GUIDANCE NOTE

PHONE-BASED FORMATIVE ASSESSMENT

GUIDANCE FOR EVALUATING IMPLEMENTATION FEASIBILITY OF PHONE-BASED FORMATIVE ASSESSMENTS IN LOW-RESOURCE SETTINGS

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SUPPORTED WITH FUNDING FROM THE GLOBAL PARTNERSHIP FOR EDUCATION
Acknowledgments

This guidance note was prepared by Aishwarya Khurana, Lucy Kruske, Victoria Levin, Julia Liberman, and Diego Luna Bazaldua of the World Bank's Learning Assessment Platform (LeAP) team. This work was sponsored by the Global Partnership for Education’s (GPE’s) grant to support continuity of learning during the pandemic. The team worked under the overall guidance of Omar Arias (Practice Manager, Global Engagement and Knowledge Unit, Education Global Practice). Valuable feedback was obtained from Maria Barron, Robert Hawkins, and Inaki Sanchez Ciarrusta. Colleagues who contributed to this document with reviews and feedback include Rabia Ali, Marguerite Clarke, Martin Elias de Simone, Koen Geven, James Gresham, and Mari Shojo. Contributions were also provided by Mark Zelman and CREA Consultores. The team was supported by the Russia Education Aid for Development (READ) Trust Fund program.

This note is part of a broader set of global knowledge products on phone-based learning assessments, including a note on psychometric considerations for phone-based assessments, a landscape review of existing phone-based assessment interventions and their key features, and a checklist template to assess implementation prerequisites and enabling conditions for phone-based formative assessment solutions.
Executive Summary

- *Phone-Based Formative Assessment* refers to the use of mobile phone technology to engage students outside the classroom, assess their learning in real time, and provide timely, constructive feedback. Such assessment is particularly critical to promote learning continuity in the context of COVID-19-related school closures, which have led to the expansion and availability of remote teaching and learning resources.

- This guidance note explores considerations for the use of Short Message Service (SMS), Interactive Voice Response (IVR), and direct phone calls to conduct formative learning assessments. It focuses on factors that may affect the feasibility of implementing such solutions in low-resource contexts and discusses conditions that may be needed for successful implementation.

- A combination of phone-based assessment tools can be helpful to target different student groups, particularly those most disadvantaged, and provide tailored support for the learning process outside the physical classroom.

- While some countries are considering solutions for remote formative assessment to support learning continuity as a response to COVID-19, low-cost mobile technologies offer a long-term opportunity to improve the quality of education overall by supporting learning outside the classroom and contributing to education systems’ resilience to future shocks, including natural disasters and unrest in fragile contexts.

- Phone-based learning assessment activities can further be used to mitigate the digital divide, with different applications of mobile technologies having their own advantages and disadvantages.

- Considerations for implementing phone-based formative assessments tend to fall under two categories: (1) the capacity of an education system and (2) technological and logistical considerations. Concerning the education system’s capacity, it is important to align the assessment with existing learning content and education policy, as well as with critical human resource capacity. Critical technological and logistical factors to consider when determining the appropriateness and implementation feasibility of such assessment modality include a country’s demographic makeup, access to and availability of mobile technologies, and the capacity of service providers. Additional logistical considerations pertain to financial resources and time constraints, as well as to the capacity of local implementing organizations with relevant experience.
Introduction

Since the beginning of 2020, the COVID-19 pandemic forced countries around the world to close schools and introduce or expand remote learning. While many countries were able to quickly roll out remote learning initiatives using various web-based applications, not all children were able to access such resources, particularly when they required having internet connectivity and digital devices (such as computers, tablets, and smartphones) at home. This situation reflects some of the challenges faced in low-resource contexts, which are defined as rural or urban settings where human, economic, time, or environmental resources are constrained. In general, low-resource contexts in low- and middle-income countries present limited infrastructure or cannot offer basic services, including education resources and services to support remote learning.

