

**ITEP for the Future: Toward Sustainable, Inclusive, and  
Technology-Driven Teacher Education**

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**Abstract**

India's Integrated Teacher Education Programme (ITEP) is the most consequential restructuring of initial teacher preparation since independence, aligning pre-service curricula with the National Education Policy (NEP) 2020 and Sustainable Development Goal 4 (SDG 4). This paper synthesizes policy, theoretical, and practice-oriented literature to articulate a future-ready vision of ITEP that is (a) sustainable-ecologically, institutionally, and financially; (b) inclusive-responsive to disability, language, gender, and socioeconomic diversity; and (c) technology-driven-grounded in robust pedagogical frameworks such as TPACK and SAMR, which are the four levels of integrating technology into learning to enhance or transform educational tasks). Using a narrative integrative review, the article maps policy mandates (NEP 2020; NCTE's ITEP norms), global agendas (SDG 4; ESD (Education for Sustainable Development)), and Indian digital public infrastructure (DIKSHA, SWAYAM, NISHTHA). It then proposes a design blueprint for ITEP curricula, practicum, assessment, and faculty development, including sample course modules, micro-credential paths, universal design templates, and transformation-oriented educational technology integration. The paper concludes with an implementation roadmap and research agenda to evaluate equity, quality, and technology outcomes across ITEP cohorts.

*Keywords:* integrated teacher education programme (ITEP), national education policy 2020 (NEP 2020), sustainable development goal 4 (SDG 4), inclusive education, universal design for learning (UDL), technological pedagogical content knowledge (TPACK), substitution, augmentation, modification, and redefinition (SAMR), digital infrastructure for knowledge sharing (DIKSHA), study webs of active learning for young aspiring minds (SWAYAM), national initiative for school heads' and teachers' holistic advancement (NISHTHA).

## **Introduction**

The Integrated Teacher Education Programme (ITEP) is designed to bring together India's previously scattered teacher-training pathways into a unified, four-year model that blends disciplinary study, pedagogy, and sustained school engagement. It translates the aspirations of NEP 2020 by treating teaching as a true profession, raising the bar for entry, and aligning teacher preparation with the skills needed in contemporary classrooms. To support this transition, the National Council for Teacher Education (NCTE) released updated regulations and notifications guiding institutions on shifting from the earlier four-year B.A./B.Sc. B.Ed. courses to the new ITEP framework, with admissions to the old programs ending from 2025–26. NEP 2020 also emphasizes that teacher education should be “rigorous, multidisciplinary,” rooted in India's cultural ethos, and equipped to use technology meaningfully for blended learning.

At the same time, India's commitments under SDG 4 stress the need for “inclusive and equitable quality education” and lifelong learning for every learner. UNESCO's Education 2030 agenda identifies Education for Sustainable Development (ESD) and inclusive teaching approaches as central strategies for transforming education systems. These global and national priorities intersect within ITEP: a next-generation teacher-education model must be sustainability-oriented (ESD-focused), inclusive (attentive to diversity, disability, and equity), and technologically enriched in ways that support - not overshadow- sound pedagogy.

This study provides three contributions. First, it offers a literature-grounded rationale for a sustainable-inclusive-tech triad in ITEP. Second, it translates policy frameworks into an actionable program design using UDL, TPACK and SAMR (Substitution, Augmentation, Modification, and Redefinition, which are the four levels of integrating technology into learning to enhance or transform educational tasks). Third, it outlines an implementation and research agenda that the profession can use to track impact on teacher competence and student outcomes.

## **Review of Related Literature**

### **Policy and Governance: National Education Policy (NEP) 2020 and ITEP Norms**

NEP 2020 reimagines teacher education as a four-year, integrated, multidisciplinary degree situated in universities, with robust subject majors,

educational theory, practicum, and research (MoE, 2020). It stresses professional standards, competency-based curricula, and Continuous professional development (CPD) of at least 50 hours per year (NCERT, 2025). The NCTE's ITEP regulations (Gazette, 2024) establish program norms and a national transition from legacy integrated degrees to ITEP, with no fresh admissions to the older four-year integrated B.A./B.Sc. B.Ed. from 2025–26 (NCTE, 2021&2024). A May 2025 NCTE public notice reiterates alignment with NEP 2020 and the statutory basis for ITEP implementation (NCTE, 2025).

