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Bridging India's Digital Divide

A White Paper providing a Governance Roadmap for Inclusive Digital Education

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Suggested Citation:
Anand, N., Bhardwaj, A., Thakkar K.(2025, September). Bridging India's Digital Divide: A white paper providing a governance roadmap for inclusive digital education. Centre for Civil Society.

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Publication Details:
Publication Date: 30 September 2025
Publisher: Centre for Civil Society
A-69, Hauz Khas, New Delhi- 110016

Email: ccs@ccs.in, Website: www.ccs.in

Acknowledgement: We acknowledge the Indian Cellular and Electronics Association (ICEA) for their funding support. This publication is an independent work of the Centre for Civil Society, and all findings and views expressed herein remain those of the authors.

Contents

List of Abbreviations:

1. **AI** – Artificial Intelligence
2. **APAAR** – Automated Permanent Academic Account Registry (student ID system)
3. **ASEP** – Association of School EdTech Providers *(context: possible industry association mentioned as manager of marketplace)*
4. **BIS** – Bureau of Indian Standards
5. **CSR** – Corporate Social Responsibility
6. **DBT** – Direct Benefit Transfer
7. **DIKSHA** – Digital Infrastructure for Knowledge Sharing
8. **DPDP Act** – Digital Personal Data Protection Act
9. **EdTech** – Education Technology
10. **EWS** – Economically Weaker Section
11. **GST** – Goods and Services Tax
12. **ICEA** – Indian Cellular and Electronics Association
13. **ICT** – Information and Communication Technology
14. **IFP** – Interactive Flat Panel
15. **IVR** – Interactive Voice Response
16. **KII** – Key Informant Interview
17. **LLM** – Large Language Model (in AI context, e.g., generative AI)
18. **MeitY** – Ministry of Electronics and Information Technology
19. **MoE** – Ministry of Education
20. **NCERT** – National Council of Educational Research and Training
21. **NCPCR** – National Commission for Protection of Child Rights
22. **NCTE** – National Council for Teacher Education
23. **NDEAR** – National Digital Education Architecture
24. **PC** – Personal Computer
25. **ROI** – Return on Investment
26. **RTE Act** – Right to Education Act
27. **SCERT** – State Council of Educational Research and Training
28. **SMC** – School Management Committee
29. **TV** – Television
30. **UDISE+** – Unified District Information System for Education Plus
31. **UK** – United Kingdom
32. **UNESCO**-OREALC – UNESCO Regional Office for Education in Latin America and the Caribbean
33. **VAT** – Value-Added Tax

1. Executive Summary:

India's digital education policy stands at a decisive moment. Over the past fifteen years, successive programmes- from the National Knowledge Network to the DIKSHA platform and device distribution schemes under Samagra Shiksha, have significantly expanded the supply of digital infrastructure in schools. Yet, evidence from national assessments and independent studies suggests that this expansion has not consistently translated into measurable improvements in learning outcomes.

This white paper argues that the gap lies not in the absence of resources, but in the governance architecture underpinning digital education. Centralised procurement, uniform deployment, and input-based success metrics have led to inefficiencies, underutilisation of assets, and low teacher adoption. Moreover, policy implementation is fragmented across ministries, with insufficient coordination between curricular priorities, technology standards, and funding mechanisms.

The paper proposes a structural shift towards decentralised choice, demand-led provisioning, and fiscal accountability, grounded in principles of subsidiarity, proportional regulation, and institutional diversity. Recommendations are organised into five domains:

1. Governance and Fiscal Architecture for Digital Education;
2. Empowering Choice and Market Responsiveness in Digital Education;
3. Autonomy and Local Innovation in Digital Education;
4. Parents and School Oversight in Digital Education;
5. Phased and Accountable EdTech Expansion.

Each recommendation is informed by extensive primary research — including interviews with over 150 parents, 96 teachers, and multiple school association leaders across seven states, including Delhi, Haryana, Andhra Pradesh, Telangana, Uttar Pradesh, Uttarakhand and Himachal Pradesh. Additionally, various EdTech companies were consulted to gain insights into the practical design and implementation of techno-educational device selection. Interviews with government officials helped highlight priorities, gaps, and alignment within EdTech policies. The study also included discussions with academics and EdTech researchers who identified potential evidence gaps and systemic risks. Furthermore, the recommendations draw on a comparative review of international models from Chile, Uruguay, Estonia, Finland, Singapore, Australia, and the United Kingdom. These examples illustrate that decentralized systems, when coupled with quality assurance and transparent accountability, consistently yield improved outcomes in both efficiency and equity.

The paper concludes with a detailed implementation roadmap mapping each recommendation to the relevant Indian ministries, departments, and fiscal instruments, as well as risk assessments and mitigation strategies.

2. Introduction: Context and Rationale

India's education system serves over 260 million students across 1.5 million schools, with vast heterogeneity in infrastructure, teacher capacity, and learner needs. In such a context, a centralised, standardised approach to educational technology deployment is structurally mismatched. Policies that assume homogeneity — for example, by prescribing a single device type or a uniform platform — overlook the reality that what works in an urban English-medium school in Bengaluru may be entirely unsuitable for a rural school in Bihar. The primary research thus puts an intentional focus on a broad device range including mobile, tablets, desktops, laptops, AR/VR, IFPs, TVs etc.

This challenge is compounded by the political economy of procurement. Large-scale contracts issued through central or state tenders tend to lock in a narrow set of vendors, reduce competitive incentives for innovation, and increase the risk of technology obsolescence. Meanwhile, the relevant policy levers are dispersed across multiple ministries: the Ministry of Education (MoE) sets curricular priorities; the Ministry of Electronics and Information Technology (MeitY) establishes platform and data governance standards; and state governments handle procurement and local implementation. Without formalised coordination, these actors often work in parallel rather than in concert. Past experiences, both in India and abroad, show that technology deployment unaccompanied by teacher training, curriculum integration, and sustained support often results in underutilisation of tech features and pedagogical possibilities. Audit reports from several Indian states have documented cases of devices lying idle due to software incompatibility, lack of electricity or internet, or insufficient user training. This mirrors early phases of Uruguay's Plan Ceibal, where universal laptop distribution yielded little measurable learning impact until governance reforms shifted the focus towards teacher capacity, localised choice, and ROI measurement (Severin et al., 2011).

This white paper seeks to reframe India's digital education policy by moving away from input-maximisation towards outcome-optimisation. The approach is guided by three interlinked shifts:

- From centralised procurement to decentralised, end-user-driven selection;
- From counting inputs to measuring learning returns on investment;
- From fragmented administration to coordinated, multi-level governance.

3. Methodology:

This white paper employs a mixed-methods research design to critically examine India's digital education landscape with an emphasis on governance, accountability, and outcomes. The methodological framework integrates both primary field research and comprehensive policy analysis, while also incorporating multi-stakeholder validation and comparative international review.

3.1 Primary Research:

Between March and July 2025, the research team conducted a substantial number of interviews to gain nuanced insights into various perspectives on digital education. A total of 150 interviews were carried out with parents, which aimed to understand their viewpoints regarding access, affordability, and the learning impacts associated with digital education initiatives. Additionally, 96 interviews with educators were conducted to explore adoption barriers, training deficiencies, and the practical experiences educators face within classroom settings when utilizing educational technologies (EdTech). To further enrich the data collection, focused group discussions were held with school associations across several states, including Delhi, Haryana, Andhra Pradesh, Telangana, Uttar Pradesh, Uttarakhand, and Himachal Pradesh. These discussions provided a comprehensive mapping of institutional priorities and

identified systemic challenges faced by educational institutions.

