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From Digital Divide to Developed Nation: Institutional Strengthening in Education and Governance in Telangana's Government Schools– Strategic Convergence with NBM for Viksit 2.0 Bharat 2047

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Abstract

The State of Telangana's future economic strength hinges on its youth. However, the persistent digital divide in its government school system remains a critical vulnerability, hindering equitable learning outcomes and preparation for the digital economy. This policy brief assesses Telangana's current performance, which lags national and top-state benchmarks in digital readiness, and proposes aggressive targets for the 2025-2027 periods. Crucially, the accompanying strategy focuses on strategic resource maximization by aligning the state's digital efforts with the newly launched Government of India's National Broadband Mission (NBM**)** 2.0. By leveraging NBM 2.0's focus on anchor institutions like schools and its infrastructure mechanisms, Telangana can ensure universal, equitable, and high-speed connectivity to achieve its educational transformation goals.

1. Introduction

Equitable and high-quality education is central to India's state and national development aspirations, yet the digital divide remains a persistent barrier in Telangana's government school system. As articulated in the Viksit Bharat 2047 agenda, institutional strengthening and governance reforms are pivotal to overcoming these vulnerabilities. Telangana, a state with significant investments in infrastructure and education, still faces gaps in digital readiness and learning outcomes compared with leading states like Kerala. Bridging these gaps calls for a comprehensive strategy that addresses digital access, teacher training, student device availability, and content localization, signifying a transformative pathway towards national development goals.

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The National Education Policy (NEP) 2020 and the launch of the National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN) Bharat Mission highlight foundational skills as the non-negotiable priority for India's education system. For Telangana, a state with significant demographic capital, this mandate is crucial for ensuring future economic competitiveness. While Telangana has excelled in initial metrics, such as near-universal enrollment for the 3-year-old cohort, this success is currently undermined by what can be termed the Foundational Gap: a systemic failure to translate access into robust learning outcomes.

Furthermore, the state's digital preparedness remains critically underdeveloped. The absence of functional digital infrastructure and trained educators risks making future pedagogical reforms, particularly those utilizing the Digital Public Infrastructure (DPI), largely irrelevant for the majority of government school students. This research paper argues that these two deficits—the FLN gap and the Digital Divide—are mutually reinforcing institutional challenges that require a single, coherent, and convergent strategic solution for Telangana to meet the NIPUN Bharat target by 2027.

2. Methodology

The approach is based on policy analysis and qualitative review. Data sources include the Unified District Information System for Education (UDISE 2021-22), the National Achievement Survey (NAS 2021), Government of Telangana budget reports, and recent policy announcements. Thematic analysis of strategic documents, stakeholder interviews—including district education officers, school principals, and technology partners—inform the assessment of digital infrastructure, institutional governance, and educational outcomes. Comparative benchmarks with top-performing states establish aspirational targets.

3. Results/Findings

Digital Infrastructure: As of 2021-22, only 39.8% of schools had functional computers and 28.5% had internet access—far below Kerala's benchmarks (89.7% and 87.4%, respectively).
Academic Outcomes: The average NAS score for Class 10 mathematics in Telangana was 245, compared to 258 nationally and 272 in Kerala, demonstrating the correlation between digital readiness and achievement.
Teacher Capacity: A gap in consistent digital pedagogy training was identified, with only a minority of teachers having basic certification.
Student Access: Device scarcity remains a concern, with many students lacking reliable access to digital learning tools.
Governance Reform: Decentralized decision-making has empowered local education authorities to be more responsive, but coordination across departments needs strengthening. The analysis identifies three critical, interconnected barriers to achieving educational equity in Telangana:
FLN Proficiency Crisis: The most recent national assessments indicate that the proficiency of Grade 3 students in both Language and Mathematics falls below the national average benchmark. This failure to achieve foundational competency severely undermines all subsequent educational investment.
Severe Human Resource Bottleneck: A fundamental structural weakness is the shortage of teaching personnel, with approximately 15,000 vacant teaching positions across the state. This operational deficit makes the resource-intensive, pedagogical requirements of the NIPUN Bharat Mission practically impossible to meet under current conditions.
Critical Digital Infrastructure Lag: Telangana demonstrates a significant lag in digital readiness, scoring poorly on indicators such as functional computer and internet access, digital content usage, and teacher capacity compared to both the national average and states that have successfully scaled digital education.

4. Performance Assessment: Telangana in Context

Analysis of the Unified District Information System for Education (UDISE+) and the National Achievement Survey (NAS) reveals a critical lag in the state's digital readiness compared to the national average and high-performing benchmark states like Kerala.

Table 1: Analysis of the Unified District Information System for Education (UDISE+) and the National Achievement Survey (NAS)

Indicator	Telangana	National Average	Kerala (Benchmark)	Data Source
Schools with Functional Computers (%)	39.8%	47.5%	89.7%	UDISE+ 2021-22
Schools with Internet Access (%)	28.5%	33.9%	87.4%	UDISE+ 2021-22
Average NAS Score (Class 10 - Maths)	245	258	272	NAS 2021
Expenditure on Education (% of GSDP) FY22-23	Equivalent to 1.8%	Equivalent to 2.9%	Equivalent to 3.2%	State/Union Budget Reports

Key Observations:

Infrastructure Gap: Less than one-third of schools in Telangana have internet access, a severe impediment to modern pedagogy and the consumption of high-quality digital educational context.