### **Global and National Agendas: SDG 4 and ESD (Education for Sustainable Development)**

SDG 4 emphasizes both equity (“inclusive and equitable quality education”) and relevance for sustainable development. UNESCO describes Education for Sustainable Development (ESD) as the process of enabling learners to develop the understanding, competencies, values, and dispositions needed to contribute to a sustainable future. It emphasizes that teacher-education programmes should integrate ESD throughout their curriculum. Additionally, the Education 2030 Global Cooperation Mechanism highlights the need for education systems to advance more rapidly by strengthening collaboration among multiple stakeholders (UNESCO, 2023).

### **Inclusive Education and Legal Mandates**

The Rights of Persons with Disabilities (RPwD) Act, 2016 in India requires educational systems to ensure inclusion by upholding principles of non-discrimination, accessibility, and reasonable accommodation (Government of India, 2016). Official guidance highlights education-specific provisions (Department of School Education & Literacy, 2019). For pre-service programs, this implies coursework and practicum that prepare teachers to design accessible environments, use assistive technologies, and develop Individualized Education Plans (IEPs). UDL provides an evidence-informed framework aimed at enhancing learning for every student by ensuring varied options for engagement, representation of content, and ways to demonstrate understanding (CAST, 2018).

### **Technology Integration: Frameworks and Platforms**

Evidence suggests that technology improves learning only when integrated with pedagogical and content knowledge. The Technological Pedagogical Content

Knowledge (TPACK) framework (Mishra & Koehler, 2006; Koehler & Mishra, 2013) conceptualises this intersection. The SAMR model (Substitution, Augmentation, Modification, Redefinition) guides reflective progression from enhancement to transformation (Puentedura, 2013; Romrell et al., 2014). As Puentedura (2013) puts it, the key design question is: “What is the new task... uniquely made possible by the new technology?”

### **India’s digital public infrastructure**

DIKSHA ((Digital Infrastructure for Knowledge Sharing - NCERT’s national platform for content and teacher development) and SWAYAM (Study Webs of Active Learning for Young Aspiring Minds - government MOOCs) - expands access to open educational resources, micro-credentials, and CPD. NISHTHA (National Initiative for School Heads’ and Teachers’ Holistic Advancement), India’s large-scale teacher capacity program, now runs online variants (NISHTHA 2.0) and codifies NEP’s 50-hour CPD expectation (NCERT, 2025; DSEL, 2024). These platforms can be braided into ITEP for stackable learning pathways.

### **Empirical and Theoretical Syntheses**

Reviews of SAMR applications show its utility as a reflective design lens but caution against treating it as a linear ladder detached from pedagogy (Blundell et al., 2022). TPACK research corroborates the need to develop knowledge at the intersections rather than in silos (Mishra & Koehler, 2006; Schmidt et al., 2009). UDL’s evidence base points to benefits for diverse learners when curricula intentionally vary representations, engagements, and expressions (CAST, 2018).

## **Conceptual Framework**

This study conceptualizes future-ready ITEP through a Sustainability-Inclusion-Technology (SIT) Triangle:

1. Sustainability (ESD - Education for sustainable development): Teachers cultivate systems thinking, futures literacy, and place-based problem-solving aligned with SDG 4 and ESD.
2. Inclusion (UDL + RPwD): Programs embed UDL checkpoints and disability rights literacy across coursework and practicum; inclusive assessment is normative.

3. Technology (TPACK) + SAMR (Substitution, Augmentation, Modification, and Redefinition): Technology integration is design-led and evidence-based, moving toward SAMR “modification/redefinition,” not gadget substitution.

This triangle is undergirded by policy compliance (NEP 2020; NCTE norms), open infrastructure (DIKSHA/SWAYAM), and professional growth (NISHTHA/CPD).