The team also engaged in structured conversations with representatives from EdTech companies. These discussions offered insightful perspectives on the design, procurement, and deployment models for various devices and platforms in the educational sphere. In addition, interviews with government officials from education and technology ministries helped illuminate critical areas such as alignment issues, funding mechanisms, and coordination gaps evident in policy implementation.

3.2 Secondary Research and Policy Analysis:

The study also conducted an extensive review of key policy documents and program evaluations, which included significant frameworks such as the National Knowledge Network, the DIKSHA platform, and the Samagra Shiksha schemes. An analysis of independent assessments and pertinent academic literature was undertaken to triangulate the findings from the field research and to benchmark progress against established policy objectives. This rigorous examination led to an in-depth analysis that identified governance bottlenecks, fiscal inefficiencies, and structural risks embedded within existing approaches to digital education.

3.3 Multi-Stakeholder Validation:

To validate the emerging draft recommendations, the research team organized a multi-stakeholder stress-test workshop. This collaborative event brought together a diverse group of participants, including school leaders, teachers, students, EdTech providers, think tank researchers, and industry representatives. The workshop allowed for a comprehensive real-world examination of the proposals, surfacing practical challenges, highlighting equity concerns, and identifying pathways for refinement. The recommendations were further enhanced through expert reviews conducted by academics, policy researchers, and practitioners.

3.4 International Comparative Review:

In order to provide a broader context for India's experience, the research team also examined digital education governance models from various countries, including Chile, Uruguay, Estonia, Finland, Singapore, Australia, and the United Kingdom. The insights obtained from these international case studies offered valuable lessons in decentralization, fiscal accountability, quality assurance, and equity in the deployment of EdTech.

3.5 Synthesis and Analysis:

The synthesis of findings from the field, secondary literature, and validation exercises was achieved through thematic coding of qualitative data, alongside structured comparisons of international models. This analytical process facilitated the identification of systemic gaps, institutional vulnerabilities, and feasible reform pathways. The resulting recommendations were framed around five thematic pillars: governance and fiscal architecture, market responsiveness, local autonomy and innovation, parent and school oversight, and phased accountable expansion.

Overall, this layered methodology ensures that the proposals put forth in this paper are rigorously evidence-based, subjected to thorough stress-testing by a diverse array of stakeholders, and benchmarked against global best practices. This comprehensive approach ultimately renders the recommendations both practical and ready for policy implementation.

4. Theory of Change:

The theory of change underpinning these recommendations rests on the understanding that the most effective allocation of educational technology occurs when decisions are made as close as possible to the point of use, within a clear framework of quality assurance and accountability.

4.1 Decentralised Decision-Making:

Local actors — whether teachers, school leaders, or district administrators — possess contextual knowledge about infrastructure readiness, student learning profiles, and linguistic needs. A governance model that empowers these actors to choose from a pre-

certified menu of devices and platforms, supported by transparent procurement guidelines, is more likely to result in sustained use and pedagogical integration.

4.2 Linking Finance to Learning Outcomes:

Public investments in digital education should be tied to measurable improvements in engagement, comprehension, and attainment. Uruguay's later-stage Plan Ceibal reforms demonstrate the efficacy of tying budget allocations to independent evaluations and cost–benefit analyses (Severin et al., 2011). This creates a feedback loop in which ineffective tools are phased out, and resources are redirected to interventions that deliver measurable gains.

4.3 Coordinated Multi-Level Governance:

A coherent digital education policy requires integration between the MoE (curriculum), MeitY (technology standards and data governance), the Department of Telecommunications (infrastructure), and state governments (adaptation and implementation). This integration must be formalised through inter-ministerial working groups and state–centre compacts that clarify roles, align timelines, and synchronise budgets.

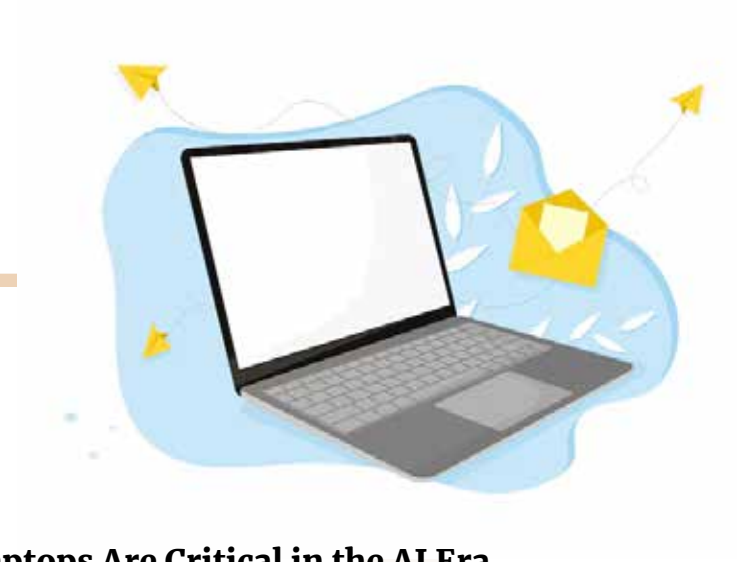
4.4 Causal Pathways:

The reform strategy assumes three mutually reinforcing pathways:

1. Increased relevance of technology through localised choice improves adoption and sustained use;
2. Fiscal incentives linked to outcomes enhance cost-effectiveness;
3. Clear accountability lines across governance levels reduce waste and accelerate policy responsiveness.

5. Comparative International Evidence:

A review of seven international cases highlights effective pathways in educational technology implementation. Chile's Yo Elijo Mi PC enabled students to choose from pre-approved devices, improving daily device use by 40%, especially in rural areas (OECD, 2020). Uruguay's Plan Ceibal transitioned from universal distribution to performance-linked procurement, leveraging independent evaluations for strategic adjustments (Molina, Cobo, Rovner, Novali, & Pineda, 2024). Estonia's VAT exemption for educational ICT alleviated household cost barriers and promoted adoption without hindering competition. In the UK, the Code for age-appropriate use of technology instituted 15 privacy standards, enhancing children's online safety and increasing parents' comfort with their children's internet usage, with 70% of children feeling safer online (ICO, n.d.). Finland trusts teachers with full autonomy in tool selection while holding schools accountable for outcomes. Singapore provides lump-sum technology grants to schools, avoiding central micromanagement, and Australia's eSafety parental workshops engage parents as co-educators and decentralized monitors of safe technology use.



Why Laptops Are Critical in the AI Era

As the world enters the AI era, India's education system cannot rely on devices designed primarily for communication and consumption. Smartphones and tablets provide access, but they do not support the productive use of AI such as coding, model-building, data analysis, or content creation. Laptops uniquely provide the compute power, keyboard interface, multi-tasking capacity, and secure environments needed to turn AI from a toy into a tool, especially for children in middle school grades or higher.

Equally vital, teacher training in AI integration can only be meaningfully conducted on laptops. Without this, AI in classrooms risks becoming superficial confined to app demonstrations on mobiles rather than embedded in pedagogy through projects, simulations, and assignments. By equipping both teachers and students with laptops, India ensures AI adoption is deep, safe, and skill-building, not shallow or distracting.

Positioning laptops as the primary educational device is therefore not simply a technology choice, but it is a national competitiveness imperative. It ensures that India's workforce grows up not as passive consumers of AI tools but as creators, innovators, and problem-solvers in the global digital economy.