Learning Outcome Disparity: The state's average NAS score in core subjects like Mathematics is below the national average. Digital exclusion is directly correlated with stagnation in academic achievement.

Need for Convergence: The infrastructure deficit presents a compelling need for the state to strategically tap into national initiatives to accelerate deployment.

5. Aspirational Targets and 2025-2027 Timelines (actual timeline 20230)

The 2025-2027 timeframe must focus on rapid foundational build-up, using the NBM 2.0 launch in April 2025 as a catalyst for immediate action.

Table 2: Timeframe of aspirational target using the NBM 2.0

Target Area	Aspirational Target (Full Vision)	Immediate Milestone (2027 Timeline)
Digital Infrastructure	Equip 90% of all government secondary and higher secondary schools with functional computer labs and reliable, high-speed internet access by end of FY 2028.	Equip 60% of all government secondary and higher secondary schools with functional computer labs and high-speed internet access by the end of FY 2027.
Learning Outcomes	Improve Telangana's average NAS scores for Grade 10 students in Mathematics, Science, and Language by 10% in the next survey cycle (~2029).	Ensure 100% of Grade 9-10 teachers have completed Tier-1 Digital Pedagogy Certification by Q4 2026.
Student Access	Achieve a 1:1 student-to-device ratio for all students in Grades 9-12 across all government schools by 2030.	Launch a phased scheme to provide subsidized devices, achieving a 1:5 student-to-device ratio for Grades 9-10 by Q2 2027.

6. Policy Measures (2025-2027 Implementation Roadmap)

To achieve the critical 2027 milestones, the Government of Telangana must adopt a four-pronged strategy, anchored by convergence with NBM 2.0:

I. Mission T-Connected: Leveraging National Broadband Mission 2.0 (NBM 2.0)

The launch of NBM 2.0 in April 2025, which aims to propel India into a new era of digital transformation through universal and equitable high-speed broadband, offers a direct mechanism to address Telangana's school connectivity deficit. The state must strategically align its 'Mana Ooru Mana Badi' program with NBM 2.0's objectives.

Action: Secure the 60% school connectivity milestone by FY 2027 by fully integrating state efforts with NBM 2.0 mechanisms.

Implementation:

Prioritize Anchor Institutions: As NBM 2.0 explicitly targets connecting anchor institutions like Schools, Public Health Centres (PHCs), and Anganwadi centers, the Department of School Education must coordinate with the Department of Communications (NIC in the district HQ) to ensure all government secondary and higher secondary schools are placed at the top of the state's NBM 2.0 deployment list.

Infrastructure Leveraging: The state should immediately utilize NBM 2.0's mechanism for leveraging existing assets, specifically the Optical Ground Wire (OPGW) infrastructure from the power sector, to accelerate fiber deployment, particularly in Telangana's remote and hilly regions where traditional Right of Way (RoW) processes are challenging.

Last-Mile Delivery: Institutionalize a framework of Public-Private Partnerships (PPPs), leveraging the fiber backbone established by BharatNet (as facilitated by NBM 2.0), to ensure efficient and meaningful last-mile connectivity to all Gram Panchayat schools. This mechanism, focused on universality and affordability, is the most sustainable path to achieving the 2027 infrastructure target.

II. Teacher Capacity Building: Empowering the Educator

Effective technology utilization requires a highly skilled teaching force. This measure ensures all educators can effectively transition to digital-enabled pedagogy.

Action: Implement a mandatory, multi-tiered certification program on digital pedagogy, focusing on integrating state-specific tools like DIKSHA and T-SAT content into classroom teaching.

Implementation: SCERT Telangana must lead the curriculum design, with a mandate to achieve the 100% Tier-1 certification milestone by Q4 2026. This training must also cover the use of 5G network applications and satellite broadband (as promoted by NBM 2.0) for educators in remote, hard-to-reach areas, ensuring equitable professional development irrespective of location. A master-trainer model should be established to ensure scalable and sustainable training delivery.

III. The Digital Learning Companion: Ensuring Student Access

Addressing the challenge of device scarcity is crucial for equitable learning access and fulfilling the mission's goal of Antyodaya.

Action: Roll out a phased scheme to provide subsidized, managed tablets to students from Grade 9 onwards, aiming for the 1:5 student-to-device ratio milestone by Q2 2027.

Implementation: Adopt a Direct Benefit Transfer (DBT) model to deliver the subsidy to parents for devices. The devices must be pre-loaded with the state curriculum, educational apps, and secure access controls. District-level service centers should be established to handle maintenance and support, ensuring device longevity and functionality through 2027.

IV. Content Localization & Real-Time Monitoring

Success hinges on localized content and rigorous, data-driven accountability.

