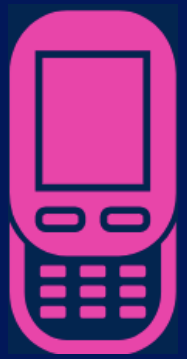

# Mobile Distance & Hybrid Education Solutions

## A Knowledge Pack

*Last updated: November 11, 2020*

*Author: Marisa Steinmetz, World Bank, EdTech Team*

WORLD BANK GROUP
Education

**Overview:** *What does the World Bank and its Global EdTech team do? How does this Knowledge Pack fit in?*

# Background

- World Bank's goals
- World Bank Education Technology team's vision
- World Bank's 5 EdTech Principles
- World Bank's EdTech Approach
- **Overview of this Knowledge Pack on Mobile Distance & Hybrid Education Solutions**

*Click on any hyperlink to jump directly to the section.*

# What are the World Bank's goals?



**The World Bank Group has two goals:**

**To end extreme poverty and promote shared prosperity in a sustainable way.**

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# What is the World Bank's Education Technology team's vision?



**The World Bank's Education Technology (EdTech) team's vision is to:**

**Reimagine Human Connections to Transform Teaching and Learning for All**

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# What are the World Bank's 5 EdTech principles?



1 **ASK WHY:**
EdTech policies and projects need to be developed with a clear purpose, strategy and vision of the desired educational change.

2 **DESIGN AND ACT AT SCALE FOR ALL:**
The design of EdTech initiatives should be flexible and user-centered, with an emphasis on equity and inclusion, in order to realize scale and sustainability *for all*.

3 **EMPOWER TEACHERS:**
Technology should enhance teacher engagement with students through improved access to content, data and networks, helping teachers better support student learning.

4 **ENGAGE THE ECOSYSTEM:**
Education systems should take a whole-of-government and multi-stakeholder approach to engage a broad set of actors to support student learning.

5 ***BE* DATA DRIVEN:**
Evidence-based decision making within cultures of learning and experimentation, enabled by EdTech, leads to more impactful, responsible and equitable uses of data.

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# What is the World Bank's EdTech approach?



**To operationalize the 5 EdTech principles, the World Bank focuses on:**

**discovery, deployment and diffusion of new technologies.**

**Discover**, document, generate and analyze evidence-based technology solutions in education relevant to developing countries.

**Deploy** solutions, at the pilot level and at scale, tackling adoption barriers (including in procurement) and in ways that are informed by evidence and which allow for efficient course correction.

**Diffuse** related knowledge widely across policy makers in our client countries and support capacity development to better use this new knowledge.

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# What is a Knowledge Pack? Who does it aim to serve?



## What is a Knowledge Pack?

A series of short, pragmatic guides on individual topics within EdTech that supports the target audience to make informed yet quick decisions about EdTech interventions in their work, especially with education ministries.

## Main Target Audience

World Bank staff, institutions and individual decision-makers beyond the World Bank especially those who support education ministries.

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# Overview of this Knowledge Pack

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*Click on any hyperlink to jump directly to the sectior*

# An overview of this Mobile Knowledge Pack

*Click on any hyperlink to jump directly to the section.*

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# Context



**Amid the Covid-19 pandemic, distance & hybrid education solutions became no longer optional, but essential.** The pandemic triggered an education emergency of unprecedented scale: in May 2020, nationwide school closures in 188 countries peaked at 1.6 billion children being out of school, equivalent to 91% of enrolled learners.

**With a vaccine projected to be available only in 2021, this is the "new normal".** Students are at risk of losing more than a year of learning, or dropping out for good, thereby diminishing a generation's opportunities for a lifetime. Fiscal challenges are compounding academic ones.

Those countries that are reopening schools often do so in a **hybrid model**, so that in-school time is minimized.

There is no time to be lost - and **innovative, mobile solutions are crucial to overcoming this challenge.**

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# Key Questions to be Answered



*Can mobile be an **effective** tool for supporting distance learning or hybrid learning **in my context**?*

*How can we effectively **design, deploy and continuously improve** mobile interventions?*

*How should we leverage mobile solutions in the **short-term versus in the long-term**?*

*Who has implemented such interventions and **who can we speak** to in order to learn about **lessons learned**?*

*How can mobile help us assess **if learning is taking place** from a distance?*

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# Highlights & Target Audience



**Mobiles are becoming increasingly ubiquitous and represent an effective 2-way communication tool too valuable for education to pass up.** 96% of the world's population has access to a mobile; 70% of that lives in low-resource settings.

**Leaders should leverage this "new normal" to learn about & integrate mobile solutions more permanently into their education systems.**

**Highlights in this deck include:**

- A detailed 14-phase implementation guide
- A Strategy Decision tree
- A list of ~100 feature & smartphone solutions
- Case studies from 4 contexts
- A checklist of Enabling Conditions

**This Knowledge Deck is intended to provide a basic overview of *Mobile Distance & Hybrid Education Solutions* to those who are considering mobile strategies**, including:

- **Ministries of Education (MoEs)** in low- and middle-income countries
- **Task Team Leaders (TTLs)** at the World Bank
- **Private sector actors**
- **Third sector actors**

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# 1. Why use Mobiles for Education?


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# How can we leverage Mobile for Education?



## *Mobile has 9 Use Cases - consider ALL of them!*

**1. Communication For Coordination**
Mobile communication between parents, teachers, principals & government with explicit objective of coordinating stakeholders to support student learning; e.g. weekly learning schedules, homeschooling guides, etc.

**9. Digital Credentialing**
Authentication of student ID, e.g. for high-stake exams; via fingerprint scanner, face recognition, voice biometrics, etc

**8. Authentication**
Authentication of student ID, e.g. for high-stake exams; via fingerprint scanner, face recognition, voice biometrics, etc

**7. Monitoring & Evaluation**
Mobile data collection (usage data, surveys, voice calls, IVR, browser-based) on inputs, outputs & outcomes

**6. Content Creation**
Teachers or students use mobiles (only smartphones) to create educational digital content (video recordings, edited video compilations, images with explanations drawn onto them, explanatory docs, etc)

**2.1 Content Delivery (static)**
Mobile delivery of "one-way" content that doesn't respond to student interaction but is purely for consumption (sending of files, e.g. video, audio, images, voicenotes, podcasts, links, documents, m-books, print2screen, fixed e-learning courses)

**2.2 Content Delivery (Interactive)**
Mobile delivery of "two-way" content which changes in response to student (interactive voice response (IVR), chatbots) mobile apps (incl. educational games), e-books with text-2-speech, adaptive assessments, adaptive content delivery, LMS)

**3.1 Synchronous Instruction (Parent)**
Conducted by the parent at home, as 1-on-1 or 1-to-many, guided by instructions received via mobile

**3.2 Synchronous instruction (Teacher)**
Conducted remotely/in hybrid mode by teacher, 1-on-1 or 1-to-many, via text-, audio-, video- or LMS-based mobile solutions (audio/voice call, SMS/MMS/ IM, voice notes, mobile radio, etc)

**4. Peer-2-Peer Collaboration**
Collaboration between students via simple mobile communication tools (voice call, SMS/MMS, IM) or more interactive, mobile, online tools (online forums, LMS, cloud-based collaborative file editing, etc)

**5. Assessment**
Formative (in-class checks for understandings , homework, surveys, quizzes, exit slips, etc; Interim (every 6-8 weeks, helps predict performance on summative exams) & summative (end-of-year high-stake exams)

## *Consider ALL configurations*

Mobile can be used on its own or - ideally - as a way to complement other educational media such as TV, radio and print symbiotically. Evaluate mobile's particular value-add from an angle of **unique advantages over other tools, such as its 2-way communication ability** that enables assessment, M&E, authentication, peer-collaboration, etc - which can't be done via TV or radio. The exact use case should always depend on context and need; see the decision tree for guidance.

## *Consider ALL Phone Types*

**Feature Phones**
1.8 to 2.8-inch LCD screens (color/B&W), SD card, GPS, camera, buttons-based input, torchlight; voice calls, SMS, MMS, basic browser, FM, media player; no wifi

**Smart Feature Phones**
Feature Phones with web-browser capability enhanced via KaiOS to run smartphone apps (YouTube, Google maps, Whatsapp, etc)

**Smartphones**
Touchscreen, 2 cams, micro-SD; mobile OS, apps, advanced browsing & UI, etc

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# Is Mobile an Option in our Context?



## Mobile might be the most equitable option

**Mobile penetration is actually at times higher than that of TV, radio or computers, specifically among the poor.** For example, in households of primary-aged students in Africa, 46% of poor households own mobiles, while that number is only 30% for radio, 4% for TV, 1% for computers and 0.3% for the internet. Similarly, in the Nigerian state Edo 91% have access to a mobile phone, yet only 69% to TV and 46% to a radio.

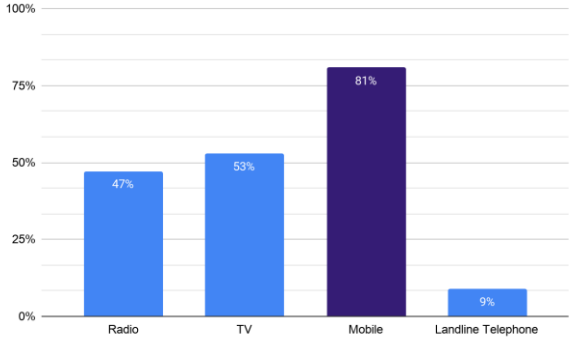
**Household ownership of course does not imply that the child owns or has access to the phone; the extent of phone access at home always needs to be evaluated in-depth.** Furthermore, while ownership of mobiles is high, penetration and affordability of cellular & internet subscriptions still vary.

**Current trends however clearly justify investing in mobile sooner than later - especially in Sub-Saharan Africa and the MENA region, adoption is rapidly on the rise.** Africa is now a bigger mobile phone market than Latin America or USA and in the next few years will surpass Europe. Currently, subscriptions are reaching on avg. min. 44% of people across regions.

**In the short-term, focus on offline, low-bandwidth mobile solutions, but rapidly enhance mobile internet access to advance to sophisticated mobile solutions long-term.** "Offline" strategies like SMS, voice calls & IVR are still the most equitable avenue for large-scale mobile learning.

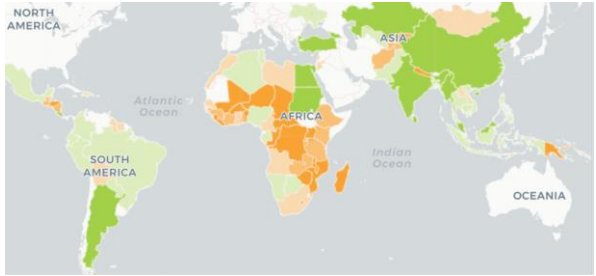
**Some mobile solutions are more inclusive than others:** for example IVR is accessible to the blind, physically disabled & dyslexic, offline, feature-phone compatible, configurable as multilingual & soon personalized with AI NLP.

## Households with access to different media (DHS 2011-18)




*To view country-level data, visit the World Bank database, ITS statistics portal or USAID's DHS data portal.*

## How much data can 2% of avg. local monthly income buy?

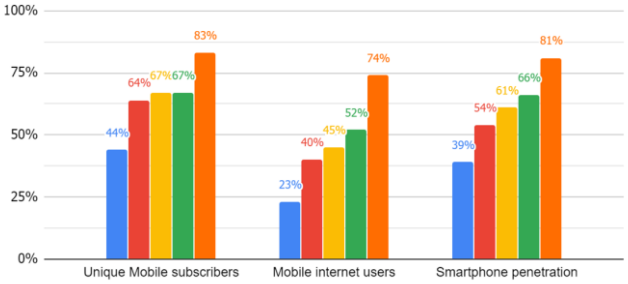



Greater than 1GB at 2% GNIC

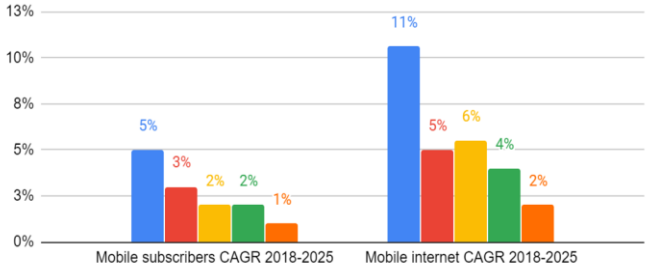
Less than 1GB at 2% GNIC

*e.g. South Africans with incomplete formal schooling need 10% of their monthly expenditure to afford 1GB.*

## Current Mobile Access by Region (GSMA, 2018)




## Growth in Subscriptions & Internet Access by region (GSMA)

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# How effective are Mobile Solutions for Education?



**Overall, existing evidence shows extreme promise of mobile usage for education.** However there still are huge literature gaps and a dire need for more research (and in particular more RCTs) in mobile-based education solutions, especially in low-income settings. Note that this is just an evidence *scan* rather than a full-fledged *review* and is far from exhaustive - this does not cover all educational levels nor all student groups and contexts; it is supposed to be illustrative.

**However there is no question that mobile *can* be effective in supporting education outcomes**; the devil is, of course, in the details: Implementation fidelity, content selection, even the framing of SMS, etc.

**As mobile is under-researched, and to some extent always will be given its fast pace of development, highly agile, iterative, and data-driven project management must fill the knowledge gaps** on the go to constantly learn from success and failures in implementation. We encourage you to document & share your lessons learned with us!

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### Communication For Coordination

**With parents:** Communicating formative mathematics assessment results of rural Chinese primary school children to parents produced 0.3 SD improvements, especially for left-behind children. Similarly, when Chilean parents received regular SMS about their child's attendance, behavior and mathematics test scores, the probability that a student attends school sufficiently to permit grade progression increased by 6.6%, and the likelihood that they passed the grade by 2.9%, virtually eliminating grade failure among marginal students; the positive effects were larger when parents were sent more messages. In the US, effects of such interventions were even larger.

Parents often don't have accurate information about their children's effort and performance, and in particular low-income parents hold mistakenly optimistic beliefs about their children's learning & attendance; providing that information can enable parents to better support their children. The risk is that low-resource parents at times reallocate resources away from lower-performing children toward their higher-performing children, reinforcing inequalities in performance. This can be remedied possibly via additional info; explicitly explaining the earnings returns of secondary education to parents in the Dominican Republic led to a 0.2 to 0.35-year increase in the years of schooling completed.

However mobile-only communication with parents also has a number of challenges that should be addressed in the design phase: they're prone to misuse, conflicts due to misunderstandings, engaging on out-of-hours, harming the school climate & minimizing face-to-face communication. Determining & enforcing group rules, informing group members about the aims of the group, only group admins texting the group and not abandoning face-to-face communication can minimize those issues.

**With principals:** In Peru, school managers were nudged via SMS alerts to use funds appropriately and be accountable for completing maintenance work on time. The study found that sending SMS increased the likelihood that maintenance managers performed their activities at the appropriate time, reducing the noncompliance rate in reporting by more than 15%. It was also found that the impact of the messages is different depending on the content: the impact was greater with "social norm" messages that mentioned that most of their nearby peers completed the work, leveraging reputational and peer pressure.

**With students:** SMS were sent to remind college-intending high school students of required pre-matriculation tasks and to connect them to counselor-based support; this increased student enrollment by 4-7%. The effects were largest for students with less clearly formulated college plans and less access to help from other sources. SMS nudges also reduced dropout levels of US STEM community college students; 72% of the students who participated in a nudges trial decided to continue on in STEM courses after their first semesters, compared with just 56% of the students who opted to not receive nudges. Similarly, reminders to apply for financial aid for their second year, where recipients were about 12–14 % more likely to remain enrolled in the next two semesters. Interestingly, when scaled nationally, the same strategy appeared less effective; this was explained via a lack of personalization. Even small changes in the framing of information may change or de-bias behaviour because of cognitive and attentional limitations; e.g. not providing how-to instructions reduces effectiveness of nudging.
Of course, primary and ECCE students can be expected to benefit less from mobile communication for coordination than secondary and postsecondary students.

**With teachers:** There seems to be no research on how effective mobile communication is between principals and teachers, or teachers and the government. With regards to their coordination with parents, research affirms that teachers need quality training and constant encouragement to display regular, effective use of mobile messaging with parents (& students). Plus, inconsistent take-up of mobile communication platforms tends to be due to, in part, administrators' failure to establish school-wide norms about adopting one communication platform & a set of communication practices.

### Content Delivery

**SMS-based:** ***Primary***: M-stories increased student literacy in primary school students in Papua New Guinea and in Zambia via 50 maternal language stories. **Secondary:** m-learning showed significant positive effects for language learning (specifically vocabulary retention) & math. **University**: Programming students receiving SMS as learning support improved their performance. **Adult Education:** SMS lead to significant and long-term gains in literacy, numeracy and retention. **General:** SMS-based delivery - compared to print - can enhance learner creativity, learner flexibility & self-image.