A National Laptop Access Scheme should be instituted to address India's digital divide in education and to prepare the next generation for an AI-driven future. The scheme could be designed as a centrally sponsored programme with financing shared equally between the Centre and participating States on a 50:50 basis. Such a model will ensure both national coherence and state-level commitment, creating a balanced structure of accountability and implementation. The scheme should set an ambitious target of enabling access to at least 10 million laptops over the next five years, signalling a structured, nationwide effort rather than piecemeal distribution. Laptops must be positioned as the foundational productivity tool for learning, coding, problem-solving, and AI-readiness, capabilities that smartphones and tablets cannot adequately deliver. By embedding this scheme within the education financing framework, India can strategically establish universal laptop access across its school system, equipping students with the skills and orientation required for a technology-intensive economy. This approach aligns with NEP 2020 and contributes directly to the vision of Viksit Bharat @2047.

6. Policy Recommendations:

Domains	Recommendations
Domain 1: Governance and Fiscal Architecture for Digital Education	1. Embed Child-Specific Data Rights into the DPDP Act 2. National AI and Ethics Certification for EdTech Providers 3. ROI Analysis and Public Reporting for Digital Investments 4. Reform GST for Certified Educational Devices
Domain 2: Empowering Choice and Market Responsiveness	5. Digital Device Learning Vouchers for Students 6. Open Marketplace for Approved EdTech Platforms
Domain 3: Autonomy and Local Innovation	7. Local Procurement Autonomy for Culturally Fit Solutions 8. Competitive Teacher Training and District Innovation Cells
Domain 4: Parents and School Oversight	9. Digital Oversight Sub-committees 10. Structured Digital Parenting Workshops
Domain 5: Phased and Accountable Expansion	11. Mandate Pilot Programmes with Independent Evaluation 12. National EdTech Mission

Domain 1: Governance and Fiscal Architecture for Digital Education

India's digital education journey has too often been driven by procurement scale and political signalling rather than by a coherent governance architecture anchored in accountability, fiscal prudence, and child-centric safeguards. Field evidence from 10 schools in Delhi and Uttar Pradesh shows that 98.1 percent of students have access to at least one device in school or at home, yet 36.6 percent use them for less than one hour a day and 46.3 percent rely solely on smartphones. These devices, while ubiquitous, are least suited for complex tasks like research, writing, or coding, leading to passive and fragmented engagement.

For policymakers and institutions advancing AI readiness, laptops must be prioritized over phones and tablets because they uniquely support the end-to-end process of coding, experimentation, and scaling. Empirical studies demonstrate that pen-based and touchscreen devices are inadequate for programming tasks such as editing and compiling code, limiting their effectiveness for serious computing (Edwards & Barnette, 2004). At the same time, most

AI projects begin with local experimentation on laptops, often through Python notebooks, before seamlessly scaling to distributed clusters or cloud environments (Dai et al., 2022). These findings underscore that laptops are not merely convenient but essential infrastructure for equipping learners and practitioners with the capacity to engage meaningfully in AI development.

The primary research confirms that infrastructure spending is often reactive, driven by grants or CSR cycles, with per-student annual digital investments ranging from ₹2,000 to ₹5,000 in most schools but rarely tied to measurable learning outcomes. Only three of the surveyed schools track per-student digital spending, and maintenance or replacement cycles are inconsistent. This reflects an incentive structure where political and administrative success is measured by device distribution counts rather than by improvements in pedagogy or learning outcomes. As Hayek warned, centralised systems distort decision-making when easily measured proxies replace outcome-oriented feedback.

The global evidence remains consistent. Uruguay's Plan Ceibal embedded independent evaluation into its national laptop programme, allowing mid-course corrections based on learning data rather than procurement timelines. Estonia removed VAT on certified educational ICT and stimulated a domestic refurbishment market, showing how fiscal design can foster equitable adoption and sustainability. The United Kingdom's Age-Appropriate Design Code reoriented technology providers toward child privacy by embedding enforceable safeguards into design defaults.

The lesson, echoed in Elinor Ostrom's work on polycentric governance, is that durable reform arises when interlinked institutions enforce accountability, adapt to local realities, and generate trust through transparency. In India, this means not only aligning fiscal incentives with learning outcomes but also closing the governance gaps revealed by the field data: weak pedagogical integration (only 25 percent of teachers have extensive training despite 86.5 percent reporting high confidence), fragmented stakeholder roles, and limited parental involvement in digital planning.

The four recommendations under this theme aim to create such an enabling environment:

1. **Embed child-specific data rights into the Digital Personal Data Protection Act** so that parental consent, data minimisation, and purpose limitation are enforceable in educational contexts. This is critical when over half of surveyed students have used AI tools but with superficial understanding and without structured safeguards. This is also critical since the Education Technology (EdTech) is revolutionalising learning by personalising the process, hence creating an immediate need to enable child-specific data rights.
2. **Institute a national AI and ethics certification regime for EdTech providers** to ensure that algorithms influencing learning are transparent, bias-audited, and developmentally appropriate.
3. **Mandate return-on-investment analysis and public reporting for all major public digital education investments** to ensure that fiscal outlays are justified by measurable learning improvements over the years. This addresses the current gap where most schools cannot quantify the educational returns on their digital spend.
4. **Reform GST for certified educational devices** to lower fiscal barriers, stimulate domestic innovation, and formalise quality standards, taking cues from Estonia's VAT reform.

Without these pillars, downstream reforms in pedagogy, content, and access risk being captured by entrenched interests, dissipating scarce public funds, and eroding public trust. As Adam Smith observed, the wealth of a nation lies not in resources alone but in the effectiveness of its institutions to channel those resources toward the common good. In digital education, that effectiveness begins with governance design grounded in fiscal discipline, accountability, and child protection.

6.1: Recommendation 1: Embed Child-Specific Data Rights into the Digital Personal Data Protection (DPDP) Act

The Digital Personal Data Protection Act 2023 provides a baseline for personal data rights but does not classify children's educational data as a distinct high-sensitivity category. In education, minors are not only the primary data subjects but also among the least equipped to

exercise meaningful agency over how their data is collected, processed, or shared.This is also critical since the Education Technology (EdTech) is revolutionalising learning by personalising the process, hence creating an immediate need to enable child-specific data rights. This leaves a structural gap in the governance of digital learning, where data flows are increasingly complex and often opaque.

Our primary research shows that over 58 percent of surveyed students have used AI tools, yet most could neither name the tools nor explain their purpose, indicating shallow and unsupervised exposure. Parents expressed concern about screen time, AI misuse, and digital distractions, yet few schools engaged them in digital planning or provided guidance on data protection. Without explicit safeguards, educational data collected under the pretext of pedagogy can be repurposed for commercial profiling, undermining trust and eroding constitutional guarantees of privacy.

Addressing this requires a framework that recognises both the need for innovation and the imperative of protecting individual rights. Hayek's argument that effective governance must harness local and contextual knowledge rather than rely on overly centralised control (Hayek, 1945) supports a model where data protection rules are strong but adaptable to diverse school environments. Locke's view that the government's role is to safeguard life, liberty, and property (Locke, 1689) speaks directly to the state's duty to protect the personal information of learners. Adam Smith's emphasis on justice and trust as foundations of a functioning society (Smith, 1776) reinforces the idea that without clear rules for data protection, public confidence in educational technology will weaken. Ostrom's research on polycentric governance (Ostrom, 2010) further suggests that multi-level oversight — involving schools, state regulators, and independent audit bodies — is more effective than relying solely on central enforcement. Rand's insistence on the moral primacy of the individual (Rand, 1964) aligns with the view that children must be treated as ends in themselves, with their privacy upheld as a non-negotiable right. Friedman's argument for informed choice (Friedman, 1962) strengthens the case for parental consent mechanisms that are transparent, accessible, and available in local languages.

