International Journal of Engineering Research and Development
e- ISSN: 2278-067X, p-ISSN: 2278-800X, www.ijerd.com
Volume 22, Issue 4 (April 2026), PP 331-343

A CIPP–CFIR Analysis of NEP Implementation in India

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ABSTRACT: *India's National Education Policy (NEP) 2020 outlines a comprehensive reform agenda spanning school and higher education, emphasizing equity, flexibility, multidisciplinary learning, foundational literacy and numeracy (FLN), institutional restructuring, credit portability, regulatory reform, and technology integration. This paper translates key policy provisions into actionable implementation tasks and measurable indicators, and synthesizes early evidence from administrative datasets (UDISE+, NAS, AISHE, NIRF), digital platforms (DIKSHA, SWAYAM, Academic Bank of Credits), and policy documents to assess progress and bottlenecks. Findings show momentum in ECCE and FLN initiatives, competency-based assessments, four-year undergraduate programmes with multiple entry–exit options, and digital public infrastructure adoption. However, uneven state capacity, teacher shortages, accreditation constraints, interoperability gaps, and digital divides limit scalability. The study proposes a phased implementation roadmap and a compact set of key performance indicators to support coordinated, equitable, and evidence-driven reform, offering a practical framework to advance NEP 2020 from policy vision to sustainable system-wide transformation.*

Keywords: *Academic Bank of Credits, Digital Public Infrastructure, Educational Governance, Implementation Science, National Education Policy 2020*

Date of Submission: 11-04-2026 Date of acceptance: 23-04-2026

I. INTRODUCTION

India's National Education Policy (NEP) 2020 is the country's first comprehensive education reform in over three decades, replacing the National Policy on Education of 1986/'92. It articulates a vision of an education system that is equitable, inclusive, flexible, and multidisciplinary. The proposed education system is capable of cultivating foundational literacy and numeracy, deep disciplinary knowledge, and twenty-first-century competencies aligned to national development and global citizenship [1]. For school education, NEP 2020 reorganizes the system into a 5+3+3+4 curricular–pedagogical structure, prioritizes Early Childhood Care and Education (ECCE), mandates universal foundational literacy and numeracy (FLN) in the early grades under NIPUN Bharat [2], encourages mother-tongue/local-language instruction at least to Grade 5, and emphasizes experiential learning with reduced curricular load and holistic assessments led by a new national assessment centre (PARAKH). For higher education, the policy seeks to raise the Gross Enrolment Ratio (GER) to 50% by 2035, phase out the affiliating college system, promote multidisciplinary institutions and flexible curricula (including four-year undergraduate programs with multiple entry–exit options), operationalize the Academic Bank of Credits (ABC) [3] for credit portability, and restructure regulation and quality assurance under a proposed Higher Education Commission of India (HECI) with distinct verticals for regulation, funding, accreditation, and standards [1]. Cross-cutting provisions include a four-year integrated B.Ed. for teacher preparation, National Professional Standards for Teachers (NPST), strengthened research via a National Research Foundation (now legislated as the Anusandhan NRF [4]), technology enablement through a National Educational Technology Forum (NETF), and scaled use of digital public platforms such as DIKSHA [5] and SWAYAM [6] to improve access and quality.

Translating this ambitious blueprint into practice is an implementation challenge of unusual scale and complexity. India's education system is federal and highly heterogeneous, with substantial variation across states and institutions in language policy, administrative capacity, fiscal space, digital infrastructure, and legacy governance arrangements. NEP 2020's provisions are also interdependent. Foundational literacy initiatives such as NIPUN Bharat interact with teacher capacity building and assessment reforms hinge on curricular realignment and data systems (e.g., PARAKH, NAS). Higher-education flexibility depends on enabling rails such as the ABC, accreditation pipelines, and institutional restructuring. Technology enablement requires concurrent progress on connectivity, content, capacity, and governance. The COVID-19 disruption further compressed timelines and shifted priorities, amplifying the importance of resilient, inclusive digital strategies while exposing persistent digital divides—making careful implementation design and monitoring all the more critical.

Despite the policy's salience, systematic evidence on early implementation remains limited and fragmented. Much public discourse draws on policy documents, guidelines, and case reports rather than comparable indicators across jurisdictions or longitudinal outcomes. Administrative datasets (e.g., UDISE+ for

school inputs and participation [7], NAS for learning outcomes [8], PGI for governance, AISHE [9] and NIRF for higher education, ABC transaction logs, and platform analytics from DIKSHA/SWAYAM) offer partial visibility but are uneven in coverage, frequency, and alignment with NEP's specific provisions . There is also a paucity of cross-sector analysis that connects school and higher-education reforms, or that integrates governance and technology dimensions (NETF, data standards, credit interoperability) with pedagogy and institutional change. This paper addresses these gaps by mapping NEP 2020's provisions to implementable actions and measurable indicators, and by synthesizing early evidence from multiple sources to characterize progress, variation, and bottlenecks.

We organize our inquiry around three research questions.

- RQ1: What are the key policy provisions of NEP 2020 across school and higher education, and how do they translate into concrete implementation tasks for governments, boards, institutions, and teachers?
- RQ2: What is the status of implementation against a set of proposed key performance indicators (KPIs) at national and state/institutional levels, and what patterns of progress or lag are evident in available administrative series (UDISE+, NAS, AISHE, NIRF, ABC), digital platforms (DIKSHA/SWAYAM), and policy/budget documents?
- RQ3: What barriers and enablers do stakeholders (teachers, school leaders, higher-education administrators, regulators, students) report, and what design and governance choices appear to facilitate inclusive, scalable, and sustainable implementation?

Our contributions are fourfold. First, we develop a policy-to-practice mapping that translates NEP 2020 clauses into a structured set of actionable items and indicators. Second, we assemble a multi-source, mixed-evidence snapshot using publicly available administrative data, platform analytics, policy circulars, budget documents, and selected cases to provide an early national overview and illustrate cross-state and cross-institutional variation. Third, we synthesize stakeholder perspectives from published surveys and interviews and, where feasible, include targeted qualitative insights to illuminate how policy is experienced at the classroom and campus levels. Fourth, we propose a pragmatic implementation roadmap: a phased set of priorities, governance and data practices, capacity-building strategies, and equity safeguards that can help align actors and accelerate progress.

