
From Awareness to AI Readiness: Artificial Intelligence Literacy, Gendered Barriers, and Future Opportunities For Women in Higher Education

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Abstract

Artificial intelligence (AI) is becoming embedded in teaching, learning, research, assessment, and employment, making AI literacy an increasingly important component of higher-education readiness. Awareness of AI tools does not necessarily imply the ability to understand their limitations, evaluate outputs, protect privacy, recognise bias, or use AI ethically. Gender adds another layer to this problem because access to digital resources, confidence, patterns of technology use, institutional support and perceptions of risk may not be evenly distributed. This critical integrative review examines the relationship between AI literacy, gender and future readiness among women in higher education. The review synthesises conceptual scholarship on AI literacy, recent evidence on gender differences in higher-education AI engagement, international digital-inclusion data, and policy frameworks concerning AI competencies and responsible educational use. The analysis treats AI literacy as a multidimensional capability comprising AI knowledge, functional use, critical evaluation, ethical judgement, and future-oriented agency. Recent systematic evidence indicates that gender differences in AI engagement exist, while also showing that female students may approach AI more cautiously and express stronger concerns about privacy, dependency, reliability, and critical thinking. Such patterns should not be interpreted automatically as technological deficiency; they may also reflect different risk perceptions and expectations concerning responsible academic use. Global digital-access data further show that the gender digital divide remains present, with women representing 65% of Internet users compared with 70% of men globally in 2024. The review proposes a Women's AI Readiness Framework linking awareness, literacy, critical evaluation, ethical competence, confidence and future participation. The paper argues that

universities should move from tool-oriented AI adoption towards human-centred, gender-responsive AI education that equips women to become informed users, critical evaluators and responsible co-creators of AI-enabled knowledge and professional practices.

Keywords: Artificial Intelligence Literacy, Women, Higher Education, Gender, Generative AI, AI Readiness, Digital Inclusion, Ethics, Employability, India

1. INTRODUCTION

Artificial intelligence has moved rapidly from specialised computing environments into ordinary educational, professional and social practices. Generative AI systems can now produce text, images, code, summaries, translations and other forms of content, while conventional AI applications support recommendation, prediction, classification, automated feedback and data analysis. In higher education, these developments have implications for teaching, research, assessment, academic integrity and graduate employability. The question is therefore no longer whether students will encounter AI, but whether they will possess sufficient knowledge and judgement to engage with it responsibly. AI literacy provides a useful conceptual response to this transformation. Long and Magerko (2020) framed AI literacy as a set of competencies that enables people to understand, use, evaluate and critically engage with AI. Ng et al. (2021), through an exploratory review of 30 peer-reviewed studies, similarly identified four broad dimensions: knowing and understanding AI, using and applying AI, evaluating and creating with AI, and addressing ethical issues. These formulations establish an important distinction between simple exposure to AI tools and deeper literacy.

The distinction is particularly significant in universities. A student may be able to generate an essay with a chatbot without understanding hallucination, training data, bias, privacy, intellectual property, or the limits of automated reasoning. Conversely, a student who uses AI selectively, verifies outputs, and understands its limitations may demonstrate stronger AI literacy even if she uses fewer AI tools. Accordingly, frequency of use should not be treated as a proxy for competence. Gender is relevant because technological participation is shaped by social, educational and economic conditions. The International Telecommunication Union reported that in 2024, 70% of men globally used the Internet compared with 65% of women, leaving 189 million more male Internet users worldwide. The gap varies substantially by region and level of development. Such differences matter because AI literacy is built upon digital access, opportunities to experiment and exposure to learning resources.

Recent higher-education research also indicates that gender differences may appear in AI adoption, confidence, perceived usefulness and concerns. Matobobo's (2026) systematic review analysed 30 studies published between 2020 and 2025 and found that male students generally reported higher frequency of AI use, confidence and behavioural intention, whereas female students more often emphasised ethical use, guided support, privacy, dependency and critical thinking. These findings suggest that gender differences should be examined as differences in patterns of engagement rather than reduced to a simple male-versus-female ability narrative.