As an alternative to reach students in low-resource contexts, countries such as Bhutan, Cambodia, Colombia, Costa Rica, Czech Republic, Ethiopia, Fiji, and many others delivered educational content through other means, such as television, radio, and hard-copy learning packets (World Bank 2020). While the initial focus during school closures was on ensuring the continued delivery of educational content, limited information was available on whether students accessed this content, whether they were learning, and what additional learning materials and resources they needed to progress along their learning trajectory.

Prior to the COVID-19 pandemic, education was delivered in a traditional classroom setting. In the classroom, information about what students know, understand, and can do, and where students need further support and practice, was obtained by teachers through daily interaction with students. This process is known as formative assessment. While the concept of formative assessment includes peer-to-peer and self-assessment, formative assessment comprises activities that allow teachers to know students' learning status, determine students' progress towards curriculum learning goals, and provide timely feedback to students to support their learning process.

With schools closed during the COVID-19 pandemic, the typical classroom-based mode of formative assessment and the ability of teachers to provide immediate feedback to students could not continue, and education policymakers, organizations, and practitioners sought innovative solutions to ensure that teachers could continue supporting student learning outside school doors. With a global penetration rate of 104 percent, feature (basic) phones are a promising option for supporting learning continuity through formative assessment, especially in contexts with limited access to more advanced digital technology and internet connectivity. Besides their immediate relevance in the COVID-19 context, investment in phone-based assessment solutions can strengthen crisis preparedness and make education systems more resilient to future shocks.

The purpose of this note is to provide information on how basic phones, specifically through Short Message Service (SMS), Interactive Voice Response (IVR), and direct phone calls, can support formative assessment activities and continuation of learning outside the classroom even in low-resource contexts. This document also provides guidance on how to assess the feasibility of implementing phone-based formative assessment activities in a given context.

1 For the purpose of this note, ‘low-resource’ refers to areas where network connectivity for feature (basic) mobile phones and smartphones is limited or nonexistent.
1. The role of phone-based formative assessment during the COVID-19 pandemic and beyond

What is formative assessment?

As the COVID-19 pandemic forced schools to close, many education systems shifted gears and made available learning resources to students so they could learn remotely. With students learning outside of the classroom, the usual practice of classroom assessment was difficult to implement given the sometimes limited, and often nonexistent, communication between students and teachers. However, assessment of student learning is a fundamental feedback mechanism in education, allowing the stakeholders of the teaching and learning process – teachers, principals, students, parents, policymakers, among others – to understand what is being learned, where further support is needed, and what additional learning resources need to be provided to learners to ensure they can continue with their learning trajectory.

Formative assessment consists of ongoing feedback between teachers and students to monitor students’ progress towards curriculum learning goals. Traditional methods of formative assessment rely on in-person interaction, such as oral questioning, alongside other formal approaches such as quizzes, classroom projects, and homework (Perry 2013). In the context of in-school instruction, formative assessment is typically administered as part of daily teaching in the form of checks for understanding, group classroom activities, homework, and other activities that inform teachers about what students know and can do. Formative assessment differs from summative assessment, which tends to happen at the end of a curriculum unit or at the end of the school year to establish whether students achieved the learning goals specified in the curriculum. Formative assessment aims to generate timely information that teachers can use to shape instruction, help students understand concepts and reinforce learning content, and inform subsequent coursework. Moreover, formative assessment is an adaptive process centered on individualized support and constructive feedback. As such, formative assessments are low-stakes, do not take the form of a particular task, and may or may not be used in formal grading. With formative assessment, the focus is on supporting the students’ progress towards achieving learning goals, and that is why it is sometimes referred to as “assessment for learning.”

During sudden shocks to education systems that keep students out of school for a long time, such as pandemics, social unrest, natural disasters, conflicts, or other emergencies, information about what students are actually learning is at a premium, as students are not directly observed by teachers in the classroom. Conducting formative assessments remotely through basic phones can provide such timely information to teachers, parents, and students, and thus support learning continuity in times of crisis and beyond.

