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Open Educational Resources in Indian Teacher Education

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ABSTRACT

Open Educational Resources (OER) have emerged as a significant lever for democratizing access to quality educational content, especially in contexts where resource constraints limit teacher preparation and continuous professional development. In India, teacher education is simultaneously undergoing regulatory reform, technological disruption, and a push toward inclusive, competency-based curricula. This manuscript investigates how OER are perceived, accessed, integrated, and sustained within Indian teacher education programmes (pre-service and in-service). Drawing on a survey of 100 stakeholders—comprising student-teachers, teacher educators, and academic administrators—this study triangulates quantitative trends with qualitative insights to unpack motivators and barriers to OER adoption. The analysis reveals that while awareness of OER is moderately high, structured integration into pedagogy, assessment, and reflective practice remains inconsistent. Key facilitators include cost-effectiveness, flexibility, and alignment with local curricular needs; prominent barriers involve digital literacy gaps, inadequate institutional policy support, and concerns about content quality and contextual relevance. The paper concludes with recommendations for institutional capacity-building, policy scaffolding, community-driven curation, and robust evaluation frameworks. It also delineates the scope and limitations of the present study and identifies areas for future research, such as the role of artificial intelligence in OER personalization and sustainable OER ecosystems in multilingual teacher education. Overall, the study underscores OER's transformative potential when embedded thoughtfully within the socio-cultural and infrastructural realities of Indian teacher education.

KEYWORDS

Open Educational Resources; Teacher Education; India; Pre-service Training; Digital Pedagogy; Policy; Quality Assurance; Survey Research

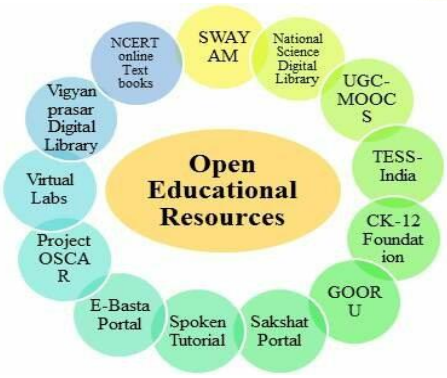

Fig.1 Open Educational Resources,Source([1])

INTRODUCTION

Teacher education in India stands at the crossroads of tradition and transformation. On the one hand, postcolonial legacies, standardized curricula, and exam-oriented mindsets continue to shape teacher preparation; on the other hand, national policy shifts—such as the National Education Policy (NEP) 2020—and the proliferation of digital technologies are ushering in more learner-centric, competency-based paradigms. Within this evolving landscape, Open Educational Resources (OER) have gained renewed attention as viable tools for supplementing curricula, experimenting

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with innovative pedagogy, and fostering communities of practice.

OER, defined broadly as teaching, learning, and research materials in any medium that reside in the public domain or have been released under an open license permitting no-cost access, use, adaptation, and redistribution, offer multiple affordances. They lower economic barriers, enable localization and contextualization, and encourage collaborative knowledge production. For teacher education, which demands a blend of theoretical knowledge, pedagogical content knowledge, and reflective practice, OER can provide accessible models of pedagogy, multimedia exemplars, and open assessments.

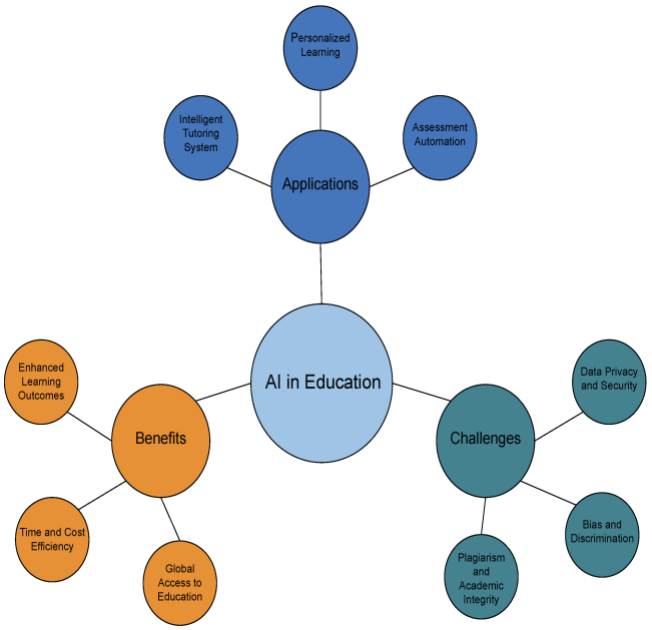

Fig.2 Digital Education, Source([2])

However, the mere availability of OER is insufficient. For OER to translate into meaningful pedagogical change, several conditions must align: teachers must be aware of what constitutes OER; they must possess digital and pedagogical literacies to remix and repurpose materials; institutions must incentivize and recognize open practices; and quality assurance mechanisms must ensure credibility and cultural relevance. In India, where teacher education institutions (TEIs) vary tremendously in resources and quality, the integration of OER is both a challenge and an opportunity.