This distinction is important for educational policy. If universities respond only by encouraging greater AI adoption, they may overlook the quality of students' engagement. A human-centred approach requires students to understand what AI can and cannot do, recognise uncertainty, protect personal data, evaluate generated content and retain responsibility for academic decisions. UNESCO's AI Competency Framework for Students identifies 12 competencies across four dimensions-human-centred mindset, ethics of AI, AI techniques and applications, and AI system design-and places these competencies across

progression levels of understanding, application and creation. The Indian context makes this discussion especially relevant. National Education Policy 2020 places emphasis on technology-enabled education, digital capabilities, equity and inclusion. However, access to technological opportunity is embedded in wider inequalities. Ahmad et al. (2026), in a recent analysis of Muslim student participation in Indian higher education, highlighted the importance of affordability, institutional support, geography, and educational infrastructure in understanding unequal participation. Although that study does not measure AI literacy, its broader inclusion perspective is useful for interpreting AI readiness as an institutional and social issue rather than an individual skill alone.

Ahmad, Khatoon, and Gardia (2026) have also examined AI through a gender-sensitive educational lens in relation to women's environmental health awareness. Their conceptual analysis is relevant to the present review because it illustrates how AI applications can be connected with gender-responsive educational practice. Used cautiously, this work helps situate AI literacy within a broader agenda of women's educational empowerment rather than treating AI as a purely technical subject. The present article therefore examines AI literacy among women in higher education through an integrative and critical lens. It asks what constitutes meaningful AI literacy, what gendered and institutional barriers may influence it, and how universities can translate AI awareness into responsible future readiness.

2. RESEARCH QUESTIONS

The following research questions for this study-

1. How is AI literacy conceptualized and measured in contemporary higher-education research?
2. What gender-related, digital, socioeconomic, and institutional factors shape women's AI engagement, literacy, and readiness in higher education?
3. How can institutions respond through gender-responsive and ethically grounded approaches?

3. OBJECTIVES OF THE REVIEW

The objectives for this study-

1. To critically examine the conceptual dimensions and core competencies associated with artificial intelligence literacy in higher education.
2. To synthesize existing evidence on women's AI awareness, self-efficacy, engagement, and use of artificial intelligence in higher education.
3. To examine the gendered, digital, socioeconomic, and institutional barriers influencing women's development of AI literacy and readiness in higher education.

4. REVIEW OF LITERATURE

4.1 Conceptualising AI literacy

AI literacy has developed from broader traditions of digital, media, and information literacy. Long and Magerko (2020) proposed a competency-oriented approach that focuses on what individuals should know and be able to do when interacting with AI. Ng et al. (2021) extended this discussion by organising the literature around understanding, application, evaluation/creation and ethics. The significance of the latter two dimensions is increasingly apparent in the era of generative AI, where users can obtain fluent outputs without necessarily understanding their reliability.

4.2 Measurement and assessment

The growth of AI literacy research has created a parallel need for valid measurement. Lintner (2024) systematically reviewed AI literacy scales and identified 22 studies validating 16 instruments across populations including higher-education students, teachers and the general population. The review indicates

that measurement remains heterogeneous, with instruments differing in constructs, dimensions and levels of specificity. For research on women in higher education, this means that comparisons should be made cautiously unless studies use conceptually comparable measures.

4.3 AI in higher education

Systematic reviews of AI in higher education have documented applications in assessment, profiling and prediction, intelligent tutoring, adaptive systems and other educational functions. Zawacki-Richter et al. (2019) observed that much of the literature was driven by technological applications and that pedagogical and ethical perspectives received comparatively less attention. More recent work on generative AI has intensified questions around academic integrity, assessment redesign, critical thinking, authorship and student agency.