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2 For more information on learning assessment considerations and planning during the school reopening process, please retrieve and review our Learning Assessment Platform team guidance note: https://blogs.worldbank.org/education/assessing-outside-classroom-box-while-schools-are-closed-potential-phone-based-formative
The case for phone-based formative assessment

The COVID-19 crisis forced most countries around the world to partially or fully close schools to contain the spread of the coronavirus (that is, COVID-19), at the height of school closures affecting 90 percent of the world’s learners (UNESCO 2021). Without the ability to provide in-person instruction, countries such as Bhutan, Cambodia, Colombia, Ethiopia, Fiji, Ghana, Kenya, and many others have turned to delivering learning content to students and parents through various modalities, including online, TV/radio, and via delivery of hard-copy learning packets (World Bank 2020).

As countries’ experiences have shown, especially at the time of mass school closures, many children and youth did not have access to digital resources, due to poor connectivity or limited access to digital devices. In this context, more low-tech and readily available modalities, such as basic phones, can facilitate learning continuity. As shown in Figure 1-1, even in low-resource contexts, more than half of the population in low-income countries has a mobile phone subscription (World Bank, n.d.). For instance, in Sub-Saharan Africa, mobile cellular subscription (per 100 people) increased from 2 in 2000 to 87 in 2019 (World Bank, n.d.). Although this represents a rapidly increasing rate, when one looks at unique mobile subscribers the penetration rate remains low in lower-middle and low-income countries. For example, in Sub-Saharan Africa, unique mobile subscribers stand at 46 percent of the population or 495 million, and only 28 percent of the population (or 303 million) have access to internet on their mobile phone (Global System for Mobile Communications Association [GSMA] 2021). Therefore, conducting formative assessment remotely using basic phones can improve access to learning support outside of the school and can enable more students to continue to move along their learning trajectory.

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3 Basic phones are the most basic forms of mobile phones that use second generation (2G) networks. They can be identified by their small screen, standard numeric keypad, long battery life, and absence of high-end features such as access to the internet. Basic phones primarily perform two main functions: sending and receiving voice calls and text messages. These phones rely on mobile networks, such as Vodafone, for communication. One common example is the Nokia 1100 phone. “Feature phones” and “feature smart phones” are largely similar in external appearance to basic phone but also come with minimum multimedia and internet capabilities. Such types of phones were among the first to use third generation (3G) networks.

4 Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the Public Switched Telephone Network (PSTN) using cellular technology that helps in making connection between two telephones lasting as long as the duration of the call. Mobile cellular telephone subscriptions (the indicator) includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e., that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services.

5 A unique mobile subscriber is defined as an individual person who can own multiple mobile connections (i.e., SIM cards).
Phone-based assessment may also improve the take-up and effective use of remote learning resources by providing students, their parents, and their teachers with the necessary information to support the learning process, albeit from a distance. While mobile phone technologies include feature phones, smart feature phones, and smartphones, students in low-resource and low-connectivity contexts may typically only have access to basic phones with basic functionalities, such as text messaging (SMS) and phone calls. To address their needs and to support learning continuity for those who are often behind the digital divide, this guidance note will focus exclusively on basic phones.

Phone-based assessment can play a critical role in fostering learning continuity and learning recovery. In the short term, phone-based formative assessment is critical to support learning continuity during COVID-19 school closures. Low-tech modes of remote content delivery have expanded through the use of TV and radio, and these can be complemented with the multimodal use of phone-based formative assessment. In the medium term, some of the methods of phone-based formative assessment can support critical learning recovery by providing opportunities for complementing and reinforcing learning outside of the classroom, monitoring attendance to school, and reaching children who may be at risk of not returning to school.

Moreover, the usefulness of phone-based formative assessment is not limited to the context of COVID-19. Remote learning and remote assessment may be sustained even after return to in-person instruction if it proves to create value to stakeholders and proves to be sustainable over time. In the long term, phone-based assessment can become an essential ingredient for building the resilience of education systems and expanding access to learning opportunities for out-of-school children and youth. In fragile contexts, emergencies due to natural disasters, or sudden shocks to in-person schooling, assessments administered over the phone can be part of formative strategies for the continuity of learning. Likewise, phone-based assessment can support learning of the future, where students, even those in low-resource contexts, can learn anytime and anywhere.

Three phone-based solutions for formative assessment

Basic phones enable users to send and receive SMS/text messages, automated phone calls, and voice messages, and to connect one or more parties in
This section discusses applications of SMS/text messages, interactive voice response (IVR), and direct phone calls using basic phones to conduct formative assessment remotely.

