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Artificial Intelligence in Early Childhood Education in India: A Review of Teacher Digital Literacy, Professional Experience and Readiness for AI-Supported Practice

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Abstract

Artificial intelligence (AI) is creating new possibilities for teachers to prepare learning materials, plan activities and access professional support. In early childhood education (ECE), however, its use requires care because young children learn through play, exploration, communication and relationships. Teachers need more than basic digital skills to decide when AI is useful and appropriate. This narrative review explores how digital literacy, professional experience, institutional support and ethical awareness relate to teachers' readiness to use AI in Indian ECE. The literature suggests that AI readiness involves understanding technology, evaluating AI-generated content, making sound pedagogical decisions and protecting children's privacy. Professional experience may help teachers judge what is suitable for young children, but years of teaching alone cannot determine readiness to use AI. Language diversity, cultural relevance, unequal access to technology and limited training also affect adoption. The literature reviewed offers useful insights into digital competence and AI literacy, but provides limited direct evidence about AI readiness among Indian preschool teachers. Further, empirical research is needed across different ECE settings to understand teachers' needs and develop contextually relevant training.

Keywords: Artificial intelligence, early childhood education, teacher digital literacy, AI readiness, professional experience, India, teacher education.

Introduction

Artificial intelligence is becoming more visible in education. Generative AI tools can help teachers prepare stories, worksheets, visual aids, activity ideas and lesson plans. They may also help adapt resources for different learning needs. However, access to these tools does not automatically mean teachers can use them effectively.

In early childhood education (ECE), learning takes place through play, exploration, language, movement and interaction with adults and other children. Teachers must judge whether a resource is developmentally appropriate, culturally relevant and suitable for the children they teach. AI should therefore support, rather than replace, professional judgement and meaningful human interaction.

Su and Yang (2022) reviewed research on AI in ECE, while Su *et al.* (2023) explored AI literacy education for young children. These studies offer a useful starting point, but they do not establish how ready Indian preschool teachers are to use AI in everyday practice.

India's ECE settings include Anganwadis, private preschools, Balvatikas and school-based Foundational Stage programmes. Teachers' qualifications, teaching experience, access to devices, training opportunities and institutional support can differ considerably across these settings. This review considers the relationship between teacher digital literacy, professional experience and readiness to use AI, alongside the cultural, infrastructural and ethical issues that may influence adoption.

Review Methodology

The literature reviewed for this article includes published work in the area of artificial intelligence (AI) in education, early childhood education (ECE), teacher digital competence and AI literacy, studies conducted with Indian teachers and policy documents related to these areas. The literature was reviewed to explore how prepared teachers are to incorporate AI into their teaching practices in early childhood environments. The review focused on teachers' digital skills, years of professional experience, and their readiness to implement AI-based approaches to teaching. Studies involving school teachers and pre-service teachers were also reviewed to gain a broader understanding of teachers' readiness to integrate AI into their classrooms, since research specifically addressing AI integration in early childhood classrooms remains limited. As a narrative review, the paper brings together available literature on the topic but does not

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aim to provide an exhaustive systematic search or a formal assessment of the quality of each study included.

AI in Early Childhood Education

AI may help teachers generate ideas for stories, rhymes, games, thematic activities and questions that encourage children to explore and communicate. It can also support lesson planning, the adaptation of learning materials and the preparation of inclusive resources. For example, a teacher planning an activity about animals might use AI to suggest a story, vocabulary and discussion questions. The teacher must still check the accuracy, language, cultural relevance and suitability of the suggestions.

Su and Yang (2022) identified a range of AI tools and potential learning outcomes in ECE, while noting the need for further research into classroom use and impact. Su *et al*. (2023) also highlighted opportunities and challenges in AI literacy education for young children. Together, these reviews suggest that AI may be a useful resource, but its value depends on how thoughtfully it is selected and used.

Young children need hands-on exploration, movement, creativity, questioning and social interaction. AI-generated resources should enrich these experiences rather than replace them.

