital literacy and AI literacy is crucial for the future of education. It goes far beyond merely knowing how to operate machines; it fosters a deep understanding of computational logic and the impact of AI technology across various spheres of



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human activity. For India, where education is undergoing rapid and significant transformation under NEP 2020, integrating AI literacy into this framework is essential to achieving the goal of a 'Viksit Bharat' (Developed India).

This requires looking beyond the superficial implementation of technology. Instead, the focus must shift toward curriculum development, innovative pedagogical methods, robust teacher training, nuanced assessment strategies, comprehensive ethical guidelines, and an approach that ensures equal opportunities.

Learners need to do more than just interact with machines; they must be able to understand and critically analyze them, use them ethically, and employ them meaningfully to contribute to the betterment of society.

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