This manuscript pursues four core questions:

1. What is the current level of awareness and utilization of OER among stakeholders in Indian teacher education?
2. How are OER integrated into pre-service and in-service teacher education curricula and pedagogical practice?
3. What barriers hinder and what enablers facilitate sustained OER use and creation?
4. What policy, institutional, and pedagogical recommendations can enhance OER adoption in Indian teacher education?

To investigate these questions, we conducted a mixed-method survey among 100 participants, representing different regions, institutional types (government, aided, private), and roles. The findings are situated within an extensive review of literature on OER globally and within India, and the paper culminates in a set of pragmatic recommendations grounded in the Indian context.

Literature Review

The literature on OER encompasses diverse domains: open licensing frameworks, technological platforms, instructional design, community dynamics, policy frameworks, and impact evaluation. This section synthesizes key strands relevant to teacher education in India.

2.1 Conceptual Foundations of OER

Wiley's "5Rs" framework—retain, reuse, revise, remix, and redistribute—remains central to OER discourse, emphasizing the permissions that differentiate OER from simply "free" resources. UNESCO and the Commonwealth of Learning have also provided influential definitions and policy guidelines, underscoring the role of OER in achieving Sustainable Development Goal 4 (quality education).

2.2 OER in Teacher Education: Global Insights

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Internationally, OER initiatives such as TESSA (Teacher Education in Sub-Saharan Africa) and OERu have demonstrated the potential of open resources to bridge gaps in teacher preparation. Studies highlight that OER can enhance pedagogical innovation by offering exemplar lesson plans, case studies, and assessment rubrics. Yet, barriers persist: educators often lack the time or skills to adapt OER; institutional cultures may undervalue open practices; and quality assurance remains uneven.

2.3 Indian OER Landscape

India's OER ecosystem is heterogeneous. Government platforms such as NROER (National Repository of Open Educational Resources), SWAYAM, DIKSHA, and e-Pathshala provide curated content aligned with national curricula. NGOs and universities also contribute OER in local languages, though discoverability can be an issue. Literature indicates a mismatch between availability and active use: while platforms host a wealth of content, teachers often rely on proprietary textbooks and conventional lecture notes due to habit, assessment pressures, or lack of institutional support for digital innovation.

2.4 Teacher Educators and Digital Literacies

Teacher educators—those who train future teachers—play a pivotal role in modeling open practices. Research suggests that digital literacy is uneven among teacher educators, influencing the extent to which they can guide student-teachers in OER-based pedagogy. Digital literacy, in this context, spans technical skills (searching, downloading, editing multimedia), legal awareness (licenses, attribution), and pedagogical integration (aligning OER with outcomes and assessments).

2.5 Quality and Localization Concerns

Quality assurance frameworks for OER often adapt criteria from instructional design: clarity of objectives, pedagogical alignment, accuracy, and accessibility. In India, localization—adapting OER to regional languages, socio-cultural contexts, and local examples—emerges as crucial. While open licenses permit adaptation, actual localization requires time, expertise, and collaborative structures.

2.6 Policy and Institutional Support

Policies can catalyze OER adoption by mandating open licensing for publicly-funded materials, recognizing OER creation in faculty appraisal, and providing training infrastructure. The NEP 2020 endorses technology integration and open digital resources, yet operational guidelines at the institutional level remain nascent. Literature emphasizes the need for micro-policies within TEIs that clarify intellectual property, quality review processes, and support for faculty OER projects.

2.7 Emerging Trends: AI, Analytics, and Micro-OER

Recent scholarship explores how artificial intelligence can personalize OER recommendations, generate adaptive assessments, and automate translation. Micro-OER—small, modular assets like infographics, short videos, or interactive quizzes—are also gaining traction for mobile-based learning environments common in India. Learning analytics applied to OER platforms can inform continuous improvement by tracking usage patterns and learner outcomes.