Indian thinkers echo these priorities. Palkhivala (1974) warned that the liberties of those too young to defend themselves require proactive legal safeguards. Masani (1979) championed institutional transparency to guard against the abuse of power. Raju (1996) cautioned that poorly designed regulation can punish smaller, compliant actors while leaving larger, non-compliant entities untouched — a principle that should inform proportional enforcement under the DPDP Act.

The DPDP Act should therefore be amended to:

- Define "child data in education" as a protected sub-category covering all personal and behavioural data generated in educational contexts.
- Require explicit, informed parental consent for all processing of such data, with consent notices available in the official language or languages of the child's state.
- Prohibit behavioural profiling for non-pedagogical purposes.
- Mandate age-appropriate privacy notices that are developmentally comprehensible to the child.
- Require automatic deletion of non-essential data after defined retention periods, subject to independent audit.

Implementation Mapping: The amendment should be introduced by the Ministry of Electronics and Information Technology in consultation with the Ministry of Education and the National Commission for Protection of Child Rights. Enforcement should rest with the Data Protection Board of India, supported by state-level Education Data Protection Officers.

Risk and Mitigation: Strong compliance requirements could pose challenges for smaller EdTech providers. This can be mitigated through regulatory sandboxes, allowing start-ups time-bound exemptions under strict parental consent, anonymisation, and learning purpose requirements. Such proportionality ensures that protections are upheld without discouraging innovation.

By embedding child-specific data rights into statutory law, India can create a governance framework that safeguards the dignity, autonomy, and privacy of learners while enabling educational technology to

develop within a framework of trust and accountability.

6.2: Recommendation 2: Institute a National AI and Ethics Certification Regime for EdTech Providers

Our primary research shows that although more than half of students have used AI tools, their understanding is superficial and exposure is often unsupervised. Teachers and parents expressed concerns about safety, bias, and the absence of clear ethical standards for AI use in learning. Without institutional safeguards, AI in education risks becoming a vehicle for opaque decision-making, manipulation, and unequal outcomes rather than a means of expanding opportunity.

The governance of AI in education must strike a careful balance between fostering innovation and protecting the autonomy of the learner. Hayek's argument that centralised systems often falter because they ignore the dispersed knowledge embedded in local contexts (Hayek, 1945) underscores the need for a flexible framework that can adapt to diverse educational settings while ensuring clear accountability. Ostrom's work on polycentric governance (Ostrom, 2010) reinforces this point by showing how multiple, interconnected oversight mechanisms are better at maintaining trust and quality than a single, top-down authority.

This vision of governance is consistent with Locke's view that the role of government is to act as a trustee safeguarding life, liberty, and property (Locke, 1689), which in the context of AI in education means protecting the learner's right to privacy and self-determination. As Smith observed, markets thrive only when built on trust and justice (Smith, 1776), and a transparent certification regime can embed these values into the digital learning marketplace. Friedman's emphasis on informed consumer choice (Friedman, 1962) supports the idea of a public trust mark for certified AI tools, enabling schools and families to select products that meet their pedagogical and ethical needs. Rand's insistence that individuals must be treated as ends in themselves, not means to an end (Rand, 1964), reinforces the imperative that AI tools serve the learner rather than monetise them.

A national AI and ethics certification regime would translate these insights into actionable safeguards for India's education system. It would set enforceable benchmarks for privacy, algorithmic transparency, and age-appropriateness in educational technology. Certified platforms would display a public trust mark, enabling informed choices by schools and parents while rewarding providers who meet high ethical standards.

The certification framework should include:

- Mandatory independent audits of algorithms used in education, with public disclosure of results.
- Transparent public dashboards rating platforms on safety, compliance, and privacy.
- Prohibition of manipulative design patterns unrelated to pedagogy.
- Regular bias testing to ensure fair outcomes across gender, language, socio-economic, and regional groups.
- Certification must ensure EdTech providers enable laptop-based AI learning environments, as laptops are essential for coding and scaling workflows.
- Providers must integrate hands-on coding and AI experimentation on laptops, not just content delivery, to build genuine AI readiness.

Implementation Mapping: The Ministry of Electronics and Information Technology should lead this initiative in partnership with the Bureau of Indian Standards, the National Council of Educational Research and Training, and the National Commission for Protection of Child Rights. Certification should be mandatory for any EdTech provider supplying tools in publicly funded programmes, with renewal linked to compliance audits and published benchmarks.

Risk and Mitigation: Smaller providers may face capacity challenges in meeting certification requirements. This can be addressed through phased compliance timelines, regulatory sandboxes, and targeted technical support. Proportionate regulation will ensure that harmful practices are curbed without discouraging innovation or crowding out smaller, high-quality providers.

By grounding AI governance in principles of trust, transparency, proportionality, and respect for individual autonomy, India can ensure that technology enhances

educational opportunity rather than undermining it.

6.3: Recommendation 3: Mandate Return-on-Investment Analysis and Public Reporting for All Major Public Digital Education Investments

Our research shows that schools spend between ₹5 lakh and ₹10 lakh annually on digital infrastructure, yet few track per-student costs and almost none connect investments to learning outcomes. Shallow indicators like login counts or screen time are misused as proof of success, even though they reveal little about comprehension, skills, or critical thinking. In practice, this has led to wasteful expenditure and a culture of symbolic digitalisation, where procurement is targeted at the optics. This absence of rigorous evaluation allows procurement priorities to be driven by optics, such as the number of devices distributed, rather than by educational value delivered or the impact on student learning.

Accountability in public spending is a core principle of sound governance. Adam Smith emphasised that the wealth of a nation depends not only on its resources but also on the capacity of its institutions to channel those resources toward the public good (Smith, 1776). Milton Friedman argued that effective policy requires evidence of whether public expenditure actually achieves its intended outcomes (Friedman, 1962). Hayek's insight into the limitations of centralised decision-making (Hayek, 1945) supports the idea that spending decisions must be informed by feedback from the ground — in this case, transparent evaluation of educational results from digital investments.

John Locke's understanding of government as a fiduciary for the people (Locke, 1689) provides a further moral grounding for this recommendation: those entrusted with public funds are obliged to demonstrate that they are being used effectively. Ostrom's work on polycentric governance (Ostrom, 2010) underscores that monitoring and evaluation are most effective when conducted across multiple levels, national, state, and institutional, rather than being confined to a single central audit. Rand's insistence that individuals must not be treated as means to an end (Rand, 1964) reinforces the argument that students should not be the passive subjects of untested policies; their learning outcomes must be the central measure of success.

Indian thinkers have made parallel points. Palkhivala (1974) maintained that public accountability is not optional but an essential safeguard in a democratic society. Masani (1979) argued that transparency in public expenditure is a precondition for maintaining trust between citizens and the state. Raju (1996) warned that when public spending lacks clear metrics of success, the result is wasteful allocation and the entrenchment of ineffective programmes.

A national framework for ROI analysis in digital education would address these gaps. It should require:

- Per-student cost breakdowns, including devices, content licensing, training, and maintenance.
- Comparative performance metrics before and after digital integration.
- Equity indicators capturing rural–urban, gender, and socio-economic differences in impact.
- Analysis of infrastructure maintenance and replacement cycles to prevent recurring inefficiencies.
- Device-type Cost-Benefits Analysis should be linked to measured learning/productivity outcomes.

