PAL Works

Personalised Adaptive Learning (PAL)

An Evidence-Backed EdTech Solution to Address India's Learning Challenge

Learning Heterogeneity – A Growing Challenge Across Middle and Secondary Grades in Indian Schools

In the last decade, India has achieved near-universal school enrollment. Yet, student learning outcomes remain a persistent challenge.

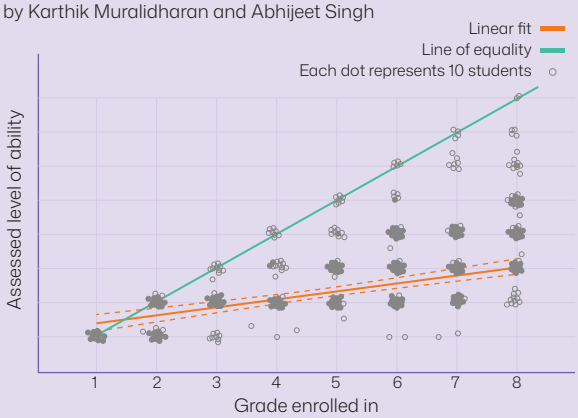
- Only **1** in **3** students reach grade-level learning by Grade 9 (PARAKH 2024 Assessment).
- **~55%** of Grade 8 students are unable to solve a simple division problem (ASER 2024).

Classrooms in India frequently contain students with learning levels spread across several grade levels. This represents a systemic challenge to improving student learning that teachers, often under pressure to complete the prescribed syllabus, are not adequately equipped to address.

Consequently, students who are behind fall further back as they progress through schooling, resulting in the large learning gaps that we now see.

Level of Learning: Ideal v/s Actual (2019)

by Karthik Muralidharan and Abhijeet Singh



Therefore, we need instructional approaches that can respond to diverse learning levels within the same classroom and support all students in progressing towards grade-level competencies.

The good news is that technology can effectively enable differentiated and adaptive learning paths to address learner diversity and improve learning outcomes at scale.

What is Personalised Adaptive Learning (PAL)?

Personalised Adaptive Learning (PAL) is a technology-driven educational approach that customises the learning experience for each student in real-time, moving beyond "one-size-fits-all" teaching by adjusting content, pace, and difficulty based on individual performance, needs, and preferences. It identifies learning gaps using data analytics and provides targeted support, remedial materials, or advanced challenges to ensure every student masters concepts at their own optimal speed.

PAL Works

How PAL Works?

Imagine a student learning 2-digit addition with carry. PAL first checks whether the student understands prerequisite concepts such as number sense, including recognising numbers, understanding place value (tens and ones), and basic addition without carry. Based on the student's responses to initial questions, PAL identifies specific learning gaps.

If the student struggles with carrying, the system guides the student back to foundational skills, such as grouping numbers into tens and ones and understanding how ten ones make a ten, through simpler questions and clear explanations. As the student's understanding improves, PAL gradually reintroduces 2-digit addition with carry, increasing the level of difficulty step by step. The system continuously checks for understanding and provides additional practice if needed.

In this way, each student learns at their own pace, builds strong foundations, and progresses only after demonstrating mastery of the concept.

Step 1 — Diagnose the Learning Level

Step 2 — Map the Personalised Learning Path

Step 3 — Deliver Level-Appropriate Learning

Step 4 — Adapt in Real Time

Step 5 — Check for Concept Mastery

Step 6 — Targeted Remediation and Practice

Step 7 — Data-Driven Insights for Teachers

PAL follows a continuous learning cycle:

Assess → Personalise → Teach → Adapt → Check Mastery → Remediate

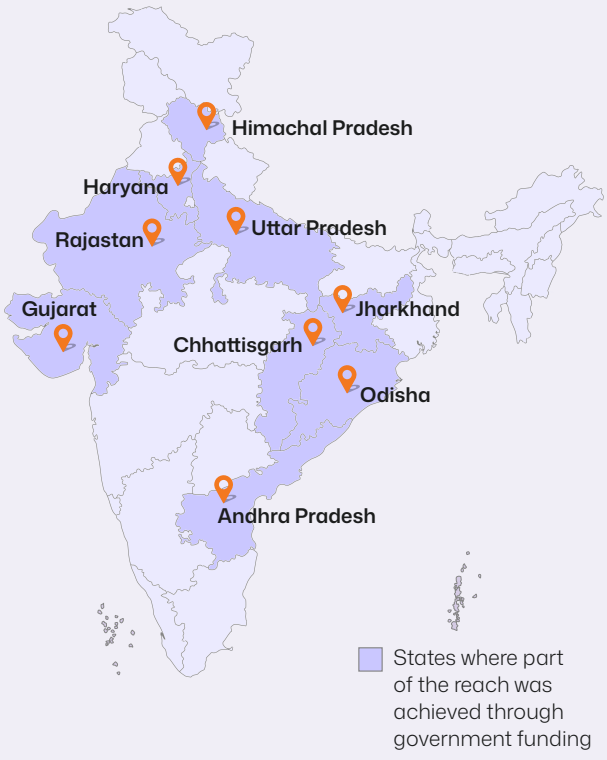
Personalised adaptive learning means each child learns at the right level, at the right pace, with the system adjusting every step of the way.

Policy Tailwinds Supporting PAL Adoption

PM SHRI Schools

PM Shri Guidelines on School Transformation under Digital Library suggest:

> *Personalised and Adaptive Learning (PAL) programme could be adopted to cater to the different needs of students.*



Samagra Shiksha

Section 12.10 of ICT Framework Samagra Shiksha Abhiyan 2023 says:

> *PAL involves tailoring instruction to the learning levels of each child and leading the child to master one learning outcome at a time, and thereby climbing up on his or her unique learning trajectory. This is more effectively possible in classrooms with highly trained and experienced teachers and fewer students per teacher.*

PAL at Scale Across Indian Government Schools

PAL is already being implemented across thousands of government schools in India, demonstrating its ability to operate at scale within public education systems.

From Andhra Pradesh to Uttar Pradesh, Rajasthan to Himachal Pradesh, PAL deployments have shown visible and consistent improvements in classroom practice and student learning outcomes.

States & UTs
9

Government Schools
42,000+

Students
42,00,000+

**PAL has also been adopted by 4,00,000+ students across 7,000+ other private schools and centres.*

PAL: One of the Most-Evidenced EdTech Solutions

India's EdTech ecosystem is large and rapidly growing. However, only a limited number of solutions have rigorous, independently validated evidence of improving student learning, particularly within government school systems.

PAL has demonstrated consistent, replicable learning gains across multiple large-scale rigorous evaluations conducted in Indian government schools.

There are **8 publicly available evaluations,** some of which are given below, led by prominent researchers including Nobel Laureate Prof. Michael Kremer and J-PAL Affiliated researchers such as Prof. Karthik Muralidharan and Prof. Abhijeet Singh.

Across these studies, students learnt at least ~2x times in PAL classrooms relative to peers in comparable classrooms with largest gains seen for the lowest performing students and those with consistent usage of PAL. Improvements are particularly evident in foundational skills, as students receive targeted support before progressing to higher-level concepts.

Beyond measurable learning gains, states implementing PAL have reported several secondary benefits that strengthen classroom practice and system effectiveness:

- **Clear visibility into learning levels**
- **Improved student attendance and engagement**
- **Enhanced teacher support**

Study 1

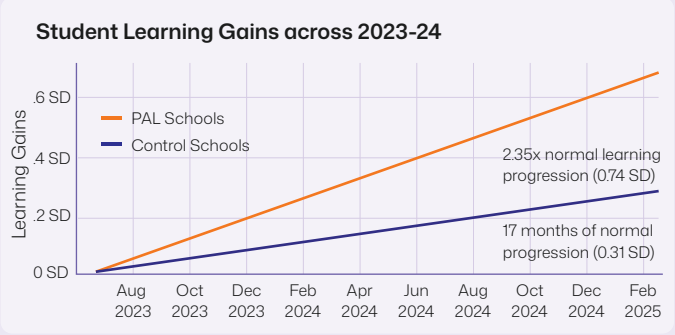
Impact of PAL on Student Learning Gains in Andhra Pradesh (2023–2025)

Study Sample: 14,000 students across Grades 6–9
Research Methodology: Randomised Control Trial
Subject: Mathematics
Location: Andhra Pradesh

Researchers: Development Innovation Lab (University of Chicago) led by Nobel Laureate Prof. Michael Kremer
PAL product evaluated: SwiftPAL by ConveGenius

Key Results:

- In just 17 months, students in PAL-enabled classrooms improved **2.5x times (0.43 SD)** compared to those in non-PAL classrooms.
- Gains were seen across grades and genders, with higher gains for girls and double the average gains in Grade 6 underscoring the importance of starting early.