4.4 Gender and AI engagement

The gender dimension cannot be inferred from general AI adoption figures alone. Matobobo (2026) synthesised 30 studies and found recurring gender differences in use, confidence and concerns. Female students in the reviewed literature were more likely to express concerns related to privacy, dependence, reliability and critical thinking. This finding complicates a deficit model: caution may sometimes represent stronger attention to risks rather than lower capability. Giraud (2026) similarly argues that female caution in higher education should be interpreted within the context of academic and ethical concerns rather than automatically treated as a problem.

4.5 Digital inequality as a foundation

AI literacy depends partly on prior digital opportunities. ITU (2024) reported a global Internet-use rate of 65% among women and 70% among men. The difference was considerably larger in some lower-income contexts. The implication is not that Internet access determines AI literacy, but that access, affordability, device quality, connectivity and opportunities for experimentation can create enabling or constraining conditions for literacy development.

4.6 Ethics, privacy and academic integrity

Ethical literacy is central to responsible AI use. UNESCO's guidance on generative AI in education and research emphasises human agency, privacy, transparency and responsible use. In universities, ethical AI literacy includes understanding when AI assistance is permissible, acknowledging its use where required, verifying generated information, protecting confidential data and recognising risks of bias or discrimination. These responsibilities are particularly important when students use AI in research, assessment or professional preparation.

4.7 Indian higher-education perspective

India's higher-education system combines rapid digital expansion with substantial differences in access and institutional capacity. NEP 2020 emphasises technology integration alongside equity and inclusion. Recent work by Ahmad et al. (2026) on Muslim participation in higher education shows how affordability, geographical access, infrastructure, and institutional support can affect participation. Such evidence supports an ecological understanding of AI literacy: individual competence is influenced by the learning environment in which that competence is developed.

The framework proposes the pathway AI literacy → AI self-efficacy → perceived usefulness/ease of use → AI readiness, while gendered social, institutional, and structural conditions operate across the pathway. AI readiness is understood as the capacity to use AI purposefully, critically, ethically and

confidently in academic and future professional contexts. A gender-and-technology perspective provides the structural context. Gendered participation in technology can be shaped by unequal access to devices and connectivity, social expectations, institutional culture, mentoring, role models, privacy and safety concerns, and opportunities for experimentation. This perspective prevents gender differences from being reduced to an individual deficit. Lower or more cautious use may reflect different opportunities, constraints, or risk perceptions rather than lower underlying capability.

The third component is the Technology Acceptance Model (Davis, 1989). TAM proposes that perceived usefulness and perceived ease of use shape technology acceptance. In higher education, perceived usefulness may relate to learning, research, academic productivity, and future employability, while perceived ease of use concerns the effort required to learn and apply AI systems. These perceptions should be interpreted alongside competence and institutional conditions rather than treated as isolated psychological variables. The second component is Social Cognitive Theory (Bandura, 1986), particularly self-efficacy. AI self-efficacy refers to confidence in learning, using, and adapting to AI-enabled technologies. Personal beliefs, behaviour and environmental conditions interact in this perspective. Training opportunities, previous digital experience, peer support, feedback and institutional encouragement can therefore influence whether women develop confidence in using AI. Self-efficacy is consequently positioned as an important pathway between literacy and readiness.

The first component is the digital competence perspective. AI literacy is understood as a multidimensional capability involving knowledge and understanding, functional use, critical evaluation, ethical judgement, and responsible engagement. This follows the competency-oriented work of Long and Magerko (2020) and the four-dimensional formulation proposed by Ng et al. (2021). Awareness of an AI tool does not, by itself, establish competence. A learner may recognise a generative-AI platform yet remain unable to assess the reliability of its output, identify bias, protect personal information or determine whether its use is academically appropriate. The present review draws on complementary theoretical perspectives to explain how women in higher education may move from awareness of artificial intelligence to meaningful AI readiness. Rather than treating AI readiness as a simple outcome of technology exposure, the framework connects AI literacy, self-efficacy, technology acceptance, and the wider gendered social and institutional environment. The model distinguishes what students know about AI from what they can do with it, how confidently they engage with it, how they judge its usefulness and ease of use, and the conditions that enable or constrain participation.