Implementation Mapping: The Ministry of Education should make ROI reporting a requirement under Samagra Shiksha and link it to funding approvals for digital initiatives. Independent evaluation agencies and academic institutions should conduct these assessments, with findings made publicly available through a central portal to ensure transparency and public scrutiny.

Risk and Mitigation: ROI reporting could devolve into a procedural formality with little analytical value. This can be mitigated through standardised templates, mixed-method evaluations that incorporate teacher and student feedback, and linking continued funding to demonstrated improvements in learning outcomes.

By embedding ROI analysis and public reporting into the governance of digital education, India would fulfil both the economic principle of efficient resource allocation and the civic principle of accountability to those whom

the education system serves.

6.4: Recommendation 4: Reform GST for Certified Educational Devices

India's current GST rate of 18 percent on computing devices treats educational tools no differently from luxury electronics. Our primary research shows that while 98.1 percent of students have access to at least one device in school or at home, 46.3 percent rely solely on smartphones. Only 12 percent use laptops exclusively, 12.5 percent use a smartphone–laptop combination, and 8.3 percent use a smartphone–desktop or tablet combination. Desktops are largely confined to school settings, and tablets are rare, with only 3.2 percent of students using them as their primary learning device. Teachers consistently report that smartphones, though affordable, are ill-suited for extended study, coding, or collaborative work, while laptops enable deeper engagement and more complex learning tasks.

Fiscal policy has a powerful role in shaping educational access. Adam Smith noted that the wealth of a nation depends not just on its production but on removing unnecessary barriers to the flow of goods that support public welfare (Smith, 1776). Milton Friedman observed that taxation should be a "handmaid to opportunity" rather than a constraint on it (Friedman, 1962). By applying a high GST to laptops and tablets, the state inadvertently increases the cost of access to the very tools needed to make the right to education meaningful in the digital age.

Hayek's warning against policies that impose uniform burdens without regard to their local effects (Hayek, 1945) is directly relevant here: a flat tax on all computing devices ignores the difference between personal entertainment devices and those used as core educational infrastructure. Locke's principle that the government exists to protect and promote the legitimate interests of its citizens (Locke, 1689) applies equally to ensuring that fiscal policy supports rather than hinders equitable access to learning tools. Ostrom's findings on institutional adaptability (Ostrom, 2010) suggest that targeted, criteria-based tax incentives — such as certification for educational devices — are more effective than blanket subsidies or uniform tax structures.

In the Indian context, Palkhivala (1974) argued that the state's duty extends to creating the conditions for every individual to realise their potential, which includes removing artificial cost barriers to essential tools. Masani (1979) stressed that policy should not treat the poor and the well-resourced identically when their circumstances differ so fundamentally. Raju (1996) warned that policies which ignore ground realities risk deepening inequities rather than resolving them.

A targeted GST reform would address these concerns by creating a concessional rate of 5 percent or less for certified educational ICT devices. Certification criteria should include:

- Minimum hardware specifications aligned with curricular needs.
- Preloaded educational content meeting NCERT and state standards.
- Ability to run approved GenAI LLMs for creating interactive and personalized learning plan.
- Ability to research, create and curate content afresh.
- Compliance with privacy and safety benchmarks.
- Durability and repairability to ensure extended device life cycles.

Implementation Mapping: The Ministry of Finance, in coordination with the Ministry of Electronics and Information Technology and the Ministry of Education, should propose the reform to the GST Council. The Bureau of Indian Standards should define certification requirements, and state education departments should monitor end-use compliance. A public registry of certified devices would enhance transparency and deter misuse.

Risk and Mitigation: Vendors may attempt to classify general-purpose devices as educational to benefit from the reduced GST rate. Independent audits, compliance checks, and public disclosure of certification status can address this risk. Another way to mitigate this risk could also be to link the Aadhar IDs of students (or the upcoming APAAR IDs) in a certain age bracket)

By reforming GST to lower the cost of certified educational devices, India can reduce affordability gaps, encourage the adoption of effective learning tools, and ensure that fiscal policy actively supports the right to quality education.

Domain 2: Empowering Choice and Market Responsiveness in Digital Education

India's digital education infrastructure has expanded rapidly, with significant coverage achieved through national and state procurement programmes. While this approach has improved access, it can face challenges in fully accommodating the diversity of learner needs across regions, grade levels, and pedagogical contexts.

Our primary research confirms that even when resources are available, utilisation and learning impact can be constrained if the tools provided are not well matched to local requirements. Teachers noted that devices sometimes lacked regional language integration or offline functionality, and parents reported that a better match between tools and student needs could improve sustained use.

Scholarly insights reinforce the case for complementing central provisioning with structured choice. Hayek observed that decision-making benefits when it draws upon the dispersed knowledge of those closest to the point of use (Hayek, 1945). Locke described public authority as a trustee for its citizens, suggesting that the state should create conditions that enable individuals to make informed choices affecting their lives (Locke, 1689). Adam Smith argued that competition and variety are drivers of quality and efficiency (Smith, 1776).

Global practice supports these principles. Chile's "Yo Elijo Mi PC" programme issued government-supported vouchers for approved laptops, leading to higher usage and better rural retention. In several United States states, voucher-based schemes for education technology have stimulated innovation and aligned solutions more closely with learner needs. Ostrom's research on polycentric governance shows that systems with multiple decision centres adapt more effectively to evolving requirements (Ostrom, 2010).

Indian thinkers have expressed similar views. Palkhivala (1974) emphasised enabling citizens to realise their potential through supportive policy design. Masani (1979) stressed transparency and flexibility in public initiatives. Raju (1996) warned that over-centralisation, even with good intentions, can limit innovation and responsiveness.

6.5: Recommendation 5: Digital Device Learning Vouchers for Students

A device voucher programme would provide eligible students with government-funded entitlements redeemable for certified educational devices of their choice. This model preserves quality assurance while giving families the autonomy to select what best meets their context. There has to be

The logic for this approach draws on Friedman's observation that directing purchasing power to individuals fosters accountability and responsiveness in service provision (Friedman, 1962). By allowing end users to decide among certified options, the policy aligns incentives for suppliers to compete on quality, cost, and relevance. Locke's view of government as a fiduciary (Locke, 1689) supports empowering families to participate directly in decisions affecting their child's learning environment. Adam Smith's insight that consumer choice disciplines producers (Smith, 1776) applies equally to the education technology market, where competition can raise standards across the board.

International example:

Chile's "Yo Elijo Mi PC" distributed vouchers to qualifying students in public schools, enabling families to choose from a list of laptops meeting set standards for durability, software, and repairability. Evaluations showed more than a 40 percent increase in daily usage compared to centrally issued devices and a three to five percentage point improvement in rural school retention over five years.

Proposed Indian adaptation:

Pilot the programme in aspirational districts targeting students from EWS. Vouchers would be tokens redeemable at certified retailers or approved online platforms. Devices would be required to meet BIS specifications, including regional language support, offline capability, and repairability. Expansion could be phased and guided by continuous evaluation of educational and cost-effectiveness metrics. In the subsequent phases, teachers could also be provided with vouchers, to encourage them to use tools such as laptops to curate indigenous and locally relevant content.

Implementation mapping:

- Lead agency: Ministry of Education (Department of School Education and Literacy).
- Execution partners: State Education Departments and District Education Offices.
- Performance Standards body: MeiTY and MoE.
- Payment mechanism: National Payments Corporation of India via Aadhaar-linked DBT.
- Funding: Reallocation from existing procurement budgets under Samagra Shiksha, supplemented by state contributions.