The Indian Early Childhood Education Context

The National Education Policy 2020 gives importance to the Foundational Stage, and the National Curriculum Framework for the Foundational Stage promotes developmentally appropriate, play-based and activity-oriented learning for children aged three to eight (Ministry of Education, 2020; NCERT, 2022). AI use should align with these priorities and should not encourage unnecessary screen time or reduce interaction with teachers, peers and materials.

India's ECE settings vary in teacher preparation, technology access and professional development. Language and cultural diversity also matter: resources may include unfamiliar examples, stereotypes or language that does not reflect children's everyday experiences. Mathew *et al*. (2026), in a study of 123 Anganwadi and private preschool teachers, examined beliefs and practices relating to emergent literacy. Although relevant to the broader ECE context, the study did not directly assess AI readiness.

These differences suggest that AI training should reflect the setting in which teachers work rather than follow a single approach for all institutions.

Teacher Digital Literacy and AI Readiness

The ability to locate, comprehend, analyze, and apply digital data and resources is called digital literacy. In addition to developing the aforementioned abilities in teachers, AI literacy enables teachers to recognize what AI can and cannot accomplish as well as evaluate the reliability of AI-produced data. Even though a teacher has experience utilizing presentations, video resources on the internet, and digital communications, he/she might struggle to identify inaccurate, biased or culturally unacceptable AI-generated materials.

A teacher's ability (knowledge, skills, confidence, and professional judgment) to use AI tools responsibly and effectively in her teaching. AI Readiness is more than just using the tool, it is about understanding what the tool can do, what it cannot do, and making an assessment based on those understandings of whether the tool can be used to help children learn and develop.

The AI Competency Framework for Teachers developed by UNESCO focuses on five main components that are Human-Centered Mindset, Ethics, AI Foundations and Applications, AI Pedagogy, and Professional Learning (Miao & Cukurova, 2024). In addition, the framework defines three stages of progression for teachers: Acquire, Deepen and Create.

AI readiness for early childhood educators includes knowing what AI tools can do and cannot do; developing or modifying age appropriate educational materials; evaluating AI developed material for correctness, bias, and cultural relevance; evaluating when AI would help them teach and when it would not, protecting children's privacy and personal data, evaluating if AI supported activities replace play, discovery, and interactions between people and evaluating if AI really helps children learn and grow.

AI readiness should not be assessed only by how often teachers use these tools, but also by whether they make informed decisions about their use. For instance, if a teacher decides not to utilize a particular AI tool because the tool will not meet the needs of the children, nor will it contribute to the children's learning and/or development, then that teacher has made a reasonable professional decision.

Professional Experience and AI Adoption

Professional experience can help teachers understand children's developmental needs, classroom routines and family expectations. This knowledge may support their judgement when evaluating AI-generated activities and resources. However, experience does not necessarily bring confidence with new technology. Teachers who have had limited access to digital tools may need additional guidance, while digitally confident teachers still need support to identify inaccuracies, bias and ethical concerns.

Years of teaching should therefore be considered alongside digital experience, confidence, attitudes towards technology, workload, institutional expectations and access to technical support.

Technology acceptance models can help explain these influences. The Unified Theory of Acceptance and Use of Technology highlights performance expectations, effort expectations, social influence and facilitating conditions (Venkatesh *et al*., 2003). The Technology Acceptance Model 3 also considers factors related to perceived usefulness and ease of use (Venkatesh & Bala, 2008). These models may help explain whether teachers are willing to try AI, but they need to be considered alongside the specific pedagogical and ethical responsibilities of ECE.

Teacher Training and Institutional Support

Effective AI integration involves more than access to software or a brief demonstration. Teachers need opportunities to practise, evaluate AI-generated material, identify limitations and reflect on whether its use supports children's learning. UNESCO's framework offers a basis for professional development that progresses from understanding AI to evaluating its outputs and designing AI-supported teaching practices (Miao & Cukurova, 2024).

Training should relate directly to teachers' daily work. Activities might include creating a story, adapting it to local language and culture, checking its accuracy and deciding whether it is appropriate for a particular age group. Teachers should also learn to identify errors, stereotypes and unsuitable content.

Indian studies offer useful but indirect context. Sheikh and Nath (2026) examined digital technology training and digital competence among preservice teachers, while Shankar *et al*.

