Developing AI Literacy as a Core Competency for Future Leaders

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ABSTRACT

In the rapidly evolving digital landscape, Artificial Intelligence (AI) is reshaping how decisions are made, problems are solved, and strategies are executed across sectors. As such, **developing AI literacy has become a critical core competency for future leaders**. This paper explores the concept of AI literacy beyond technical understanding, emphasizing the strategic, ethical, and human-centric dimensions leaders must grasp to thrive in AI-integrated environments. It argues that AI-literate leadership entails the ability to interpret, evaluate, and responsibly integrate AI tools in ways that enhance decision-making, foster innovation, and promote inclusive growth. Drawing from interdisciplinary literature, real-world case studies, and emerging frameworks, the study proposes a holistic model for embedding AI literacy into leadership development programs. The findings underscore the urgency of equipping leaders not only with digital fluency but with a critical mindset capable of navigating the opportunities and challenges posed by AI. Ultimately, cultivating AI literacy is not optional — it is essential for leaders aiming to remain relevant, responsible, and resilient in the Fourth Industrial Revolution.

Keywords: Artificial Intelligence, core-competency, AI literacy, Leadership Development, Fourth Industrial Revolution.

INTRODUCTION:

In today's data-driven and technologically advanced world, artificial intelligence (AI) is not only transforming business processes but also redefining leadership expectations. Developing AI literacy as a core competency for future leaders is essential for effective decision-making, strategic innovation, and ethical oversight. AI literacy goes beyond technical expertise; it includes understanding AI's capabilities, limitations, ethical implications, and strategic applications within organizational contexts (Long & Magerko, 2020). As AI becomes embedded in governance, policy, and organizational culture, leaders must be equipped to navigate its complexities responsibly and inclusively. Cultivating this literacy ensures that leaders remain relevant and capable in an era increasingly shaped by intelligent technologies (Luckin et al., 2016). Thus, the emergence of artificial intelligence (AI) is rapidly transforming how societies function, economies operate, and decisions are made. As AI technologies become increasingly embedded in organizational processes, future leaders must be equipped not only to use these tools but also to understand their implications. AI literacy—the knowledge, skills, and ethical grounding necessary to engage with AI technologies effectively—is becoming a critical competency. This article argues that developing AI literacy should be a core component of leadership development to ensure effective, responsible, and forward-thinking leadership in the digital age.

Artificial intelligence is concerned with the development of smart machines that have the capabilities of performing tasks that would normally require human intelligence (Stewart & Rodgers, 2025). There has been a significant growth and development of AI and its societal impact in recent years, particularly through machine learning and deep learning algorithms, leading to a more advanced and intelligent technology with situational awareness and the ability to adapt to ensure that it outputs the best possible outcomes (Kong et al., 2025). As these AI based technologies become more and more common in all aspects of life, the development of AI literacy becomes essential. It can be understood as the competency to use AI at home, school, at work, online, and utilize it for individual and group collaborations and critical evaluations (Lee et al., 2021).

Understanding AI Literacy

AI literacy goes beyond basic technical knowledge. It encompasses a broad understanding of how AI systems function, their limitations, ethical considerations, and strategic applications. According to Ng et al. (2021), AI literacy includes the ability to critically evaluate AI systems, interpret AI outputs, and make informed decisions based on AI-driven insights. Key dimensions include: basic knowledge of machine learning, natural language processing, and neural networks, AI's potential and limitations, Awareness of ethical, legal, and societal implications and the Ability to collaborate with AI experts and make data-informed decisions.

Yi, (2021) further notes that AI literacy is the ability of an individual to not only utilize AI, but also recognize changes in cultures; in other words, it is the basic ability to become subjective in the era of AI. This is important as a lack of these capabilities causes problems of digital divides and digital exclusions. AI literacy, therefore, encompasses competencies that enable individuals to critically evaluate AI technologies, collaborate and communicate effectively with AI systems, and use these tools ethically in all settings.

Importance of AI Literacy

According to Shah, (2023), AI literacy is important in understanding the impact of AI technologies in both personal and professional contexts. Individuals are able to critically evaluate their functionality and societal impact. This includes recognition of biases, privacy concerns, and the ethical issues associated with the use of AI. Leaders who possess AI literacy can make informed judgements and decisions that are in line with the ethical standards thereby fostering accountability and trust in their organizations (Duin & Pedersen, 2023).

Awareness of the ethical, Legal and societal concerns in AI literacy

There is a need to have ethical AI frameworks for mitigating the risks associated with AI technologies. The frameworks promote transparency, fairness, accountability and respect for all stakeholders who actively engage with and us AI technologies. Ethical principles guide users to responsibly use AI, ensuring that the systems are designed in a way that benefits humanity while minimizing any potential harm (Scopelliti, 2023).