**IVR-based:** There is no direct evidence on IVR interventions for younger children, but audiobooks made a group of 2nd grade students outperform the control group by 3x in reading comprehension, 7x in 2nd grade vocabulary, and 4x in reading motivation in an RCT (however with a limited sample size). For youth and adults, 42% of users demonstrated increased confidence in using English after consuming BBC Janala, which reached 28 million Bangladeshis (80% of its users were from rural areas) with its 3-min audio lessons, of which 7 million were accessing via dial-in on their feature phones followed by SMS-based quizzes. [*continues on next slide*]

# How effective are Mobile Solutions for Education?

### Content Delivery (continued)

**App-based:** Adaptive smartphone based learning apps have proven effective in supporting early literacy & numeracy in low-income students without teacher guidance (KitKit, OneCourse, Homer) and as supplement. App-assisted EFL showed promising results for adult immigrants as a supplement, not core instruction. And STEM apps have been shown to enhance conceptual understanding (physics, geography) & support collaborative, inquiry & problem-based learning. However even the much more basic, browser-based learning apps accessible via smart feature phones (ie. browser-enabled feature phones) can support learning: Nokia's free *Mobile Math* app helped reduce nearly 2,000 grade 10 South African students' mathematics attainment decline by 3.5% (statistically significant); students were using the app on a voluntary, supplemental basis rather than as part of the formal school day.

**Considerations:** Evidence on mobile content delivery is still sparse, and existing evidence is mainly from settings where mobile learning was optional; effectiveness depends on many factors incl. content quality, subject, student age & implementation approach and fidelity. Plus SEL factors like growth mindset and perceived autonomy & content relatedness are a significant factor in student performance in m-learning, too.

### Synchronous instruction - Parental

**SMS-based:** Leveled m-stories sent to parents to be read at home by children with their caregivers in Zambia produced an effect of 0.3 on students' oral reading fluency; prior to the project, few parents or caretakers read with their children at home. Similarly, Parental reading time was doubled when parents of preschool children were given an electronic reading application that audio- and video-records them as they read to their child; they were asked to set goals for the amount of time they would spend reading to their child in the coming week. They were reminded by SMS to read in order to reach the goal & received a congratulatory SMS as a non-monetary reward upon reaching it. They were also provided with information about the importance & benefits of parental involvement. SMS tips can help also reduce parental stress and increase parent-adolescent communication & parental competence, thereby enhancing parent-student interaction and family peace & can improve how they manage student health functions crucial for performance, e.g. sleep.

**IVR:** There is little research on how well parents respond to IVR-based instructions in the *homeschooling* realm, however there is plenty in the *medical* that indicates that parents respond well to IVR-based guidance. For example, parents of toddlers who received IVR-based instructions on questions to ask during pediatric visits and follow-up questions were more likely to report discussing important issues, and 100% of clinicians reported that PHP improved the quality of their care. This dynamic is transferable to virtual parent-teacher meetings as well as responding to IVR-based homeschooling tips and other information.

**App-based**: While there is little research on how and which apps most effectively support parental homeschooling, simple access to an educational app can reduce parental anxiety about their students performance; this anxiety tends to be negatively correlated with elementary student achievement (in math) and is hence beneficial to eliminate.

### Synchronous instruction - Teachers

**SMS:** Medical students who were taught via SMS had higher test scores than peers who were taught via traditional lecture (however they had lower satisfaction rates), similarly to residents who were taught via SMS compared to those who read the same content in books.

**IM:** Instruction via WhatsApp was more effective in supporting vocabulary acquisition of 14-year old Iranian EFL learners than traditional classroom instructions; pictorial annotations were crucial for effectiveness. Similarly, Whatsapp-based instruction was effective in improving critique writing skills in EFL students.

**Video:** No difference in performance was found between university students who participated in face-to-face supplemental instruction versus in online instruction.

### Peer-2-Peer Learning

**SMS/IM instruction:** has been shown to increase student motivation and to be at times even more engaging than video-based P2P learning.

**Video instruction:** In an online, synchronous online mathematics peer-tutoring program over 7 weeks as well as a whole year for low-achieving third graders, students in the experimental group had a very significant gain in mathematics learning compared to their control group. Elementary school students in an online peer-assisted learning group online even outperformed the face-to-face group on reading skills.

**Hybrid**: P2P learning in the classroom that paired high-achieving students with lower achieving students and that was assisted by a mobile app resulted in the treatment group outperforming the control group.

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**Assessment:** While mobile P2P instruction seems to have positive effects, evidence on P2P assessment seems less promising. e.g. university students had negative experiences with IM-assisted peer assessments.

**General:** Researchers have identified design principles to follow for effective tech-assisted P2P learning. Mobile apps can also be leveraged to optimize scheduling and peer matching.

### Assessment - Formative & Summative

Mobile assessments can have multiple formats, from semi-automatic (assessment conducted by software, but grading & feedback done by teacher) to fully automatic (no teacher involvement needed), and their impact on student learning will vary depending on their regularity, quality, and what is done with assessment data, ie. to what extent data is used to tailor instruction to that student & whether that tailoring is done by a teacher or an ALS..

Evidence on the effectiveness of mobile assessments supporting student learning - especially remotely - is sparse. However secondary students improved exam performance in terms of their factual knowledge via formative mobile micro-assessments which followed micro-learning units. Most mobile assessment studies focused on formative assessments with elementary students in STEM subjects. Most of the articles reported a significant positive impact on student learning performance, motivation & attitudes..

Literature identifies some best practices: Establishment of a classroom culture that encourages regular use of assessment tools; use of varied approaches to assessing students; tracking of individual student progress toward goals; providing clear guidance on grading. Trust in the source of the assessment is also crucial. Gamification can increase the participation in digital formative assessments

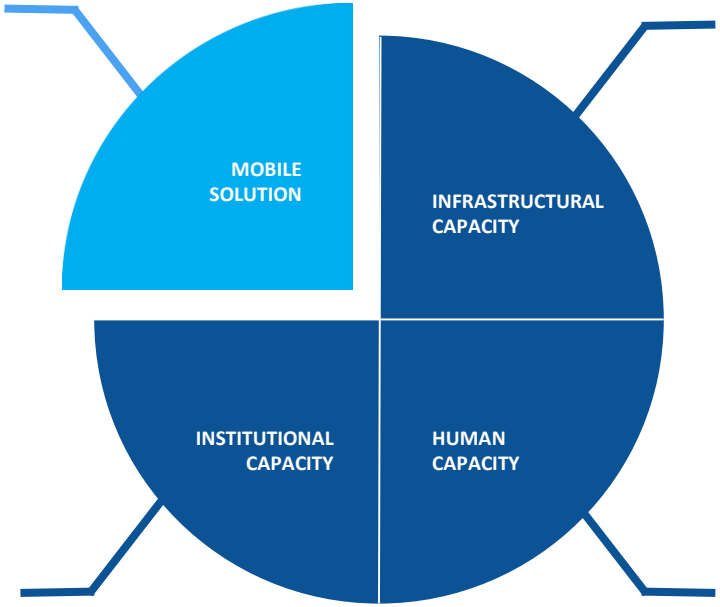
# 2. Should we use Mobile in our context?

# Which Enabling Conditions are crucial for Success?

- **Relevance:** Mobile solution adresses a clear need that is sharply felt by potential users; addresses issues important to Development Objectives, National & Local policy priorities
- **Superiority:** Need can only be addressed or be best addressed via mobile solution(s); current solutions for this issue are considered inadequate; Superior effectiveness to other innovative models established or at least strong indications for it
- **Effectiveness:** Sufficient (case studies) or strong evidence (RCTs / Independent external evaluation / meta-analyses) from multiple settings that the solution is effective in this / similar contexts
- **Interoperability:** Implementable within existing systems with few components easily added; represents a manageable departure from current practices & behaviors of target population and current practices and cultures of adopting organization(s)
- **Cost-effectiveness:** Appropriate cost-effectiveness for the context; high public ROI (over time) or viable business model (pilots might need subsidy but financially viable over time)

- **Political:** A clear EdTech Policy with an explicit mobile component is in place that outlines the short-term (3-24 months) and ideally also long-term (up to 10 years) vision for edtech in the country and the particular role that mobile has to play in that vision. There is political buy-in and support for that strategy across parties.
- **Legal:** A policy is in place to cybersecurity and data protection.
- **Partnerships:** Strong technical / financial / informational / implementation partnerships for the R&D / development / marketing / sales / deployment / M&E of mobile solutions exist between iNGOs, NGOs, unions, donors, governments (incl. IT teams, M&E teams, leadership, etc) & corporations (mainly MNOs, tech companies etc), social enterprises & startups; partnerships are leveraged for effective piloting / scaling

**Important:** you do not need to be in a context where ALL these items are checked - those contexts mostly don't exist yet. This checklist describes, the IDEAL context, and is hence a guideline for what context you should build out OVER TIME time, in phases. You only need a few (underlined) to begin.




***Country Context***

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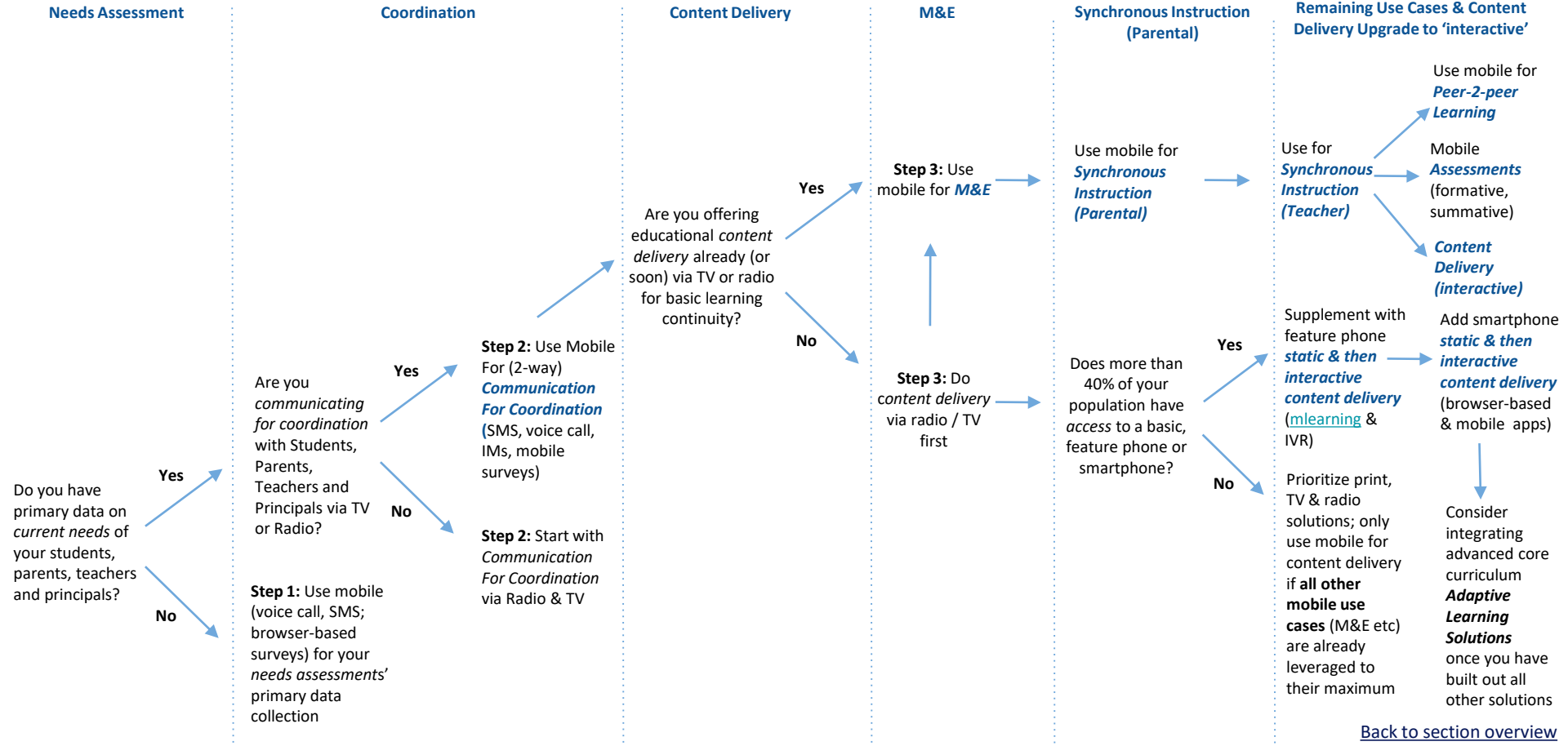
- **Financial:** Budget is at the very least sufficient for low-tech mobile interventions (e.g. SMS-based); systems are in place for safely and transparently distributing funding to mobile solutions
- **Technical:** Mobile penetration is high (90% among feature phones), at-home mobile / broadband internet access & school connectivity are high; a dedicated, organization-internal IT team is well-equipped, Government has a digital M&E system in place
- **Informational:** Strong Knowledge & Information Exchange (KIX) structures are in place; KIX helps identify promising, contextually relevant mobile solutions and analyze implementation fidelity, impact effectiveness & cost effectiveness of mobile solutions. Easy-to-use online communication platforms/ offline forums enable 1) parents & teachers to find info on mobile solutions (effective products/services, how-to guides), 2) private & third sector organizations on how to collaborate with the government for mobile solutions and why, 3) researchers & leaders to compiles emerging best practices, 4) entrepreneurs to understand the struggles that the public education sector needs solutions for & on curriculum standards; Regular KIX meetings are held between stakeholders, 5) online training resources, etc.
- **Skillfulness:** Beneficiaries have the digital literacy to use the mobile solution/ can be easily upskilled to do so; intermediaries have technical skills to select, develop & deploy the solution(s)
- **Managerial:** Leadership has a clear strategy for mobile but is able to adopt an agile / adaptive and data-driven approach to implementation given the fast-evolving nature and still limited evidence on best practices for mobile. Across levels, there are clearly assigned individuals whose role & responsibilities focus on mobile solutions management. Accountability is maintained via high standards & close tracking of results. Performance management is maintained, rewarding those who succeed & supporting those who struggle
- **Cultural:** Mobile phones are accepted as a tool that can serve educational purposes; women and girls have the same access to mobile phones as men and boys do.

# How should we start? How to prioritize Use Cases?



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# How should be budget a Mobile Intervention?



## Key Cost Components

1. **Capital expenses**
   a. **Hardware**
      i. Smartphones / feature phones
      ii. Microservers
      iii. Main servers
   b. **Content**
      i. Content development
         → subject matter experts
         → UI/UX designers
         → Videographers/Voice artists
         → Graphic Designers
      ii. Licenses for Purchased content
   c. **Networks**
      i. national airtime rates
      ii. number of users (more users = more airtime)
      iii. minutes/SMS per user
      iv. number of interactions
      v. Hosting / Servers
      vi. mobile internet rates
2. **Human resources**
   a. Services
   b. Training
3. **Time**
   a. Duration of the project

## Sample unit costs

1. **Devices**

| | | | |
|---|---|---|---|
| a. | Smartphone | min. $50; $214/avg. | |
| b. | Feature Phone | min. $10 | |
| c. | Smart Feature Phone | min. $11 | (KaiOS) |
| d. | Microserver | ~$500 | (Rachel 3) |

2. **Content**

| | | | |
|---|---|---|---|
| a. | Content management platform | $73,000 | (EdoBEST@Home) |
| b. | Content License | $234,000 | (EdoBEST@Home) |

→ both of the above are rates charged by Bridge Academies International

3. **Network**

| | | | |
|---|---|---|---|
| a. | SMS rates | $0.01-0.08 | /SMS |
| b. | Airtime rates | $0.01-0.19 | /minute |

→ View additional surveys & sample country-specific rates from Viamo here

4. **Server/Hosting costs**
   a. AWS rates: View calculator here to calculate costs based on your specific needs.

1. **Services**

| | | | | |
|---|---|---|---|---|
| a. | Mobile Survey Design & Setup | $5,000 | /Survey | (Viamo) |
| b. | Call Center Set-up | $5,000 | /Project | (Viamo) |
| c. | Call Center Training | $2,000 | /Project | (Viamo) |
| d. | Remote Training Technical Design & Setup | $5,000 | /Round | (Viamo) |
| e. | Design and Implementation Team | $300 | /day | (Viamo) |
| f. | IT support (for content platform) | $67,000 | /project | (EdoBEST) |

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# 3. How to strategically implement Mobile Solutions?