II. BACKGROUND AND LITERATURE REVIEW

India's education reform trajectory provides crucial context for understanding NEP 2020's departures and extensions. The Kothari Commission (Education Commission, 1964–66) emphasized national integration, equality, and a common school system, recommending systemic investments, curricular relevance, and teacher development as levers for quality and equity [10]. The National Policy on Education (NPE) 1986 (modified in 1992) operationalized many of these goals—expanding access, strengthening teacher education, and creating institutions such as NCERT/SCERTs for curricular support—while articulating a child-centred pedagogy and national curricular frameworks [11]. The Right of Children to Free and Compulsory Education Act, 2009 (RTE) subsequently created justiciable entitlements for 6–14 year-olds, mandating norms for infrastructure, pupil-teacher ratios, and teacher qualifications [12]. NEP 2020 retains these equity and quality imperatives but departs in several substantive ways:

(i) a restructured 5+3+3+4 curricular–pedagogical design with universal Early Childhood Care and Education (ECCE) and a national mission on Foundational Literacy and Numeracy (FLN)
(ii) a shift toward competency-based curricula and assessments (with PARAKH as a national assessment centre)
(iii) multilingualism with mother-tongue/local language instruction at least to Grade 5
(iv) school complexes and holistic progress cards
(v) in higher education, multidisciplinary universities/institutions, four-year undergraduate programmes with multiple entry–exit and credit portability via the Academic Bank of Credits (ABC), and a reimagined regulatory architecture under a Higher Education Commission of India (HECI) with distinct verticals for regulation, funding, accreditation, and standards.

Collectively, these features extend earlier access-and-quality goals into systemic flexibility, outcomes focus, and digital enablement.

Table 1: NPE 1986/'92 vs. NEP 2020

Dimension	NPE 1986/'92	NEP 2020
Overall scope	Focused largely on school education, teacher education, adult literacy, and some higher-education issues	Fully system-wide: ECCE → school → higher education and skilling, including regulation, research, technology, and data systems
Structural pattern of schooling	10+2+3 structure (10 years school + 2 years higher secondary + 3 years UG)	5+3+3+4 curricular–pedagogical structure (Foundational, Preparatory, Middle, Secondary) within 12 years of schooling

Early Childhood Care & Education (ECCE)	Recognized pre-school/early childhood care but not as a universal, integral part of schooling	Universal, high-quality ECCE by 2030; ECCE integrated with schools/Anganwadis; national ECCE curricular framework
Foundational Literacy & Numeracy (FLN)	Emphasis on universal elementary education, basic literacy and numeracy, adult literacy campaigns	Dedicated national FLN mission (NIPUN Bharat), explicit Grade-3 FLN goals, aligned pedagogy, materials, and assessments
Curriculum & pedagogy	Child-centred approach; national curricular frameworks (e.g., NCF 1988); focus on access and quality	Outcomes- and competency-based curricula (NCF 2023), experiential and multidisciplinary learning, reduced content load
Assessment philosophy	Predominantly summative, content-heavy board examinations	Competency-based assessment; application-oriented items; PARAKH as national assessment centre; holistic progress cards
Language policy	Reaffirmed three-language formula; emphasis on regional language; continuity with earlier policies	Reaffirms three-language formula; stronger push for mother-tongue/home-language MoI at least to Grade 5; stronger multilingual emphasis
School organization	Neighbourhood schools; Operation Blackboard; focus on infrastructure and access	School complexes/clusters to share teachers, labs, libraries, counsellors, especially for small/rural schools
Vocational education (school)	Strong focus on vocationalisation at secondary level, often via separate streams	Early vocational exposure from Grade 6 (“bagless days”), later credit-bearing vocational pathways under NCrF
Teacher education	Emphasis on improving teacher quality; creation of DIETs, CTEs, IASEs; in-service training	Four-year integrated B.Ed. as minimum qualification by 2030; National Professional Standards for Teachers; continuous PD via blended modes
Higher education structure	Affirmed 10+2+3; affiliating university model largely unchanged	Multidisciplinary universities and autonomous degree-granting colleges; phased reduction of large affiliating systems
Undergraduate programmes	3-year UG norm; limited flexibility; rigid entry–exit	Flexible 4-year UG with multiple entry–exit (certificate/diploma/degree), creditized internships, research option
Credit system & mobility	Limited credit transfer; credits mostly locked within institutions	Academic Bank of Credits (ABC) and National Credit Framework (NCrF) for credit portability, stackable credentials, and lifelong learning
Regulation of higher education	Multiple overlapping regulators (UGC, AICTE, etc.) combining funding and regulation roles	Proposed Higher Education Commission of India (HECI) with 4 verticals: NHERC (regulation), NAC (accreditation), HEGC (funding), GEC (standards)
Quality assurance (HE)	NAAC created later; quality assurance not fully integrated into a unified architecture	Accreditation central to HE architecture; NAC under HECI; autonomy and funding linked to accreditation and outcomes
Research & innovation	Research addressed but without a single, unified national funding architecture	National Research Foundation (NRF) to fund and catalyse research across disciplines and institution types
Technology in education	Educational TV/radio; audio-visual aids; ET cells in NCERT/states	Strong EdTech and DPI focus: DIKSHA, SWAYAM, PM eVidya, NDEAR, NETF; emphasis on open standards, platforms, and data use
Data & governance	Administrative statistics and inspections; limited integration of data systems	Interoperable digital registries (NDEAR), platform analytics, ABC logs; dashboards for UDISE+, AISHE, NIRF; emphasis on data governance
Equity & inclusion focus	Emphasis on equalizing opportunity; special programmes for women, SC/ST, minorities	Broader SEDG (Socio-Economically Disadvantaged Groups) lens; inclusion-by-design (multilingual, offline-first, accessible), disaggregated monitoring
Adult and continuing education	Major focus on adult literacy and campaigns (e.g., National Literacy Mission)	Adult education reframed as lifelong learning, with flexible credit pathways under NCrF/ABC; less focus on mass literacy campaigns alone
Governance & decentralization	Advocated decentralization, Panchayati Raj role, community participation	Continues decentralization; adds strong emphasis on institutional autonomy, transparent regulation, and digital governance
Time horizon & targets	Universalization of elementary education; reducing dropouts; improving quality (without concrete long-range GER targets)	Time-bound targets: universal FLN by ~2026–27; GER in higher education to 50% by 2035; full realization of vision by 2040

