From Hype to Reality: The Promise and Challenges of Educational Technology in Practice

Insights from Targeted Instruction Program (TIP) in KP

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March 2023
FCDO
We, at CERP, designed a contextualized, system-aligned foundational program to fill in gaps in students’ foundational skills.

Targeted Instruction in Pakistan (TIP)

A foundational learning program to support existing teachers, through a low-cost technology software, in helping primary students (grades 1-5).

- **Direct COVID education response** to mitigate learning losses
- **Integrate closely with government priorities** around curriculum, teacher training, and learning
- **Build students’ foundational skills** to make regular classes more productive
- **Minimize costs** by leveraging existing technology devices (personal smartphones and tablets) to support administration
TIP Intervention: 40 days of **targeting** and **tracking** students

**Diagnose Learning**
Map learning gaps with low-stakes student assessment

**Sort Students**
Sort students across or within classrooms into subject-wise learning groups for part of the day

**Target Instruction**
40 activity-based lessons to tailor instruction to student learning levels with **innovative pedagogy**

**Track Learning**
Quizzes to determine if students have mastered the content

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**Minimize costs** by leveraging existing technology devices to support teachers through a software
## TIP Research Sample

<table>
<thead>
<tr>
<th></th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>2 districts in KP</td>
<td>ICT</td>
</tr>
<tr>
<td><strong>Schools</strong></td>
<td>1250 public primary schools</td>
<td>560 public primary schools</td>
</tr>
<tr>
<td><strong>Teachers</strong></td>
<td>~7000 teachers and head teachers</td>
<td>2500 teachers and head teachers</td>
</tr>
<tr>
<td><strong>Students</strong></td>
<td>~250,000 from classes 1-5</td>
<td>~90,000 from classes 1-5</td>
</tr>
<tr>
<td><strong>Household actors</strong></td>
<td>NA</td>
<td>10,000</td>
</tr>
</tbody>
</table>
Through an iterative process, we developed a *teacher-support Tech Tool* with a toolkit consisting of an adapted curriculum and related instructional materials, a grading tool, and asynchronous training resources.
Minimize costs by leveraging existing technology devices to support teachers

Features of the TIP Tech Tool

- Assists teachers in efficiently grading students
- Generates child-, class- and skill-wise student results
- Sorts students into learning and peer groups to target instruction to individual students
- Cues readily available, downloadable lesson plans and related TLMs for targeted instruction
- Offers training videos, focused on pedagogy and content, in downloadable and online formats
- Systematically organizes school, teacher and student level data
Alleviating teachers’ constraints in tech adoption

TIP is designed as a scalable and sustainable solution for budget-constrained settings.

➔ A low-cost technology software, built using WhatsApp UI/UX interface, that can be used offline once downloaded on existing smart devices.

➔ Smartphones as the instrument of choice, given its high prevalence and comfort among teachers as a personal digital device.

Source: TIP Teacher Baseline Survey (2022)
<table>
<thead>
<tr>
<th>Targeted Instruction</th>
<th>No technology (paper-based)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mandatory technology</td>
</tr>
<tr>
<td></td>
<td>Optional technology</td>
</tr>
<tr>
<td></td>
<td>Mandatory, then optional tech (grace period)</td>
</tr>
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<td>No Targeted Instruction</td>
<td>No targeted instruction (pure control)</td>
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**Treatment Groups Allow Us to Test...**

- Tech vs. paper-based TIP (T1 vs. T2-T4) to examine how teacher tech adoption impacts TIP implementation and student learning.
- Is tech an *experience good*? Varying exposure and mandated usage policy.
- TIP as a whole (T1-T4 vs. T5) to test the efficacy of our targeted instruction program as a whole.
### TIP KP: Research Design

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<td>2. Mandatory technology</td>
<td></td>
</tr>
<tr>
<td>3. Optional technology</td>
<td></td>
</tr>
<tr>
<td>4. Mandatory, then optional tech (grace period)</td>
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We focus on teachers’ choices in T3 and T4.

T3 allows people to self select into the technology tool.

We know women have less confidence in technology. In T4, we first mandate exposure to the tech tool for 2 weeks, then we allow them to opt out / keep and see whether they differ vs. optional treatment arm.
Heterogeneity in Teachers’ Access and Confidence in Technology
### Dataset: Teacher Baseline Survey

- Teacher Baseline Survey
- Date(s) collected: May 2022
- Unit of observation: teacher-level
- N=6,833 public primary teachers across all treatments

<table>
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<tr>
<td>Section 1</td>
<td>Teaching experience, training, commute, personality</td>
</tr>
<tr>
<td>Section 2</td>
<td>Technology confidence and usage</td>
</tr>
<tr>
<td>Section 3</td>
<td>Time allocation in-class vs. outside-class, pedagogy styles</td>
</tr>
<tr>
<td>Section 4</td>
<td>Beliefs about pedagogy styles and TIP’s effectiveness</td>
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Female and male teachers have similar access to smartphones.
However, men are significantly more confident in all devices except basic camera.
Across ages, men are mostly more confident in digital devices than women are.
Head teachers are older ...

- Head teachers are much older than teachers (+ 13 years)
- These *older* head teachers display different technology preferences and beliefs

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Graph: Distribution of Age by Teacher Status

- Teacher Mean = 38.9
- Head Teacher Mean = 49.8

Note: Latest collected as of January, 2023. Sample includes 5,608 teachers and 1,232 head teachers.
... and *less comfortable with technology*

TIP leverages *Tech Captains*, a chosen/self-volunteered teacher in the school, to reinforce tech take-up of the tech tool by teachers, especially older ones.
Preliminary Results: Teacher Take-Up of Technology
Technology take-up is correlated with *ex ante confidence in technology*. 

![Graph showing the relationship between teacher's confidence in technology and technology take-up](image-url)
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We know women have less confidence in technology. In T4, we first mandate exposure to the tech tool for 2 weeks, then we allow them to opt out / keep and see whether they differ vs. optional treatment arm.
Getting over the confidence gap: women are more likely to use the technology tool after being mandated to do so.
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**Effect of Requirement Policy and Ex-Ante Confidence on Tech Take-Up**

Mandated, then Optional Treatment - Confidence in Smartphone

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- **Mandatory Period**
- **Optional Period**

Notes: Lines show the local estimates of regressions of tech take-up on confidence. Confidence is measured on a 1-5 Likert scale (1-Very confident; 5-Not at all confident). Tech take-up is measured by teacher-level means of total graded quizzes across subjects on the tech tool. Sample includes teachers N=1,019 in optional; N=931 in mandated then optional, and N=964 in mandated tech treatment arms. Sample excludes teachers or students who transferred away or into sample schools during TIP administration. Overall treatment means during trial are 0.79 during mandatory period, and 0.53 in optional period. In the mandated then optional tech treatment arm, the opt-out announcement was made to schools after 2 quizzes (or 4 weeks) after the start of TIP classes.
**Smartphones** is the most prevalent digital device among teachers.

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Teachers' Access to Digital Devices

- Basic Phone: 0.30
- Smartphone: 0.70
- Tablet: 0.05
- Computer: 0.16

Note: Data collected as of May, 2022. Sample includes 2,151 females and 2,892 males.
Teachers also have the **highest confidence** in smartphones.

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**Teachers' Confidence in Digital Devices**

- Basic Camera: 0.61
- Smartphone: 0.68
- Tablet: 0.51
- Computer: 0.51

*Note: Data collected as of May, 2022. Sample includes 2,151 females and 2,892 males. Confidence is a binary variable taken from a 5-pt Likert scale.*