### Short Message Service (SMS)

SMS is by far the most widely used phone-based technology due to its low cost, relative ease to develop and deploy in mobile applications, and compatibility with a wide variety of existing platforms and mobile phones. Text messaging is a basic feature included across all types of mobile phones. Formative assessment through text messaging is an asynchronous process, during which students respond to questions messaged based on previously provided content. The learning content delivery and assessment can occur either at different moments in time or presented together to collect information about students’ learning immediately.

The delivery of assessment content through SMS typically requires the development of a tailored software application that sends out SMS messages and receives responses, which can be done through

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### Box 1-1. Mobile-based Post Literacy Programme, Pakistan

**About the program**: Implemented in the Punjab Province of Pakistan, this program aimed at providing literacy teaching in Urdu to young and adult women ages 15-30 with limited or no literacy skills. The program ran from 2009-2012 in three phases: pilot (first) phase in 2009, second phase from April-September 2010, and third phase from March-August 2012. Over three years, the program provided free mobile phones, SIM cards and SMS services for four months to over 2,500 participants.

**Content delivery**: The program spanned more than six months and was divided into two stages: the first stage comprised in-person teaching that lasted two months and the second stage focused on mobile-based literacy and lasted for four months. During the first stage (two months), the participants met six times per week for two to three hours to learn and write the alphabet and to read, with an emphasis on phonics. During the second stage (four months), participants received SMS on their phones 6-8 times a day. After receiving the SMS, the participants were required to read the texts provided in the SMS, to write the text in their notebooks and to answer the questions that were asked. Additionally, basic math was taught to participants using the calculator function on their phones.

**Assessment procedure**: To monitor the progress and participation, a web-based system was used to send SMS messages to the participants. Assessments mainly involved responding to questions/multiple-choice-questions (MCQs). Additionally, a monthly exam was conducted at learning centers to track the development of participants’ literacy skills and rates of retention in the program.

**Results/outcome**: During the pilot phase with 250 learners, in the Sialkot district, test results showed that by the end of four months of mobile-based literacy instruction, only 14% of the participants fell into the low (0-50%) score range, as compared to 90% during the first month. There was also a notable increase in participants falling into the high (70-100%) score range, rising from 0% to 39%. Additionally, participants also reported that they developed the ability to read an Urdu newspaper, signboards, and simple Urdu books, and learned how to read and solve simple money problems using calculators.

### Box 1-2. Mobile Literacy Programme, Afghanistan

**About the program:** The program, implemented by Afghan Institute of Learning in 2011, aimed at imparting literacy in Dari to 50 female students ages 14-32 living in two villages in rural Afghanistan. The program combined classroom teaching and mobile phone technology by providing basic mobile phones to all participants alongside a notebook to practice their reading and writing skills. The mobile phones were provided free of cost and with enough credit balance for students to complete literacy assignments sent by the teacher. The program also encouraged the personal use of the mobile phones, assuming that such use would strengthen literacy skills.

**Content delivery:** Over the period of four months, students met six times per week for one hour. The in-person instruction in Dari comprised traditional methods, such as reading aloud, writing in the notebook, and memorizing words.

**Assessment procedure:** The in-person classes during which students received literacy instruction were complemented with formative assessment that involved direct interaction between students and a teacher through SMS. After the in-person classroom instruction, the teacher sent daily text messages to students with a reading exercise, prompting them to respond by text messaging.

Primarily, the text message comprised three types of questions:

1. Fill-in-the-blank sentences, which students had to rewrite with the word filled in;
2. Open-ended questions to facilitate critical thinking and writing skills to which students were required to compose a response; and
3. Correctly reordering a jumbled sentence to practice comprehension and grammar.