2.1 International Comparators

NEP 2020’s outcomes-orientation and flexibility align with global shifts toward outcomes-based and competency-based education. Outcomes-based curricula articulate clear learning outcomes and align pedagogy and assessment to those outcomes; international frameworks such as the OECD Learning Compass 2030 [13] and the PISA assessment frameworks [14] have pushed systems toward competencies (e.g., literacy, numeracy, problem-solving, global competence) and performance-based assessments. Competency-based curriculum design, widely discussed in UNESCO-IBE guidance, emphasizes mastery, progression on demonstrated competence, and authentic assessment [15]. In higher education, credit portability and recognition of prior learning are institutionalized through systems like the European Credit Transfer and Accumulation System (ECTS) [16] enabling student mobility, modular learning, and stackable credentials. India’s ABC and the National Credit

Framework (NCrF) mirror these ideas by integrating school, skilling, and higher-education credits and enabling multi-entry/exit pathways [17]. Engineering accreditation's adoption of outcomes-based education through the National Board of Accreditation (NBA) and Washington Accord membership further anchors the Indian shift to outcomes and competencies in professional education [18]. On the school side, CBSE's move toward competency-based question items and assessment patterns signals alignment with NEP's assessment reforms.

2.2 Implementation Science Lenses

To analyse policy-to-practice dynamics, we draw on two complementary lenses. First, the CIPP (Context–Input–Process–Product) evaluation model [19] provides a structured way to examine NEP implementation:

- Context: state/institutional needs, equity gaps, language ecology
- Inputs: resources, teacher capacity, data systems
- Processes: curricular realignment, teacher development, assessment pilots, ABC operations
- Products: early outcomes on FLN, GER, accreditation coverage, credit transactions

Second, the Consolidated Framework for Implementation Research (CFIR) [20] offers following constructs to interpret variation:

- Intervention characteristics: complexity of multi-entry/exit and ABC operations
- Inner setting: institutional culture/capacity in HEIs and schools
- Outer setting: federal policy, funding, accreditation and regulatory environments
- Characteristics of individuals: teachers, administrators
- Process: planning, engaging, executing, reflecting/evaluating

While our main analysis uses CIPP and CFIR, we acknowledge complementary perspectives:

1. Lipsky's "street-level bureaucracy" highlights how frontline discretion—of teachers, principals, and college administrators—shapes how policy is enacted under resource and accountability pressures [21].
2. Theory of Change/Logic Model guidance helps make explicit the assumed causal pathways from inputs/activities to outputs/outcomes/impact, and where measurement is needed [22].

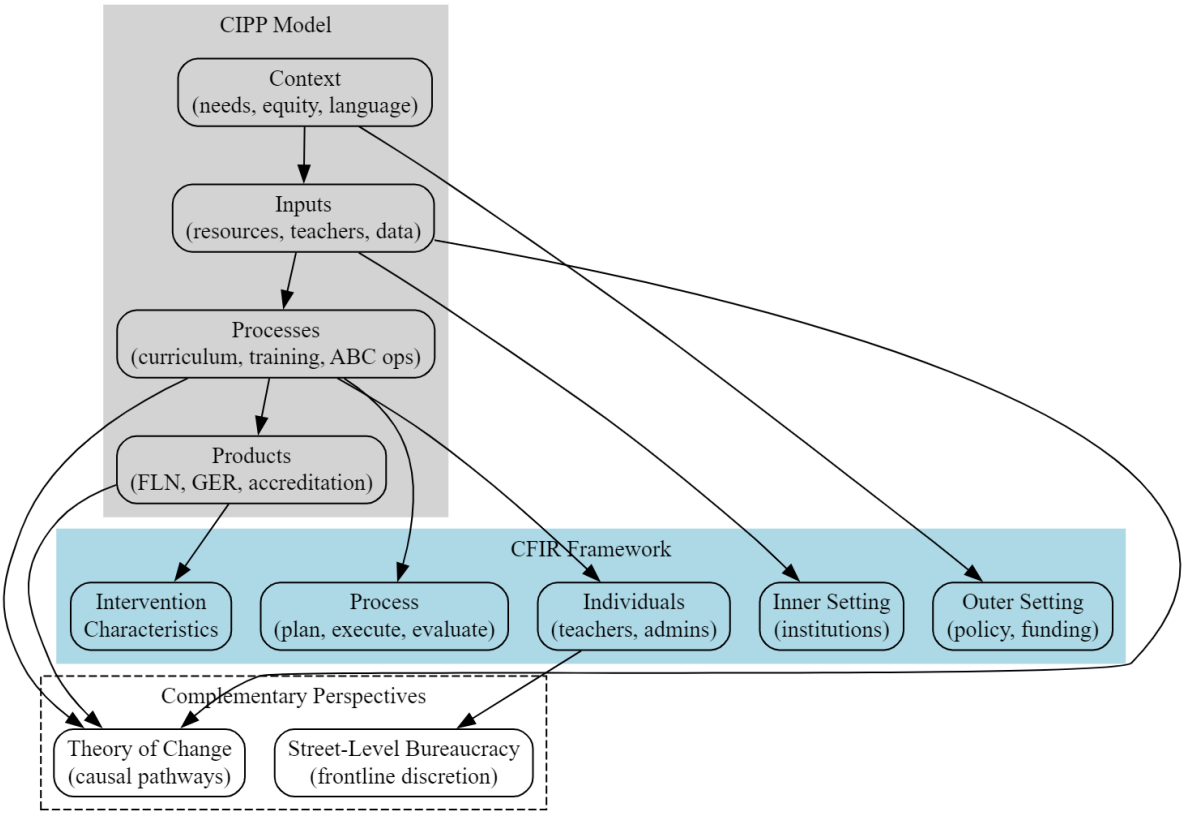

Figure 1: Implementation Science Lenses

2.3 EdTech and Governance Literature

NEP's technology agenda combines a governance institution (NETF) with digital public infrastructure and platforms (e.g., DIKSHA, SWAYAM) to scale high-quality content, teacher professional development, and multilingual learning resources. DIKSHA's role during COVID-19 has been documented as an example of digital public infrastructure for education—leveraging open standards, interoperability, and state customization to reach diverse learners and teachers at scale [23].