Synthesis: The literature underscores that OER's promise for teacher education is contingent on human, institutional, and technological ecosystems. In India, this translates into building digital capacities, establishing supportive policies, curating contextually relevant content, and fostering communities that value openness. The present study contributes empirical evidence on these aspects through a focused survey and proposes actionable recommendations.

Survey Design and Methodology

3.1 Research Approach

A mixed-method cross-sectional survey design was employed to capture both breadth (quantitative indicators) and depth (qualitative insights) regarding OER adoption in Indian teacher education. The study population included pre-service student-teachers enrolled in B.Ed./M.Ed.

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programmes, teacher educators (faculty), and academic administrators (principals, heads of departments).

3.2 Sample and Sampling Strategy

A purposive-cum-convenience sampling strategy was used to recruit 100 participants across five Indian states representing north, south, east, west, and central regions. The final sample consisted of:

- 60 student-teachers (pre-service)
- 30 teacher educators (faculty/mentors)
- 10 administrators (principals, coordinators)

Gender distribution was 62% female and 38% male, reflecting the gendered nature of teacher education enrolment. Participants ranged from 21 to 56 years in age. Approximately 68% reported teaching or study experience in government or government-aided institutions, and 32% in private institutions.

3.3 Instrumentation

A structured questionnaire was designed with four sections:

1. **Demographics and Institutional Context** (8 items)
2. **Awareness and Usage of OER** (12 items, Likert scale 1–5)
3. **Perceived Barriers and Enablers** (10 items, Likert scale; multiple-response)
4. **Open-Ended Questions** (3 items) capturing qualitative insights on best practices and suggestions.

The instrument was validated by three experts in educational technology and pilot-tested with 12 respondents for clarity and reliability. Cronbach's alpha for the Likert-scale items was 0.82, indicating acceptable internal consistency.

3.4 Data Collection

Data were collected over a four-week period through an online form (for digitally literate participants) and paper-based surveys (for institutions with limited internet access). Informed consent was obtained, and anonymity was assured.

3.5 Data Analysis

Quantitative data were analyzed using descriptive statistics (means, percentages) and cross-tabulations (e.g., role vs. awareness level). Qualitative responses were thematically coded to identify recurrent patterns related to OER benefits, challenges, and recommendations. Triangulation was applied to corroborate themes across data types.

3.6 Ethical Considerations

The study adhered to ethical norms: voluntary participation, confidentiality, and use of data solely for academic purposes. Institutional permission was sought where necessary.

RESULTS

This section presents the key quantitative and qualitative findings from the survey.

4.1 Awareness and Understanding of OER

- **Overall awareness:** 71% of respondents reported being "aware" or "highly aware" of what OER are; 19% were "somewhat aware"; 10% indicated no prior awareness.
- **Correct identification:** 64% could correctly distinguish between open and merely free resources.
- **License literacy:** Only 28% understood Creative Commons licenses well enough to choose appropriate licenses for their own materials.

Awareness was higher among teacher educators (mean score 4.1/5) compared to student-teachers (3.5/5). Administrators showed moderate awareness (3.7/5) but indicated interest in policy-level implications.

4.2 Usage Patterns

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- **Access frequency:** 52% reported accessing OER at least once a week; 23% used them monthly; 25% rarely or never accessed them.
- **Types of OER used:** PDFs and text documents (78%), videos (65%), lesson plans (39%), interactive simulations/quizzes (21%).
- **Platforms:** DIKSHA (46%), SWAYAM (33%), YouTube EDU (54%), NROER (29%), international repositories (MERLOT, OER Commons) (14%). Multiple selections were allowed.

4.3 Integration into Pedagogy

- 48% of teacher educators reported incorporating OER-based activities in lesson planning assignments for student-teachers.
- 37% used open textbooks or modules as core readings.
- Only 22% assessed students on remixing or creating OER.

Qualitative comments highlighted that OER are often used as supplementary material rather than embedded within assessment frameworks. Some respondents mentioned time constraints and lack of institutional mandates as barriers.

4.4 Barriers

The most frequently cited barriers were:

1. **Digital literacy gaps** (58%) – difficulties in editing, attributing, or repurposing OER.
2. **Quality assurance concerns** (49%) – uncertainty about accuracy or alignment with Indian curricula.
3. **Lack of institutional incentives** (44%) – absence of recognition or workload adjustment for OER creation.
4. **Bandwidth/connectivity issues** (32%) – particularly in rural TEIs.
5. **Language limitations** (29%) – insufficient materials in regional languages.

