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ARTIFICIAL INTELLIGENCE LITERACY AMONG SCHOOL TEACHERS IN MAHARASHTRA: MAPPING AWARENESS, READINESS, AND PROFESSIONAL DEVELOPMENT NEEDS

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ABSTRACT

Artificial Intelligence is steadily entering Indian classrooms, yet the preparedness of school teachers to understand and use these tools remains uneven across states. This paper examines AI literacy among school teachers in Maharashtra, focusing on three interlinked dimensions: awareness of AI concepts, readiness to adopt AI based practices, and the professional development needs required to close existing gaps. Drawing on the theoretical foundations of the National Education Policy 2020 and recent Indian empirical studies on teacher AI literacy, the paper argues that awareness alone does not translate into classroom readiness unless supported by adequate infrastructure, institutional encouragement, and structured training. A conceptual framework linking these three dimensions is proposed, along with a phased continuous professional development pathway suited to Maharashtra's diverse school system. The paper concludes that a sustained, teacher centred approach to AI capacity building is essential for equitable and meaningful technology integration in schools across the state.

KEYWORDS: ***Keywords not detected.***

Artificial Intelligence Literacy, School Teachers, Maharashtra, Professional Development, NEP 2020, Digital Readiness, Educational Technology

INTRODUCTION

India's school education system is undergoing a significant technological shift, and Artificial Intelligence has moved from being a distant concept to a practical classroom concern. The National Education Policy 2020 places strong emphasis on the use of technology to make learning more personalised, inclusive, and future ready, and it explicitly calls for teachers to be equipped with digital and emerging technology skills. Maharashtra, as one of India's largest and most diverse states in terms of school infrastructure, offers an important setting to study this transition. The state has a mix of well resourced urban schools, semi urban zilla parishad schools, and remote tribal belt institutions, all of which experience the arrival of AI tools in very different ways. Teachers are central to this transition because no policy document, however well written, can shape classroom practice unless the teacher understands the tool, trusts it, and knows how to use it responsibly. This paper therefore looks closely at three connected ideas, namely awareness, readiness, and professional development needs, and argues that these three together form the backbone of AI literacy among Maharashtra's school teachers.

The discussion is theoretical in nature and draws upon recent Indian research to build a conceptual understanding rather than presenting new field data.

Conceptualising AI Literacy: Dimensions and Theoretical Anchors

AI literacy for teachers cannot be reduced to knowing how to operate a chatbot or a grading tool. Ng and colleagues describe AI literacy as a layered competence that includes knowing what AI is, being able to use AI tools meaningfully, evaluating AI outputs critically, and understanding the ethical questions that AI raises. This layered view is useful for the Indian context because it separates surface level familiarity from deeper professional competence. A teacher in Maharashtra may have used a translation app or an automated worksheet generator, yet this does not automatically mean the teacher understands how such tools process data or where their limitations lie. Recent qualitative research on Indian school teachers found that understanding of AI often remains superficial and tool centred, with very limited hands on exposure, a pattern that is more visible in rural and government schools where structured exposure to technology is rare. Building on this, the present paper organises AI literacy into three connected dimensions for the Maharashtra context: awareness, which is conceptual and ethical understanding; readiness, which covers attitude, confidence, and access to infrastructure; and professional development needs, which covers the structured training required to move from awareness to confident classroom use. The diagram below sets out this conceptual framework and the elements that feed into each dimension.