The National Digital Education Architecture (NDEAR) presents a reference architecture for federated, interoperable education systems—defining data registries, consent layers, and building blocks for content, assessment, and credentials—intended to support NEP's goals (e.g., credit portability, assessment reform, multilingual content) while addressing privacy and inclusion [24]. On the higher-education side, NEP's proposed HECI aims to unbundle functions (regulation, accreditation, funding, standards) into separate, coordinated verticals—an instance of federated regulation intended to reduce conflicts of interest and enhance accountability and transparency. Earlier drafts such as the 2018 HECI bill outline design intents, while contemporary UGC regulations operationalize specific elements like the ABC and curriculum/credit frameworks. This edtech-and-governance literature underscores two recurrent themes for implementation:

(i) the need for open standards and interoperable data systems to realize portability and scaling
(ii) the centrality of inclusion—multilingual content, offline-first designs, and accessibility—so digital initiatives reduce, rather than exacerbate, divides.

III. NEP 2020: PROVISIONS AND IMPLEMENTATION ARCHITECTURE

3.1 School Education

NEP 2020 reorganizes schooling into a 5+3+3+4 curricular–pedagogical structure aligned with developmental stages: five years of Foundational (3 years of pre-primary/ECCE + Grades 1–2), three years of Preparatory (Grades 3–5), three years of Middle (Grades 6–8), and four years of Secondary (Grades 9–12). Universal, high-quality Early Childhood Care and Education (ECCE) is to be provided through strengthened Anganwadis, pre-schools, and school-based Balavatikas, with a national curricular framework for ECCE led by NCERT [1]. Foundational Literacy and Numeracy (FLN) is prioritized via the NIPUN Bharat mission, which targets FLN attainment by Grade 3 (with intermediate benchmarks) through teacher support, appropriate materials, and local languages of instruction [2]. Mother-tongue/home language instruction is recommended, where possible, at least until Grade 5 to improve comprehension and learning outcomes, with multilingual exposure thereafter. The policy proposes "school complexes/clusters" to share resources (teachers, vocational instructors, counsellors, libraries/labs) across proximate schools to improve efficiency and equity, particularly in rural and small schools. Vocational education is to be integrated from Grade 6 with internships, exposure to local crafts/trades, and a gradual increase in the share of students receiving vocational experiences by 2025. Assessment reforms shift from rote/intensive summative exams to competency-based assessments emphasizing application, analysis, and formative feedback; a new national assessment centre "PARAKH", within NCERT will set norms, standards, and guidelines for student assessment and evaluation across boards. The "holistic progress card" replaces one-dimensional report cards with multi-modal, 360-degree feedback on cognitive and socio-emotional domains, and "bagless days" encourage experiential learning, art/sports, and vocational exposure. Digital public platforms such as DIKSHA and PM eVidya (TV channels, radio, digital repositories) support multilingual content, teacher professional development, and continuity of learning, with attention to accessibility and offline options.

3.2 Higher Education

NEP 2020 envisions a higher-education ecosystem of vibrant multidisciplinary universities and autonomous degree-granting colleges, phasing out the affiliating college model over 15 years and raising the Gross Enrolment Ratio (GER) to 50% by 2035. Undergraduate education will be flexible and modular, with four-year UG programmes (FYUP) offering multiple entry–exit options and appropriate certifications/diplomas/degrees at exit points. The Academic Bank of Credits (ABC) is to enable credit portability and accumulation across institutions and modalities (including online), anchored in common nomenclature and credit frameworks (e.g., CCFUP, National Credit Framework).

A new regulatory architecture, the Higher Education Commission of India (HECI), will consolidate and unbundle functions into four verticals:

1. National Higher Education Regulatory Council (NHERC) for regulation
2. National Accreditation Council (NAC) for accreditation
3. Higher Education Grants Council (HEGC) for funding
4. General Education Council (GEC) for learning outcomes/qualification frameworks

Professional standard-setting bodies will continue to define programmatic norms in their domains. The policy proposes Model Multidisciplinary Education and Research Universities (MERUs) as exemplars of high-quality research-intensive institutions, and a National Research Foundation (NRF) to catalyse and fund

research across disciplines, now legislated via the Anusandhan NRF Act (2023) [4]. Internationalization is to be facilitated through credit recognition, joint/dual degrees, and enabling world-class foreign institutions to operate in India under clear regulatory norms; in parallel, Indian HEIs are encouraged to expand high-quality international partnerships and programmes. Digital platforms such as SWAYAM and credit recognition mechanisms are intended to mainstream high-quality online/blended courses (with appropriate proctoring/assessment safeguards) into degree pathways.

3.3 Cross-Cutting Enablers

Teacher education is to be overhauled, with a four-year integrated B.Ed. (by 2030) as the minimum qualification for school teachers, complemented by National Professional Standards for Teachers (NPST) and continuous professional development through blended modalities. Technology enablement is coordinated via a National Educational Technology Forum (NETF) to advise on policy, standards, and best practices; open, interoperable digital public infrastructures (e.g., DIKSHA, NDEAR) are intended to support content, assessment, and credentialing at scale while safeguarding privacy and inclusion. Inclusion is foregrounded through targeted measures for socio-economically disadvantaged groups (SEDGs)—including scholarships, hostel/school infrastructure, language support, and flexible pathways—to ensure access, participation, and learning across schooling and higher education. PM eVidya complements these efforts with "One Class, One Channel" TV, radio/community radio, and special e-content for children with disabilities. In higher education, the GEC/NHEQF and ABC/NCrF aim to integrate general/vocational/skilling credits, support lifelong learning, and enable flexible, stackable credentials across formal and non-formal routes.