Table 1. Synthesis of Key Evidence

Source	Evidence base/contribution	Relevance to present review
Long & Magerko (2020)	Developed a competency-oriented conceptualization of AI literacy.	Establishes the competency foundation.
Ng et al. (2021)	Reviewed 30 peer-reviewed studies and proposed four AI-literacy dimensions.	Supports the multidimensional model.
Zawacki-Richter et al. (2019)	Systematic review of AI applications in higher education.	Provides higher-education context and highlights pedagogical considerations.

Lintner (2024)	Systematic review identified 22 studies validating 16 AI-literacy scales.	Shows measurement diversity and the need for careful instrument selection.
UNESCO (2024)	Framework with 12 competencies across four dimensions and three progression levels.	Provides a policy benchmark for responsible AI competence.
Matobobo (2026)	Systematic review of 30 studies on gender differences in higher-education AI use.	Direct evidence for gendered patterns of engagement.
Giraud (2026)	Analyses female caution in higher education AI use.	Supports interpreting caution beyond a deficit model.
ITU (2024)	Global and regional Internet-use data by sex.	Provides contextual evidence about the digital foundation of AI participation.
Ahmad, Khatoon, & Gardia (2026)	Gender-sensitive conceptual application of AI in women's environmental health education.	Provides an Indian gender-responsive educational perspective.
Ahmad, Ayat, & Gardia (2026)	Analyses inequalities in Muslim student participation in Indian higher education.	Supports an ecological inclusion perspective.

5. THEORETICAL FRAMEWORK

The study conceptualizes AI readiness among women in higher education as a developmental process rather than a single technology-use behaviour. The proposed framework integrates AI-literacy scholarship with Social Cognitive Theory, the Technology Acceptance Model and a techno feminist perspective. The combination is deliberately complementary: AI-literacy research specifies the competencies to be developed; Social Cognitive Theory explains the role of self-efficacy and environmental learning; TAM explains perceptions that shape technology acceptance; and techno feminism places these processes within gendered social and institutional relations.

5.1. AI literacy as the capability foundation

The competency foundation comes from Long and Magerko (2020) and Ng et al. (2021). In this framework, AI literacy encompasses foundational knowledge, functional use, critical evaluation, and ethical judgement. UNESCO's AI Competency Framework for Students further supports a progression from understanding to application and creation, while emphasizing human-centred and ethical engagement (Miao et al., 2024). This means that awareness is treated as an entry condition rather than the endpoint of AI readiness.

5.2. Social Cognitive Theory: self-efficacy and learning environment

Social Cognitive Theory emphasizes reciprocal relationships among personal factors, behaviour, and environment (Bandura, 1986). Applied to AI learning, self-efficacy represents confidence in learning, experimenting with, and adapting to AI tools. Training opportunities, successful prior experiences, peer learning, mentoring and institutional encouragement may strengthen self-efficacy. Conversely, limited

practice opportunities, fear of making mistakes, or an unsupportive environment may weaken confidence. Self-efficacy therefore provides a plausible mechanism through which AI literacy can become readiness for purposeful use.

5.3 Technology Acceptance Model: usefulness and ease of use

The Technology Acceptance Model proposes perceived usefulness and perceived ease of use as central determinants of technology acceptance (Davis, 1989). In the context of higher education, women who perceive AI as useful for learning, research, productivity, or future employment may be more willing to integrate it into their academic practices. Perceived difficulty, uncertainty, or low relevance may reduce intention to engage. TAM is used here as a behavioural-acceptance component rather than as a complete explanation of gendered AI participation.

5.4 Techno feminist perspective: gendered conditions of technology use

The techno feminist perspective adds the social and structural dimension. Wajcman (2004, 2007) argues against treating technology as independent of gender relations and emphasizes the mutual shaping of technology and social life. Applied to AI readiness, this perspective directs attention to gender norms, unequal access to resources, institutional cultures, mentoring, role models, safety and privacy concerns, and the distribution of opportunities to experiment with technology. It also discourages a deficit interpretation in which lower reported use is automatically equated with lower capability.

