Bridge learning gaps by making better use of existing resources

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India's aspiration to become a developed nation by 2047 hinges critically on the strength of its human capital. However, persistent learning gaps in public education— highlighted by assessments like Annual Status of Education Report (ASER) and Performance Assessment, Review, and Analysis of Knowledge for Holistic Development (PARAKH)—pose headwinds to this vision. In response to these learning gaps, the Government of India introduced the New Education Policy (NEP) in 2020 and the National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat Mission) in 2021, and is undertaking many other systemic reforms. The impacts of these will unfold in the years to come, when the slow, systemic effects of educational reform start to become visible.

The reasons behind learning gaps in public schools are well known and many—ranging from pedagogical methods, rote-based assessment practices, and teacher shortages, to structural issues in training institutions like District Institutes of Education and Training (DIETs), amongst others. Addressing each of these systemic issues demands long-term solutions and sustained efforts, but the key question right now is: are there potential pathways that can contribute to bridge learning gaps that can be implemented quickly, efficiently, and within existing resources?

Technology-led learning could offer one of the practical ways forward, especially when existing budget allocations are already available with the Ministry of Education. Over the past two decades, the Government of India has invested heavily in establishing computer (ICT) labs in secondary schools, with more than 1.2 lakh schools having been sanctioned these facilities till date. These labs are primarily intended to help students build basic digital skills. However, given the rapid advancements in technology-led learning solutions, India should also carve out an approach to utilize these existing ICT labs towards subject learning.

Encouragingly, recent experiences by a few state governments around using ICT labs as 'Learning Labs' have shown promising results in bridging learning gaps. With the availability of advanced AI-based learning tools, these ICT labs can complement classroom teaching and help students learn more effectively, without the need for an additional financial outlay. This strategy is especially valuable in schools struggling with teacher shortages or deep learning gaps, where technology can serve as a vital support system.

Early initiatives such as the ones led by NITI Aayog in Aspirational Districts (280 schools), Mission Buniyaad by the Government of Rajasthan (3,500+ schools), and a similar program in Andhra Pradesh (524 schools) offer promising hope. All three programs have effectively leveraged advanced AI-based Personalized and Adaptive Learning (PAL) solutions within available ICT budgets for schools to support subject learning. These labs are equipped with PAL tools that deliver customised learning content to each student, based on their individual learning needs. As a result, two students in the same classroom in the same school can follow different learning paths tailored to their specific learning needs and pace.

Did it work? Independent evaluations—one led by the Nobel Laureate Dr. Michael Kremer for the Andhra Pradesh program, and another by an independent evaluator for the NITI Aayog initiative—clearly show the positive impact of a well-executed, ICT-led learning intervention. When ICT infrastructure is consistently used for academic learning, students have demonstrated gains equivalent to 0.9 to 2.5 additional equivalent years of learning within 2 to 3 years of implementation in the NITI Aayog and Andhra Pradesh program. Students in Rajasthan have demonstrated an increase of 21 percent points in their learning score within 2 years. These findings highlight the transformative potential of integrating technology alongside regular classroom instruction—not by assigning new budgets, but by utilising the existing ICT budgets more effectively.

To make the program more impactful, NITI Aayog introduced a significant policy shift by linking payments to ICT providers with actual improvements in student learning outcomes. This marked a significant departure from the current practices, where vendors were paid simply for setting up ICT labs, regardless of the labs' usage or its impact on learning. Under NITI's model, a substantial portion of the payment was withheld unless measurable learning gains were achieved. This outcomes-based approach—also known as 'Pay for Results'—created strong incentives for providers to work closely with schools and ensure that ICT labs were used to drive meaningful, learning-focused practices

Interestingly, once digital-led learning becomes a regular practice in schools, anecdotal evidence from these programs shows a positive shift in student behaviour. Enrolment and attendance rates have improved as students demonstrate a stronger interest in engaging with digital tools.

States with adequate ICT infrastructure in schools should consider blending classroom teaching with learning from 'ICT-based Learning labs' in their reform journey. However, a few critical elements must be addressed to ensure successful integration of ICT labs for learning, as seen in programs led by NITI Aayog, Andhra Pradesh, and Rajasthan.

First, states need to instil a vision where ICT labs are seen not merely as infrastructure, but as **'Learning Labs'** that are an integral part of the academic ecosystem. This shift in perspective helps create a shared vision across all levels in the education system, right from senior bureaucrats to classroom teachers. Thereafter, any learning-focused initiative undertaken by the state education system naturally places ICT labs at the centre of learning —recognizing them as a key enabler for improving learning outcomes.

Second, responsible procurement of future ICT labs is essential. This includes selecting advanced ICT infrastructure that has a longer lifespan, requires lesser maintenance, and, more importantly, ensures that the labs are powered by strong, AI-driven Personalized and Adaptive Learning (PAL) content. PAL is vital because it addresses the personalised learning needs of students far more effectively than generic digital tools.

Third, greater ownership and accountability must be placed on ICT providers to actively support schools in using these labs effectively. The **'Pay for Results'** model, as implemented in the NITI Aayog program, offers a practical framework. By linking vendor payments to measurable improvements in student learning, this approach creates powerful incentives for providers to deliver quality implementation and drive real impact in classrooms.

Fourth, regular monitoring, continuous learning during implementation, and timely course corrections must be core principles guiding the program's execution. Real-time data from ICT lab usage, combined with on-going impact on student learning, will offer valuable insights. This allows the system to identify gaps early-on and take corrective action promptly ensuring the initiative stays on track and delivers maximum impact.

Undoubtedly, systemic gaps in the education sector must be addressed with urgency and sustained effort. Technology-led learning is not a substitute for quality teachers—but it can be a powerful complement. In a vast education system where learning gaps remain a persistent challenge, reimagining the use of existing ICT infrastructure presents a practical, cost-effective, and scalable opportunity. Experiences from Andhra Pradesh, Rajasthan, and NITI Aayog's Aspirational Districts show that with the right vision, quality content, and accountability mechanisms, ICT labs can be transformed into effective 'Learning Labs'.

As the education system strives to deliver more with limited resources, making better use of what already exists may well be the most immediate and impactful step toward meaningful learning reform in India.