Risk and mitigation:

To reduce the risk of diversion to resale markets, device activation should be linked to verified student IDs and resale permitted only through registered refurbishers.

6.6: Recommendation 6: Open Marketplace for Approved EdTech Platforms

A national EdTech marketplace would be a transparent, state-of-the-art industry managed portal where certified platforms are listed with standardised performance metrics. This structure enables schools, educators, and parents to compare offerings on cost, curriculum alignment, offline capability, accessibility, and evidence of learning impact, and to make purchases using allocated vouchers.

The marketplace concept reflects Smith's assertion that open competition, under clear and fair rules, stimulates innovation and drives efficiency (Smith, 1776). Hayek's insight into the limitations of centralised allocation (Hayek, 1945) supports creating an environment where multiple providers compete to meet varied needs rather than relying on a single, centrally procured solution. Ostrom's research on polycentric systems (Ostrom, 2010) suggests that a diversified provider base, overseen by transparent certification standards, is more resilient to changes in technology and pedagogy.

International example:

The United States EdSurge Product Index serves as a neutral database where schools can compare tools on cost, features, accessibility, and evaluation results. Vendors must meet privacy and accessibility standards to be listed, and competition within the platform has improved quality and affordability.

Proposed Indian adaptation:

Establish an industry-led, self-regulated "EdTech Marketplace" listing certified platforms with comparable metrics. Independent evaluations and user ratings could be incorporated to improve transparency and guide future procurement or selection decisions.

Implementation mapping:

- Lead agency: Ministry of Electronics and Information Technology and Ministry of Education to provide guidelines for hosting and managing the portal; Industry Association like ICEA or ASEP manages the portal.
- Certification: Bureau of Indian Standards and Quality Council of India to define and enforce listing criteria.
- Curriculum review: NCERT to verify alignment.
- Funding: Listing fees from vendors and operational grants from the Ministry of Electronics and Information Technology.

Risk and mitigation:

To prevent market dominance by any single provider, participation caps should be set for publicly funded subscriptions in each state, and periodic compliance audits should be conducted.

Domain 3: Autonomy and Local Innovation in Digital Education

India's digital education reforms have relied heavily on centralised procurement, uniform training modules, and top-down platform selection. While this approach ensures administrative simplicity, it often sacrifices contextual fit and responsiveness. Our research findings demonstrate that device access is nearly universal at 98.1 percent, yet 36.6 percent of students use devices for less than an hour daily, and 46.3 percent rely exclusively on smartphones, which are ill-suited for advanced tasks such as coding, research, or collaborative work. Teachers report high confidence with digital tools at 86.5 percent, but only 25 percent have received extensive training, and 21.9 percent have had none at all.

Such patterns reflect a deeper structural issue: those directly responsible for delivering learning, such as teachers and school leaders, have minimal say in the selection of tools, training, or partnerships. Procurement decisions are largely driven by vendor scale and budget optics rather than by curriculum alignment, local language needs, or the realities of classroom integration. Key informant interviews underline this misalignment, noting that content is often insufficiently adapted to local contexts, offline compatibility is not consistently built into solutions for rural and low-power environments, and post-distribution follow-up is limited.

Economic thinkers have long argued that decisions are best made by those with the most relevant, ground-level knowledge. Decentralised authority allows schools, and districts to act as informed consumers in a competitive market, creating a feedback loop in which providers are incentivised to innovate, adapt, and improve. Research consistently shows that tools and training chosen locally have higher rates of adoption, are better maintained, and yield stronger learning outcomes.

Internationally, high-performing systems combine quality assurance at the national level with autonomy at the point of delivery. Finland allows schools to choose tools within a regulated framework, fostering ownership. Singapore employs a cluster procurement model that balances economies of scale with flexibility for local adaptation. São Paulo offers competitive marketplaces for teacher training and innovation, allowing educators to pilot new ideas, and scale what works.

For India, the lesson is clear: national policy should set safety, quality, and accountability benchmarks, while devolving significant decision-making power to schools and districts. This decentralised model not only improves the cultural and linguistic fit of solutions but also strengthens the domestic innovation ecosystem, ensuring that local EdTech providers and training institutions can compete on merit. By embedding autonomy within a structured accountability framework, India can transform digital education from a supply-driven exercise into a demand-responsive, contextually relevant system that maximises public investment and enhances learning outcomes.

6.7: Recommendation 7: Local Procurement Autonomy for Culturally Fit Solutions

Our research findings show that access to devices is nearly universal at 98.1 percent, yet meaningful engagement remains limited. 36.6 percent of students use devices for less than one hour daily and 46.3 percent depend exclusively on smartphones, which are poorly suited to advanced tasks such as research or coding. Teachers report high confidence in using digital tools (86.5 percent) but only one in four have received extensive training, and over one in five have had none at all. Procurement processes remain largely centralised, often prioritising cost and vendor scale over the match between technology and local pedagogy. Teachers and school leaders have little scope to choose tools that fit their curriculum, language needs, and community context.

Decentralising procurement aligns with the principle that those closest to the learner have the best knowledge of their needs. Thinkers have long argued that decision-making authority should rest with those directly responsible for outcomes, as they have both the strongest incentives and the most relevant information. Markets for educational tools respond best when demand is shaped by informed local actors rather than distant administrative priorities. Competitive choice among certified providers encourages innovation, cultural fit, and responsiveness.

Studies consistently show that locally selected tools see higher integration into teaching practice, better maintenance, and stronger adoption by students. In multilingual and culturally diverse contexts, tools with local language support and contextualised content produce measurably better learning outcomes.

Key informant interviews and field findings emphasise that content should be aligned to curriculum, available in multiple languages, and adaptable to diverse school contexts. They also note that policy guidance is often top down with limited direction on integration and safety, while local language content remains scarce. EdTech implementers highlight that offline compatibility is critical in rural and low power settings and that logistics and device handling limit classroom use. These constraints help explain low depth of use despite high access. The literature review further finds that localised and culturally relevant content is crucial for engagement and effectiveness, which supports school or cluster autonomy in selecting context appropriate tools.

International example:

Finland allows schools to choose tools within a quality-assured framework, sustaining high adoption and teacher ownership. Singapore's cluster procurement combines the benefits of collective negotiation with the flexibility of local choice, enabling culturally adapted solutions.

Proposed Indian adaptation:

Establish a digital oversight committee in each government and aided school, integrated into the School Management Committee, with representation from teachers, parents, and students (in higher grades).

Allocate 20 to 30 percent of digital budgets for locally determined procurement from a certified vendor list. Guidelines for different devices by different uses - to be adopted, as per needs.

Encourage partnerships with local EdTech providers offering regional language content, offline-first functionality, and pedagogy that reflects community needs.

Require transparent public reporting of procurement decisions and usage outcomes.

Implementation mapping:

- Lead agency: State Education Departments.
- Certification: MeITy for device and platform safety, durability, privacy, and accessibility.
- Curriculum review: NCERT and SCERTs to ensure content and features align with curricular goals and language requirements.
- Funding: Allocate a fixed share of Samagra Shiksha digital budgets for locally determined procurement.
- Risk and mitigation:
  - **Risk:** Uneven quality or vendor capture.
  - **Mitigation:** Maintain a pre-approved vendor registry, rotate committee membership, require conflict-of-interest declarations, and use transparent evaluation rubrics.