3.4 Implementation Architecture: Timelines, Roles, Funding, Governance

NEP 2020 outlines a phased implementation over the coming decade(s), with milestones such as universal FLN by 2026–27, teacher education reforms by 2030, the transition to multidisciplinary/autonomous HEIs and phasing out affiliation by ~2035, and GER targets by 2035; full realization is envisaged by 2040 [1, 2]. Implementation is federal and multi-actor. At the Union level, the Ministry of Education (MoE) sets policy, issues guidelines/regulations (often via UGC/AICTE/NCTE), funds centrally sponsored schemes, and steers national institutions (NCERT, PARAKH, NETF, NRF). States/UTs adapt and execute through State Departments of Education, SCERTs/SCF-aligned curricula, school complexes, recruitment/training, and state higher-education councils; Boards (CBSE/State Boards) align assessment practices with competency-based standards [25]. HEIs implement FYUP/multiple entry–exit, ABC integration, curricular redesign to learning outcomes (GEC/NHEQF), autonomy pathways, and accreditation readiness; regulatory transition toward HECI will demand coordinated change management in UGC/AICTE/NAAC ecosystems. Funding channels include Samagra Shiksha [26] for school education (ECCE/FLN, teacher development, infrastructure, inclusive education), RUSA [27] for state higher-education strengthening and autonomy/accreditation, targeted central sector schemes (e.g., NRF grants), and state budgets; digital/public platforms are resourced via MoE/MeitY initiatives such as DIKSHA, PM eVidya [28]. Governance changes emphasise unbundling of regulatory functions (HECI), standardized outcomes/credit frameworks (GEC/NCrF/CCFUP/ABC), and digital public goods (DIKSHA/NDEAR) to enable portability, scale, and trust, coupled with equity safeguards (multilingual content, offline-first designs, accessibility).

NEP 2020's outcomes-orientation and flexibility align with global shifts toward outcomes-based and competency-based education. Outcomes-based curricula articulate clear learning outcomes and align pedagogy and assessment to those outcomes; international frameworks such as the OECD Learning Compass 2030 [13] and the PISA assessment frameworks [14] have pushed systems toward competencies (e.g., literacy, numeracy, problem-solving, global competence) and performance-based assessments. Competency-based curriculum design, widely discussed in UNESCO-IBE guidance, emphasizes mastery, progression on demonstrated competence, and authentic assessment [15]. In higher education, credit portability and recognition of prior learning are institutionalized through systems like the European Credit Transfer and Accumulation System (ECTS) [16] enabling student mobility, modular learning, and stackable credentials. India's ABC and the National Credit Framework (NCrF) mirror these ideas by integrating school, skilling, and higher-education credits and enabling multi-entry/exit pathways [17]. Engineering accreditation's adoption of outcomes-based education through the National Board of Accreditation (NBA) and Washington Accord membership further anchors the Indian shift to outcomes and competencies in professional education [18]. On the school side, CBSE's move toward competency-based question items and assessment patterns signals alignment with NEP's assessment reforms.

IV. IMPLEMENTATION STATUS AND EARLY OUTCOMES

This section synthesizes early implementation signals for NEP 2020 using administrative series (UDISE+, NAS, AISHE, NIRF), regulatory and platform dashboards (ABC, DIKSHA/SWAYAM), and policy circulars.

4.1 National Snapshot: School Education

- Foundational years (ECCE and FLN): UDISE+ shows continued growth in pre-primary sections attached to schools and co-located Anganwadis, consistent with the ECCE thrust, though coverage and quality vary across states/UTs. NIPUN Bharat has catalysed FLN-focused teacher training and materials; NAS 2021 provides a baseline on early-grade proficiency for subsequent comparison as states roll out FLN interventions and NCF-aligned curricula.
- Language and pedagogy: Several states/UTs have notified mother-tongue/regional language as medium of instruction in early grades and are developing bilingual materials; alignment to NCF 2023 is ongoing. Evidence on classroom uptake is still emerging through state monitoring and independent studies.
- School complexes/clusters: States have notified clustering frameworks and initiated consolidation, especially in rural/small schools, with UDISE+ reflecting early formation in select jurisdictions. Benefits (shared resources, specialist teachers) are contingent on transport, timetabling, and local governance capacity.
- Vocational integration: Exposure from Grade 6 (bagless days, local crafts) and gradual vocational offerings are visible in state circulars and Samagra Shiksha workplans; consistent tracking indicators (share of students with exposure/certification) are still maturing.
- Assessment reforms: Boards (e.g., CBSE) have increased the share of competency-based items, signalling movement toward NEP's assessment vision; PARAKH under NCERT has been notified to set norms and support alignment across boards. States are piloting holistic progress cards and school-level assessment reforms, with heterogeneous readiness.
- Digital public infrastructure: DIKSHA/PM eVidya usage spiked during COVID-19 and has stabilized at higher-than-pre-pandemic levels; multilingual content growth, QR-coded textbooks, and teacher professional development are notable, but device/connectivity constraints persist for disadvantaged students. NDEAR building blocks are being adopted by some states to improve interoperability and governance.

4.2 State-Level Variation

Implementation reflects India's federal diversity. Early adopters typically pair clear notifications (e.g., competency-based assessment, school complexes), front-loaded capacity building, and data/reporting pipelines (e.g., DIKSHA telemetry, FLN monitoring). Others are in groundwork stages (curriculum realignment to NCF 2023, teacher training scale-up, assessment pilots). Variants include different clustering models, language policies adapted to local ecologies, and phased vocational rollouts. Cross-state comparisons are currently constrained by indicator availability and definitional heterogeneity; harmonized KPIs under PARAKH/NCF and Samagra reporting would improve comparability [27].