The Andhra Pradesh programme is the only fully state-funded PAL programme to date. What began as a **60-school** pilot has now scaled to **1,224 schools**, reaching **3.25 lakh students** with each student using SwiftPAL for 80 minutes a week.

Study 2

Impact of PAL on Student Learning Gains in Rajasthan (2025)

Study Sample: ~6,500 students across Grades 1–8
Research Methodology: Randomised Control Trial
Subject: Mathematics and Hindi
Location: Rajasthan
Researchers: Led by J-PAL Affiliated professors Karthik Muralidharan and Abhijeet Singh
PAL product evaluated: Ei Mindspark by Educational Initiatives

Key Results:

- In just 18 months, students in PAL groups improved by **0.22 SD** in Mathematics and **0.20 SD** in Hindi compared to those in non-PAL groups.
- Gains were seen across grades, gender, and socio-economic status, implying that the programme was equally effective in teaching all students.

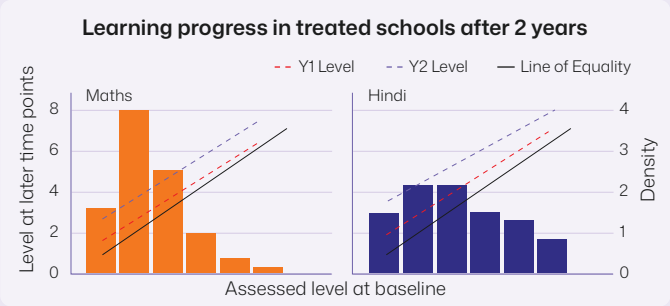
Study 3

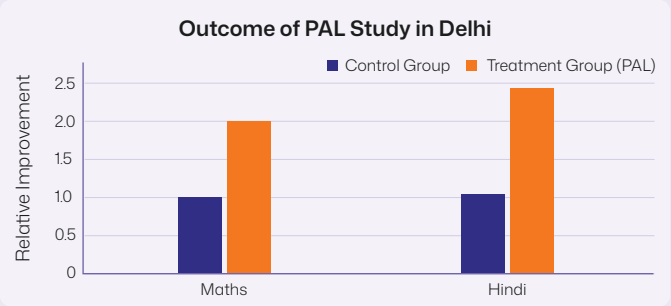
Impact of PAL on Student Learning Gains in Delhi (2015-2016)

Study Sample: 619 students across Grades 6–9
Research Methodology: Randomised Control Trial
Subjects: Mathematics and Hindi
Location: Delhi
Researchers: Led by J-PAL Affiliated professors Karthik Muralidharan, Abhijeet Singh and Alejandro J. Ganimian
PAL product evaluated: Ei Mindspark by Educational Initiatives

Key Results:

- In just 4.5 months, students in PAL groups improved **2x** times in Mathematics **(0.37 SD)** and **2.4x** times in Hindi **(0.23 SD)** compared to those in non-PAL groups.
- Gains were seen across gender and socio-economic status and did not vary by level of initial achievement, implying that the programme was equally effective in teaching all students.





We acknowledge the vital contributions of philanthropic organisations and ecosystem partners whose support enabled the pilots and evidence that has helped scale PAL adoption in India.

PAL finds a mention in the **'Best Buys for Education Reports'** 2020 and 2023, anchored by UNICEF, The World Bank and Foreign, Commonwealth and Development Office.

Introducing PAL Works

PAL Works convenes diverse stakeholders with a focus on advancing effective EdTech, specifically PAL, toward unlocking the next level of PAL scale-up in government systems.

Scan to access **'Smart Buys in EdTech: Guide to Enabling PAL at Scale'** and other helpful guides.

PAL Works

Vision

Every child in India can achieve their full potential through personalised and adaptive learning journeys.

Mission

To enable students in government schools to achieve higher learning outcomes through tech-enabled PAL solutions.

The Evidence is Clear.
The Path is Proven. The Time is Now

https://palworks.in/
info@palworks.in
http://linkedin.com/company/palworks-in

January 2026