6.8: Recommendation 8: Competitive Teacher Training and District Innovation Cells

The research data shows that while 86.5 percent of teachers report confidence in digital tools, more than half have only basic training and 21.9 percent have had no training at all. Many prefer training that is subject-specific, language-appropriate, and flexible in format. District officials report that teacher-led innovations rarely reach wider adoption because there is no institutional mechanism to test and scale them.

Professional growth is most effective when individuals can choose from competing providers offering diverse approaches. When teachers control their own development pathways, providers have stronger incentives to improve quality and relevance. Innovation flourishes when authority is distributed and feedback loops between practitioners and policymakers are open. Encouraging teacher-led experimentation not only improves classroom outcomes but also strengthens the wider ecosystem of educational tools and practices.

Research shows that competitive markets for professional development improve both quality and responsiveness. Systems that allow educators to select

from accredited providers report higher satisfaction, greater skill transfer, and better integration of training into everyday practice. District-level innovation hubs in other countries have proven effective at nurturing culturally and linguistically relevant tools that achieve higher adoption rates.

Key informant interviews indicate teacher fatigue after COVID and highlight that successful adaptation requires training, trust building, and peer led demonstrations, with teacher buy in central to sustained use. Devices are often underutilised due to limited electricity, network connectivity issues, teacher readiness, or follow up support. Interviews also stress that content should be aligned to the curriculum and available in multiple languages, while state guidance on integration and safety remains limited.

International example:

In Canada, teachers use portable credits with accredited providers, enabling personalised and relevant professional growth. São Paulo's district EdTech labs incubate teacher-developed innovations, scaling the most successful across the system.

Proposed Indian adaptation:

- Establish a national registry of accredited digital pedagogy training providers with transparent performance ratings.
- Provide portable credits under Samagra Shiksha for teachers to use with any accredited provider.
- Create district innovation cells to identify local learning challenges, co-develop solutions with teachers and local EdTech firms, and pilot test them before scaling.
- Link funding for providers and projects to evaluation results and teacher satisfaction scores.

Implementation mapping:

- Lead agency: Ministry of Education with NCERT and NCTE
- Certification: Independent accreditation bodies under NCERT supervision
- Curriculum review: NCERT and SCERTs to ensure training content aligns with curricular and language requirements
- Funding: Reallocate existing teacher training budgets under Samagra Shiksha; establish district innovation grants with CSR co-funding
- Risk and mitigation:
- Risk: Variable quality across providers
- Mitigation: Strict accreditation criteria, transparent provider ratings, outcome-linked funding
  - **Risk:** Underutilised innovation cells
  - **Mitigation:** Integrate with teacher networks, require annual showcases, and link promising projects to state-level scaling

Domain 4: Parents and School Oversight in Digital Education

India's digital education landscape has expanded rapidly, but its governance and community engagement structures have not kept pace. While centralised policies and procurement have improved device penetration, our research shows that without sustained parental engagement and local oversight, usage often remains shallow and risks go unaddressed.

Field findings indicate that 98.1 percent of students now have access to at least one device in school or at home. However, 36.6 percent use these devices for less than one hour a day and 46.3 percent depend exclusively on smartphones, which are unsuitable for complex tasks such as research or collaborative projects. Parental understanding of how to guide safe and effective device use varies widely, in addition to awareness on what they lose out on if the digital divide widens. Surveys reveal that 68 percent of rural parents and 54 percent of

urban parents have never received formal guidance on supporting their children's digital learning.

At the school level, there are few institutional mechanisms for continuous monitoring of device usage, content quality, and integration into classroom practice. Without such structures, challenges like unsafe usage, poor content alignment, and low utilisation rates persist. Economic and governance thinkers have long argued that decisions are most effective when made by those closest to the point of service delivery. By equipping parents with digital literacy will be a lifelong learning skill in the digital age that will impact the parents positively. Embedding oversight at the school level, India can create feedback loops that improve accountability, promote culturally relevant solutions, and ensure public investment delivers tangible learning outcomes.

International evidence reinforces this approach. Australia's eSafety Commissioner programme has shown that targeted parental workshops reduce unsafe online behaviour and improve home–school collaboration. Finland's school-level councils demonstrate that governance close to the learner improves both adoption and responsible use of technology. For India, the lesson is clear: policies must build structured opportunities for community engagement and give schools the authority to shape their own digital governance within a framework of national standards.

6.9: Recommendation 9: Digital Oversight Sub-committees

Primary research shows that procurement remains largely centralized, often prioritising vendor scale and cost over curriculum alignment, language needs, and the realities of classroom integration. KIIs reveal that teachers and school leaders have minimal say in selecting digital tools, despite their proximity to learner needs. Oversight is typically handled by district officers, whose sporadic visits leave gaps in monitoring safe use and educational alignment.

Granting schools structured oversight authority aligns with the view of John Locke that governance must protect the interests of those it serves through representation and consent. By involving parents, teachers, and students in decision-making, procurement becomes more responsive and better matched to local pedagogical needs. Friedman's advocacy for decentralisation as a means to foster innovation is reflected in creating a governance mechanism where local actors actively shape demand.

International Example: Finland's school councils, which include teachers, parents, and student representatives, are empowered to approve procurement decisions, monitor integration into pedagogy, and oversee compliance with safety protocols. Their authority ensures that investments reflect local priorities while adhering to national standards.

Proposed Indian Adaptation:

- Amend SMC rules under the RTE Act to include a Digital Oversight Subcommittee with binding authority on budget allocations and procurement sign-off.
- Ensure representation from teachers, parents, and higher-grade students, supported by a structured review framework.
- Allocate 20 to 30 percent of school digital budgets for locally determined purchases from certified vendor lists.
- Require quarterly reporting to district offices, feeding into state-level dashboards for procurement planning.

Implementation Mapping:

- **Lead agency:** State School Education Departments.
- **Certification:** Bureau of Indian Standards for device and platform safety, durability, privacy, and accessibility.
- **Curriculum review:** NCERT and SCERTs to ensure content alignment and language compatibility.
- **Funding:** Existing school management grants and Samagra Shiksha allocations.
- **Risk and mitigation:** Prevent tokenism by granting committees binding authority; rotate membership and publish transparent evaluations to avoid vendor capture.

6.10: Recommendation 10: Structured

Digital Parenting Workshops

Primary research reveals that 68 percent of rural parents and 54 percent of urban parents have never received formal guidance on managing their child's digital learning environment. KIIs confirm that many parents either over-restrict access, limiting learning potential, or fail to monitor usage, exposing children to harmful content or excessive screen time. The absence of sustained parental engagement weakens the home–school link in digital education.

Embedding structured parental engagement echoes the thinking of Nani Palkhivala, who stressed the state's duty to safeguard the liberties of those unable to defend themselves, particularly children. Smith's insight that trust between institutions and citizens is built through transparency and participation applies equally here: informed and involved parents strengthen the legitimacy and effectiveness of public education initiatives.

International Example:

Australia's eSafety Commissioner runs nationwide workshops for parents covering safe device use, online privacy, cyberbullying prevention, and supporting school digital assignments. The programme's evaluation shows increased parental confidence and improved student outcomes through better home–school coordination.

Proposed Indian Adaptation:

- Integrate quarterly Digital Parenting Workshops into school calendars, delivered in local languages and adapted for different literacy levels.
- Cover safe device use, digital literacy basics, privacy rights, and strategies for supporting schoolwork at home.
- Offer delivery through both in-person sessions at parent–teacher meetings and remote channels such as WhatsApp or IVR.
- Provide follow-up resources to maintain engagement over time.