4.3 Higher Education: Restructuring, Flexibility, and Quality Assurance

- FYUP and curriculum frameworks: Following UGC's Curriculum and Credit Framework for Undergraduate Programmes (CCFUP), many HEIs have notified four-year UG structures with multiple entry–exit options, academic advising, and creditized internships/skills modules. Adoption is phased and varies by governance type (central/state/private) and disciplinary mix; alignment to learning outcomes and assessment practices is a work in progress [29].
- Academic Bank of Credits (ABC): The ABC has expanded registrations and credit transaction capabilities, enabling limited portability across institutions and modalities (including SWAYAM). Growth trajectories differ by state and HEI type; operational issues include common course/catalogue taxonomies, credit equivalence, re-admission rules, and student/user interfaces [3].
- Accreditation and autonomy: NAAC coverage continues to expand, but capacity constraints create bottlenecks for rapid scaling; NIRF participation has increased, indicating greater transparency and benchmarking. The proposed HECI's unbundled model will require coordinated change management across NHERC/NAC/HEGC/GEC once legislated/operationalized [1].
- Internationalization and online/blended learning: UGC regulations on academic collaboration and foreign HEIs in India provide enabling conditions; institutions are piloting joint/dual degrees and expanding credit recognition for SWAYAM MOOCs under proctored assessment norms.
- Research ecosystem: The Anusandhan National Research Foundation Act establishes a statutory basis for scaled research funding and collaboration; downstream implementation (governance, calls, peer review) will shape outcomes [4].

4.4 Technology and Inclusion Across Tiers

- Platforms and interoperability: DIKSHA's QR-textbook model, content repositories, and analytics support teacher PD and student learning; NDEAR provides an architectural blueprint for federated,

standards-based systems (registries, consent, credentials) that can underpin assessment and credit portability.

- Equity safeguards: PM eVidya's 'One Class, One Channel', community radio, and accessible content for CwD aim to mitigate divides; sustained attention to device access, offline-first design, accessibility standards, and multilingual content remains essential for inclusion [30].
- Data governance: Initiatives to improve data quality/lineage (UDISE+, ABC logs), consent, and interoperability (NDEAR, GEC/NCrF schemas) are foundational to trust and scaling; privacy-by-design and role-based access practices are needed as data use expands.

Table 2: Digital Public Infrastructure & Governance

DIKSHA	QR-coded textbooks, content repository, teacher PD, analytics
SWAYAM	MOOCs with credit recognition for HEIs
PM eVidya	"One Class, One Channel" TV, radio, digital content, CwD content
NDEAR	registries, consent, credential building blocks; interoperability
NETF	advisory on EdTech policy and standards
ABC	credit registry enabling portability across institutions / modes

4.5 Emerging Risks and Bottlenecks

Common challenges include teacher vacancies and capacity for new pedagogies/assessments; alignment of textbooks and assessments to competency-based curricula; transport/timetabling issues in school complexes; accreditation throughput for HEIs; ABC operational harmonization (catalogues, re-entry rules, grievance redressal); and digital divides (devices, connectivity, accessibility). Data issues—reporting lags, definitional changes, uneven coverage—limit near-real-time implementation tracking. These risks argue for phased rollouts with feedback loops, clear KPIs, and investment in capacity building and digital public goods.

V. DISCUSSION

This section interprets early implementation signals through the evaluation lenses outlined earlier—CIPP (Context–Input–Process–Product) and CFIR—while foregrounding equity, system-level effects, and lessons from international experience. We focus on what the emerging patterns suggest for the feasibility and trajectory of NEP 2020's reforms, and for the design choices that can improve adoption, fidelity, and outcomes.

5.1 Interpreting Early Signals via CIPP

- Context: India's linguistic diversity, uneven digital access, and wide inter-state variation in administrative capacity and financing shape implementation possibilities in both school and higher education. Mother-tongue instruction, for instance, is contextually appropriate but demands differentiated language ecologies, materials, and teacher support across states and within multilingual districts. Digital divides documented during COVID-19 continue to condition the reach and effectiveness of DIKSHA/PM eVidya and related platforms, especially for socio-economically disadvantaged groups (SEDGs).
- Inputs: Persistent teacher vacancies, limited time for continuous professional development (CPD), and nascent assessment design capacity constrain the speed at which ECCE/FLN and competency-based pedagogy can spread system-wide. On the higher-education side, accreditation and advising capacity, student information systems (SIS) modernization, and ABC integration represent key input bottlenecks for FYUP and multiple entry–exit reforms.
- Processes: Early movement is visible on several fronts: competency-based items in board examinations (CBSE/state boards), formation of school complexes in select states, phased FYUP adoption, ABC registrations/credit transactions, and growing use of DIKSHA/SWAYAM. However, process fidelity is uneven. Curriculum–textbook–assessment alignment lags in some jurisdictions, school complex logistics (transport/timetabling) remain challenging, and ABC operations require harmonized catalogues and equivalence rules to function smoothly at scale.
- Products (early outcomes): Given the policy's time horizon, measurable system-level outcomes are nascent. Proximate "products" include increased NIRF participation, expanding NAAC coverage, ABC account growth, competency-based assessment pilots, and stabilized post-pandemic usage of digital platforms. Longer-term outcomes (FLN proficiency, GER increases, quality improvements) will require longitudinal tracking with disaggregation by subgroup to assess equity.

5.2 CFIR Perspective: Complexity, Settings, and Process

- Intervention characteristics: Many NEP reforms are complex, with multiple interdependent components—e.g., FYUP with multiple entry–exit relies on academic advising, cataloguing, assessment redesign, and ABC rails; competency-based assessment depends on curriculum realignment, item-writing capacity, and PARAKH support. Complexity heightens the importance of phased pilots and implementation toolkits.
- Inner setting: Institutional culture, leadership, and IT/process maturity in schools and HEIs influence uptake. Early adopters commonly exhibit strong leadership, preexisting digital infrastructure, and active communities of practice (teachers, deans/registrars), enabling faster localization of guidelines (NCF/CCFUP).
- Outer setting: Federal policy, funding (Samagra/RUSA), and regulation (UGC/AICTE; NAAC) shape incentives and capacity. The proposed HECI's unbundling aims to clarify roles and reduce conflicts of interest, but transition management will be pivotal.
- Process: States/HEIs that emphasize stakeholder engagement (teachers, principals, students), structured planning (roadmaps with milestones), and iterative reflection (monitoring dashboards, course corrections) appear to report smoother implementation, consistent with CFIR's "engaging" and "reflecting/evaluating" constructs.