5.5 Integrated Women's AI Readiness Model

The integrated model proposes the following pathway: AI awareness → AI literacy → AI self-efficacy → perceived usefulness and perceived ease of use → AI readiness → meaningful academic and future professional participation. Gendered social and institutional conditions operate across the pathway, while access, training, mentoring and institutional support can enable progression. The model does not assume that every relationship is linear or that all women will follow the same trajectory. Rather, it provides an organizing framework for examining how capability, confidence, acceptance and context interact.

The model also distinguishes four concepts that are often conflated. Access concerns whether a learner can reach and use the technology. Adoption concerns whether the learner chooses to use it. Literacy concerns whether the learner can understand, evaluate, and use AI responsibly. Readiness concerns whether these capabilities and judgements support meaningful participation in academic and future professional settings.

AI Awareness	→	AI Literacy	→	AI Self-Efficacy	→	AI Readiness
	↑	Foundational knowledge + use + evaluation + ethics	↑	Training + prior experience + peer/institutional support	↑	Academic, research, employability and lifelong-learning agency
Gendered social & institutional conditions		access norms mentoring role models privacy safety affordability		institutional culture disciplinary context language connectivity		future opportunities

Figure 1. Integrated theoretical model of women's AI readiness.

Conceptual representation prepared from Long and Magerko (2020), Ng et al. (2021), Bandura (1986), Davis (1989), Wajcman (2004, 2007), and Miao et al. (2024).

5.6 Theoretical propositions for future empirical testing

1. AI literacy is expected to be positively associated with AI self-efficacy.
2. AI self-efficacy is expected to be positively associated with AI readiness.
3. Perceived usefulness and perceived ease of use are expected to be positively associated with AI readiness.
4. Training, mentoring, and institutional support are expected to strengthen the relationship between AI literacy and readiness.
5. Gendered structural conditions are expected to shape access to opportunities for developing and applying AI literacy.
6. Ethical and critical literacy should be treated as dimensions of readiness rather than as constraints that necessarily reduce AI engagement.

6. METHODOLOGY

This article adopts a critical integrative review design. The purpose is to synthesise conceptual, empirical and policy literature rather than estimate a pooled effect size. PRISMA 2020 principles are used to improve transparency in describing the review question, information sources, eligibility logic and synthesis approach. Because the present manuscript is prepared as a critical integrative review rather than a registered systematic review with a completed database audit, no fabricated screening totals are reported.

6.1 Information sources and search strategy

The literature search was designed around Scopus-indexed and internationally recognised scholarly sources, supplemented by Web of Science, ERIC, ScienceDirect, SpringerLink, ACM/IEEE literature where relevant, and authoritative institutional publications from UNESCO and ITU. Search concepts included combinations of: “artificial intelligence literacy,” “AI literacy,” “generative AI,” “AI competence,” “women,” “female students,” “gender,” “higher education,” “university students,” “AI readiness,” “ethics,” and “digital divide.” Priority was given to peer-reviewed research published from 2020 to 2026, while seminal earlier work was retained where it established foundational concepts.

6.2 Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Peer-reviewed empirical, review or conceptual research relevant to AI literacy or AI engagement	Purely technical AI papers with no educational or human-literacy dimension
Higher education or findings transferable to higher education	Studies unrelated to students, education or educational technology
Gender- or women-related evidence where relevant	Promotional, commercial or non-scholarly material
Authoritative policy/framework documents from UNESCO, ITU and similar organisations	Duplicate records or sources lacking sufficient bibliographic information

English-language sources with identifiable authors, publication details and/or DOI	Unverifiable references
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Table 2. Inclusion and exclusion criteria

6.3 Synthesis approach

Evidence was organized thematically under six analytical domains: conceptual understanding, functional use, critical evaluation, ethical competence, gendered conditions of engagement, and future readiness. The synthesis distinguishes documented findings from interpretation. Particular care was taken not to equate lower frequency of AI use with lower literacy, because responsible engagement can involve selective use and stronger scrutiny.