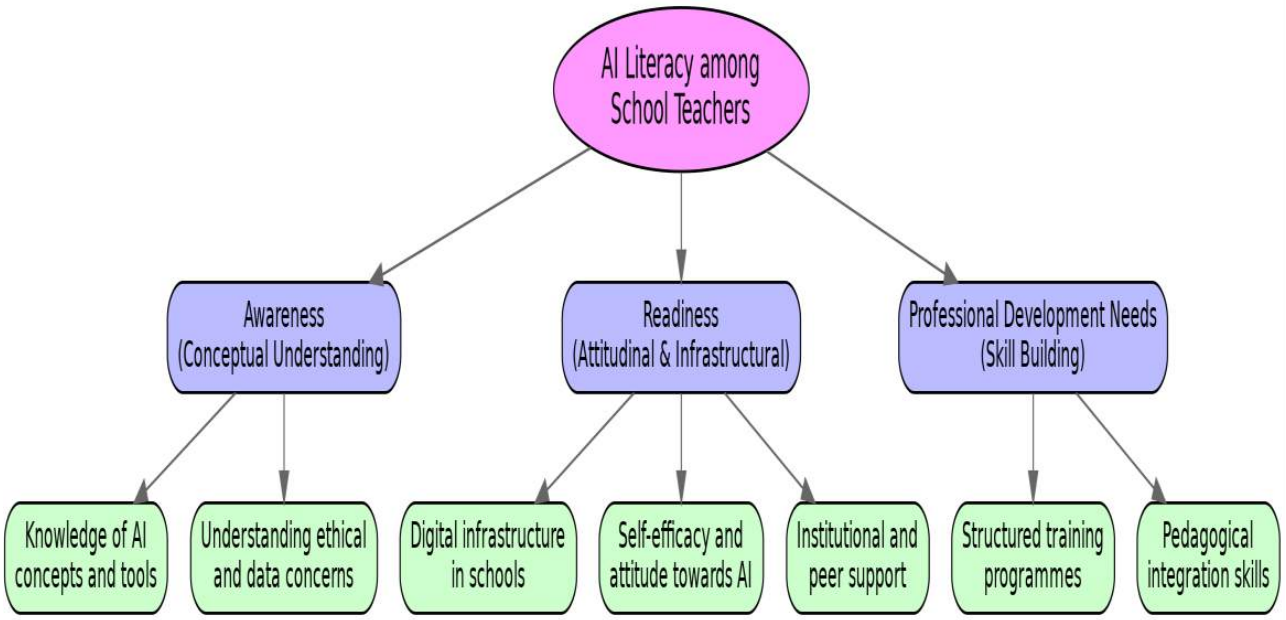

Figure 1. Conceptual framework of AI literacy among school teachers, showing the three interlinked dimensions of awareness, readiness, and professional development needs.

Awareness and Readiness among Maharashtra's School Teachers

Awareness and readiness are related but distinct ideas, and conflating them can lead to weak policy design. A teacher may be aware that AI tools exist and may even hold a generally positive attitude towards them, while still lacking the confidence or infrastructure needed to use these tools in an actual classroom. Studies conducted in Indian metropolitan schools, including one based on interviews with teachers in Delhi, found that educators simultaneously value AI for improving learning and administrative efficiency, while expressing genuine concern about students becoming overly dependent on these tools and losing critical thinking ability. This dual reaction, part enthusiasm and part caution, is likely to be present among Maharashtra's teachers as well, particularly those working in city schools with reasonable internet access. However, readiness is shaped by more than attitude alone. A large scale survey of Indian schools found that many teachers still struggle with basic digital pedagogy skills and lack access to grade appropriate digital content, which naturally limits how far AI adoption can proceed even where interest exists. A state level digital schools survey conducted across Maharashtra's government schools similarly found wide variation in digital infrastructure and teacher digital skill between urban, rural, and tribal regions, a divide that will directly shape how AI literacy develops unevenly across the state. Readiness, therefore, should be understood as an outcome of several converging factors rather than a single attitude, and these factors are represented in the model below.