# Implementation - Overview of the 14 Phases



*Note: While this implementation guide has been designed with the current Covid-19 pandemic in mind, the overall steps apply to all mobile interventions, independent of context.*

## Phase 01-04: Inclusive Planning

1. Establish a Representative Working Group
2. Conduct a Rapid Target Group Needs Assessment
3. Conduct a Rapid Internal & External Capacity Assessment
4. Create Initial Implementation Plan & Risk Analysis

## Phase 05-10: Setup & Rollout

5. Ramp up Internal Capacity
6. Ramp up External Capacity
7. Activate Public Communication
8. Set up the Initial M&E structure
9. Maximize Access (to Mobile phones & the Internet)
10. Intervention Rollout (depends on use case)

## Phase 11-14: Sustainable Iteration

11. Ongoing internal & external KIX, L&D and agile Iteration
12. Ongoing Capacity Building
13. Hybrid Reopening of Schools
14. Post-Covid: The “New Normal”

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# Implementation - Short term (Phase 1-4): Inclusive Planning



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| | Phase 1<br>**Establish a Representative Working Group (WG)** | Phase 2<br>**Conduct a Rapid Target Group Needs Assessment** | Phase 3<br>**Conduct a Rapid Internal & External Capacity Assessment** | Phase 4<br>**Create Initial Implementation Plan & Risk Analysis** |
|---|---|---|---|---|
| **Objective** | **The situation is evaluated from all possible stakeholder perspectives and solutions are co-designed** to maximize buy-in, inclusion, as well as prevent redundancy with what other stakeholders are doing. | **The needs of your affected target group (students - incl. adult learners-, parents, teachers, principals) are truly understood.** Beyond educational needs, analysis should cover contextual factors like health, safety, financial and mental well-being. | **The financial, technological, human, political, legal & informational capacity of both internal & external stakeholders & target group, as well as areas for partnerships, are clear.** Identify strengths & weaknesses in all to optimize symbiosis. | **The initial Plan has agile design that lives up to the dynamic situation, integrates best practices gleaned from other contexts, meets standards, is scalable & includes contingency plans for early-stage risks.** In the short-term, goal is learning continuity & engagement for dropout prevention, less so academic outcomes. |
| **Setup** | **Invite national public, private & third sector, intersectoral & international actors into the WG**, either as core team members or as advisors; incl. especially teachers & parent associations, MNOs, tech firms, community leaders, think tanks, NGOs, religious orgs, donors. | **Use both qualitative & quantitative data; start with secondary data, then collect primary data and centralize it.** Use a framework to guide data collection. Segment & quantify subgroups in your target group e.g. by mobile access, etc. Truly LISTEN to your target groups' needs. | **Create a simple rapid capacity evaluation rubric** that lists all the above capacity areas, further segmented into strengths & weaknesses. Interview samples of all stakeholders, from MNOs to community leaders. Do phone calls, mobile surveys (e.g.Google Forms) & smartphone-based digital literacy assessments (e.g.Pwc app). | **Share the rapid assessment insights among stakeholders & create agile / adaptive plan outline** (context, needs, SMART objectives, intervention(s) design, timeline, risks, responsibilities, budget incl. gaps, KPIs/M&E**); invite stakeholders to contribute (digitally)**. Consult with countries in similar situations; include L&D plan. Use 10 Digital Principles. , incl. designing with users. Hold 2 reviews for approval. |
| **Execution** | **Establish clear & inclusive objectives for the WG.** Both short-term & long-term objectives should cover the categories of equity, inclusion, quality, transparency, agility, accountability, & cost-effectiveness. The equity lens should generally include those with no access to devices and/or internet, but also IDPs, refugees, women, special needs students, language minorities, nomads, SES & rural-urban divides. | **Analyze targets' groups needs to identify which mobile use cases would be most valuable & whether those needs are best and most equitably served via mobile or other media.** For the latter, analyze target groups' access to mobile versus other media (TV, radio, print), as well as types of devices (basic, feature, smartphone). For primary data collection, leverage mobile (incl. phone calls) and be mindful of creating representative samples. Leverage community leaders and NGOs. | ***Human***: in orgs, staff's expertise, skills & access to training channels plus ability to hire external consultants; in target group, (digital) literacy & ability to handle educational concerns amid crisis. ***Tech***: hardware / software infrastructure, e.g. cellular internet vs router access (sample survey in **Appendix C**), electricity/battery charging opportunities, types of devices, actual daily mobile access for student (in mins), etc. ***Info***: databases, intra-& inter-stakeholder channels. ***Legal***: cybersecurity & procurement laws. | **Pick your battles, think multimodal and use insights from other orgs/ countries.** Prioritize use cases that cannot be covered by TV/radio (e.g. *M&E, P2P-collaboration, assessment, 2-way communication*) rather than just *content delivery*. Prioritize solutions that maximize equity & fast implementation. Ensure that stakeholders are aligned, well-informed, bought-in & agree on comms structures (regularity, medium, points of contact, etc). Consider multimodal options, e.g. weekly SMS alerts 30 mins prior to a broadcast boosts radio campaign listenership by up to 20%. |

# Implementation - Short term (Phase 5-7): Institutional Setup



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| | Phase 5<br>**Ramp up Internal Capacity** | Phase 6<br>**Ramp up External Capacity** | Phase 7<br>**Activate Public Communication** | Phase 8<br>**Set up the Initial (Remote) M&E structure** |
|---|---|---|---|---|
| **Objective** | **Organization-internal capacity is rapidly ramped up to meet the moment**; including financial, human, technological & informational capacity. | **Capacity of students, teachers, principals, parents, and partner organizations is increased rapidly** to enable them to cooperate productively. | **Students, parents, teachers & principals are well-informed on the intervention & expectations** and kept up to date about changes | **Internal M&E and external M&E structures are setup quickly** and designed in a relevant, agile & cost-effective manner. |
| **Setup** | **Financial:** Tap national Universal Service Funds & Covid Emergency Funds. Mobilize private & Third sector Partnerships to mobilize funding; e.g. Brazil's São Paulo mobilized $40 million in funding for their Covid education response from existing partners.<br><br>**Human**: Based on the results of your internal needs assessment, proceed with upskilling as needed (digital literacy, design thinking for redesign of processes for rapid deployment, agile project management, family engagement, etc). Hire consultants/staff where upskilling isn't an option.<br><br>**Informational:** Designate clear communication structures (regularity, POCs) for the intervention; assign an L&D unit to capture & disseminate best practices on the go; ensure that local & central units are clear on communication structures & intervention design. Leverage community leaders, principals, parent associations & MNOs for data collection (e.g. numbers). Map school connectivity.<br><br>**Technological:** If needed, expand IT infrastructure, e.g. server capacity. Adapt existing digital tools rather than create new ones where possible. Design with the user, & design for scale to the extent that time & resources permit. Put in place QA processes to ensure that newly added capacity works well & that issues are flagged before they cause problems. Address data privacy & security | **Financial**: Ensure that parents have basic financial security despite crisis in order to have the mindspace to assist their child in mobile learning process. Ensure that teachers & principals have access to funds needed to e.g. get SIM cards to communicate with students. Ensure that partner orgs can channel money effectively to where it's needed for the intervention.<br><br>**Informational:** Provide clear instructions on how the mobile intervention will work & what the reason for it is, using TV & radio (e.g. caregivers need to know that they will receive an IVR call and how that works) Leverage community leaders and local NGOs to further spread the word. Put in place communication structures with external partners for coordination.<br><br>**Human**: Partner with MNOs & tech companies to provide digital & mobile literacy training to external stakeholders, incl. users & intermediaries. Ask School Management Committees (SMCs) (if in place) & community leaders to support coordination in villages. Share guidance with parents on how to prepare their kids for distance learning, e.g. how to behave during video-based instruction. Leverage free online M&E courses & how-to-guides to upskill M&E staff, etc.<br><br>**Technological:** Create data & server capacity sharing agreements with partners. Put data sharing & cybersecurity agreements in place with organizations. | **Based on info gathered during needs assessments, draft clear PR documents which describe the why & how of the intervention** and where to go for FAQs, and set expectations that are to be met. Have a dedicated PR team with school district members. Review PR documents with stakeholders involved in implementation prior to publication. Develop message development protocols to enable prompt drafting and approval of statements so that communications can be completed in a timely way.<br><br>**Set up a helpdesk toll-free hotline & a website** that people can visit for FAQs & to fact-check misinformation. Allow people to send questions via various media, incl. Twitter, Facebook, Email, SMS. Send updates via multiple channels every 1-3 days.<br><br>**Be multimodal in your PR.** Publish press release on website;share it with media & partner organizations (NGOs, Labor Associations, private companies esp. MNOs, etc). Make PR announcement via radio & TV. If within budget & of sufficient reach, run awareness campaigns via social media. Post content regularly on social media pages; Dr. Shawqi, Egyptian Minister of Education, earned praise for tweeting a 6-min video where he explained to students how to register for the Edmodo platform. Print street ad banners. Then share the announcements via mobile (SMS/Whatsapp). Consider regular blasts via robocalls as well. | **Have a holistic, agile M&E Plan.** Organization-internal & external, beneficiary / partner-focused KPIs. Keep processes short (sample design, surveys, QA, etc). Consider scale-based & MCQ surveys to maximize responses. Define data protection rules, e.g. for phone numbers, recording of calls. Include a baseline. Make samples representative (rural-urban, SES, language minorities, etc) & disaggregated. Adapt existing M&E.<br><br>**Pick only crucial internal & external KPIs at the beginning, ie. those that will allow to make better decisions, fast.** While KPIs should cover inputs, activities, outputs, outcomes (learning continuity, mental well-being) & impact (learning outcomes, student retention), focus on KPIs like engagement & service satisfaction rates, mental health, etc. that act as early warning systems when things go off-track.<br><br>**Consider multi-modal remote mobile M&E avenues.** Phone calls, SMS-based, IVR-based, browser-based surveys, offline surveys, sending of videos/photos via Whatsapp - it depends on your users access situation.<br><br>**Mobilize multiple stakeholders to help with data collection, but don't rely much on volunteers.** e.g. ask teachers to reach out to each of their students 1/week to identify student needs under remote instruction. Ask MNOs to track & share relevant mobile (GPS)data.<br><br>**Be strategic in your M&E staff training.** Train your M&E staff with short (e.g. 2-day) workshops. |

# Implementation - Short term (Phase 9): Maximizing Access



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## Phase 9.1
## Increasing Internet access

**Ask MNOs to "zero-rate" educational websites & apps**; i.e., no data charges apply when these resources are accessed (e.g. South Africa). Be mindful of resource bandwidth requirements. Request that MNOs give preferential access to scarce bandwidth for education-related data & service ("bandwidth-shaping").

**Make available free SIM cards for use by teachers, students & parents**, with expedited registration procedures, coupled with special data plans. Or distribute full-on smartphones with preloaded content and data plans already installed.

**Set up free public wifi spots & movable hotspots.** e.g. via buses / Google's 4G Loon balloons. Hotpots cause gatherings that harm social distancing; tell people to keep 2m apart.

**Consider reverse-billed SMS messaging, unbanning VoIP, or "data-free" IM apps** like Moya to enable free communication.

**Utilize bluetooth or offline File Transfer Apps to pass on files within communities.** Bluetooth's radius range is on avg. 10m. File transfer apps are 200x faster than Bluetooth.

**Boost Wifi signal available in schools.** Some schools have local area networks /wifi hotspots that could be boosted to enable the surrounding homes to access the network.

**Install local plug-and-play microservers that create local intranet, accessible via mobile**s to view preloaded content (RACHEL, Kolibri, OLX, Kiwix, BluPoint, BRCK, Snappbox).

**MNOs can host offline content platforms on local servers to connect to their base stations**, enabling access to the server anywhere a 3G connection is connected to the tower.

## Phase 9.2
## Increasing access to Mobile Phones

**Encourage communities to systematically share phones among families.** If you are considering mobile content delivery, provide instructions on how many hours each child will need access to a phone to be able to have a positive learning experience.

**Provide access to installments-based phone purchase schemes** to credit-unworthy low-income communities.

**Consider phone loan schemes.** Smartphones /Feature phones could be loaned to families for the duration,based on a needs assessment, with the provision of a solar lamp that enables at-home USB charging. Phones could be tagged with transponders or enabled to "find my device" in case the item is misplaced. Provide info on care for the phone (e.g. that they cannot be washed with water and soap are important) and asked to sign a loaner agreement.

**Partner with MNOs and Phone producers to get (MNO-branded) devices into the hands of learners** & teachers, incl. procurement & delivery.

**Leverage a pre-loaded advertising application on smartphones to subsidise the cost of a handset by ~$49 for low-income users.** (Social Eco)

**Negotiate discounted bulk purchase prices for feature or smartphones with mobile phone manufacturers.** Sign up a sufficient number of parents who are interested in a reduced phone price prior to this negotiation. As an MoE, consider slashing import taxes & duties temporarily; they can reach as high as 50% of the total device cost in some African countries.

## Phase 9.3
## Optimizing software for maximum access

**General questions to ask:** Can the software be used offline? At what network speed does it function? Is it multilingual / allows for easy localization? Is it purpose-built for underserved populations or just adapted from a high-income context? If the latter, has it been used in low-income contexts before? At what maximum scale has the platform been used in the past and how easy is it to scale it further in case additional capacity is needed? Is it customizable, if yes, to what degree? How easy is UX / does it require only minimal digital literacy? What is their data privacy policy? Can you try before you buy? Compatibility with in-house software?

**Key questions to ask when procuring messaging software:** Does the platform allow for sending multilingual SMS/USSD incl. easy instant translation features? What real-time data shows up on the data data dashboard (e.g usage, message delivery, customer satisfaction,etc)?

**Key questions to ask when procuring IVR software:** How easily does the software integrate existing contact data from one's CRM? How complex of an interaction can the software handle? Does the platform layer technology such as AI, automatic speech recognition, text-to-speech, call recording, SMS, voice biometrics, transcription, voicemail detection? Do they have different voice artists who can deliver messages in appropriate tone (serious, fun, etc)? Does it work only via VoIP, or in-country network infrastructure (former is more expensive)? How do they pilot IVR content prior to full delivery? Does it allow to speak to a live operator eventually when needed? How do they optimize for multiple calling attempts?

**Key questions when procuring software for smartphones:** Which OS version(s) is the software compatible with? How fast does it consume phone battery? How much CPU/RAM does it take up? How much storage space does it need? If it requires internet, how much bandwidth does it consume? Is it accessible for special needs users (audio instructions, text2speech, adjustable text size and font, etc). What's the server / API performance, ie. load times etc?

## Phase 9.4
## Selecting hardware for maximum access

**Whether you are looking at main servers, microservers, or devices, hardware has to meet the following criteria:** 1) optimized for low bandwidth, 2) offline capacity, ie. able to cache info and queue online sync requests for the rare times when the device is online, 3) high offline storage capacity, 4) low power consumption, 5) ability to draw energy from renewable (mainly solar), 6) chargeable on 12V/DC, 7) powersmart (e.g. powers down at night), 7) no AC/DC-inverters, 8) high battery life, 8) high CPU & RAM, 9) low cost, 10) no moving parts, 11) uses passive cooling (fans suck in dust, insects & humidity), 12) resistant to voltage swings/dips, brownouts, dips, 13) UX friendly (ie. not complex for user to use, min. number of buttons etc), 14) hard to break / durable ( resistance to water, humidity, dust, dirt, and extreme heat), 15) parts should ideally be recyclable, 16) screens need to be legible in direct sunlight 17) maintenance is low cost & requires only minimum skills (tech that can't be locally maintained, supported / repaired is unsustainable), 19) ideally can be built from scratch using local components, 20) interoperability, 21) reliability, 22) parts are recyclable.