7. FINDINGS AND CRITICAL SYNTHESIS

7.1 AI awareness is necessary but insufficient

The literature consistently supports a distinction between awareness and literacy. Awareness may involve recognising AI tools, knowing their names or encountering them in academic work. Literacy requires a deeper capacity to understand how AI systems operate at an appropriate level, select tools for particular purposes, interpret outputs, detect limitations and make responsible decisions. The four-dimensional model advanced by Ng et al. (2021) is especially useful because it connects knowledge and use with evaluation and ethics.

7.2 Functional competence must be accompanied by critical evaluation

Generative AI changes the nature of functional competence. Students can interact with sophisticated systems without learning technical programming. Consequently, AI literacy should not be restricted to coding or model development. For most university students, functional competence may include effective prompting, task selection, iterative interaction, source verification, data protection and documentation of AI assistance. Critical competence requires students to ask whether an output is accurate, sufficiently evidenced, biased, contextually appropriate and academically acceptable.

7.3 Gender differences are multidimensional

The recent evidence does not support a simple interpretation in which women are uniformly less capable with AI. Matobobo’s (2026) review identifies differences in frequency, confidence, behavioural intention and concerns, but these differences coexist with stronger emphasis among female students on ethical use, reliability and critical thinking. This suggests that gender-responsive AI education should address confidence and skills without suppressing legitimate caution.

7.4 Digital inequality remains an upstream condition

Internet connectivity is an enabling condition for AI participation, although it is not equivalent to AI literacy. ITU data show that the global gender gap in Internet use remains measurable. The gap is especially relevant in contexts where students depend on shared devices, mobile-only access, unstable connectivity or costly data. Universities that assume universal access to AI tools may inadvertently widen inequalities.

7.5 Institutional support can convert awareness into readiness

AI literacy is more likely to become durable when institutions integrate it into curriculum, library instruction, research methods, assessment guidance and career preparation. A one-time workshop on generative AI is unlikely to develop the full range of competencies described by UNESCO. Students

require repeated opportunities to compare AI outputs with authoritative sources, examine bias, practise ethical decision-making and reflect on how AI changes disciplinary work.

7.6 Ethical literacy is central to women's AI readiness

Ethical AI literacy includes privacy, consent, intellectual property, authorship, academic integrity, bias and accountability. Women's AI education should therefore not be framed solely as a programme for increasing adoption. A more appropriate objective is to build informed agency: students should be able to decide when to use AI, when not to use it, how to verify it and how to communicate their use transparently.

8. Data and Graphical Evidence

Figure 1 uses International Telecommunication Union (ITU) 2024 data. It compares the percentage of women and men using the Internet across selected regions. These figures provide contextual evidence of the digital conditions that precede AI participation; they are not direct measures of AI literacy.