4.5 Enablers

Key enablers included:

- **Cost-effectiveness** (72%) – eliminates textbook costs for student-teachers.
- **Flexibility and adaptability** (63%) – ability to contextualize materials.
- **Peer sharing culture** (41%) – communities of practice, WhatsApp groups for exchanging links.
- **Policy alignment** (26%) – NEP 2020 and NCTE guidelines encouraging digital resources.

4.6 Preferred Support Mechanisms

Respondents prioritized:

- Hands-on workshops on creating/adapting OER (67%)
- A vetted list of quality OER aligned to Indian teacher education curricula (58%)
- Institutional OER repositories with recognition for contributors (46%)
- Clear policy guidelines on licensing and attribution (39%)

4.7 Illustrative Qualitative Insights

Three themes emerged from open-ended responses:

1. **Contextualization Need:** "We need OER examples that show how to teach multilingual classrooms with limited hardware."
2. **Mentorship:** "Senior faculty should mentor juniors in both digital skills and open pedagogy."
3. **Recognition:** "Include OER creation in performance appraisal to motivate faculty."

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DISCUSSION

The survey confirms that awareness of OER among Indian teacher education stakeholders is growing, but depth of understanding (especially licensing and remixing) lags behind. This echoes international findings, suggesting that digital literacy training must encompass not just tool use but also legal and pedagogical dimensions. The predominance of passive consumption (downloading PDFs and videos) over active production (creating or remixing OER) indicates a missed opportunity to cultivate reflective, collaborative teacher identities.

Barriers such as quality concerns and language limitations underscore the need for localized curation. While DIKSHA and NROER host substantial resources, their discoverability and alignment with specific B.Ed. course objectives can be improved. Institutions could develop micro-repositories curated by subject-method specialists, ensuring that OER are integrated into syllabi, practicum tasks, and assessments.

The finding that only 22% of respondents engage students in OER creation aligns with the observation that assessment drives learning behavior. Embedding OER production into coursework—e.g., designing an open lesson plan, creating a multilingual teaching aid—can normalize open practices. Recognition systems, such as badges, portfolio credits, or appraisal points, can incentivize faculty.

Interestingly, administrators express moderate awareness but willingness to explore policy levers. This is a strategic entry point: administrators can champion micro-policies on open licensing, allocate hours for digital content creation, and invest in training infrastructure. A cascade model—training a core team of "OER champions" who mentor peers—could be efficient in resource-limited TEIs.

The role of AI and analytics is an emerging frontier. While not extensively probed in this survey, literature suggests that AI tools can ease translation, summarization, and personalization of OER. However, ethical use, data privacy, and bias mitigation must be considered.

METHODOLOGY

While Section 3 summarized the methodology, this section elaborates to enhance replicability.

6.1 Research Design Rationale

A cross-sectional survey was selected for its efficiency in capturing a snapshot of OER adoption across diverse institutions. The mixed-method approach (quantitative + qualitative) allows both generalization (within sampling limits) and depth.

6.2 Instrument Construction

Items were derived from existing OER adoption frameworks and adapted to the Indian teacher education context. For instance, the awareness scale included items like "I can explain the difference between OER and free online resources" and "I know how to apply a Creative Commons license to my materials." Barrier items asked respondents to rate statements such as "I am unsure about the quality of OER available for my subject." Open-ended questions invited narratives of best/worst experiences with OER.

6.3 Validity and Reliability

Content validity was ensured by expert review (three experts evaluated alignment with research questions). Construct validity was supported by factor analysis: items on awareness loaded on a single factor (eigenvalue >1). Reliability (Cronbach's $\alpha = 0.82$) indicates acceptable internal consistency.

6.4 Data Coding and Analysis Procedures

Quantitative data were entered into a spreadsheet and analyzed using descriptive statistics. Cross-tabulations compared awareness and usage across roles and institution types. Qualitative responses were coded inductively; two researchers independently coded data to enhance trustworthiness, resolving discrepancies through discussion.

6.5 Limitations of Methodology

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The purposive-convenience sample limits generalizability. Self-report measures may inflate perceived awareness or usage due to social desirability bias. Nonetheless, triangulation and transparent reporting ameliorate these concerns.

Implications for Practice and Policy

7.1 For Teacher Educators

- Integrate OER creation/remixing tasks into coursework to build open practices.
- Use reflective journals where students document how they adapted OER for micro-teaching.
- Collaborate across institutions to co-create and peer-review OER, ensuring quality and contextual relevance.