# Implementation - Short term (Phase 10): Intervention Rollout



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| | Use Case 1<br>**Communication For Coordination** | Use Case 2<br>**Mobile M&E** | Use Case 2<br>**Synchronous Parental Instruction** | Use Case 4<br>**Content Delivery** | Use Case 3<br>**Synchronous Teacher Instruction** |
|---|---|---|---|---|---|
| **Setup** | Survey a representative sample of parents **/ teachers / principals/ students to identify the regularity, format & topic they want for communication.** Pick your mass communication medium - voice calls, SMS, VoIP, IM, file sharing - based on users' capacity & needs. Set fixed times for outreach to create a routine for users & maximize uptake. | **Pick your mobile M&E medium based on Phase 2&3 data** (user needs & capacity assessment), ie. choose among USSD/ SMS /voice calls / IVR / IMs etc. Create protocols for data collection, analysis & reporting. Common actionable KPIs: activity (usage of solution); learning outcomes; early warning indicators for students at risk of dropout / not graduating (attendance, (mental) health, homework submissions, GPA, etc) | **Survey parents to understand their literacy levels, digital literacy, most common mobile apps used, and how much time in a day they can and want to devote to conducting educational activities with their child.** Pick your mobile delivery mode for instructions/ activities that are to be sent to parents based on survey insights. Invite caregivers to share evidence of their child's learning, e.g. by sending a video / picture /audio. | Analyze capacity assessment data that you collected on your students to understand 1) how many minutes/day on avg. students have access to phone 2) with what internet speed & bandwidth 3) what their digital literacy is, 4) whether access is via feature or smartphone. Accordingly pick content avenue (SMS, IVR, IM, website, LMS, etc). Make lessons short given likely limited phone access. | Based on the capacity & needs assessment data (digital literacy, internet access, phone ownership etc) you have on students & teachers, pick the tools that will provide most equitable access or create sub-segments of students by tool/device. Provide standards on distance grading practices & update or simplify assessment rubrics to reflect the current situation. |
| **Procurement** | **Start with simple, human-led voice calls & SMS**, then procure mass messaging/IVR/ chatbot platforms. Content should be developed in-house, regarding: **for all:** distance learning info, health advice, digital access initiatives, financial support, responsibilities, salary/fee payment, FAQs, mental health; **for teachers:** instructional & training resources; **for parents:** learning goals, grades, absences & missed assignment, skill gaps & learning successes | **View checklist here. Key considerations:** Does your internal policy allow data to be stored on external servers (ie. cloud) or not due to sensitivity? Which survey answer types need to be supported? Do you need real time synchronization from the field/field office? In what formats do you need the data to be exported (Excel, STATA, etc)? What should the data dashboard look like? Which language(s) do you need supported? Which admin-portal features do you need & should they be role-based? | **Leverage mobile communication channels that parents are already comfortable with**, e.g. Whatsapp, rather than asking to install new apps. Procure existing activities from other organizations; activities just need to be implementable around the home, with minimal parental effort, with an element of fun & which can be shared in 64-character limitations of an SMS. Universal Design for minorities (language, location, SES, etc) & low-literacy parents. In PR, highlight importance of parental engagement. | **Pick content authoring tool & choose content source based on content rubric, internal capacity & urgency:** 1) existing in-county content, 2) OER, 3) free online content, 4) content from proprietary publishers, 5) developing content in-house. Local existing content is preferable. Hire instructional designers & Subject Matter experts (SMEs). Design for universal access; e.g. audio, text-to-speech. Include non-cognitive content (meditation sessions, digital safety content) & analogue activities. | **For video-conferencing tools, consider 1) required bandwidth**, 2) required internet speed (2G, 3G, 4G, LTE, broadband, dial-up), 3) participant number, 4) cybersecurity, 5) data policy 6) pricing, 7) features & relevant format options (webcast, webconference, and/or webinar) 8) ease of UX, 9) quality of technical customer support, 9) tool compatibility with relevant OS (likely Android), 10) Vendor stability & references from past clients |
| **Deployment** | **Standardize message structures**, topic range, regularity & which groups of contacts each type of message is sent out to. 1/week is a minimum. Put QA processes in place for development, approval and send-off of messages. Include M&E mechanisms (how many people "read" an IM, etc). Establish "office hours" for educator check-ins | Weekday evening calls tend to be the best to get a high response rate. To keep up a response rate over months, consider introducing mobile money based incentives or vouchers. If number database is incomplete, consider random number dialing, using a quick screening questionnaire to identify whether the respondent is from a relevant group. | **Share activities via SMS** (How To Guide) **& Whatsapp.** Encourage parents to conduct learning activities via social media hashtags where they can share posts of them conducting activities(e.g. #LearningAtHome). For ECCE, ideally share activities as videos where teacher models the exercise. Share a PDF Guidebook to enhance overall parental engagement/ family relationships & reduce violence at home in these stressful times. | **Always pilot & validate content with a small sample prior to large-scale deployment to make final tweaks as necessary. Ensure that content approval procedures are fast if they require the MoE's approval.** Put in place tight feedback mechanisms from students, teachers & parents on content quality & relevance to improve content constantly and leverage assessments too. Optimize costs over time. | Train teachers in the tool(s) in 2-day workshops/month & cover where to find shareable MoE resources/OER & how to conduct formative tests using SMS/ Whatsapp/ voice (notes) & attitudinal barriers (growth mindset). Clarify remote teaching M&E/ teacher performance structures/incentives Provide teacher FAQ & hotlines. Share behavioral norms with students & parents for video conferences. |

# Implementation - Long-term (Phase 11-14): Sustainable Iteration



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| | Phase 11<br>**Ongoing internal & external KIX, L&D and agile Iteration** | Phase 12<br>**Ongoing Capacity Building** | Phase 13<br>**Hybrid Reopening of schools** | Phase 14<br>**Post-Covid: The New Normal** |
|---|---|---|---|---|
| **Objective** | **The mobile intervention is constantly improved over time based on data-driven insights documented from formal M&E & stakeholder progress review meetings and Knowledge Innovation Exchange (KIX) structures.** Curation of & access to lessons learned is UX-friendly; how to use database is clearly communicated across stakeholders. | **Capacity of stakeholders continues to be built on the fly, throughout.** Human capacity is built via internal & external upskilling, technological via continuous upgrades of software, hardware and general IT; informational via improved communication structures; etc. Schools / individuals that are succeeding get recognized, those that aren't get extra support. | **Mobile interventions are smoothly adapted / transitioned into (post-peak!) reopening rather than discarded.** Given necessary strategies for Covid (split schedules/class rotation to reduce class sizes & need for remediation), the urgency for mobile 2-way communication & personalized mobile instruction remains. Users' behavioral shift is capitalized on. | **Due to the increasing ubiquity of mobile phones & internet access as well as the Covid-19 behavioral shift towards digital learning, mobile education strategies become an integral part of "normal" education&enhance it.** Personalization, M&E, communication, authentication, dynamic content creation & delivery for education are maximized thanks to mobile. Integrate in policies. |
| **Setup** | **Agile iteration is a constant cycle of improvement in products / services / policy based on prototyping & testing insights rather than unachievable perfect information at the outset**.: 1) Define Initial Strategy via latest data 2) Define Solution Requirements 3) Develop Prototype/MVP, 4) Internal & user testing, 5) Bug fixing & 1st iteration via test insights, 6) Wider testing, 7) 2nd iteration based on test2 insights, 8) Beta Field Release / soft launch to smaller segment, 9) Alpha release to all & scaling, 10) Start again | **Regularly update your capacity mapping (every 6 months);** this incl. defining desired vision, outcomes and KPIs together with stakeholders, and mapping across all stakeholders, capacity areas (technological, human, political, legal, etc) and spheres/levels **(**system, org., individual/ community level**).** Have an M&E system in place to track progress in capacity development (CD). Assess the incentives for stakeholders that will ensure follow-through of CD. Update capacity building interventions accordingly. | **Design a hybrid learning model (distance & in-person instruction) which compensates for lost instructional time (remediation), enables smooth class rotation of students, frees up teachers from admin, PD to strengthen teacher capacity to work with blended digital pedagogy.** Content must include knowledge on disease transmission & prevention. Use mobiles to further strengthen communication & coordination mechanisms that promote engagement with communities. | **Do a stocktake of effective mobile strategies acquired during school closures & do a capacity and needs assessment to evaluate the extent to which - and how fast - additional layers of mobile solutions can be integrated.** Take into consideration again all the possible mobile use cases listed in this deck, look at your context's CAGR in access & affordability rates & think about what students & workforce need to survive in the 21st century. Consider investing in custom software (takes ~1yr development, 6mo. piloting). |
| **Execution** | **Maximize Knowledge & Innovation Exchange by documenting & sharing best practice & case study files, hosting/sharing webinars, creating collective databases & collaborating to create upskilling courses (across countries).** Have a single, user-friendly, searchable software where you store all your knowledge. Identify topics of interest for KIX via regular stakeholder surveys. Foster a knowledge-sharing,agile culture; ensure daily workflows have built-in mechanisms for easily sharing ideas & information. | **Be multimodal in your capacity building.** Formal training, coaching, mentoring, peer exchange networks, resource hubs, institutional twinning, consultative support, financial injections, virtual conferences - they can all be mixed and matched to meet the moment. Have an assigned capacity development workgroup in your organization. Review CD M&E indicators regularly.<br><br>**Regularly advocate for CD.** Share success stories to ensure it's top of mind for stakeholders. Engage the media in covering efforts, to further encourage & recognize stakeholder efforts. | **Continue as many mobile uses cases as possible, adapted for the partial in-school context.** Continue content delivery & synchronous remote instruction (AI/teacher) for remedial purposes. Continue communication for coordination to keep parent participation levels high. Continue remote assessments and general M&E to track behaviors, best practices, learning outcomes and identify students at risk of dropping out or repeating the year. Encourage content creation among teachers and students to maximize OER. | **Start designing your system around 21st century pedagogies by leveraging mobile**: flipped classrooms, blended learning, project-based learning, inquiry-based learning, student-driven learning, etc. Leverage mobile apps to expand access via mobile to 21st subject topics that are hard to make time for during standard school days (e.g. life skills, socio-emotional learning, entrepreneurship, coding, digital literacy, global citizenship, etc) & to free up teachers from repetitive admin tasks (attendance taking, basic grading, salary pickup when mobile money is an option instead etc), or to improve M&E (e.g. better dropout warning systems, attendance, etc) |

# Implementation - Phase 13: Hybrid Reopening (in-depth)



### Hybrid Learning is the only option

*Hybrid learning* means that 25-75% of traditional face-to-face time is replaced by digital instruction. A combination of in-school and at-home distance learning, rather than a full return to face to face classes, will have to be the required reopening strategy for multiple reasons:

1. **Reopening of schools will likely be staggered**, resulting in students still depending on distance learning solutions part-time. starting with the younger K-8 students (since they require more face-to-face time to learn effectively) and involving smaller class sizes via rotating class schedules (half-day or half-week,with either shortened or extended school days until 5pm), possibly even a school year extension oto still to still achieve sufficient instructional hours; desks spaced six feet apart, separated by plexiglass while teachers rotate between classrooms & staggered drop-off and pick-up times.

2. **You might face limited in-school staff**, especially if a large proportion of your teaching force is over 50, that segment might not be able to return to the classroom safely, as well as educators with pre-existing conditions might have to remain at home and teach remotely. Similarly, at-risk students and administrators should not return to school.

3. **Localized, 14-to-28-day rolling closures triggered by new outbreaks** could cause full shifts back to distance learning. In Tel Aviv, schools had to shut down again due to a renewed outbreak just after reopening.

4. **Due to variations in learning loss, you will need an adaptive, personalised system that can base student progression on demonstrated mastery of competencies**, rather than on seat time.

### Challenges to address upon reopening

1. **A widened achievement gap** not necessarily along not necessarily geographically or school type specific ways, but likely along SES and depending on whether the family was directly affected by Covid or not. Given schools' varied capacity in deploying distance learning, some students will come back to school having experienced little to no distance learning.

2. **Rampant mental health issues:** A study of 2,300 Chinese elementary school students found that 23% reported having depressive symptoms during the shutdown, a 35% jump from the norm. A recent poll of American teens found that more than 20% report feeling disconnected from their school community, 25% reported that they lost sleep due to worry, and 30% that they feel unhappy or depressed. And PTSD seems prevalent, too.

3. **Continued digital divides:** Given a continued need for distance learning, In the ideal case, by the beginning of the school year, all students should have the device and connectivity they need to access learning at home. Until that is accomplished, print learning packets will be necessary to bridge the divide.

4. **Overwhelmed teachers:** Students' learning loss and its high variation will demand an extensive amount of highly personalized remediation. Plus, teacher and admin staff layoffs caused by budget crunches combined with at-risk teachers staying at home will worsen student-teacher ratios. Teachers might need to teach wearing PPE and disinfect regularly, inhibiting their focus which will already be limited by stress and burnout.

5. **A need to simplify curriculum.** Given the school reopening context limiting instructional time due to likely involving reduced staff, massive variation in student learning losses, time lost to additional health protection procedures, limited classroom time for students and instability caused by infection resurgences, it's absolutely crucial to focus on the basics and cut out from the curriculum elements that aren't essential. Plus, PE & SEL will have to take up more time in the curriculum to ensure that students' mental health is addressed.

6. **Flexible procedures:** Given the dynamic situation, clear protocols are needed for all kinds of scenarios: from school reopening to temporary school closures, all requiring fast communication structures & ways to practice protocols.

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# Implementation - Phase 13: Hybrid Reopening (in-depth)



## 01: Needs & Capacity Assessment

→ **Assess students' and teachers' social, emotional, and mental health** after this period of isolation. Student and teacher stress may mutually reinforce each other.

→ **Identify the most vulnerable students** (homeless, disabled, affected by COVID-19 through family death / hospitalization, offline) & prioritize them in support efforts

→ **Check-in with parents via phone calls / IVR to assess how much learning support they were able to provide** to their child (regularity & quality) and listen to their concerns (be it academic, health-wise, financial, etc) to evaluate their capacity to support their child during remedial efforts

→ **Check-in on UX with deployed distance learning solutions** - update your data on their access, usability, and effectiveness to inform remedial / hybrid learning strategy

→ **Internally, check if you have experts in mental health & instructional designers** with expertise in remedial instruction, mental health and socio-emotional learning, as that content will be crucial for addressing student learning losses. Hire short-term consultants to fill gaps in expertise if necessary. Consult with other countries and organizations that have already deployed comparable solutions to see if content can be shared and localized.

## 02: Communication for Coordination

→ **Clearly announce reopening dates & how reopened schools will function via SMS, IVR, voice calls, IMs** to principals, parents (also see 1, 2, 3, 4, 5), min. 1 month prior. Announce benchmark assessments, remediation systems, instructional / mental health / financial / health support structures, and key hotlines / FAQ websites for parents & admins

→ **Announce in relevant languages and both in text and audio** to cater to illiterate parents / caregivers \

→ **Explain how hybrid learning works & communicate expectations** for what (measurable) learning targets are to be met under these unusual circumstances, and what role parents / caregivers, teachers, community leaders play in ensuring that students reach those targets

→ **Manage expectations;** make clear that operations might not be smooth from the start, and that constant feedback will be crucial for success of the intervention

## 03: Assessment - Interim

Prior to reopening, conduct a student benchmark assessment to understand extent & variation of learning losses:

→ **Send out clear instructions to parents on the assessment date & ideal setup at home** (quiet room, access to phone, etc)

→ **Conduct a short oral student benchmark assessment using IVR** (15 mins max.) for core subjects like math, language, and STEM, and **a short SMS-based live, timed student quiz using a mass messaging platform** as proxy for a written assessment

→ **Categorize students in a database into their *real* grade levels; combine that data with additional M&E data** about students' /parents'/teachers' extent of usage of distance learning to inform remediation strategy

→ **Conduct interim assessments every 1-2 months after school reopening; provide benchmark targets to teachers & parents** (e.g. words/minute). Tests should be administered by the teacher in-class. Tests should be short (half-page) paper-based benchmark assessments and instructions for teachers simple; then make teachers share results via SMS to one centralized number and enter the results into the central student database.

→ **Report results of interim assessments to parents via SMS so that parents** know when to increase their support if needed (or to feel rewarded/proud when the student improves).

## 04: Content Delivery - Mental Health

Prior to & throughout resuming school, address students' mental well-being, else their ability to learn will be impaired.

→ **Send out simple mental health advice, reminders & activities via SMS** to parents & teachers; gather feedback on their usefulness to iterate their design. Provide resources to deal with anxiety, isolation, grief and trauma**.** Share guidelines with parents on how to protect children's as well as their own mental health. Making children feel safe, regular play, enough sleep, limiting exposure to news (2 times/ day), family harmony & exercise are all helpful for reducing stress.

→ **Set up mental health hotlines (1-on-1 counselors) & IVR solutions** for teachers & students & parents. Ideally have mental health counselors check-in with students once every two weeks.

→ **Set up SMS- and IM-based peer group chats for students, parents and teachers** and regularly share prompts to make them discuss their mental wellbeing challenges.

→ **Include mental health indicators in your M&E and conduct regular SMS-based mental health check-ins with students**

## 05: Content delivery - Remedial

→ **Reduce the mandatory curriculum for the academic year to only core topics,** as most of the year will go into remediation / catch-up programs/ALPs for missed content & mental health recovery. Inform teachers.

→ **Inform teachers & principals about the 'real' grade levels of their students and share ability grouping instructions.** Follow-up with principals/community leaders via SMS/calls to confirm that ability grouping has taken place.

→ **Prepare a prioritized & sequenced digital content repository containing small group instruction materials**; static content (SMS-length activities & lesson plans, digital worksheets, audio & video files) & interactive content (IVR, apps, browser-based quizzes & MOOCs, etc). Design content sufficient for 2 months, then use feedback to improve the next round

→ **Share content via SMS, IVR, IMs or offline P2P sharing apps** to community leaders/ teachers/parents /principals.

→ **Explain tiered instruction to teachers and to adjust ability grouping every 2 months when benchmark results are out.** e.g. if a grade 3 student fell to grade 2, he gets grade 2 content until the 2nd benchmark says he's reached grade 3, then content should be grade 3 again.

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# Implementation - Phase 13: Hybrid Reopening (in-depth)



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## 06: Synchronous Teacher instruction - Hybrid / Remedial

→ **Design low-resource Hybrid Learning (likely scripted) lesson plans based on reduced curriculum;** this ensures that teachers are clear on how to keep a continuity between what happens in the classroom & during distance learning.