Implementation Mapping:

- **Lead agency:** State Education Departments and SCERTs.
- **Support:** MeitY for safety guidelines, Ministry of Women and Child Development for parental outreach.
- **Funding:** ICT capacity-building budget under Samagra Shiksha, with CSR co-funding from technology companies.
- **Risk and mitigation:** Address low attendance by integrating workshops into mandatory school events and providing incentives; prevent one-off impact through periodic follow-up messages and community-led peer groups.

Domain 5: Phased and Accountable EdTech Expansion

India's digital education landscape has often been shaped by large-scale announcements followed by rapid procurement and deployment, with adaptation left for later phases. This approach may generate quick political visibility, but it risks diverting scarce public funds toward interventions that are poorly aligned with classroom realities. Our primary research and key informant interviews highlight that high access to devices, at 98.1 percent, has not automatically translated into deep or sustained engagement, with over one-third of students using devices for less than an hour daily and almost half relying solely on smartphones. Teacher readiness, content relevance, and maintenance systems remain uneven, which limits the potential returns from large-scale investments.

Philosophical and economic thinkers have long argued that effective public policy requires sequencing and feedback before scaling. Milton Friedman stressed that public expenditure should be disciplined by mechanisms that reveal whether it delivers intended benefits. Adam Smith's emphasis on prudent stewardship of public resources reinforces the case for linking expansion to clear, measurable outcomes. Elinor Ostrom's work on polycentric governance suggests that multi-stakeholder oversight increases both the quality and legitimacy of complex public programmes. These insights point to a governance model in which evidence, accountability, and stakeholder alignment are embedded before nationwide

expansion.

International examples demonstrate the benefits of this approach. Uruguay's Plan Ceibal began with pilot programmes that were rigorously evaluated before scaling, allowing for adjustments to teacher training, content design, and device specifications. The United Kingdom's Education Endowment Foundation model formalises this by funding and publishing controlled trials of education interventions before recommending wider adoption. In both cases, sequencing and transparency improved programme quality and public trust.

For India, this means moving away from "scale first, adapt later" toward a phased and accountable model that prioritises piloting, independent evaluation, and coordinated governance. A National EdTech Oversight Mission, bringing together representatives from the Ministry of Education, other relevant ministries, state departments, civil society, think tanks, industry, schools, parents, and media, can serve as the central platform for policy alignment, research commissioning, and regulatory oversight. By meeting periodically, commissioning independent evaluations, and ensuring public communication of findings, such a body would help guarantee that scaling decisions are evidence-based, fiscally responsible, and socially trusted.

When expansion is tied to demonstrated value, India's digital education investments can become both more efficient and more equitable, ensuring that each new phase strengthens learning outcomes and public confidence rather than merely increasing distribution numbers.

6.11: Recommendation 11: Mandate Pilot Programmes with Independent Evaluation

Primary research findings show that even in high-access environments, usage patterns and learning integration vary widely. State-wide deployments without prior piloting risk misalignment with local needs, wasting resources and eroding teacher and parent confidence. KIIs highlight that district-level administrators often have valuable contextual knowledge but are rarely involved in programme design before full-scale rollout.

Locke's conception of governance as a fiduciary duty to protect the interests of citizens demands that public resources be deployed responsibly and adaptively. Hayek's argument that local knowledge is indispensable to sound decision-making supports the case for piloting in representative settings before committing to full-scale expansion.

International Example:

Uruguay's Plan Ceibal began with carefully selected pilot schools across urban and rural settings, testing both device integration and teacher training models. Evaluation feedback shaped procurement specifications, support structures, and the scale-up strategy, reducing waste and improving outcomes.

Proposed Indian Adaptation:

- Require all major digital education initiatives to run a pilot phase of at least one academic year in diverse school clusters before full deployment.
- Make independent evaluation a statutory precondition for scale-up, with results published in a public dashboard.
- Involve district and block officials, along with teacher representatives, in pilot design and assessment to ensure contextual relevance.

Implementation Mapping:

- Lead agency: State Education Departments in coordination with NITI Aayog.
- Evaluation: Independent research institutions and accredited evaluation agencies.
- Funding: Dedicated allocation under Samagra Shiksha's innovation and pilot projects budget.
- Risk and mitigation: Prevent delays by setting clear pilot timelines; ensure evaluator independence through open contracting and public disclosure of reports.

6.12: Recommendation 12: National EdTech Mission

India's digital education landscape is currently shaped by fragmented decisions across ministries, states, and private actors, with limited mechanisms for sustained

coordination. Primary research shows that even well-intentioned initiatives suffer from gaps in alignment between policy, classroom implementation, and public communication. KIIs point to duplication of efforts, lack of long-term accountability, and weak channels for evidence from the ground to influence policy.

A standing multi-stakeholder body can bridge these gaps by creating a single forum for setting priorities, aligning regulations, and commissioning independent evaluations. This would ensure that digital education policy is adaptive, evidence-driven, and accountable to both learners and the public.

Ostrom's principle of polycentric governance supports a structure in which authority and responsibility are shared across interconnected decision centres, improving both adaptability and accountability. Adam Smith's argument that public trust depends on visible coordination and the prudent use of resources applies directly here. Friedman's emphasis on transparency and ongoing evaluation underscores the value of a body empowered to track both outcomes and costs.

International Example:

South Korea's Smart Education Promotion Council, composed of government agencies, educators, industry representatives, and civil society, meets regularly to review progress, address implementation bottlenecks, and coordinate messaging to the public. This has allowed the system to remain coherent while adapting to new technologies and market changes.

Proposed Indian Adaptation:

- Constitute a National EdTech Mission under the Ministry of Education, with the Secretary of Education as an ex-officio member and chair.
- Include representatives from line ministries such as MeitY and the Ministry of Women and Child Development, state education departments, civil society organisations, academic think tanks, teacher associations, parent bodies, industry leaders, and media.
- Meet quarterly to set policy priorities, align implementation timelines, and coordinate public communication strategies.
- Commission independent research and evaluation on emerging technologies, learning impact, and cost-effectiveness.
- Act as the regulatory oversight body for ensuring compliance with safety, privacy, and quality standards in publicly funded EdTech initiatives.
- The proposed National EdTech Mission should set clear national targets for EdTech device access, especially devices such as laptops used for generative and creation based learning practices.
- Publish an annual State of EdTech in India report to inform Parliament, state legislatures, and the public.

Implementation Mapping:

- Lead agency: Ministry of Education.
- Membership: Multi-stakeholder representation from government, civil society, research institutions, industry, parents, teachers, and media.
- Mandate: Policy alignment, regulatory oversight, commissioning research, ensuring accountability, and public communication.
- Funding: Joint allocation from the Ministry of Education and MeitY, supplemented by competitive grants and CSR contributions.
- Risk and mitigation: Avoid bureaucratic inertia by setting term limits for members, using rotating subcommittees for specialised tasks, and linking annual budget renewal to demonstrable achievements.

7. Conclusion:

India's digital education policy can deliver a transformative impact if it moves away from centralised input distribution towards decentralised, outcome-driven governance. By enabling local choice within a regulated framework, linking finance to learning returns, and embedding coordination across governance levels, the system can become more responsive, efficient, and equitable. International evidence shows that such models not only improve adoption but also sustain long-term learning gains. With the right sequencing, institutional mapping, and accountability mechanisms, India can transition from being a high-investment, low-return digital education system to one that maximises both public value and learner outcomes.

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