**Results/outcomes:** At the end of the program, some of the key results included:

- The rate at which students covered content was four times faster relative to the regular speed of education in a classroom environment (4 months for an 18-month program).
- 83% of the students were able to pass all the literacy assessments within four months.
- Students sent approximately 1,750 messages per month (including messages to teachers and for other).
- All students remained in the program during the assessment process (4 months).
- The project addressed the issue of lower phone ownership by women, and some students left the course with the ability to read magazines and newspapers.

a variety of mobile aggregator platforms, such as Twilio and Tatango. See boxes 1-1 and 1-2 for examples on the use of text messages for learning assessment. (For more examples on the use of SMS, please see Annex 1.)

Interactive Voice Response (IVR)

Interactive Voice Response (IVR) is a tool that can be utilized to reach populations with limited literacy because it relies on speech rather than text (World Bank 2012). It can be used on any type of landline or mobile phone to communicate information via a voice message system in the form of audio recording (Diedhiou et al. 2015). IVR works by inviting users to call a number, usually toll-free. An automated system delivers pre-recorded audio messages that may contain on-demand educational content or voice-based quizzes to which users respond by pressing a number key or saying the number that corresponds to their answer choice (i.e., “say yes or press 1, say no or press 2”).

IVR also allows users to leave a recorded voice message with a detailed response or query. In addition to enabling access to content for individuals with limited literacy, IVR can be used to reach individuals with visual impairments, and it facilitates delivering the same content in multiple languages, including those that have no written form (Diedhiou et al. 2015). All these features offered by IVR solutions may increase the engagement of students during the learning assessment process. See boxes 1-3 and 1-4 for examples of the use of IVR in learning assessments. (Please see Annex 1 for more examples on the use of IVR to assess student learning.)

Direct phone calls

Direct phone calls between students and teachers can ensure continuity of the learning process. In the context of COVID-19, the primary purpose of direct calls is to ensure that students can continue learning through guidance and constructive feedback from teachers or instructors outside of the classroom (e.g., when doing homework, reviewing

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6 Mobile aggregators link different carrier networks with SMS software / platform providers. They simplify the mass distribution of SMS to many carrier networks. Mobile aggregators have agreements with carrier networks to send and receive SMS through these networks.

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**Box 1-3. Viamo, in Zimbabwe and across Africa**

**About the program:** In response to school closures as a result of the COVID-19 pandemic, the program was designed and implemented to offer prerecorded lessons, using the IVR platform. In Zimbabwe, the pilot phase included 10,000 students, all age 5. In other countries, the scale of the work varied; for example, Tanzania had 200,000 callers in a 12-month period.

**Content delivery:** The program primarily focused on the delivery of literacy and numeracy lessons or modules in the Ndau language at the early childhood level. Each module was set to 10 minutes a week.

**Assessment procedure:** Mini assessments were incorporated into the modules. These assessments were short and simple. To check if the child has listened to the audio and/or if they are still present, the system would first play a nursery rhyme and then prompt a question, such as “What sounds does this animal make?” and provide options for children to respond to.

Feedback provision can also come from parents or older siblings acting in coordination with teachers. Direct calls also allow teachers to assess students’ engagement with remote learning resources, understand their absorption of learning content, and respond to students’ questions.

Moreover, direct calls serve as an opportunity to provide emotional support and encouragement, which are particularly important when students and teachers cannot be together physically in the classroom (Lainchaur 2020, p. 16). Phone calls can also help teachers encourage parents to support learning at home and coordinate with them in the delivery of learning content to students. In addition to teachers calling students to check in on their learning, another way of connecting students and teachers remotely is by establishing a teacher hotline or call center, which students can

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**Box 1-4. Allo Alphabet, Côte d’Ivoire**

**About the program:** The study was first piloted in a rural village in Adzopé Department of Côte d’Ivoire. The study included 38 students in grade 5 and spanned five weeks from October-December 2018. Later, from 2019 to 2020, the program was scaled up to reach 1,200 children (800 in the treatment group and 400 in the control) in remote rural communities of Côte d’Ivoire. The literacy curriculums in Attié and French were designed and implemented on an interactive voice response (IVR) system named Allo Alphabet.

**Content delivery:** The content delivered focused on overall literacy skills such as phonological awareness and print-sound mapping. Over time, the difficulty of the content was increased from simple phoneme and syllable awareness to mapping between letters, words, and sounds. For example, the learner performed tasks such as matching words/syllables sharing similar sounds/combination of sounds and choosing the word or sound that did not belong to the given set.