→ **Design remedial lesson plans** (low-resource) which assume that students have been grouped by ability in-class or across classes

→ **Share these lesson plans weekly via SMS/IM with teachers**/via a browser-based LMS; if possible & appropriate, provide teachers with zero-rated access to MoE-compiled content repository websites.

→ **Provide hotlines, group chats & coaching voice calls to support teachers in multiple modalities** for adoption of lesson plans; incl. mental health check-ins

→ **Text parents reminders on cybersecurity rules for the mobile distance learning component.**

→ **Make principals check in min. 1/week with each teacher.** In Peru, principals discuss: 1) ways to evaluate student participation & performance, 2) status updates on student work completed, 3) support for development of activities.

## 07: Synchronous Parental instruction - Remedial

→ **Design low-resource remedial activities which parents can conduct at home with their children; share them both via SMS & IVR** (to cater to illiterate parents)

→ **Parent-led activities need to be designed for varying student learning loss**, and then activities matching the grade level that the student receded to due to learning loss (based on info gathered during the original needs assessment); content should be aligned with the remediation content used by teachers; while there is no guarantee that all parents will be willing and able to support their child, those who do will help reduce the burden on teachers.

→ **Provide guidelines to parents on how to structure their children's day;** children should continue to have a regular school day routine at home on the days when students aren't in school, ie. regular start & finish times, regular recess, & consistent 45-min. learning slots for the students.

## 08: Assessments - Formative

To rapidly fill learning gaps, students need regular, useful feedback on learning & teachers need to adapt instruction. Formative assessments combined with tiered instruction enable that.

→ **Design low-resource formative assessments for each grade that can be shared with teachers via SMS / as part of Lesson Plan PDFs via IMs.** Provide a good mix of CFUs, exit slips, short essay topics, quizzes, self-& peer assessments, etc; for pre-, during & post-class.

→ **Provide simple decision trees for teachers for which resources from the content repository to give to students** based on formative test results.

→ **Make it mandatory for teachers to share the results from formative assessments in SMS format** to one government number.

→ **Ensure that teachers follow basic formative assessment best practices:** 1) clarify learning objectives & rationale to students, 2) explain to students how to gauge progress, 3) ask high quality follow-up questions to the assessment to identify student misconceptions or redirect their thinking, 4) if necessary, re-explain by presenting concepts in a new way (different format, etc), 5) share feedback that makes students reflect on performance & provides next steps, 6) give students a 2nd chance to demonstrate success (in other format).

## 09: P2P-collaboration

Leverage mobile for peer support to reduce the burden on teachers & administrators.

→ **Pair students (grade 3 upwards) who have access to a mobile phone for peer learning** and make teachers share peer exercises / prompts for peer collaboration via SMS/IM; establish regularity and timing of peer interaction (e.g. 2x/week for 30mins). Encourage students to help each other with assignment questions, both via SMS and in-person during school hours.Explicitly tell students that message exchange should be limited to academic purposes to prevent excessive charges. Inform teachers on how and when to shuffle student pairing. Try out both cross-age and same-age peer systems, as well as groups of up to 5 peers.

→ **Create local mobile peer communities of practice which can support each other** on an academic & mental health level, as students, parents, teachers & admins currently face similar struggles. Limit parent / teacher / student groups to 50 members each; provide codes of conduct for groups to prevent message flooding. Provide guidance on which type of information should/should not be shared in groups; encourage sharing of text-only information to minimize data consumption. If you can't zero-rate access, choose SMS-based groups over IMs, as the latter consume precious data. Assign 1 moderator/group. Use group messaging tools that hide member numbers/ images.

## 10: M&E

→ **Leverage mobile to gather data via SMS or check-in calls from teachers / principals on key KPIs, e.g. 1) Outcomes:** a) % of students below grade-level according to latest benchmark assessments, b) % of students who moved up by a grade level according to latest benchmark assessment, c) % of students who made learning progress since last benchmark assessment; **2) Early Warning Indicators:** a) % of students in a school with low attendance, b) % of teachers with low attendance, c) % of students with low mental well-being, d) % of students who are stagnant or still regress in their learning after 2 benchmark assessments. **3) Activities:** a) % of teachers who participate in ongoing training on ability grouping & remedial instruction, b) % of principals, admins & SMCs trained to support & monitor teachers.

→ **Ensure that sufficient staff is available to analyze data & to conduct follow-up calls with underperforming schools.** Leverage community leaders and SMCs (if in place ) to do in-person follow-up, incl. school visits to observe teachers.

→ **Reward & support.** Publicly recognize the schools /teachers who are showing high fidelity implementation and/or manage to produce results. Similarly recognize students & parents. Give extra support to those who struggle, via training, financial or infrastructural support.

→ **Identify best practices.** Identify what schools who are steadily succeeding are doing and share their practices widely, since those practices will be relevant to your particular context.

# Implementation - Phase 13: Reopening: Adaptive Remediation

*Numerous countries are considering Adaptive Learning Systems to remedy the vast differences in learning losses. These slides provide an intro. Relevance varies by context.*

Adaptive Learning **systems / software (ALS) / technology (ALT) guides a student through instruction, remediation & assessments that are continuously calibrated to each student's evolving proficiency level**. The ALS dynamically adjusts the learning experience in real time based on data points created by students' interaction with it. This data is processed by an algorithm that alters instructional goals, content delivery systems, or curriculum, usually keeping students in their Zone of Proximal Development.

**The types of algorithms are (simple to advanced):** *Decision Tree ALS → Rules-Based ALS → Advanced Algorithm ALS → Machine-Learning-Based ALS*

**The sophistication of so-called 'adaptive' learning systems varies significantly.** It is hence important to analyze in detail what exactly a vendor means when they say that their product is 'adaptive'. A *rudimentary* system e.g. only provides one benchmark assessment at the beginning and hence works with a static learner profile, rather than constantly update that profile throughout usage; it also often adapts just on right or wrong answers. More *sophisticated* algorithms adapt based on the specific (false) answer chosen, since each answer choice usually represents a misconception and 2 students at the same level may be stuck for different reasons. They consider factors incl. time to complete exercises, past performance of students with a similar learner profile, or learning style preference (if students perform better by watching a video vs reading some text) to optimize content adaptation.

## Evidence Review

Pedagogical interventions that tailor teaching to student learning levels - either teacher-led or facilitated by ALS - are effective at improving student test scores, as is individualized, repeated teacher training often associated with a specific task or tool (Evans & Popova 2016). The pooled effect size associated with adaptive instruction is 0.42 standard deviation, while that of programs with non-adaptive instruction is about one-quarter that, at only 0.12 SD.

***ALS on computers in After-School Centers***

Learning gains using an ALS (Mindspark) for students (grade 6-8) in after-school centers was at least 2x as much as students in the comparison group. *90 days of attendance (equivalent of half a school year at 80% attendance) would deliver 0.59 standard deviations of learning in math and 0.37 in Hindi* (avg. attendance among lottery winners was 58% (~50 days) The RCT was conducted with 619 students from public middle schools in low-income neighborhoods in Delhi; student proficiency was highly heterogeneous, spanning 5-6 grade levels in each grade. six 90-minute slots per week outside of school hours 45 mins were computer-based instruction (a mix of math, Hindi & English across days); the other 45mins were instructor-led in groups of 12-15 students, providing homework completion help, preparation for school exams and instruction on topics of broad relevance. The cost per student was ~US$3/month. The ALS enabled to cater the varying proficiencies seamlessly; where group-based instruction has had any impacts in the past, it required making student groups more homogeneous (ability grouping for remedial work / re-grouping classes). Gains in math scores were seen on below grade-level questions (which is what the CAL software taught), not on grade-level questions (which weren't taught by the CAL software).

***ALS on Mobiles / Tablets at home (self-directed)***

**Tablet:** In Tanzania, 100 students used Kitkit School's numeracy and literacy tablet app over 3 months in 2 test groups: 1) 6-10-year-olds in a community center, 2) a treatment group of Grade 1-3 students in a rural primary school. The out-of-school children's post-test scores became comparable to the baseline scores of the in-school group: children in-school averaged 53% on the literacy and 48% on the math baseline test, while out-of-school children achieved a 52% average on the literacy post-test, and a 48% average on the math post-test. On average, they showed a 15% improvement in literacy scores and 20% improvement in math. In Rwanda, nearly 700 primary school students improved their literacy in 3 months via 30-mins of KitKit each weekday (voluntary). In Kenya, refugee students used KitKit for 30 minutes/day for 40 sessions throughout 8 weeks and saw improvements of 32-46% in literacy and 14-36% in numeracy. nSimilarly, Onebillion's OneCourse created learning gains in Brazil, Malawi (incl. special needs students) & Tanzania.

**Mobile:** Homer, With just 15 minutes of practice a day, HOMER increased early reading scores among low-income 4-5-year-olds by 74% (Test of Preschool Early Literacy TOPEL); improvements showed especially in print knowledge, phonological awareness & letter sounds. The randomized, 6-week study sampled 95 disadvantaged (eligible for free/reduced lunch) students across 7 Head Start classrooms in Brooklyn, who mostly had little or no previous exposure to touchscreen devices (Neuman, 2014).

**Other:** In an ALEKS pilot in Ecuador 800 students increased curriculum knowledge by 10%/month (vs. US results). i-Ready created gains of 38-46% in math & ELA in grades K-8 (sample of 860,000 students). Knewton at ASU improved college course completion.

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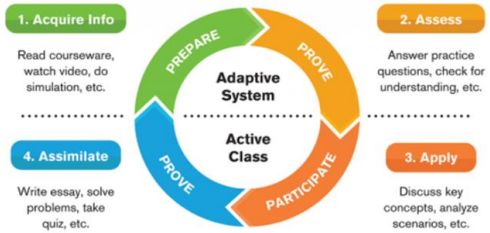
## Conditions for Success

**Success:** In the short-term, successful remediation despite varied learning losses is success; however over time, ALS should enable enhanced equity and changing the role of teachers from imparting knowledge (which can be done mostly by ALS) to teaching higher-order, applied skills. ALS can teach basic content pre-class, provide remedial instruction post-class & monitor student progress, freeing teachers up to provide targeted support, and do more project-/inquiry-based learning in-class.




### Conditions

**Human:**

1. Stakeholder buy-in & shift towards innovation
2. Sufficient digital infrastructure in-school/at home
3. Ongoing staff training & professional development
4. Emotional, financial support for students/ teachers
5. Clear expectations management & communication
6. Incentives for students to complete course
7. Sufficient technical expertise & coordinating ability in implementing agent (government / organisation)

**ALS:**

1. Alignment of content to curriculum & exams
2. Quick & direct feedback on student performance
3. 24/7 Technical support services
4. structured curriculum, with clear goals & real-life applications based on students' interests
5. Supports diverse learning (individual/ peer/team)

# Implementation - Phase 13: Reopening: Adaptive Remediation



## Implementation

View extensive guide here & implementation case studies here.

1. **Assess Need:** validate rationale with teachers, parents, students & regional education officials; is an ALS really what they need to progress in school / employability?
2. **Assess Capacity:** Evaluate technical infrastructure, student /parent / teacher digital literacy, staff's attitude toward innovation, regional governmental capacity to coordinate implementation & maintain IT, etc.
3. **Choose Learning Modality:** Will a school-based, after-school or home-based ALS (or both) be best-suited? If school-based, will you use a station rotation or lab model?
4. **Evaluate Cost-effectiveness:** Mindspark in Delhi cost $3/child/month, but costs can be higher. Main cost drivers are on-the-ground & remote support as well as hardware purchases, servers, cloud services, and maintaining IT systems. Compare that to take-home print materials, etc.
5. **Ensure buy-in:** Install/reinforce incentives for instructors to participate & change via training from pure content delivery & seat-time-based learning to targeted support & competency-based learning; assign responsibilities; sensitize communities
6. **Carefully select ALS:** Choose ALS based on rationale for ALS, infrastructural limitations, budget, HR capacity etc
7. **Design intervention:** Design pilot together with teachers, parents, IT teams, vendor, regional educational officials, community leaders & headmasters from the start; interview all stakeholders about concerns, goals, etc
8. **Capacity ramp up:** install solar charging stations for in-school / take-home devices; distribute smartphones via Field Assistants on motorbikes; train staff (incl. using OER); etc
9. **Pilot ALS:** Define KPIs for pilot success; test for human and technical capacity issues; document lessons learned. Ensure sufficient time on task for students. Ensure that teachers check student analytics boards min. 1/week.
10. **Iteration, Scaling and M&E:** Track student ALS usage & assessment performance; teacher engagement with analytics & ability grouping / personalization in-class
11. **If early results are promising, continue to advocate for ALS** & celebrate small successes to maximize motivation of staff

## Steps

### What adaptive learning software exists out there?

| Subject | Level | Smartphone App | Browser-based (with content) |
|---|---|---|---|
| Math | ECCE | ABCMouse, ToDoMath, Hatch | ALEKS, Pearson Success Maker |
| | 1-12 | ST Math, Byju's, Mathspace, Mangahigh, Levered | Mindspark, ALEKS, LearnBop, Imagine Math, Dreambox, Redbird Advanced Learning, Pearson Success Maker, KnowRe, Khan Academy |
| | Higher Ed | Scootpad | Pearson MyLab |
| Literacy | ECCE | Homer, Hatch, OneCourse | Lexia |
| | 1-12 | Homer, Scootpad, i-Ready, iStation (ELL), Freadom | Lexia Redbird Advanced Learning, Pearson Success Maker |
| STEM | 1-12 | Ck-12 Platform, Byju's, Tappity | |
| | Higher Ed | | Pearson Mastering |
| Various | | WileyPlus, Desire2Learn, Cengage MindTap, Knewton Alta | Waggle, McGrawHill Connect, Acrobatiq, Realizeit, SmartSparrow, Cogbooks, Fulcrum Labs, Sapling, Course Connect, Kidaptive, Cerego, Waymaker (OER), EdReady |

## How to procure ALS?

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*Send out an RFI (Request for Information). See an extensive sample ALS RFI here and a framework to evaluate courseware here.* ***Some basic questions to ask are:***

1. ***Content:*** *Does the platform come with preloaded content? If yes, is the content supposed to be a study aid, provide supplemental instruction, or is it a whole course? Can the algorithm be layered onto our existing content?*
2. ***Student UX:*** *Ease of navigation? How advanced is the feedback a student gets for right/wrong answers (none, text/ img/ video)? What format do hints have (text, image, video, live tutors)? Does it have accessibility features?*
3. ***Infrastructure:*** *Does it work offline (with periodic sync)? Is there a mobile app? How much bandwidth does this ALS consume? Any LTI integrations? API availability?*
4. ***Customization:*** *Is the knowledge map accessible so that one can verify & edit it to one's liking? e.g. intro to biology can be taught from macro to micro (from biomes to DNA) or vice versa; depends on instructor/curriculum. How customizable is the content (some configurability; off-shelf course content / authoring offered as service / Open authoring platform)? How much (if any) control does a teacher have over content?*
5. ***Support:*** *How does onboarding and setup work? How big is the team on the provider's end that would be at disposal for teacher training, parent questions, student support? Do they provide ongoing support beyond setup? Cybersecurity?*
6. ***Analytics:*** *What does the student data analytics page look like for students vs admins vs parents?*
7. ***Adaptivity****: Is just the instructional or the assessment component internally adaptive, or both? How regularly is the student assessed and the content adapted?*
8. ***Effectiveness:*** *Any effectiveness studies/ case studies?*

# Risks & Challenges to account for in each Use Case



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## General Risks

**Safety: During school closures, children's exposure to harm is increased,** reducing their mental well-being & ability to focus on academics; from malnutrition (given lack of school meals), to risks of abuse/ FGM/ pregnancy, and child labor/early marriage to supplement family's crisis-reduced income. Ministries of Education, health, gender, social protection, etc. have to cooperate and provide stipends.

**Human**: **MNOs might not cooperate for zero-rating**, and are usually reluctant to zero-rate "heavy" content like videos; focus on low bandwidth solutions. Governmental capacity & institutional path dependence might seriously inhibit ability for agile response. Schools might have to conduct layoffs to save money. **Parents are worried about their livelihoods & hence have limited capacity to support their child's learning.** Teachers/principals are faced with countless questions from parents/ students. Unequal access to mobile phones - along Gender/rural-urban/ SES divides, etc can exacerbate inequalities if unaddressed**. Avoid inflated expectations;** at such an early stage hype can cause disappointment.

**Financial:** private & public school budgets will be strained due to purchase of new materials, software & bandwidth needed for distance education solutions, combined with economic downturn. Parents might request their school fees to be refunded. public school budgets could be slashed Will hence likely need a huge injection of cash.

## Content Delivery

**Cybersecurity is a standard risk if students go online to access content**; protecting personal data & ensuring internet access is limited to educational content is crucial, as much as protecting platforms from hacking.