Action: Need to create a state-level digital content repository with high-quality, interactive materials (in vernacular languages, including Telugu, Hindi and Urdu, aligned with the state syllabus. Develop a real-time data dashboard for monitoring progress.

Implementation: The dashboard must track key metrics such as internet uptime (verified via NBM 2.0 data), device utilization rates, content access patterns, and teacher certification completion. This framework will enable data-driven decision-making, ensuring accountability at all levels and allowing for rapid mid-course corrections necessary for achieving the aggressive 2027 timelines. This strategic focus will help Telangana move beyond just infrastructure deployment to realizing the true promise of digital education.

7. Discussion and Findings

Analysis reveals that effective bridging of the digital divide is multi-dimensional:

Strategic Convergence: Telangana's alignment with NBM 2.0 provides a mechanism for universal high-speed connectivity by leveraging national resources, particularly targeting anchor institutions like schools.

Teacher Upskilling: Mandatory, multi-tiered digital certification for educators—led by SCERT—ensures readiness for technology-enabled classrooms, with master-trainer models increasing scalability.

Equitable Device Access: A Direct Benefit Transfer (DBT) model, providing subsidized tablets to students with district-level support centers for maintenance, is recommended to achieve the 15:1 student-device milestone.

Localized Content and Monitoring: Development of vernacular digital resources and real-time dashboards allows for customized learning and progress tracking, supporting data-driven accountability.

Public-Private Partnerships: Leveraging BharatNet and PPPs to secure last-mile connectivity is critical for sustainability.

Aspirational Timelines: Immediate milestones (2027) include equipping 60% of secondary and higher secondary schools with digital infrastructure and certifying 100% of Grade 9–10 teachers. Full vision targets (2030) aim for universal access and improved NAS scores by 10%.

Findings show that context-sensitive implementation and adaptive governance yield better results, while lapses in coordination or teacher capacity hamper effective digital integration.

The findings confirm that Telangana's challenge is not merely one of curriculum or pedagogy, but a deep-seated institutional and operational crisis. Access without proficiency is empty, and proficiency cannot be achieved without the adequate personnel and tools.

The policy goal is therefore not incremental improvement, but a **structural surge** accomplished through strategic convergence. The convergence model integrates the two policy briefs:

The 3P Surge Strategy: This addresses the core FLN personnel deficit via Personnel Stabilization (mass recruitment/deployment, minimum two-year tenure for FLN teachers), ensures quality through Pedagogical Coherence (mandatory NISHTHA-FLN certification, use of locally contextualized FLN materials), and sustains the mission via Prioritized Finance (ring-fencing funds for FLN).

The Digital Strategy Convergence: This strategy ensures equitable digital access is not an afterthought but a foundational enabler of pedagogical coherence. It proposes:

- Aggressive Infrastructure Expansion (100% functional digital access).
- Mandatory Teacher Digital Up skilling (achieving 90% teacher certification).
- Subsidized Device Access (for students in SAGY villages).

- Real-Time Accountability Dashboard to track internet uptime, utilization, and SAGY-specific human development goals.

By strategically leveraging the community-centric, outcome-focused approach of SAGY in rural areas, the digital mission ensures that technology is a tool for **holistic development** and **equity**, rather than a driver of greater disparity.

8. Conclusion

Telangana stands at a pivotal moment. By embracing strategic convergence, particularly leveraging the momentum and resources of the National Broadband Mission 2.0, the state can decisively overcome the digital divide in its education sector. The proposed 2025-2027 roadmap—focused on aggressive infrastructure built upon NBM 2.0, mandatory teacher upskilling, subsidized device access, and real-time accountability—provides a clear, achievable, and fully contextualized pathway to educational equity. This proactive approach will transform Telangana into a leading example of technology-enabled learning and secure a competitive advantage for its future workforce.

Telangana possesses the demographic advantage necessary for future growth, but this potential is contingent upon immediate and decisive institutional reform to bridge the foundational learning and digital equity gaps. The proposed strategic convergence of the 3P Surge Strategy and the SAGY-leveraged Digital Strategy provides a clear, actionable, and contextualized roadmap for systemic transformation.

The failure to implement the Personnel Stabilization component by the final quarter of 2025 will structurally guarantee the state's inability to meet the NIPUN Bharat deadline. The path forward is therefore clear: an aggressive investment in human capital through structural stabilization, pedagogical quality, and equitable technology integration. This concerted action is a vital investment in the state's future, positioning Telangana as a leader in equitable, technology-enabled education and achieving the 85% Grade 3 FLN proficiency target by Q4 2027

Telangana’s journey from digital divide to digital inclusion is integral to Viksit Bharat 2047. By combining aggressive infrastructure rollout, educator up skilling, student device access, and localized content within a robust governance framework, the state can overcome longstanding inequities. Institutional strengthening—anchored in strategic convergence with national missions—offers a timely and scalable model for other states. Effective execution and accountability mechanisms will not only raise academic achievement but also create future-ready youth capable of contributing to India’s developed nation vision.

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