5.3 Equity Lens: Opportunities and Cautions

NEP's emphasis on multilingualism, FLN, vocational exposure, and flexible pathways can advance inclusion if resourced and designed for SEDGs. Bilingual/local-language materials and teacher support are essential to avoid disadvantaging non-dominant language groups; school complexes can expand access to specialists and labs if transport/timetabling barriers are addressed; vocational pathways and recognition of prior learning (within NCrF/ABC) can open doors for first-generation learners; and digital public infrastructure must prioritize offline-first, accessible, multilingual content to ensure participation by low-income and disabled learners [15, 31]. Disaggregated KPIs (e.g., FLN proficiency by subgroup; ABC usage by gender, caste, rurality) should be embedded in monitoring to prevent averaging away gaps.

5.4 System-Level Effects and Unintended Consequences

Large-scale change can create new frictions. In schools, premature shifts to competency-based assessments without aligned textbooks and teacher support risk "teaching to unfamiliar tests" or superficial compliance. In higher education, credit portability without harmonized taxonomies, robust advising, and grievance redressal can produce student confusion and administrative burden. Accreditation throughput limits may slow autonomy and restructuring, and expanding reporting requirements (UDISE+/AISHE/NIRF/NAAC) can increase administrative load unless digitized and streamlined (NDEAR-style registries and APIs). These risks argue for pacing reforms with capacity, simplifying frontline workflows, and investing in shared digital rails.

5.5 International Comparators: Adaptation, not Transplantation

NEP's outcomes/competency orientation and credit portability echo international trends (OECD Learning Compass [32]; PISA's performance-based assessments [33]; ECTS/AQF [34]; outcomes-based accreditation under the Washington Accord [35]). India's ABC/NCrF and GEC/NHEQF are consistent with modular learning and stackable credentials. However, policy borrowing must be adaptive: multilingual contexts, federal diversity, and scale require bespoke governance (e.g., federated data architectures via NDEAR), equity safeguards, and locally relevant assessments. International experience reinforces the need for alignment across curriculum, assessment, and teacher development, and for robust quality assurance and recognition systems to make mobility meaningful.

5.6 Governance and Data: Building Trustworthy, Interoperable Systems

Implementing NEP's flexibility and accountability requires interoperable, privacy-preserving data systems. NDEAR's building blocks (registries, consent, credentials) can underpin assessment (PARAKH), credit (ABC), and programme quality (NAAC/NIRF) if widely adopted with open standards and role-based access controls aligned to India's data-protection law [36]. The proposed HECI can clarify roles and reduce regulatory overlap if coordination mechanisms across its verticals (NHERC/NAC/HEGC/GEC) and with professional councils are well-designed. Publishing model/data cards for assessments and administrative indicators (definitions, lineage, limitations) would strengthen transparency and comparability across states and institutions, mirroring good practice in other sectors.

5.7 A Practical Theory of Change

A logic-model view suggests that near-term investments—teacher capacity (NPST-aligned CPD), item-writing and assessment literacy, advising and SIS modernization, accreditation mentoring, and digital public goods (DIKSHA/NDEAR/ABC rails)—are the highest-leverage inputs to unlock process fidelity (competency-based instruction/assessment, credit portability) and, over time, outcomes (FLN, GER, programme quality) [37]. Embedding equity constraints in design (multilingual/offline-first, disability access, targeted scholarships/hostels) helps ensure that gains are broadly shared.

Overall, the early picture is one of purposeful movement with heterogeneous readiness. The implementation science lenses used here highlight that success will hinge less on the elegance of policy design and more on disciplined execution: pacing reforms with capacity; aligning curriculum, assessment, and teacher development; simplifying frontline workflows; investing in interoperable, privacy-preserving digital rails; and measuring what matters—disaggregated outcomes tied to NEP's core aims of equity, quality, and flexibility.

VI. RECOMMENDATIONS AND IMPLEMENTATION ROADMAP

This section proposes a phased roadmap to translate NEP 2020's provisions into implementable actions. Recommendations are organized by time horizon—short term (0–2 years), medium term (3–5 years), and long term (5+ years)—and by tier (school, higher education, cross-cutting technology and governance). Actions are aligned with the provisions and implementation architectures discussed earlier and grounded in the CIPP/CFIR lenses and equity considerations.

6.1 Short-Term Priorities (0–2 years)

School education

- FLN acceleration: scale NIPUN Bharat with classroom-embedded mentoring, multilingual materials, and periodic low-stakes formative assessments aligned to foundational competencies; publish FLN "progress profiles" by subgroup to keep equity visible.
- Competency-based assessment pilots: under PARAKH's guidance, run item-writing workshops, build calibrated item banks, and pilot holistic progress cards in diverse districts; ensure curriculum–textbook–assessment alignment before high-stakes changes.
- School complexes: operationalize clusters with transport micro-plans, shared timetables, and role descriptions (e.g., complex head); prioritize labs/libraries/counselling hubs that serve multiple schools.
- Vocational exposure: initiate "bagless days" and local craft/industry partnerships from Grade 6 with basic safety protocols; define simple tracking metrics (share of students with exposure, hours, partner types).
- Inclusion enablers: expand PM eVidya reach (TV/community radio), DIKSHA QR-textbooks and multilingual content, and accessible formats for CwD; equip community access points (libraries/schools) for offline-first use.