**The learner was required to call a specified number:** Once the call was placed, it was automatically disconnected and the system was programmed to call back the learner to avoid any charges to them. At the start of each call, the system played a welcome message, recorded by an Ivorian researcher, that updated the learner of their progress and based on the mastery of concepts that the learner exhibited, selected a lesson to be played. Each lesson followed a structure and would start with an explanation of content and guidance on how to respond to the questions.

**Assessment procedure:** To assess the learners, the system played a prerecorded audio message containing a question and two or three response options. After selecting a response, the learner received immediate feedback from the system. Following correct answers, the system would prompt the next question. For incorrect answers, the system first provided a hint (that might include focusing learners’ attention on a specific part of a word or syllable) and then gave the learner another opportunity to answer. After one or two wrong attempts, the system provided the correct answer with a brief explanation.

**Results/Outcomes:** The analysis showed that, on average, learners called the system 14.2 days out of 32 days and initiated 81.4 calls over five weeks spending 6.2 minutes on calls.

Box 1-5. **Young Love, Botswana**

**About the program:** Between February and March 2020, before many countries closed schools due to the COVID-19 pandemic, a phone-based assessment of basic numeracy skills was administered to over 4,500 students in grades 3 to 5. The phone-based assessment was conducted by over 70 assessors who called the households directly. The assessors (mostly former teacher aides) were trained remotely using voice notes and sharing resources via WhatsApp. The program was implemented in nine out of ten regions of Botswana.

**Content delivery:** The sample of 4,500 students was randomly divided into three sub-groups: the first subgroup received weekly text messages followed by a phone call; the second group received weekly text messages only; and the third was a control group. The students in treatment groups received targeted instruction in the form of tailored messages based on their learning level, as determined from the results of a midline survey conducted at the end of week four. For example, students who knew addition received subtraction problems, and students who knew multiplication received division problems.

**Assessment procedure:** The Annual Status of Education Report (ASER) survey instrument was adapted for phone-based administration. The assessment entailed the following tasks conducted by assessors and students:

a) **Number operations task:** This task involved the assessor reading out loud the numeracy questions in ascending order of difficulty: addition, subtraction, multiplication, and division. It also included fractions and place value questions.

b) **Timed word problem task:** For this, word problems were texted to a student, who was then asked to read them out loud and to solve them.

c) **Explanation of the solution:** Students explained their work during discussions with the assessors to check for understanding.

On average, the phone calls with students lasted between 15 and 20 minutes and provided facilitators an opportunity to walk the students through the learning activities sent via SMS and to check for students’ understanding.

**Results/outcomes:** Overall, the study suggested that text messages combined with phone calls can result in substantial learning gains; ‘text message followed by phone call’ led to a 31% increase in the numeracy score. It was also found that ‘text message followed by phone call’ had larger and more cost-effective effects on household engagement in learning, as compared to ‘text message only.’

**Box 1-6. Pratham, India**

**About the program:** A month into the COVID-19-related lockdown, beginning April 8, 2020, Pratham began sending daily activities through SMS to keep children engaged in the learning process. These messages were followed by a phone call to check if the message was accurately understood by the parent and/or child and to provide feedback. The messages were sent to children in more than 12,000 communities across India in 11 regional languages and English. The content was focused on different levels of education (early childhood, primary, and upper primary).

**Content delivery:** Pratham developed an SMS and activity-based curriculum that was aligned with the National Council of Educational Research and Training (NCERT) curriculum for grades K-10. For each level of education, Pratham prioritized essential topics or areas from the curriculum. The list of topics identified is contained in the table below.