7.2 For Institutions (TEIs)

- Establish institutional OER policies clarifying licensing, attribution, and evaluation criteria.
- Create a central digital repository with tagging aligned to B.Ed./M.Ed. syllabi.
- Provide time allowances and professional development credits for OER-related work.

7.3 For Policy Makers (NCTE, State Councils)

- Mandate open licensing for publicly funded teacher education materials.
- Fund capacity-building programmes and OER hackathons for teacher educators.
- Encourage multilingual OER creation through grants and collaborative networks.

7.4 For Technology Developers

- Develop lightweight, mobile-friendly authoring tools that simplify licensing and attribution.
- Embed AI-assisted translation and adaptation features to lower localization barriers.
- Incorporate analytics dashboards that help educators see how OER are used and improved.

Conclusion

The study affirms that Open Educational Resources hold considerable promise for transforming Indian teacher education, but realization of this promise requires intentional strategies across individual, institutional, and policy levels. Awareness exists, yet deeper competencies—especially around licensing, adaptation, and assessment integration—need nurturing. The survey of 100 stakeholders reveals that while cost-effectiveness and flexibility drive adoption, persistent barriers around digital literacy, quality assurance, and incentives hinder widespread, meaningful use.

A holistic approach is essential: professional development that couples technical and pedagogical skills; micro-policies that institutionalize open practices; communities of practice that curate and co-create culturally relevant OER; and technological enhancements that facilitate translation, accessibility, and analytics. Future research can explore longitudinal impacts of OER-infused curricula on teacher identity, classroom practices, and student learning outcomes. Additionally, the intersection of OER with emerging technologies such as AI and augmented reality warrants systematic investigation.

In sum, OER are not a panacea but a potent component of a broader transformation agenda in teacher education. When embedded within supportive ecosystems, they can catalyze reflective, collaborative, and contextually responsive teacher preparation in India.

Scope of the Study

This study focuses on OER adoption within Indian teacher education programmes, examining awareness, usage, barriers, and enablers among a sample of 100 stakeholders. The scope includes both pre-service and in-service contexts

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but emphasizes pre-service teacher education, given the majority of respondents were student-teachers. The study scrutinizes institutional and policy dimensions to the extent they influence individual behavior but does not conduct a full policy analysis of all state guidelines. The research concentrates on digital OER assets (text, video, interactive media) and does not delve into open hardware or open data, though these are adjacent domains. Temporal scope is limited to the period of data collection, providing a snapshot rather than longitudinal trends.

LIMITATIONS

- **Sampling Constraints:** The purposive-convenience sample of 100 limits generalizability to the broader population of Indian TEIs.
- **Self-Report Bias:** Awareness and usage data rely on self-reports, potentially influenced by social desirability.
- **Platform-Specific Focus:** While major Indian platforms (DIKSHA, SWAYAM) were mentioned, the study did not systematically compare platform affordances.
- **Language Representation:** Although language barriers were discussed, the survey instrument was primarily in English, possibly underrepresenting non-English-speaking respondents' perspectives.
- **Lack of Classroom Observation:** The study did not observe classroom practices to verify reported OER integration.

Recognizing these limitations, the study's findings should be interpreted as indicative trends rather than definitive national patterns. Future research can adopt stratified random sampling, longitudinal designs, and mixed-method case studies to deepen understanding.

RECOMMENDATIONS AND FUTURE DIRECTIONS

1. **Capacity Building:** Conduct periodic, hands-on workshops on OER creation, licensing, and pedagogical integration.
2. **Micro-Policies:** Develop clear institutional guidelines on OER, including recognition in appraisal systems and workload models.
3. **Community Curation:** Foster cross-institutional communities to co-create, peer-review, and translate OER, ensuring quality and contextual relevance.
4. **Assessment Integration:** Embed OER production into student-teacher assessments to normalize open practices.
5. **Technology Support:** Invest in mobile-friendly authoring tools with built-in licensing prompts and translation features.
6. **Monitoring and Evaluation:** Implement analytics to track usage and impact of OER on learning outcomes.
7. **Research Extensions:** Explore AI-enabled personalization of OER, study long-term impacts on teacher identity, and analyze multilingual OER ecosystems.

By enacting these recommendations, Indian teacher education can move from sporadic OER usage to a systemic, sustainable open education culture.

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