Higher education

- FYUP readiness: publish HEI-level roadmaps for four-year programmes with course templates, creditized internships, and assessment rubrics; pilot multiple entry–exit with clear advising protocols and transcript formats.
- ABC integration: register students/faculty, integrate SIS with ABC via APIs, harmonize course/credit catalogues, and adopt grievance redressal and re-admission policies; publish usage dashboards.
- Accreditation throughput: expand NAAC mentorship, peer-reviewer pools, and digital workflows to reduce queues; prioritize first-time applicants and autonomy-seeking HEIs.
- - Internationalization scaffolds: implement UGC collaboration/joint/dual degree regulations with model MoUs and credit-mapping guides; pilot SWAYAM credit transfers with proctored assessments.

Cross-cutting (tech and governance)

- NPST-aligned CPD: provide modular, blended training with school-embedded coaching; digitize micro-credentials on DIKSHA; align teacher appraisal to developmental goals, not compliance only.
- NDEAR adoption: implement registries (institutions, staff, learners), consent layers, and credential building blocks; standardize data schemas and APIs to reduce reporting friction (UDISE+/AISHE/NIRF/NAAC).
- KPI compact and model/data cards: agree on a minimum KPI set for states/HEIs (definitions, disaggregation, update frequency); publish model/data cards for assessments and administrative indicators (assumptions, lineage, limitations).
- Funding compacts: tie portions of Samagra/RUSA funds to agreed process milestones (e.g., item bank readiness, ABC integration) with equity safeguards; avoid high-stakes output targets that risk gaming.
- Privacy and accessibility by design: align systems to the Digital Personal Data Protection Act (DPDP); adopt accessibility standards (WCAG-inspired) and vernacular UIs across platforms.

6.2 Medium-Term Actions (3–5 years)

School education

- Scale competency-based assessment: after piloting, revise board blueprints with PARAKH, expand item banks, and train master assessors; embed school-based assessment with moderation to reduce high-stakes pressure.
- Deepen complexes: add specialist itinerant teachers (arts/sports/vocational), lab coaches, and counsellors shared across complexes; monitor access/equity of shared services.
- Vocational pathways and RPL: introduce credit-bearing vocational courses with Recognition of Prior Learning (RPL) linkages to NCrF; connect students to local skilling ecosystems.

Higher education

- Institutional restructuring: progress toward multidisciplinary, autonomous HEIs; rationalize affiliation in line with state roadmaps; invest in academic advising and career services at scale.
- Strengthen quality assurance: transition to NAC (under HECI, when legislated) with calibrated, risk-based accreditation; integrate programme outcomes (GEC/NHEQF) into review cycles.
- Research funding and culture: operationalize NRF calls across disciplines, build grant-management capacity in HEIs, and support research infrastructure and doctoral training.

Cross-cutting

- Interoperable credentials: adopt digital learner wallets for credits/qualifications aligned to ABC/NCrF; enable trusted verification for employers and cross-border recognition.
- Data use for improvement: institutionalize data use in PLCs (teacher communities) and academic councils (HEIs) with protected time and simple tools; publish disaggregated progress to sustain equity focus.

6.3 Long-Term Consolidation (5+ years)

- Outcomes focus with equity: track FLN, secondary completion, GER, and graduate outcomes with subgroup disaggregation; commission independent evaluations of major reforms (FYUP/ABC, competency-based assessment).
- Mature, federated governance: complete transition to HECI verticals and NAC; stabilize roles across councils; maintain open standards and public dashboards for regulation, accreditation, and funding decisions.
- Lifelong and flexible learning: mainstream stackable credentials across general/vocational tracks; sustain internationalization with robust quality assurance and credit recognition.

6.4 Monitoring and Learning System

- Dashboards and learning reports: operate national/state/HEI dashboards with a small KPI set; publish annual "learning reports" explaining trends, gaps, and course corrections (not just scorecards).
- Audit trails and grievance redressal: ensure ABC, accreditation, and assessment systems have transparent logs, appeals processes, and user support; use helpdesks and chatbots in local languages.
- Independent capacity and evaluation: fund item-writing, assessment design, accreditation peer pools, and independent evaluation units to reduce implementation risk and conflict of interest.

6.5 Risks and Mitigations

- Capacity risk: sequence reforms and fund training/mentoring; use communities of practice to scale expertise.
- Fragmentation risk: enforce open standards via NDEAR; reduce duplicate reporting by integrating registries and APIs.
- Equity risk: mandate disaggregated KPI reporting and equity-linked funding; co-design materials and UIs with SEDGs; ensure device/connectivity access via community hubs.
- Data/privacy risk: implement consent, minimization, role-based access; conduct DPIAs for major systems; align with DPDP Act.
- Policy drift: maintain a public implementation calendar and feedback forums; publish versioned guidelines and change logs to manage transitions.

Collectively, this roadmap emphasizes disciplined sequencing, capacity building, interoperable digital rails, and continuous learning. By aligning funding and governance with a small, equity-aware KPI set, and by privileging multilingual, accessible design, India can translate NEP 2020's policy intent into durable practice at scale.

VII. CONCLUSION

NEP 2020 presents a coherent and ambitious blueprint to transform India's education system toward equity, quality, flexibility, and multidisciplinary learning. Early progress is visible across both school and higher education—through ECCE and FLN initiatives, competency-based assessment pilots, the rollout of FYUP and multiple entry–exit options, and expanding use of digital public infrastructure such as DIKSHA and the Academic Bank of Credits. However, the realization of the policy's promise depends less on its design and more on disciplined, well-sequenced implementation. Persistent teacher vacancies, alignment gaps between curriculum and assessment, institutional capacity constraints, accreditation bottlenecks, and system-integration challenges highlight the need for sustained capacity building and coordinated change management.

Digital public infrastructure, privacy-aligned data governance, and inclusion-by-design approaches are critical enablers for scaling reforms without deepening inequities. Equity must remain central through disaggregated monitoring, targeted academic and financial supports, and multilingual, accessible learning systems. A phased roadmap—combining short-term pilots, medium-term consolidation of reforms, and long-term regulatory and credentialing transformation under HECI—can support steady progress. Ultimately, NEP 2020's success will hinge on aligning stakeholders around measurable priorities, investing in teachers and institutional capacity, and building interoperable, feedback-driven systems that continuously improve policy-in-practice over the coming decade.

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