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Focus/Subject areas/Skills Targeted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-primary</td>
<td>Six developmental areas: physical/motor skills, cognitive skills, creativity, socio-emotional skills, early reading, and early math.</td>
</tr>
<tr>
<td>Primary level</td>
<td>Math: number recognition and place value, number operations, measurement, time and calendar, shape (geometry), puzzles/riddles/rhythm. Language: comprehension, creation, and exploration.</td>
</tr>
</tbody>
</table>
| Upper primary level      | Science: Nature, heat, matter, sound, light  
Math:  
- number & place values  
- basic operations (addition with or without regrouping, subtraction with or without regrouping, division, multiplication; questions on basic operations are further divided into simple sums and word problems)  
- advanced math, including fractions, decimals, geometry  
Language: reading, writing, comprehension, grammar |

To maintain consistency, the text messages were sent at the same time six days a week. Each day of the week focused on a specific activity. To adhere to the character limit of 67 characters for Indian languages, the messages were divided into three parts (based on difficulty) and were sent one after the other to the child on the same day. Having different levels of questions/activities allowed children to attempt one or two questions/parts based on their level. Over time, the content also moved from simple and generic problems to more challenging application-based questions.

**Assessment procedure:** Use of activity-based messages each day—such as measuring the height of all family members and water consumption—helped to easily assess children. To check for children’s understanding, two approaches were implemented. One involved receiving pictures and videos from the families. This was more common for early childhood and primary grades.
Second, for upper primary, a list of feedback questions to be asked over the phone was prepared that aimed to assess if the child was able to understand the question, navigate the text for information, and explain how he or she reached the solution. Examples of the feedback questions included asking the child if he can see a pattern in the numbers and asking the child to explain how he was able to solve 713 + 182. Pratham's approach consisted of active involvement of parents in facilitating learning, so that after sending the SMSes, Pratham staff would call the parents to check if they (1) received the message, (2) understood the message, and (3) could help their child complete the activity contained in the message. If the parents did not receive the SMSes or had trouble understanding them, Pratham field staff and volunteers would help resolve the issues over phone.

Before this program, Pratham also partnered with Education Above All to pilot the Digital School Program (DSP) in 2019 with 2,000 learners in 150 villages in Uttar Pradesh. The program aimed to provide access to quality content for English, Math and Language (Hindi). Due to the COVID-19 pandemic, the focus shifted to the use of phone calls, SMS, radio, TV, and IVR to deliver the content. For the first three weeks of lockdown, facilitators called a student or a group of students (2-4) to deliver lessons. Each facilitator placed 9 calls per day to their group of children assigned to them and the calls lasted about 20 minutes. Starting in the fourth week, facilitators sent out curated activity-based messages and made individual calls to students twice a week to explain the activities, check if they completed the activity, and to clarify any doubts. It was found that over 100 students were in touch with facilitators twice a week and 70% of the students completed the activities sent to them each week. (To learn more about the program, please visit this link.)

Source: Pratham, How to Create Learning Content in 160 Characters (SMS) (2021). Retrieved from https://drive.google.com/file/d/1KAPEfOLASEQwSfL-7sYiPl7mtVoO6Q/view


call to speak with a teacher to ask questions about remote learning content or to obtain support with homework assignments (see boxes 1-5 and 1-6). (See Annex 1 for more examples of learning assessments using SMS, IVR, and direct phone calls.)

Table 1-1 summarizes the three phone-based technologies discussed above – SMS, IVR, and direct calls – and their use for the delivery of formative assessments. The information in Table 1-1 covers aspects related to phone-based assessment implementation, requirements and considerations for implementation, as well as the advantages and limitations of each technology. This information is a product of lessons learned from the existing experience of using these solutions particularly in development projects.
## Table 1.1. Functionality of phone-based solutions for formative assessment