**System overload leading to an inability to deliver content is a large risk**; large file sizes of content can clash with bandwidth limitations, especially when combined with the surge in mobile network activity (China & Italy saw a surge of 70% as a result of Covid, which no mobile operator would plan for, causing internet shutdowns); including a request to the public in PR to use internet responsibly and mainly for educational purposes is hence crucial, as well as compressing files.

**If not universally designed, content will exacerbate equity gaps**; e.g. by being unilingual, or not offering adjustments to special needs students. Furthermore, a hastily put together, bad online learning experience could turn students off from future online learning experiences; focusing on quality of content and UX as much as continuity is hence crucial.

**Keep content holistic, not just academic.** Make content fun to maximize engagement, and cover topics like mental health to maximize focus and coping skills.

**Don't make content entirely screen-dependent.** Create analogue content that has screen-free activities, too.

## Synchronous Instruction (Teacher)

**If the state doesn't provide continuation of salaries, some teachers may move from their posts** to their hometowns or seek other work.

**Teachers might lack motivation to learn the skills needed to navigate the digital tools** needed to teach remotely; using tools that they already use on a regular basis (e.g. Whatsapp) can reduce the barrier to behavioral change, as well as micro-certificates linked to career progression to incentivize course taking.

**Not engaging teachers soon enough in the crisis can lead to a sense of lethargy** and irrelevance, with teachers not getting an active role soon enough, and just e.g. passing on content; it's important to engage them fast and motivate them.

## Communication

**Parents & teachers might perceive calls and texts as spam at first.** Hence announce on radio/TV when to expect outreach & how to distinguish spam from real content.

**If messaging isn't clear,** parents won't understand the why/how of engagement efforts and disengage. Parental Literacy & language & self-confidence barriers also need considerations.

**Information that isn't clear such as "nearly meets standard" can mislead parents** into believing children are on track when they are not. Actionable clear feedback is crucial.

## Assessments

**Summative, high-stakes assessments require ideally equal access to testing software & an equally peaceful assessment environment** to enable the child to focus; having a clear PR & access strategy in place is crucial to ensure that students have equal chances during high-stakes exams.

**Online assessment systems might break down due to system overload** when so many students login simultaneously; accordingly capacity has to be built up in advance and backup systems/contingency plans put in place, plus communication structures to tell users via SMS when the system will be back up again.

**Cheating is of course a real risk;** exam proctoring softwares can help address that issue, but often require smartphones (fingerprint scan, video/photo, etc) for verification. Formative assessments are lower risk, but require regular effort from teachers/MoE side to maintain & evolve.

## Synchronous Instruction (Parental)

**Given varying digital literacy and general literacy among parents, homeschooling could exacerbate learning differences** between students of different SES backgrounds; it is therefore crucial to keep activities simple, low-resource, not very time-consuming, and instructions need to be provided both via audio as well as in writing to not inhibit illiterate parents.

## Monitoring & Evaluation

**With mobile M&E, there is always a risk of selection bias**, as not everyone has access to a mobile phone and the digital literacy to navigate an m-survey; multi-modal mobile M&E (IVR, SMS, etc) can reduce this bias. Low response rates are another risk.

**Data Security is a major issue**, especially if you involve Third Party Monitors, and requires strict legal contracts, incl. data sharing consent practices.

**Siloed data & interoperability risk;** standardization & communication to prevent different definitions /indicators/ datasets is crucial.

**Sensitive, personal survey questions can create distrust in users** and reduce participation / usage.

**Staff's availability to cope with the steep learning curve** of learning, installing, testing & navigating M&E ICTs is a risk.

## Content Creation

**Quality control is crucial to make sure that content created on mobile is both safe and of high pedagogical value.**

## Peer2Peer Collaboration

The risk of cyberbullying & tech-savvy students hacking the platform exists; given the current bigger crisis however this should be minimal.

# 4. Whom can we learn from?

# Case Studies - Overview



Pratham

*Pratham, one of India's largest education NGOs at 10,000 staff, managed to pivot & scale its predominantly face-to-face programs in 5,000 villages to* ***mobile distance learning in 11,000 villages*** *just two weeks into the national quarantine.*

*Their agile response and ability to repurpose staff, re-design their extensive content for SMS and IVR delivery, and partner extensively with both the Indian state governments and other NGOs to further scale their reach, is worth learning from. The case study covers the uses cases* ***content delivery, parental synchronous instruction, communication for coordination, synchronous instruction by teachers, and M&E****; incl. feature phone and smartphone solutions.*

viamo
improving lives via mobile

*Viamo specializes in scalable feature phone engagement solutions using IVR, SMS, IM bots, Apps & Web. Globally their* ***feature phone engagement solutions reach >100,000 people/day*** *in Africa & Asia and >10 million people from 2012 to 2017.*

*They have implemented mobile education solutions across Africa, from* ***content delivery to assessments, coordination and M&E, with proven learning outcomes.*** *One of their Covid response projects is an ECCE IVR pilot in Zimbabwe for 10,000 students. Viamo's ability to rapidly deploy solutions at scale - up to 9 million users - , as well as their close partnership with MNOs and specialized expertise in feature phone solutions make them an organization worth learning from.*

PERÚ
Ministerio de Educación

*Peru's MoE completed nearly* ***20,000 M&E surveys of parents, teachers and principals in just a few weeks*** *into school closures and created a publicly accessible M&E dashboard with the collected data, with less than 50 full-time staff and an additional 300 call center staff hired. This, among other aspects, helped better understand the usage and effectiveness of Peru's Aprendo en Casa Covid distance learning solution.*

*The MoE team responsible for this was incredibly* ***agile in its ability to redesign processes for mobile M&E and shorten processes*** *that usually take e.g. 3 months to a week, without however foregoing too much QA in the process. They also have plenty of practical advice to learn from.*

EdoBEST@Home

*The Moe of the Nigerian State Edo managed to* ***pivot its effective public in-school initiative EdoBEST*** *- conceived in 2018 together with Bridge Academies International -* ***to an EdoBEST@Home mobile distance education version to support over 20,000 primary school students at home, and is now being scaled to all 250,000 Edo State students****, incl. ECCE, secondary & private school students.*

*The initiative is an example of an excellent public initiative to keep learning going, as well as a long-term perspective on a continuous transition to mobile-asssisted education even once schools reopen. Case study includes* ***content delivery, formative assessment, M&E*** *and* ***synchronous instruction by teachers / parents.***

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# Case Study - Lessons Learned: Pratham (India)

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Pratham

Feature & Smartphones | Teacher Instruction | Commu | Content Delivery (static) | Parental Instruction | M&E

| | |
|---|---|
| *Level* | Grades 1-8, TVET |
| *Org. Capacity* | 10,000 staff; founded 1994. Private, NGO. In March, they had a content repository of **4000 digital stories, 3600 videos & 300 HTML educational games (in 11 Indian languages)**, and plenty scripted lessons/activities. Had experience in IVR programs pre-crisis. Ran F2F programs in 3-5k villages. |
| *Intervention(s)* | *Content Delivery & synchronous instruction (by parents)*: For Grades 1-8, send daily activities as SMS (165 characters) to parents' phone which contain hands-on, home- or outdoor-based learning activities in language, math, English & science plus art, music & theatre; send text/ video/ audio via Whatsapp; also set up an IVR+SMS program for nursery to Grade 8 for the Delhi government.<br><br>*Synchronous Instruction (by Teachers):* In TVET, shifted from a primarily center based model to an online instruction model. Also switched to multi-skilling since crisis makes job outlook unclear. |
| *Intervention Scale* | Reaching children in 11,000 communities across 20 states in India (as of June 2020). In Delhi alone, ~600,000 students from nursery to grade 8 were sent activities over SMS or IVR on the first day. |
| *Outcomes* | The "some fun + learning" approach spurred much creativity, students sent e.g. 5,000 photos of a bangles creation activity (samples here & here & here). TVET webinars had 500 attendees. |
| *Challenges* | Transforming their content into SMS-length format, and make it accessible to communities via SMS & Whatsapp. Plus people weren't sharing devices due to social distancing. |
| *Needs Assessment.* | **Start with simple check-ins via phone:** 1,500 staff called up TVET students when Covid hit to check on each individual's' situation - how they were feeling, their salary situation, etc. |
| *Planning* | **Be agile & iterative:** They make quarterly & regionally varied plans to stay dynamic & relevant. Only took them 5 days to make IVR content for Delhi as they created only initial content & published.<br><br>**At first, prioritize student engagement over academic outcomes:** recognize the duress under which students & parents are. Intentionally designed a program that was both "A little fun" and "a little study"; most students are glad to be out of school, parents have bigger concerns than academics |
| *Capacity Ramp-up* | **Repurpose staff flexibly & keep content simple:** Video teams were asked to write SMS lessons; directors to map curricula to more state boards; staff visiting villages now do M&E calls instead. Have an organization-wide call for tasks & give responsibility generously. Make 1 SMS cover 2-3 age groups.<br><br>**Build Community Capacity:** Take the saying "it takes a village to raise a child" literally; leverage community members. They'll also create youth leadership in villages to act as coordinators/mobilizers.<br><br>**Partner extensively (outside education silo, too)**: Shared their digital & SMS content with 14 state govs, 230 nonprofits; made content available on web platform DIKSHA (mobile app) & created guide for developing educational SMS content. Non-education orgs (SEWA) also a good way to access parents.<br><br>**Leverage Communities for rapid phone number collection:** Within 2 weeks they identified community leaders/teachers/well-connected volunteers in each of the 11k villages and got their phone numbers; those then collected the community numbers **in 3 days** (now have total of 85k numbers). |
| *Coordination* | **Nudge parents via the power of imitation:** a video of a parent doing one of Pratham's activities with his child went viral among the communities; parents then recorded themselves doing this activity & sharing it. Leveraging social recognition effects can be more effective than just telling people what to do.<br><br>**Send multi-age group SMS at the same time every day.** Children begin to expect these messages and are in a learning mindset at the time. |
| *Cost Reduction* | **Leverage Free SMS packages:** kept SMS free of cost by making their points of contact get new SIM cards which offered "first 100 SMS free"; POCs receive the content via Whatsapp, then distribute content via SMS (& Whatsapp) to community using SIM. If >100 SMS needed/person, find new person & new SIM.<br><br>**Incentivize volunteers with an "Education for Education" model:** They reward volunteers for their support during this educational crisis with access to online educational content & MOOCs (TVET etc)<br><br>**Maximize hardware sharing:** A village member started using loudspeakers on temples so that everyone could listen to the voice notes. In M&E calls, they ask village volunteers to pass on their phone. |
| *M&E* | **Have a simple but holistic question protocol.** For SMS content, 4,000 staff touches base with parent min. 1/week (14 calls/day/person). *"Did you receive the activity? What will your child learn from this activity? What more do you want/need? How was your day / how are you feeling? Any challenges?"* They also try to talk to the child. For IVR, child keeps a project book which teacher checks at reopening. |

# Case Study - Sample Images of SMS Lessons by Pratham (India)



Pratham

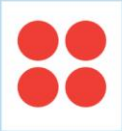
*On the right you see sample SMS content (translated into English for the reader's benefit) for Early Childhood.*

*To view **Pratham's complete guide to developing SMS-based educational content**, click here.*

*In Early Childhood, Pratham emphasizes these six main developmental categories: Cognition, Physical, Creative, Socio-emotional, Early Language, & Early Math development. The aim is to stimulate a love for learning and design activities that are so fun the child forgets that it is learning something.*

*Given the importance of parental involvement in early childhood activities, Pratham usually follows up with illiterate mothers via a phone call to explain the activity to them.*

**English translations are for the reader's benefit. These messages in particular were not sent to children in English.**

| Day: | Sample Message: | English Translation | Key Observations: |
|---|---|---|---|
| **Day 1: [Monday] Rhyme**  | हरे नीम के डाल पर<br>तीन तोते थे<br>वो तीनो सोते थे<br>एक पटाखा फूटा<br>जैसे कोई बरतन<br>टूटा<br><br>डर गये तीनों तोते<br>डाल को अपनी<br>छोड़–छाड़ कर<br>उड़ गये तीनों तोते<br>पहला तोता फुर्र<br>दूसरा तोता<br>फुर्र–फुर्र<br>तीसरा तोता<br>फुर्र–फुर्र–फुर्र ! | There were three parrots on the green neem tree.<br>They were sleeping.<br>Suddenly a cracker burst like a pot broke.<br>It scared all three parrots leaving the branch.<br>All three parrots flew.<br>First parrot furr<br>Second Parrot Furr-Furr<br>Third Parrot Furr-Furr-Furr! | Children were exposed to sounds and rhyming stanzas.<br><br>This message targets Early Language and meets the oral languages and communication goals outlined by the NCERT curriculum.<br><br>Children also used hand motions and dances to bring the poem to life, thereby meeting the Physical target. |
| **Day 5: [Friday] Project**  | कुछ पुराने रंगीन कागज लें।<br>बच्चों के साथ हाथों से कागज के छोटे–छोटे टुकड़े करें।<br>एक कागज पर 4 गोले बनाएँ।<br>बच्चों के साथ छोटे टुकड़ों को गोले के अंदर चिपकाएँ। | Take some old colored paper.<br>Hand-cut small pieces of paper with children.<br>Make 4 spheres on a paper.<br>Stick small pieces inside the circle with the children. | In this SMS, children enhance their motor skills by ripping paper.<br>Also, they inadvertently familiarise themselves with shapes.<br>Note that this message along with the above ones directly address parents. |
| **Day 6: [Saturday] Riddle**  | मै 2 पहियो वाली हूँ।<br>हवा से मै चलती हूँ।<br>बताओ मेरा नामघ<br>मै कौन हूँघ | I am 2 wheels<br>I walk through the air.<br>Tell my name.<br>Who am I? | This is not only a very fun riddle, but it also allows children to think differently.<br>Riddles also serve to bring the family together. |

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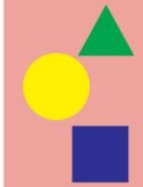
# Case Study - Sample Images of SMS Lessons by Pratham (India)



Pratham

## Sample SMS Activities - Lower Primary

| | | | |
|---|---|---|---|
| **Shapes**  | आपके परिवेश में चौकोर, आयत, त्रिभुज, गोल केआ. कार की वस्तुएं कहाँ–कहाँ दिखाई देती हैं? ढूँढें और सूची बनाएँ। इन सभी आकारों में कितने कोने होते हैं? पता करो। | Where do objects of square, rectangle, triangle, round shape appear in your environment? Find and list. How many corners do all these sizes have? Find out. | **Topic: Geometry Competency: Exploration and problem solving** -Concise and clear to understand language Piques the curiosity of the child as he delves into exploration. |
| **Exploration:**   | सना ने दादी से पूछा, बचपन में आपके कौन–कौन दोस्त थे? क्या आप उनके नाम बता सकती हैं? आप अपनी दादी से उनके दोस्तों के नाम पूछकर लिखिए। | Sana asked grandmother, what were your friends in childhood? Can you name them? Write to your grandmother by asking her friends' names. | **Interaction: Oral or Written History from family** This message allows children to engage their elder family members in their learning. -Notice that this kind of message will undoubtedly spark conversations in the family, which will increase the child's interest and enjoyment, as well as strengthen family relationships. |

### Math SMS Activity

घर में कुल 5 लोग थे।
हर एक ने 3 पराठे खाए।
फिर 4 पराठे मौसी को भेज दिए।
अभी 6 पराठे बचे हैं।
बताएं, आज कुल कितने पराठे बनाए थे?