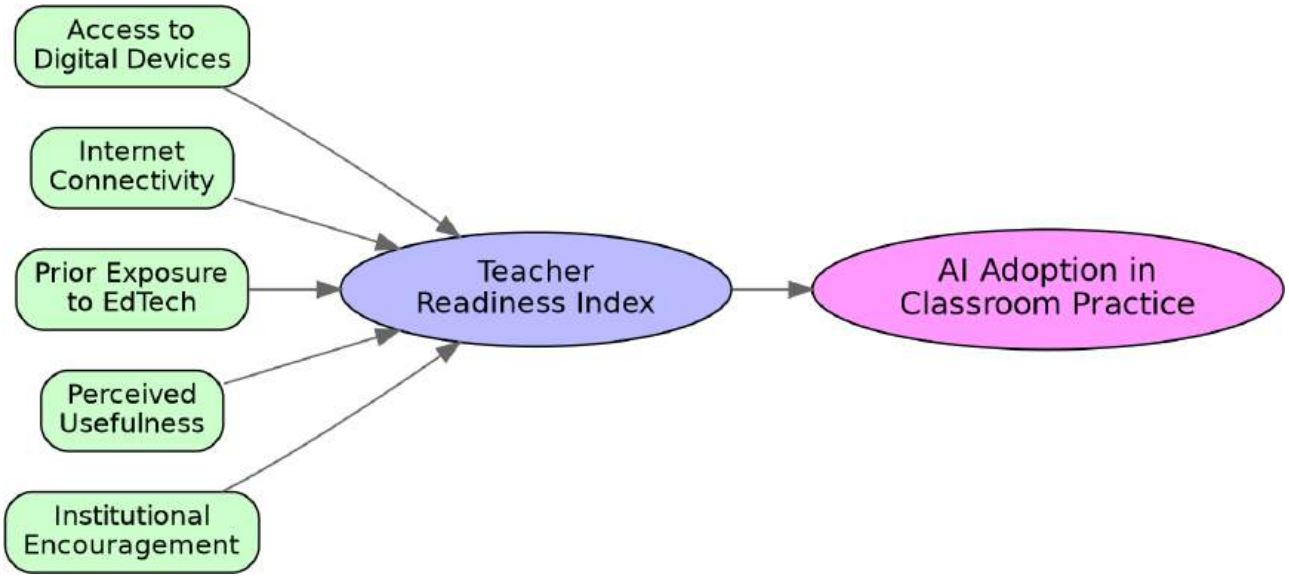

Figure 2. Model of factors contributing to teacher readiness and its influence on classroom adoption of AI tools.

Professional Development Needs and a Proposed CPD Pathway

If awareness explains what teachers know and readiness explains what teachers are willing and able to do, professional development explains how the gap between the two can be closed. Research on Indian teacher preparedness consistently points to the same conclusion, namely that one time orientation sessions are insufficient and that sustained, practice based training produces better outcomes. A study examining prospective teachers in Bihar found that formal

preparation for new and unfamiliar teaching demands remains inconsistent, a finding that is likely to hold true for in service teachers adapting to AI as well. For Maharashtra, this suggests that professional development for AI literacy should not be treated as a single workshop but as a structured pathway with distinct stages. The pathway proposed here begins with orientation workshops that build basic conceptual awareness, followed by hands on training with specific AI tools relevant to subject teaching, followed by supervised trials where teachers integrate AI into real lesson plans. This is followed by peer mentoring, where more confident teachers support colleagues within the same school or cluster, and finally reflective practice, where teachers assess what worked and what did not. Only through this repeated cycle can AI use move from an occasional experiment to a sustained part of classroom practice. The Maharashtra State Council of Educational Research and Training and District Institutes of Education and Training are well placed to anchor this pathway, given their existing role in teacher training across the state.

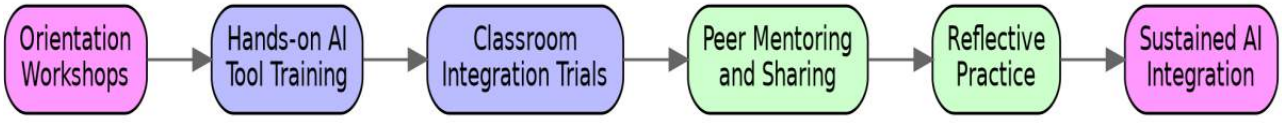

Figure 3. Proposed continuous professional development pathway for building AI literacy among Maharashtra's school teachers.

Policy Alignment: NEP 2020 and State Level Initiatives

The framework proposed in this paper aligns closely with the direction set by the National Education Policy 2020, which calls for integrating technology across teacher education and continuous professional development, while also cautioning against technology use that is not grounded in sound pedagogy. Maharashtra has already taken steps in this direction through digital infrastructure

programmes and teacher training initiatives run in partnership with non government organisations and private technology partners, though these efforts have so far focused mainly on general digital literacy rather than AI specifically. Aligning future AI training with the existing State Curriculum Framework and teacher training calendar, rather than treating it as an additional and separate initiative, would make adoption more sustainable. Equally important is ensuring that training reaches rural and tribal belt schools with the same seriousness as urban schools, since uneven investment risks widening the very digital divide that NEP 2020 seeks to close. A theoretically grounded and locally adapted approach, rather than a one size fits all national template, is likely to serve Maharashtra's diverse teacher population more effectively.

CONCLUSION

This paper has argued that AI literacy among Maharashtra's school teachers should be understood through three connected dimensions, namely awareness, readiness, and professional development needs, rather than as a single undifferentiated skill. Awareness without readiness produces curiosity without confidence, and readiness without structured professional development produces isolated experimentation rather than sustained classroom change. The conceptual framework and continuous professional development pathway proposed here offer a starting point for policy makers, teacher educators, and school leaders in Maharashtra who wish to build AI capacity in a way that is systematic rather than reactive. Future research should test this framework empirically across Maharashtra's varied school settings, comparing urban, rural, and tribal belt schools, and should examine how subject specific AI applications, for instance in mathematics or language teaching, shape teacher readiness differently. As AI continues to enter Indian classrooms, ensuring that teachers are genuinely prepared, and not merely exposed, will determine whether this technology strengthens or undermines the quality of school education in the state.

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