(2025) explored high school teachers' views on generative AI in technology-enhanced learning. Neither study directly establishes the AI readiness of Indian preschool teachers.

Institutions also have a role in providing credible resources, clear guidance, technical support and opportunities for teachers to share experiences. Training should be realistic, continuous and responsive to teachers' workloads.

Cultural, Linguistic and Ethical Considerations

Children's learning is closely connected with family life, language, stories and local culture. AI-generated resources may not reflect this diversity and may include unfamiliar examples or stereotypes. Teachers should review and adapt stories, illustrations, translations and activities before using them. AI may help prepare multilingual resources, but translations and explanations still require careful checking.

Children also need particular protection because AI tools may process names, photographs, voices, videos and developmental information. Teachers should not upload identifiable or sensitive child data without appropriate authorization and safeguards. Institutions need clear rules on approved tools, data use, parental consent and accountability.

AI-generated information may be inaccurate, biased or unsuitable for a child's developmental stage. A fluent response is not necessarily a reliable one. UNICEF's Guidance on AI and Children highlights safety, privacy, fairness, transparency, inclusion and children's best interests (UNICEF, 2025). These principles are relevant even when teachers use AI only to prepare resources rather than allowing children to interact directly with it.

Infrastructure and the Digital Divide

Access to AI is shaped by more than the availability of a device. Internet connectivity, electricity, technical support, language preferences, confidence and opportunities to practise can all affect use. A teacher may own a smartphone but still lack the time, training or reliable connectivity needed to use AI for professional purposes.

Institutions should provide accessible training, guided practice, peer support, suitable resources and clear guidelines. AI should not add unreasonable work or become a measure of teacher quality. Teachers across different ECE settings need fair opportunities to develop relevant skills.

Research Gap

A review of the literature on this topic indicates there are very few studies examining how ready Indian preschool teachers are to use AI technology, especially when considering their level of digital literacy and the number of years they have been employed as a teacher. While some studies have focused on teachers' digital competencies and readiness to use AI in schools, it remains unclear if the results of such studies would represent the needs and experiences of those teachers who educate young children.

The relationship between preschool teachers' digital skill levels, professional experience, and confidence in the use of Artificial Intelligence (AI) in education, as well as their capacity to assess AI-produced instructional materials, and their readiness to include AI as an instructional tool should be examined. Additionally, the impact of digital training programs and institutional support on preschool teachers' willingness and ability to implement AI in their classrooms should be explored. Examining these areas may assist in clarifying how ready Indian preschool teachers are to effectively utilize AI within the context of supporting the learning and developmental needs of young children

Implications for Teacher Education and Future Research

Teacher education should include AI literacy alongside digital competence. Pre-service and in-service teachers need to understand AI's capabilities and limitations, verify generated material, protect children's data and make developmentally appropriate decisions. Training should be practical and linked to everyday classroom tasks.

For example, teachers could use AI to draft a story, check its accuracy, adapt it to children's language and culture, and consider whether it encourages participation and interaction. Comparing AI-generated activities with teacher-created activities may also help teachers reflect on the strengths and limitations of each approach.

Future research could develop and test an AI-readiness model designed for Indian ECE. It could examine AI knowledge, digital skills, pedagogical judgement, ethical awareness, confidence, professional experience, training and institutional support. Mixed-methods studies could combine surveys with interviews, observations and practical assessments. Longer-term studies could investigate whether professional development improves teachers' ability to evaluate content, protect data and use AI appropriately, as well as its effects on workload.

Conclusion

AI can help early childhood teachers plan activities, develop resources and explore different teaching approaches. Its value, however, depends on careful selection, evaluation and use. In ECE, technology must support children's developmental needs and preserve play, exploration, communication and relationships.

Digital literacy is an important starting point, but AI readiness also requires an understanding of AI's limitations, ethical awareness, the ability to evaluate content and sound professional judgement. Teaching experience may help teachers assess what is appropriate, but it cannot replace targeted training and institutional support.

India's varied ECE settings, languages, resources and training opportunities make context-sensitive research essential. More empirical studies are needed to understand teachers' readiness and support their professional development. Ultimately, AI should strengthen teachers' work and knowledge, not replace the human connections through which young children learn and develop.

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