*There are 5 people at home. Each person eats 3 parathas. Then we sent 4 parathas to aunt. Now we have 6 parathas left. How many total parathas were made today?*

### A word game sent via SMS

Group message
एक खेल खेलिए। यह खेल 30 मिनट का होगा।
घर के सब लोग खेल सकते हैं।
एक शब्द बनाइए जैसे कि घर। अब अगला शब्द र से शुरू होगा जैसे रेल।
अगला शब्द ल से होगा, खेलते रहिए।

*Here is a 30 minute game. Everyone at home can play. Make a word – like home. Next word must start with "e". Example elephant. Now make a word with "t" and so on.*

## Types of & Sample SMS Activities - Upper Primary (Science)

| **Competencies** These competencies move from low to high rigour | **Type of questions** These questions are designed to meet the competencies. This is not an exhaustive list of questions. | **Skills acquired** Following skills are based on the categories that fall under the blooms taxonomy. |
|---|---|---|
| **Level 1: Vocab familiarity** | -Fill in the blanks -Choose the correct option | Remember: Students are able to recall concepts and understand basics. |
| **Level 2: Vocab familiarity and writing about it** | -Frame sentences on the words -Write a paragraph about the words | Understand: Comprehending the meaning. Questions such as framing sentences or paragraphs, expand on the information learnt in the previous level. |
| | Perform activity based on concepts level in the previous two levels. | Application: Use a concept in a new situation or unprompted use of an abstraction. Activity based questions test the application of the concepts learnt in the previous level. |

**Example:**
The space between different paragraphs indicates that the following paragraph is a different part of the same message.

| | |
|---|---|
| केवल पेड़–पौधे खाने वाले जीवों को _____ कहते हैं<br>शाकाहारी / मांसाहारी | Only plant-eating organisms are called ____<br>Vegetarian / non-vegetarian |
| शब्दों से वाक्य बनाएं<br>सजीव, भोजन, शाकाहारी, मांसाहारी, सर्वाहारी | Make sentences with words.<br>Live, food, vegetarian, non-vegetarian, omnivore |
| ऊपर दिए गए शब्दों का उपयोग करके एक अनुच्छेद लिखें। | Write a paragraph using the words above. |

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# Case Study - Lessons Learned: Viamo (Zimbabwe/across Africa)



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viamo
improving lives via mobile

Feature Phones | Content Delivery (interactive) | Parental Instruction | M&E | Teacher Instruction | Communication

| | |
|---|---|
| *Level* | ECCE (and Primary, Secondary, TVET, Postsecondary, ABE, Professional Development) |
| *Org. Capacity* | 200 staff; founded 2012. Social enterprise. Offer mobile technology services for Interactive Voice Recognition & SMS. An intervention can be designed & deployed in <3 weeks. Present in > 20 markets in Africa & Asia; implemented mobile education solutions across Africa, from *content delivery* to *assessments*, *coordination* and *M&E*. Worked with the World Bank (DRC), UN, USAID, Ministries, etc. Content expertise is brought by clients or partner organisations; Viamo only has technical expertise (turning curricula into IVR / SMS, voice recording, deployment via their technical infrastructure, translation, etc). Global reach is >100k people/day; >10 million people from 2012-17 |
| *Intervention(s)* | ECCE literacy & numeracy content delivery (in minority language Ndau) & formative assessments via IVR in Zimbabwe for rural students (5-year-olds) at 10mins/week; *World Vision*, *Aktion Deutschland Hilft, Save The Children, ECHO* & MoE are partners for curriculum development & coordination. |
| *Intervention Scale* | Zimbabwe: pilot phase with 10,000 students, potentially to be scaled up in the fall. Other projects scaled to 200,000 callers in 1 year (Tanzania) or a volume of 9.5 million calls & SMS (Pakistan) |
| *Outcomes* | This project is only about to be deployed, hence no data yet; however in a past project in Zambia (local language stories via SMS+IVR+ radio), they saw 1 grade level-improvement in oral proficiency |
| *Challenges* | → This project is one of the first times that they are using IVR for ECCE; unsure about uptake levels<br>→ Across projects, mobile access gender divide: usually the man owns the phone (60% male) |
| *Planning* | **Design IVR modules short & fun.** They try to keep IVR to 5min-modules and assessments to max. 20mins. Take into consideration tone of voice (e.g. serious vs fun). Ultimately, if users don't enjoy the content or find it useful, the intervention will fail. Gamify participation; e.g. when kids answer a lot of SMS questions correctly, they can win an automated call back from one of the show's characters (users started averaging 72 questions/day as they wanted to win more phone calls).<br><br>**Consider Master Service Agreements for international projects.** It speeds up the process as due diligence & pricing negotiations take place at the HQ level (they had an agreement with e.g.UNICEF)<br><br>**Plan for enough time for content development and clarify data collection rules.** Developed content usually has to be approved from MoE, which can be time-consuming. And not all ministries are comfortable with the idea of data being collected on their students/parents/teachers. |
| *Needs assessment* | **Understand your users phone access, usage & edtech familiarity.** Prior to launch, ask: "How frequently do you access your phone? Have you used a phone for learning prior? if yes, did you enjoy it?"<br><br>**Do your due diligence.** Viamo does a connectivity test first, always, as well as a capacity analysis of their partners. Field testing of content before offering content at scale. |
| *Capacity Ramp-up* | **Bump up server capacity if you expect large call numbers.** The capacity ceiling for Viamo is millions; 10 million was the maximum that they handled at once. They can always increase server capacity. |
| *PR* | **Communicate clear info to users about the initiative to maximize uptake.** The more sensitized users are to the fact that they will receive a call the higher uptake is. Also provide a clear audio intro for the call to explain that this is a call by MoE (not a spam call) & that they should call their child over for the lesson. |
| *Technical Setup* | **Setup speed depends on technical infrastructure already in place.** Viamo already had infrastructure set up in Zimbabwe: an E1/SIP agreement with MNO; they just need access to a server, then software connects to Viamo server/cloud. Without that, it would take min. a few months to set up. VoIP is a way to instantly set things up but that's a lot more costly. Viamo is unique in that they have in-country infrastructure.<br><br>**Send out calls on varying times and days until people pick up.** Viamo's software does that automatically. |
| *Cost Reduction* | **Negotiate airtime costs with MNOs.** Service is freely accessible for the users, cost to organizers depends on multiple factors: national airtime rates, number of users (because more users = more airtime), minutes per user, duration of the project (Viamo's fee is monthly ), number of interactions. Airtime usally the most underestimated cost. 3-2-1 is their cheapest service: it's a one time fee (30msg content bundle = $40k) and then no airtime costs because MNOs cover the cost (as usually people then stay with that MNO). Cost pp. can be from $2.5 at large scale to $30 due to smaller scale. Full project management & design fees:~$30k. |
| *M&E* | **Keep IVR formative assessments & retention surveys simple.** e.g. a nursery rhyme about what sounds do animals make, and then they ask "what sounds does this animal make" so they check via these mini assessments if students has listened and is still present. Satisfaction survey: e.g. "Were you happy with the lesson? Would you like to hear more lessons?"<br><br>**Create a UX-friendly, digital M&E dashboard.** Dashboard of for client organizations shows how people are performing on retention surveys; demographic breakdown by region & income bracket, which stems from a survey from the beginning, ie. self-reported data. |

# Case Study - Lessons Learned: Ministry of Education, Peru



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PERÚ
Ministerio de Educación

Feature Phones

M&E

| | |
|---|---|
| *Level* | K-12 |
| *Org. Capacity* | 50 staff from MoE (but not all full-time), an additional 330 people hired for M&E call center |
| *Intervention(s)* | Voice-call-based mobile M&E surveys to better understand stakeholder needs & effectiveness of Peru's Covid remote learning solutions, incl. TV & Radio and its online platform *Aprendo En Casa* |
| *Intervention Scale* | To date more than 20k surveys carried out, covering teachers, principals and families from both public and private schools, with about 30% being from rural areas. |
| *Outcomes* | They learned just how big the demand for info was. Satisfaction rate with the online platform was higher than with TV, and that Whatsapp is the preferred medium across all users (sending homework, talking to students, etc) hence recommended that the MoE give training to teachers in Whatsapp for Distance Education. ⅔ of population access internet via data plans |
| *Challenges* | → Lacked personnel to do enough surveys; trying to see if they can use families to help with data collection; either way they can't survey everyone, especially not in remote areas<br>→ Non-response rate was 75%; they didn't expect response rate to be so low<br>→ Lots of scams through telephone calls started throughout this M&E time<br>→ Coordination with other ministries & internally; the MoE & its data collection office had a way of doing things, was hard for them to adapt to this more agile situation; had to change mindset<br>→ Data security; they are conscious that they have a lot of info from a large number of people; even though they signed confidentiality agreements, they decided that they didn't want to work with volunteers anymore in order to have better data control within the ministry |
| *Needs assessment* | **Define decision-making KPIs.** They asked MoE: "What numbers do you need to make decisions?" |
| *Planning* | **Be open to adjust processes and criteria over time**. They learned to reduce surveys with principals as those are overloaded with requests from stakeholders; now a stronger focus on teachers & families. They will not sample by school, so they can then verify if things that teachers are saying are true (since the'll be able to match teachers to schools). In July they are going to go back to their regular data collection strategy called "Semáforo Escuela". They adjusted margins of error over time; for normal M&E they have 5% but now they added a bit more (8.5%), to maintain 5% would be too expensive since they would have to do a lot more surveys |
| *Capacity Ramp-up* | **Shorten & adapt existing processes.** They adapted/shortened every single part of their process; e.g. they reduced QA duration but hired more QA staff, learned to do segmentation, sample design & data entry faster (in 3 days). Assembled 1st survey in just 1 week with the help of IPA (usually takes 3 months)<br><br>**Don't be frugal with your M&E staff training.** They switched from 1-day training workshops (goals of survey, tricky questions, FAQs, etc) to 2 days to prevent issues down the line. Started ensuring 1 day rest between each new survey design to allow teams to mentally rest and develop better, thoughtful surveys.<br><br>**Partner across sectors.** OSIPTEL (Supervisory Agency for Private Investment in Telecommunications) helped with matching the ID numbers to current mobile number which ensured trustworthy contact data. *Enseña Peru (TFA)* helped with getting 422 volunteers. Regional & district education offices (DREs) helped getting teachers principals & parents onboard. Non-profit association (IPA) helped design 1st survey. |
| *Technical Setup* | **Adapt existing tools as much as possible.** They adapted their tools which were usually already used to collect data for school inspections. "Semáforo Escuela" tool will be adapted to mobile format.<br><br>**Create an official number verification mechanism for users.** Within gov. website you can verify that the number someone called you from is a legitimate gov. number. IT office in MoE helped set that up in 2 days.<br><br>**Keep questions simple.** e.g. "How often has the teacher communicated with the student over the last week?" "What things do you have access to in your house? (ie. internet, radio, mobile data network etc)" (not even their national statistics institute has data on whether families have data plan or router access) |
| *Deployment* | **Expect 5 calling attempts until you get an answer.** Conduct 5k calls/day to get ~1k to pick up phone. **Survey the parent most involved in the child's education.** They ask to speak to the parent most involved with the child's education, to get reliable information; it's hence often the women who they talk to. **Each week, survey different groups.** e.g. this week they are surveying parents. Not every week is the same in terms of volume & response rates; e.g. when they survey urban groups they get more response.<br><br>**Make your dashboard public:** *publicly accessible M&E dashboard* facilitates data- and insights-sharing. |
| *Cost Reduction* | **Don't rely on volunteers unless you have to.** They used volunteers for 1st round due to initial lack of budget; faced issues, volunteers weren't eager to call each person 5x; once results proved M&E value, gov. gave funding. Cost of M&E was $200k, however without salaries (330 staff in call center + 50 MoE). |

# Case Study - Sample Images of M&E Dashboard by MoE, Peru

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PERÚ
Ministerio de Educación

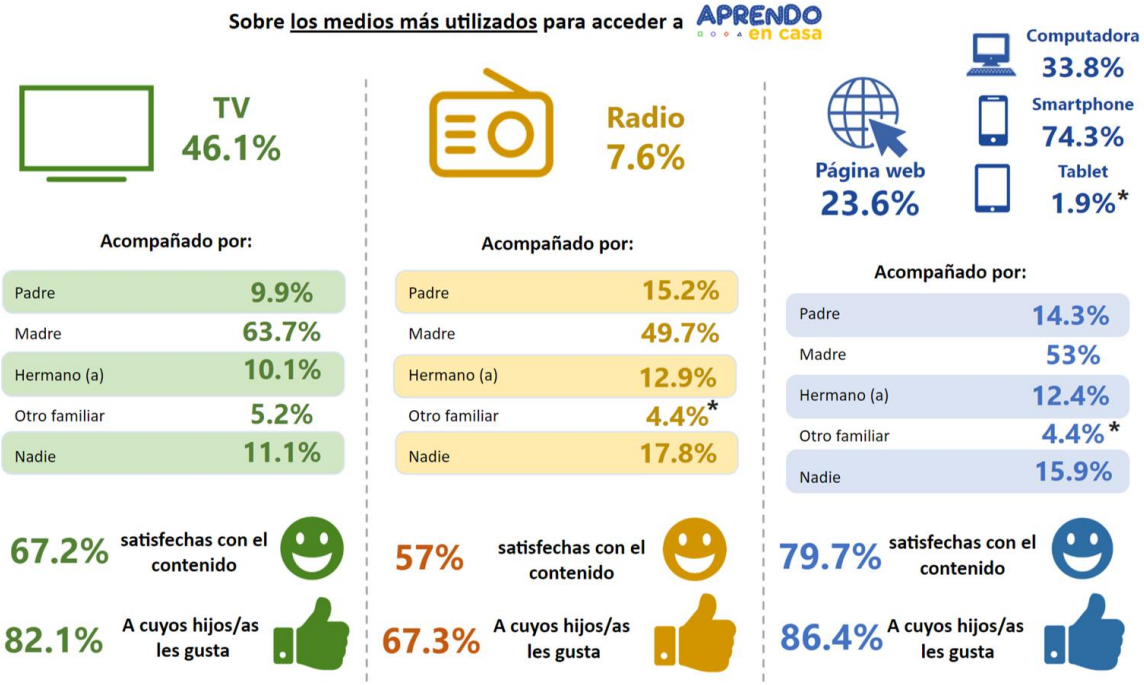

*On the left you see the main sidebar menu of Peru's Covid-19 distance learning M&E dashboard.*

*At the top, the three icons allow you to choose between "Home" (where you can pick the month you want to see data for), "Teacher M&E Data" and "Parent M&E Data"*

*Below that, you can filter the data by school level, region, district, and intervention type.*

*Below you can choose the kind of data you want to see: **coverage** of the multimodal "Aprendo en Case" (Learning at Home) initiative, **access** (by medium), **usage** patterns, regularity of remote **interaction with teachers**, how well parents are coping with **homeschooling** (and where they say they need help), **well-being** of students & families, and if parents are willing to send back their child to school or not.*

*If you wish to see screenshots of all parental dashboard M&E pages, please click here. For teacher dashboard, click here.*



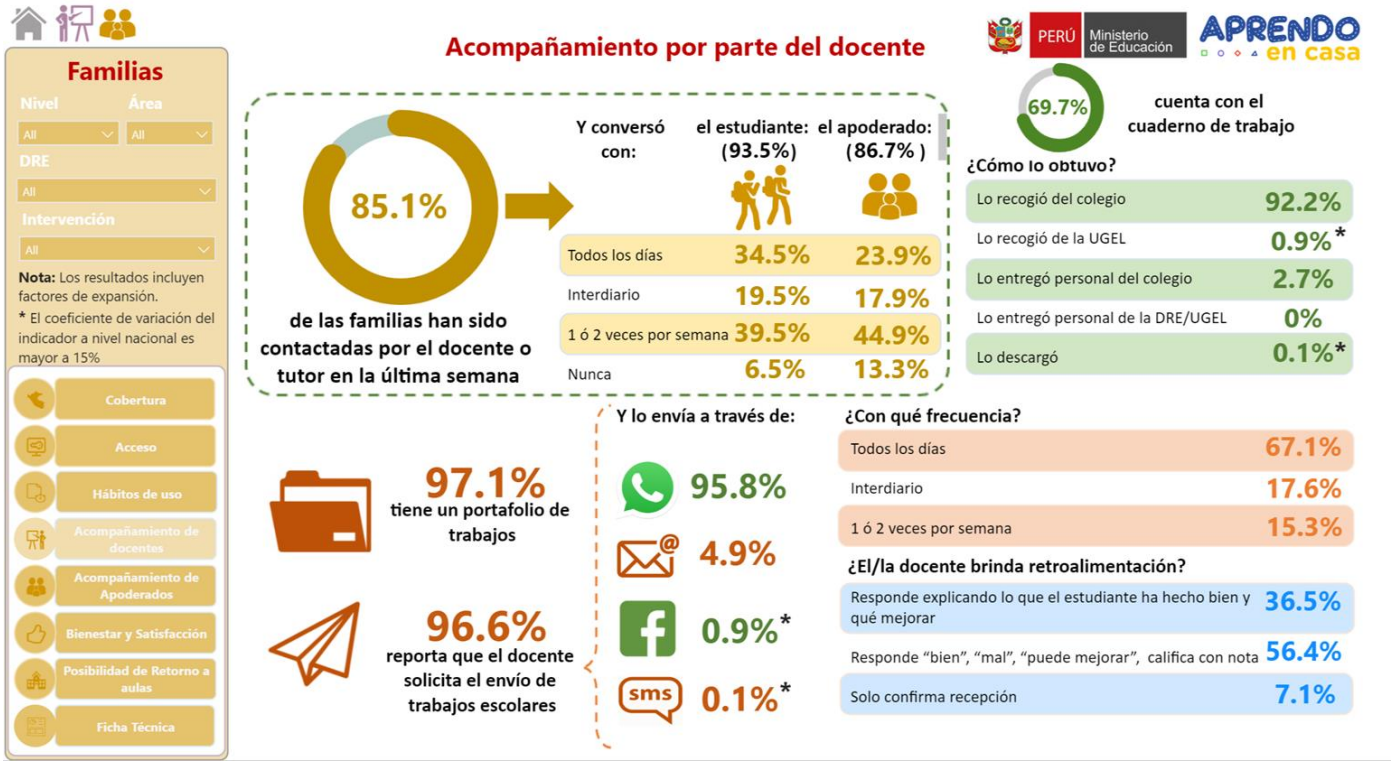

*On the left you see one small extract from the M&E dashboard with June 2020 data collected via mobile by Peru's MoE. It clearly shows that among the distance learning media for their "Aprendo en Casa" initiative, TV is the most accessed at 46%, radio the least at 8%, and the website at 24% predominantly by smartphones. While mobile access might only the the 2nd most common, Service satisfaction is the highest with the website. You can also see that the mothers are the predominant caregiver who gives the child access to the phone / who supports the phone during phone use. 16% of students have no accompaniment.*