Accountability is a crucial area in AI, more especially when AI systems are designed to make decisions that can significantly impact the lives of individuals. There should be clear frameworks that clearly highlights each individuals responsibilities among all stakeholders (Diamond & Allan, 2024). According to Stephens, (2023), all stakeholders should be engaged including marginalized communities in the development and governance of AI to ensure that all benefits are evenly distributed. Engagements with international entities and collaboration initiatives aimed at the ethical development of AI will be a good approach to addressing the challenges that may be posed by the use of AI technologies (Yadav, 2023).

AI literacy encompass Algorithmic thinking, abstraction and decomposition which involves development and use of computers to recognize data and create a prediction, Data analysis and inference, data security and privacy, digital communication and expression, ethics and its impact and Information and misinformation, which determine the credibility of AI systems and outputs in the digital landscapes that is evaluating datasets and AI products and identifying outputs that are misleading or containing inaccurate information (Mills et al., 2024)

How AI systems work

AI implements the use of techniques that allow machines to mimic the capabilities of humans (Vanderlinde et al., 2022). Some of these techniques include:

1. Natural language processing, which copies the capability of processing speech and text
2. Computer vision, which can recognize images and classify objects
3. Data mining, which can discover patterns in large data sets

In simpler terms, the systems can utilize AI as an alternative to humans. AI broadly mimics human intelligence through problem-solving and decision-making (Rožman et al., 2025)

The Imperative for AI-Literate Leadership AI is redefining leadership across sectors. Strategic decisions are increasingly driven by data and automated insights. Leaders without AI literacy may misinterpret outputs or fail to question algorithmic biases, resulting in flawed decision-making (Davenport, 2018). Moreover, AI illiteracy can hinder innovation and create ethical risks, including discrimination, privacy violations, and social exclusion.

Leadership roles most impacted including C-suite executives managing AI-driven transformations, Public policymakers regulating AI use, Educational and nonprofit leaders fostering digital equity.

Core Competencies of AI-Literate Leaders Developing AI literacy requires cultivating a set of interdisciplinary competencies such as Technological Fluency: Understanding AI tools and their integration into systems (Luckin et al., 2022), Ethical Foresight: Identifying and addressing bias, transparency, and accountability, Data-Driven Decision-Making: Evaluating AI-generated insights critically, Cross-Functional Collaboration: Working with data scientists and engineers to align AI tools with organizational goals, and Strategic Visioning: Leveraging AI to foster innovation, resilience, and growth.

Developing AI Literacy in Leadership Training To foster AI-literate leaders, education systems and organizations must embed AI concepts into leadership curricula:

1. Executive Education: Programs must incorporate AI case studies, simulations, and ethical dilemmas.
2. Interdisciplinary Curricula: Business schools should offer AI modules in MBA programs (Bughin et al., 2019)
3. Organizational Learning: In-house training, workshops, and AI literacy audits can assess and enhance understanding (Floridi et al., 2018).
4. Mentorship and Collaboration: Partnering with AI practitioners bridges the gap between theory and practice.

Challenges and ethical considerations in AI

AI has become a very crucial tools in the daily activities of entities, however it comes with a number of challenges which include financial constraints that can be mitigated through phased implementation, cost-benefit analysis, open source solutions, cloud based services and partnership and collaborations, inadequate infrastructure to adapt with the new technologies, resistance to change which may involve stakeholder engagement in AI project planning and decision making, change management providing a comprehensive change management to address employee concerns, communication stipulating the AI benefits, goals and impact to the stakeholders, employee upskilling providing training and opportunities to help employee to adapt to AI-driven changes, finally monitoring and feedback mechanisms to monitor AI implementation progress and address concerns, negative perceptions from leaders, inadequate skills and competencies, security and intrusion issues, and a lack of a proper framework and exposure to the international standards (Echedom & Okuonghae, 2021). Oghenetega et al., (2014) further notes that poor maintenance cultures, poor networking, lack of personnel who are trained and experienced, illiteracy, poverty, lack of enough infrastructure, erratic power supplies, government policy structures, political and economic factors, cultural and technological factors are all challenges encountered in the adoption of AI technologies. Some of the practical strategies may include but not limited to AI pilot projects to demonstrate value and build confidence, cross-functional teams to facilitate collaboration and knowledge sharing, AI governance, setting frameworks to ensure transparency, accountability and ethics, it may also call for identifying employee ambassadors to call for and champion for AI adoption and provide support. Finally reviewing regular continuous evaluation to measure AI progress and identify areas for improvement while adjusting strategies accordingly.

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