### **Methodology**

This paper employs a narrative integrative review to synthesize current policy documents, statutory instruments, global frameworks, and peer-reviewed literature on teacher education, inclusion, and educational technology. Sources included official gazettes, policy PDFs, UNESCO/UN sites, and seminal academic works (Mishra & Koehler, 2006; Puentedura, 2013; CAST, 2018). Selection criteria prioritized (a) statutory and official policy authority for Indian context; (b) recognized frameworks with substantial citation footprints; and (c) recency for implementation updates (NCTE notices; NCERT CPD expectations). The analysis used thematic coding around the SIT Triangle and translated themes into program design elements.

### **Findings**

#### **Blueprint for a Future-Ready ITEP**

##### ***1. Curriculum Architecture***

- **Multidisciplinary Core + ESD Spine**  
A four-year sequence should integrate a humanities/science major with an ESD spine: systems thinking, climate literacy, circular economy, and community-based projects aligned to local contexts. UNESCO’s ESD guidance recommends policy-curriculum congruence and experiential projects.
- **Inclusion and UDL:** Across the Program UDL should be embedded, not elective. Course syllabi map CAST’s checkpoints to weekly learning outcomes (CAST, 2018). Inclusive education law (RPwD) is introduced in Year 1 and operationalized in practical through accessible lesson planning, assistive tech use, and IEP collaboration (Government of India, 2016; DSEL, 2019).

- Technology Integration via TPACK + SAMR Methods courses co-design lessons where content aims drive technology choices. Candidates critique and redesign activities to shift from enhancement to transformation. For example, a traditional essay (substitution) becomes a multimodal, data-informed community brief (redefinition) co-authored with local stakeholders- uniquely made possible by the new technology (Puentedura, 2013). TPACK seminars focus on designing at the intersections (Mishra & Koehler, 2006; Koehler & Mishra, 2013).
- Micro-credentials with DIKSHA/SWAYAM  
Each semester includes at least one open micro-credential (Assessment literacy, assistive tech basics) via DIKSHA or SWAYAM, curated to ITEP outcomes; artifacts accrue to a professional portfolio (NCERT, 2025).

## **2. *Practicum and School Partnerships***

- Progressive Clinical Model  
Start with virtual micro-practicals (Year 1), move to targeted inclusion/ESD placements (Year 2–3), and culminate in a year-long internship (Year 4) aligned with NCTE practicum norms (NCTE, 2024).
- Inclusive and Sustainable School Labs  
Partner schools serve as “Living Labs” for universal design and ESD projects (e.g., energy audits, water harvesting, biodiversity mapping) integrating science, social sciences, and languages.
- Mentoring and Technology Coaching  
Mentor teachers trained through NISHTHA pathways provide coaching on UDL lesson study and transformation-oriented educational Technology. (NCERT, 2025; DSEL, 2024).

## **3. *Assessment and Quality Assurance***

- Competency-Based Assessment  
Rubrics assess (a) content mastery, (b) pedagogical repertoire, (c) inclusive design (UDL checkpoints in plans/artifacts), and (d) technology integration quality SAMR level justified by TPACK reasoning.
- E-Portfolios and Public Scholarship  
Candidates curate lesson videos, UDL plans, data-informed reflections, and community products. Public sharing on institutional repositories, where appropriate, drives authenticity.

- Program-Level Indicators  
Programs track: proportion of redefinition-level designs; accessibility compliance; number of DIKSHA/SWAYAM micro-credentials; ESD project impacts (e.g., school resource savings); and CPD continuity post-graduation.

#### **4. Faculty Development and Governance**

- 50-Hour CPD (Continuous professional development) Ecosystem  
ITEP faculty meet NEP's expectation that "every teacher... participate in at least 50 hours of CPD" annually (NCERT, 2025). Institutions recognize CPD via workload and incentives.
- Open Content and Co-Creation  
Faculty co-create OER on DIKSHA, feeding national repositories and fostering a culture of sharing (CIET-NCERT)
- Compliance and Transition Management  
Institutions align admissions, infrastructure, and staffing with NCTE's transition directives and inspection criteria (NCTE, 2021/2024; NCTE, 2025).