*The dashboard was created using Microsoft PowerBI.*

# Case Study - Sample Images of M&E Dashboard by MoE, Peru



PERÚ
Ministerio de Educación




*The other interesting set of data the Peruvian MoE collected is the extent and format of interaction that teachers have with students. It shows that the predominant medium - by far - is Whatsapp at 95% and SMS just 0.1%. It also shows that teachers predominantly interact with the student (40%) and even more so with a parent (44%) 1-2/week. An impressive 35% interact with the student every single day. While 97% of students seem to have a "portfolio" of assigned work, a disconcerting 15% haven't had any contact with the teacher in the last week. In terms of feedback, 56% of students seem to have received feedback in the form of grades of "good /bad / room for improvement", while 37% have also received full-on explanations as to what exactly they have done well and where they need to improve; however 7% of students say their teacher only confirms receipt of the messages rather than providing feedback.*

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# Case Study - Lessons Learned: EdoBEST@Home, Nigeria

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EdoBEST@Home

Feature & Smartphones Communication | Content Delivery (static) | M&E | Parental Instruction | Teacher Instruction

| | |
|---|---|
| *Level* | ECCE, Primary, Secondary |
| *Org. Capacity* | EdoBEST began in 2018 as a PPP between MoE, Bridge Academies International & the World Bank; all teachers were given 5x10 days of training & tablets where lesson plans were periodically uploaded; usage of LPs was tracked; did across-grade ability grouping; program was effective, even caused a 17% increase in public school enrollment with parents moving their kids from private to public schools; 270k parent phone numbers had been collected by headteachers already using tablets/smartphones; when Covid hit, EdoBEST covered 80% of schools in Edo, learning materials & lessons plans were already digitized, 280,000 students had experienced tech-based learning model, 11,000 (head)teachers were comfortable with use of edtech. 91% of Edo households own a mobile. |
| *Intervention(s)* | Pivoted to EdoBest@Home for primary: multi-channel, curriculum aligned remote learning, 4h of daily content; created 7000 virtual, Zoom-based classrooms (30mins daily); 20min math & literacy digital self-study activity packets & storybooks for independent study; homeschooling support via 45m-min learning guides with parent-led activities, distributed via WhatsApp & online. Formative quizzes via Whatsapp/USSD (for feature phones). Students can ask teachers questions via Whatsapp. Due to many offline users also IAI radio lessons. |
| *Intervention Scale* | The program reaches 20,000 primary school students daily and 930 primary schools have been connected online (out of 1,000 schools) to support students remotely. The bank is processing a $75m P4R operation to scale up the program; 1 million website hits in 1 month |
| *Outcomes* | Realized that the virtual classroom functions so well they could continue this even once schools reopen; unexpectedly high engagement rates of teachers; unexpectedly low from urban parents; Many people outside of Edo state from across Nigeria are visiting the website, incl. private schools; |
| *Challenges* | → Not enough data yet on whether the program is producing sufficient learning outcomes<br>→ Breaking the culture of falsifying data; putting in place QA processes<br>→ How to onboard more pupils into the program as fast and effectively as possible? (JSS next)<br>→ Low parental engagement in urban areas (even compared to remote); much more community sensitization still needed (physically going to marketplaces etc); but it's eating into their resources. When schools resume they will really have to strengthen their urban school-based committees.<br>→ Some teachers are still not participating; unsure about the reasons, need more data<br>→ Hackers trying to bring down the website<br>→ Some people tried to take content from their website and sell it despite it being proprietary<br>→ Parents complained content was too easy/hard; created content above & below grade level |

| | |
|---|---|
| *Planning* | **Plan beyond school closures.** They intend to keep the online component (EdoBEST@Home) even when schools reopen, e.g. for remedial online tutoring, but also long-term to to an advanced LMS.<br><br>**Be frugal.** The total cost of EdoBEST@Home is just $376,000; cut out everything non-essential from F2F |
| *Technical Setup* | **Zero-rate access to your educational website.** MNO MTN Nigeria zero-rated website access & 2-way-SMS<br><br>**Upgrade your cybersecurity.** They have an ICT agency that they work with routinely; agency upgraded the security certificate, firewall etc. |
| *Capacity ramp-up* | **Ensure that your staff has the technical equipment to conduct work effectively**. They're upgrading 65% of staff with high-end laptops; currently staff are mainly using inexpensive phones/paper/desktops.<br><br>**Provide pedagogical & technical coaching to your teachers for the switch to online.** L&D Supervisors & QA officers provided coaching remotely (via Zoom etc). Technical field officers conducted technical onboarding (ensuring that all teachers bought a smartphone, how to operate the virtual classroom, etc).<br><br>**Create online P2P forums for teachers.** Ongoing partnership with Facebook; they use its *Workspace* which allows teachers to collaborate online; 2000 teachers are already on there (drains lots of battery though).<br><br>**Ensure that parents use the most powerful mobile network.** Some parents were struggling to access the virtual classrooms due to unstable network; staff guided them on which SIM card provider to switch to. Local govs also download a copy of website content and distribute it locally.<br><br>**Start community sensitization early to prevent skepticism.** Initial outreach calls to parents were met with skepticism ("How did you get my number, is this a scam, will you charge for this?"). Announced initiative via a jingle in 9 languages on radio, TV, social media; shareable audio/videos explain EdoBEST@Home. |
| *Internal KIX* | **Encourage internal knowledge sharing.** They started internal webinars hosted by staff members, teachers, principals & guests to speak about their particular work & remote learning experience; currently a lack of collaboration, hence try to instill more effective communication via these 'socratic' conversations. |
| *M&E* | **Conduct daily classroom check-ins.** They took their usual offline M&E and adapted it to the online experience. Using classroom observations form, field officers now randomly select a few virtual classrooms and login to observe the teacher-student interaction; then randomly select the parents of those kids and asked them questions; to see if kids are learning, they ask them quick CFUs.Data shows up on a dashboard |

# World Bank FY 2021 Projects with a Mobile Component



| Project Use Case | Project Location | Project Total Commitments (in USD) | Project ID |
|---|---|---|---|
| M&E (textbook distribution) | Ethiopia (refugees) | 60 million | P168411 |
| Content delivery, synchronous instruction (teacher), Assessment | Ghana | 26 million | P173282 |
| Content delivery | Mauritania | 40 million | P163143 |
| Content delivery | Mali | 80 million | P164032 |
| Content delivery | Somalia | 40 million | P172434 |
| M&E | Sierra Leone | 50 million | P167897 |

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# 5. Which relevant Mobile Software exists for our use cases?

# Market Scan: Feature Phone Solutions (offline & online)



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| | Viamo | Arist | Cell-Ed | Eneza | Remind |
|---|---|---|---|---|---|
| Use Cases | ***Content delivery, Assessment, M&E, Communication for Coordination*** | ***Content delivery, Assessment*** | ***Content delivery, Assessment, Synchronous Instruction by Teacher*** | ***Content delivery, Assessment, Synchronous Instruction (by Teacher)*** | ***Communication for Coordination*** |
| Product | IVR & SMS platform | SMS (& Facebook Messenger, WhatsApp) messaging & authoring platform | Customizable,>1,000 hours of ready-to-go SMS/ call-in lessons for literacy, numeracy, language & job upskilling | Revision materials via SMS/USSD (& Web & Android) & ability to ask teachers questions live via SMS | Two-way SMS (&smartphone) platform for parent-teacher-student comms. Opt-in via SMS with code. |
| Levels | All levels | All levels | Adult | Primary, Secondary | All |
| Languages | All languages | All languages | English, Spanish | English, French, Swahili | Messages can be translated into over 70 languages; Platform is in: EN, ES, FR, DE, POR, CHN |
| Other | Reach more than 100k people/day - more than 10 million from 2012-17 | Certified to protect user data well (ISO & GDPR compliant) | Trained over 50, 000 workers in 14 countries with 50+ partners (Colombia, Chile, Ghana, India, etc) | Reached over 6mn offline users at 8,000+ schools in Kenya, Ghana & the Ivory Coast | 35mn (parents, students, teachers) use it; 2.5mn messages sent/day; good privacy policy |
| Founded | 2012 | 2018 | 2014 | 2014 | 2011 |

| | Ubongo Learning | M-Shule | World Reader | Funzi | KaiOS |
|---|---|---|---|---|---|
| Use Cases | ***Content Delivery*** | ***Synchronous Instruction (AI), Assessments*** | ***Content Delivery*** | ***Content Delivery*** | ***Versatile*** |
| Product | Literacy & numeracy content; IVR version via KaiOS & Viamo's service (investing into more IVR & SMS now) | SMS adaptive literacy & math instruction system using AI & chatbots; student data is shared with parents & teachers. Opt-in via SMS. | 12,000 e-books for literacy, language & social studies that can be accessed on a browser-enabled feature phone | Free life skill, entrepreneurship & Covid lessons via internet-enabled (feature) mobiles(browser-based). | A mobile OS that makes no-touch feature phones which have a web browser smart, enabling 300+ apps e.g Whatsapp, YouTube (KaiStore) |
| Levels | ECCE, Primary, Secondary | Grades 4-8 | ECCE, Primary | Secondary / Adult | All |
| Languages | English, French, Hausa, Kikuyu, Kinyarwanda, Luo, Swahili, Yoruba | Swahili, English | 52 languages | Arabic, Dari, EN, FIN, Somali, Sorani, Swahili. Translations upon request. | All |
| Other | TV/radio version had 24% numeracy improvement versus peers | $1/month/student; >12k primary & adult learners | Culturally relevant, curriculum aligned books; tracks time spent reading & reading engagement. | 5 million users | 150 million users, primarily from India, Indonesia, Rwanda, Nigeria |
| Founded | 2013 | 2017 | 2010 | 2015 | 2017 |

**Other**

**Content Delivery**

- RapidPro
- Smart TXTBKS
- Ustad

**Authentication**

- Boloro

**Instruction (Parent)**

- Dost Education

**Communication / M&E**

- rapidSMS
- FrontlineSMS
- Classpager
- Classparrot
- Smart IVR
- TalkingPoints

**M&E**

- EduTrac
- RapidPro

# Market Scan: Smartphone & Smart Feature Phone Solutions



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| | |
|---|---|
| **Communication** | Remind, Bloomz, eKool.eu, Edmodo, SchoolCNXT, Otus,engageSpark, Skooly, Telebu, SimpleTexting |
| **Content Creation** | ClassFlow, TES Teach with Blendspace, Screencastify, Loom, LessonUp, Explain Everything Whiteboard, Educreations, Edpuzzle, PlayPosit, Screencast-O-Matic, Nearpod, Kaltura, Pear Deck, ThingLink, Buncee, Squigl, LessonUp, Claned, EdVisto, Seppo, Audacity, Blender, GIMP, Snap Collage, Canva |
| **Content Delivery (static)** | **Offline file sharing:** ShareIt, Send Anywhere, Files Go by Google, Zapya,<br>**IM Offline:** Moya, Bridgefy, FireChat, Briar, Rumble; **IM Online:** Whatsapp, Signal, Telegram, Facebook Messenger |
| **Content Delivery (interactive)** | **ECCE: Literacy:** Homer, Google Bolo / Read Along, Reading Eggs, Storyline, Audible; **Numeracy:** Montessori Geometry, OneCourse; **Arts:** Drawn to Discover, Bandimal; **STEM:** Codeable Crafts; Simple Machines; **PE:** GoNoodle, GoNoodle Videos **Other:** Mobile Montessori apps<br><br>**Primary: Math:** Prodigy, Elephant Learning Math Academy, Illustrative Mathematics, DoodleMaths, Khan Academy, Buzzmath, Twelve a Dozen, Splash Math, Operation Math, Motion Math, DragonBox, 7generation, Zearn, Prodigy, Math snacks; **Literacy:** Google Bolo, EkStep, PBSKids, Newsela, Poio,African Storybook, Lexi's world, Storyweaver, OneClass; **STEM:** CodeSpark Academy **Arts:** METKids; **All:** Brainpop, IXL, Learning Passport<br><br>**Secondary: MOOCs:** Future Learn, iCourse, Nafham, Udemy, EdX, Alison, Coursera, Edraak, Khan Academy, Mawdoo3, AplusClick, BioInteractive, HippoCampus, KialoEdu, Lynda; **Math:** yMath, Mathspace, eMathStudio, Mathletics, Yup; Language Arts: Project Gutenberg, **Language Learning:** Akelius (English, French, Greek), Duolingo, Lingvist, Speakly; **STEM:** Tynker; **Arts:** Google Arts & Culture; **All:** Byju's, Listenwise, Unacademy, etc.<br><br>**Mental Health:** Mightifier, Calm, Sanvello, Headspace, Breathe2Relax, Mindshift, VA Mental Health Apps, WorryWatch<br><br>**Special Needs:** Bookshare, Dyslexia Academy, SpeakTX |
| **Instruction (teacher)** | **Synchronous Teaching:** Slack/Zoom/Hangouts/Skype/Trueconf/Whatsapp/Dingtalk/Jitsi/Webex, ClassIn. **Classroom Management:** Microsoft Teams, Gooru, GoClass, Verso, Edmodo, ActivelyLearn, Kiddom, Skooler, Schoology, Seesaw, ClassDojo, Classmax, EquityMaps - Chart Dialogue, FreshGrade, GradeCraft, Sanako, Eko, Kiddom, ClassPlus |
| **Instruction (parent)** | ECCE: Tinkergarten@Home, PBS For Parents,<br>**Planning:** Homeschool Panda; **Device Safety management:** Qustodio Parental Control, Family Time |
| **P2P Learning** | VoiceThread, Peergrade, Storillo, Parlay, SammTalk, Google Classroom, OneClass |
| **Assessment** | Spiral, Kahoot!, Quizlet, Classkick, SeeSaw, StickPick, ClassroomQ, Dugga. **Autograding:** Bakpax, Moby.Read, Questbase |
| **M&E** | KoBo Toolbox, LogAlto, Granity, Magpi, Mobenzi, Survey CTO, Twilio, engageSpark, FastfieldForms |
| **Digital Credentialing** | Credly, Accredible |
| **Authentication** | Duo, Thales Group, Appdome |

## Searchable Database of Mobile Solutions by the EdTech Team

Please view our database here. Filter by language, grade, subject, offline access, cost, etc.

## Other Repositories

**589 mobile, edu-resources**
*by Learning Keeps Going*
Filter by language (English, French, Spanish, Chinese, Korean, etc), grade, availability outside of US, cost, use case

**Teacher-approved Android apps**
*by Google*
Visit Google Playstore, go to the "Kids" tab" & look for the "Teacher-approved" badge.

**4,700 educational apps**
*by Common Sense Media*
2,100 Android apps; Filter by age, cost, subject, skill, genre; extensive reviews for each app from educational angle; material for homeschooling (K-5, 6-12)

**645 Digital Learning Solutions**
*by UNHCR*
Excel sheet categorized by subject, level, language, cost

**400 educational apps**

**67 educational mobile apps**
*by EdSurge*

**Educational Resources**
by EducationNation

# 6. Where can we find additional information?

*Click on any hyperlink to jump directly to the section.*

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# Additional Resources



**Covid-19 Education Response Strategy**

- Global Education Cluster — Education Crisis Management Toolkit
- INEE — International Emergencies in Education Network Resource Database
- EU — Education in Emergencies Practical Framework
- UNICEF — Guidance on Distance Learning Modalities
- UNESCO — Guidance on Active Learning at Home during Educational Disruption
- UNESCO — The Chinese Experience in Maintaining Uninterrupted Learning in Covid-19 Outbreak
- UNHCR — Education during Covid-19: Emerging Promising Practices
- US Washington State — Continuous Learning 2020 Plan

**Scaling Solutions Effectively**

- R4D — Taking Innovations To Scale: Methods, Applications and Lessons
- Journal of Educational Change — Scaling up successfully: Lessons from Kenya's Tusome national literacy program

**Online Educational Resource Databases**

- ISTE — Learning Keeps Going: Free Tech for Learning
- Education Above All — Free Education Resources For Homeschooling - Internet Resource Bank
- UNESCO — Distance Learning Solutions
- CrowdED Learning — Teacher Tools Repository

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# 7. Acknowledgements

# Acknowledgements

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viamo
improving lives via mobile

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PERÚ
Ministerio de Educación

**Veronica Diaz Hinostroza,** Consultant

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# Connect with the World Bank's EdTech Team

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*Internal*: *EdTech_Core_Team@worldbank.org*
*External*: iciarrusta@worldbank.org

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