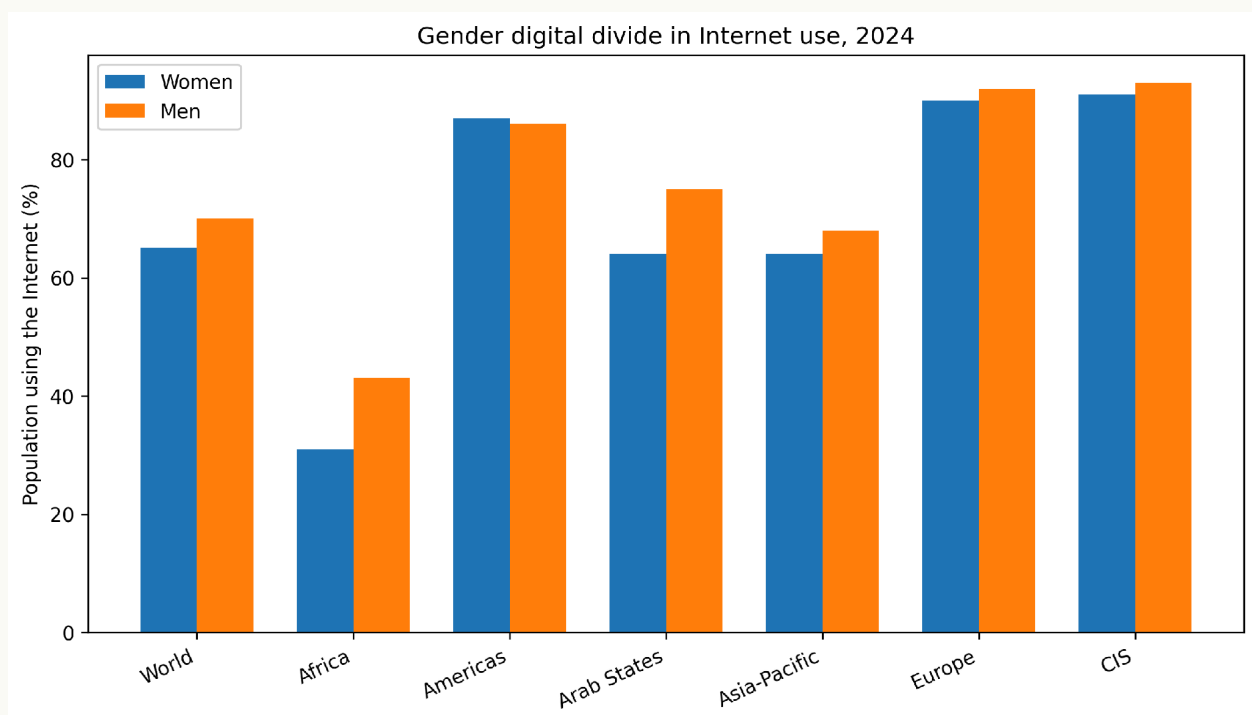


Figure 2. Gender differences in Internet use, 2024. Source: ITU (2024).

Region	Women using the Internet (%)	Men using the Internet (%)	Difference (percentage points)
World	65	70	5
Africa	31	43	12
Americas	87	86	-1
Arab States	64	75	11
Asia-Pacific	64	68	4
Europe	90	92	2
CIS	91	93	2

Table 2. Source data for Figure 2. Source: ITU (2024).

The global difference is five percentage points. The regional pattern is uneven: The Americas show near parity, and some regions have larger gaps. These differences demonstrate why AI-literacy interventions should be accompanied by attention to infrastructure, affordability and meaningful digital access.

9. PROPOSED WOMEN'S AI READINESS FRAMEWORK (WAIRF)

Based on the synthesis, the paper proposes a Women's AI Readiness Framework (WAIRF). The framework treats readiness as a developmental sequence rather than a single skill. The sequence is: awareness → foundational literacy → functional competence → critical evaluation → ethical agency → future readiness. Each stage is influenced by access, confidence, institutional support and disciplinary context.

Stage	Core capability	Indicative university practice
1. Awareness	Recognise AI systems, applications and basic terminology.	Orientation sessions and introductory AI literacy modules.
2. Foundational literacy	Understand basic concepts, capabilities and limitations.	Curriculum-integrated AI fundamentals.
3. Functional competence	Use AI tools for appropriate academic and research tasks.	Guided practice, prompting and verification activities.
4. Critical literacy	Evaluate accuracy, bias, evidence, reliability and limitations.	Source-checking, comparative analysis and reflective assignments.
5. Ethical agency	Make responsible decisions about privacy, integrity, authorship and disclosure.	AI-use policies, ethics cases and research-methods instruction.
6. Future readiness	Apply AI literacy to employability, research, entrepreneurship and lifelong learning.	Career modules, interdisciplinary projects and innovation opportunities.

Table 3. Proposed Women's AI Readiness Framework (WAIRF)

10. DISCUSSION

The synthesis suggests that the central educational problem is not simply a gender gap in AI use. It is a potential mismatch between rapid technological diffusion and uneven development of the competencies required to use AI responsibly. Universities therefore need to distinguish access, adoption and literacy. Access concerns whether students can reach the technology; adoption concerns whether they use it; literacy concerns whether they understand, evaluate and govern that use; and readiness concerns whether these capabilities translate into meaningful future participation. The gender evidence reinforces this distinction. If female students report greater concerns about privacy, dependence or reliability, those concerns should become objects of educational dialogue rather than barriers to be dismissed. At the same time, institutions should ensure that caution does not become an exclusion from opportunities to experiment, research and develop technical confidence. Gender-responsive AI education should therefore combine opportunity with criticality.