### **Discussion**

#### **Aligning Policy Ambition with Classroom Reality**

ITEP's promise hinges on coherent enactment. NEP 2020 aspires to professional standards and blended learning; NCTE codifies program norms. Yet, fidelity requires implementation capacity contains faculty upskilling, accessible infrastructure, and school partnerships that embrace inclusive and ESD oriented practices. As UNESCO's SDG 4 mechanism emphasizes, systems-level cooperation is essential to "accelerate progress" (UNESCO,2023).

#### **Inclusion as Design, Not Accommodation**

UDL reframes inclusion from retrofitted accommodations to proactive design. CAST (2018) argues UDL "improve and optimize teaching and learning for all". Embedding UDL across courses and practical develops anticipatory design mindsets. RPwD compliance must be routine: accessible facilities, assistive technologies, and IEP collaboration are non-negotiable (Government of India, 2016; DSEL, 2019).

## **Technology with Pedagogical Integrity**

The TPACK literature warns against techno centrism (Mishra & Koehler, 2006). SAMR (Substitution, Augmentation, Modification, and Redefinition, which are the four levels of integrating technology into learning to enhance or transform educational tasks), when used reflexively, supports movement from enhancement to transformation (Romrell et al., 2014). The design test is not the tool, but whether technology enables disciplinary practices and authentic audiences unavailable otherwise (Puentedura, 2013). National platforms-DIKSHA, SWAYAM, and NISHTHA-provide scale and equity if integrated as curricular elements, not add-ons (NCERT, 2025).

## **Sustainability as Core Literacy**

ESD across ITEP ensures future teachers can guide learners to connect local issues (water, waste, energy, biodiversity) to global systems. This aligns both with SDG 4's equity thrust and with Indian priorities for environmental stewardship. ESD projects in practical model civic engagement and interdisciplinary learning.

## **Implications and Recommendations**

- 1) Curricular Mandates: Require each method course to evidence UDL checkpoint mapping and at least one SAMR-redefinition design justified through TPACK reasoning.
- 2) Clinical Requirements: Guarantee placements that allow disability-responsive practice (e.g., resource rooms, inclusive classrooms) and ESD community projects.
- 3) Micro-Credential Pathways: Embed semester-wise DIKSHA/SWAYAM micro-credentials into degree audit; recognize them in hiring dossiers.
- 4) Faculty Incentives: Tie workload credit and promotion to CPD ( $\geq 50$  hours), OER contributions, and school-based research.
- 5) Infrastructure and Accessibility: Audit campuses and partner schools for RPwD - aligned accessibility; allocate funds for assistive technology.
- 6) Quality Indicators: Monitor the extent to which technology-enabled learning reaches transformative levels, assess the consistency of UDL implementation,

measure progress in ESD-related learning outcomes, and review participation trends in continuous professional development.

- 7) Policy Coherence: Ensure institutional policies and academic schedules are synchronized with the NCTE's transition requirements, and adopt NISHTHA training modules to unify and strengthen mentor preparation.

### **Limitations**

This integrative review draws on policy documents and theoretical scholarship, but it does not include original empirical evidence from ITEP student cohorts. Future research using mixed-method approaches should examine changes in teacher candidates' competencies (such as UDL and TPACK), observe how their instructional practices align with SAMR levels, and evaluate resulting student outcomes—including learning gains, inclusion indicators, and the impact of ESD-related projects.

### **Conclusion**

India's ITEP has the potential to emerge as an international model when sustainability, inclusion, and technology are integrated as fundamental elements rather than treated as isolated priorities. The foundations established through NEP 2020 and NCTE regulations already provide clear direction. Global and national reference points—such as UNESCO's SDG 4 and ESD frameworks, the RPwD Act, and pedagogical models like UDL, TPACK, and SAMR—further strengthen the conceptual roadmap.

When these principles are translated into curriculum innovation, authentic school-based practice, robust assessment processes, and ongoing professional development—and when national platforms like DIKSHA, SWAYAM, and NISHTHA are leveraged to expand effective practices—ITEP can produce teachers capable of creating inclusive, future-focused, and technology-supported learning environments for all students.

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