The Indian context requires particular attention to structural conditions. Students do not enter university with identical devices, connectivity, prior digital experiences, language resources or financial capacity. AI systems may also perform differently across languages and cultural contexts. Universities serving socially and economically diverse populations should therefore provide institutional access rather than assuming that students can purchase premium tools independently. The literature also points to the importance of curriculum integration. AI literacy should not be confined to computer science. Students in education, social sciences, humanities, health sciences, commerce and other disciplines encounter AI in different forms. A future teacher needs to understand AI-generated content and assessment implications; a researcher needs to evaluate AI-supported analysis and citations; a health student needs to understand privacy and reliability; and a humanities student needs to examine authorship, interpretation and cultural bias.

AI readiness should be connected with agency. The objective of higher education is not to produce students who follow automated recommendations without question. The more valuable outcome is a learner who can use AI while retaining responsibility for judgement. This aligns with UNESCO's human-centred approach and provides a stronger basis for women's participation in an AI-enabled knowledge economy.

11. IMPLICATIONS FOR HIGHER-EDUCATION INSTITUTIONS

1. Develop institution-wide AI-literacy programmes that move beyond tool demonstrations to understanding, evaluation and ethics.
2. Provide gender-responsive training that strengthens confidence while respecting legitimate concerns about privacy, reliability and academic integrity.
3. Integrate AI literacy into research methods, information literacy, academic writing and disciplinary courses rather than treating it as an isolated workshop.
4. Create equitable access to devices, connectivity, institutional AI platforms and human support, particularly for students facing economic or infrastructural constraints.
5. Develop transparent AI-use policies that distinguish acceptable assistance from unacceptable substitution of student work.
6. Teach verification practices, including source checking, cross-validation, citation checking, and recognition of fabricated or unsupported claims.
7. Include AI-related employability and entrepreneurship activities so that women can develop future-oriented capabilities rather than only academic tool use.

12. LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

This review has several limitations. AI literacy is a rapidly changing construct, and new generative-AI tools may alter the relevance of particular competencies. Gender categories in existing studies are often binary, limiting understanding of more complex gender identities and intersectional experiences. Evidence on women in higher education is geographically uneven, with a substantial proportion of published work originating from technologically advanced contexts. Differences in measurement instruments make direct comparison difficult. This article is a critical integrative review and does not report a pooled meta-analytic effect. Future empirical research should validate gender-responsive AI-literacy instruments, examine longitudinal changes in confidence and competence, and investigate how socioeconomic status, discipline, language, institution type, and geographic location interact with gender.

13. CONCLUSION

AI literacy is becoming an important component of higher-education participation, but meaningful literacy cannot be reduced to awareness or frequency of tool use. For women students, readiness involves a combination of knowledge, functional competence, critical evaluation, ethical judgement, confidence and access to supportive institutional environments. Current evidence indicates gender differences in patterns of AI engagement, while also suggesting that female students may express distinctive concerns about privacy, dependency, reliability and critical thinking. These differences should be understood rather than translated into deficit assumptions.

Declarations

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Conflict of interest: The author declares no conflict of interest.

Data availability: This article synthesises published and publicly available secondary sources; no primary participant dataset was generated.

Ethics statement: Ethical approval was not required because the article uses publicly available secondary literature and institutional reports.

AI-use statement: The authors declare that Grammarly and Consensus AI were used during the preparation of this manuscript. Grammarly was used for language editing and improving the clarity and readability of the manuscript. Consensus AI was used to assist with literature discovery and organization of relevant scholarly sources. These tools were used to support language refinement and literature organization; the author remains responsible for the interpretation, analysis, and final content of the manuscript.

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