<table>
<thead>
<tr>
<th></th>
<th>SMS</th>
<th>IVR</th>
<th>Direct Calls</th>
</tr>
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<tbody>
<tr>
<td><strong>Assessment procedure</strong></td>
<td>Short text-based quizzes are sent to students. With two-way SMS, students can respond via SMS (as with the learning assessment, learning content can also be delivered through SMS either before or after the assessment).</td>
<td>Users call a phone number to listen to learning content and respond to a series of voice-based multiple-choice questions. Answers are selected either by pressing corresponding keys or by saying the answer out loud. The IVR system processes responses and may provide voice-based feedback based on the result.</td>
<td>Teachers or instructors contact students by phone to go over learning content, assess students' knowledge, guide students to appropriate learning content, and encourage their use of the learning content. Feedback can be provided during the phone call.</td>
</tr>
<tr>
<td><strong>Assessment frequency</strong></td>
<td>Received regularly — i.e., once a week to several messages per day.</td>
<td>Accessed at students' convenience.</td>
<td>Made sporadically or regularly — can also be requested by parents if needed.</td>
</tr>
<tr>
<td><strong>Solution advantages</strong></td>
<td>Cost: The most cost-effective of the three tools. Time flexibility: Users can respond at their convenience, given the method's asynchronous nature. Reminders: Additional messages can be delivered to remind students to take the assessment.</td>
<td>Accessibility: Supports students with visual disabilities as well as students/parents with limited literacy.</td>
<td>Accessibility: Supports students with visual disabilities as well as students/parents with limited literacy. Synchronicity: Synchronous interaction with students allows for a more personalized approach, promotes active engagement of students in assessment and learning process, builds rapport with the assessor.</td>
</tr>
<tr>
<td><strong>Infrastructure requirements</strong></td>
<td>Access: Works on a basic mobile phone Free SMS: Need SMS credits or a free-of-charge alternative. Mobile aggregators are needed to link different carrier networks with SMS software / platform providers. Software: needed to administer content and record students' answers.</td>
<td>Access: Works on any type of phone. Free calls: Need to offer phone call credits or a toll-free number. Voice actors are needed to record the content (in different languages). Software: needed to administer content and record students' answers.</td>
<td>Access: Works on any type of phone. Free calls: Need to offer phone credits to teachers for making calls. Digital infrastructure is needed to manage students' data and feedback. Switchboard system: needed if hotlines are used.</td>
</tr>
<tr>
<td>Community considerations</td>
<td>Parent authorization: needed to send SMS and for reception of SMS outside of school hours.</td>
<td>User familiarity: necessary for receiving and engaging with IVR.</td>
<td>Parent availability: may be needed for monitoring the call between the child and the enumerator.</td>
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<tr>
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<td>-------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Solution limitations</td>
<td>160-character restriction Non-Latin characters might not display properly.Phones with small screens may create usability issues. Hard to track possible parental interference (e.g. parents telling children the correct answers). Cannot be used with landline phones.</td>
<td>Possible difficulties due lack of access to a personal phone and longer duration of engagement. Students must be attentive and complete assessments in one sitting—saving isn’t an option.</td>
<td>Possible additional burden on teachers to make the calls (sometimes even outside the school hours). Calls need to be scheduled and rescheduled to ensure children's availability and access to phone at the time of call.</td>
</tr>
</tbody>
</table>

Source: Aker & Ksoll (2015); Lau, Sanders, & Lombaard (2019); and Hortinela (2017).
2. Considerations for implementing phone-based formative assessments

Given the potential of the phone-based solutions described above to support learning continuity in the context of the COVID-19 pandemic, and their potential to strengthen the resilience of education systems to future shocks, many countries may be interested in introducing these solutions, particularly to expand access to learning outside of schools in low-resource contexts. This section focuses on factors that may affect the feasibility of implementing such solutions in certain contexts. Specifically, the section examines eight dimensions, specifying the conditions needed for successful implementation.

Each dimension includes several indicators based on their relevance to different phone-based solutions, as well as a set of other factors that need to be considered in assessing the country’s readiness for integrating phone-based formative assessment as part of remote learning. To ensure that implementation modalities for phone-based assessments can be practically evaluated, the factors presented in this section assume a “snapshot” at which time the feasibility is assessed, recognizing the limitations of data and that efforts and initiatives may be ongoing that would affect these factors over time. These factors can be revisited and evaluated as additional information and opportunities for support become available.

Given that the use of mobile phones (and particularly basic phones) for formative assessment is currently rather limited, it is difficult to refer to a “gold standard” for the successful implementation of these assessments. Therefore, this note uses examples of international development initiatives that have used the same technologies – SMS, IVR and direct calls – to draw key considerations for implementing phone-based formative assessment.

Table 2-1. Considerations for implementing phone-based formative assessments

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<td>Local implementer capacity</td>
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</table>
Education system capacity

Learning content and its alignment with assessment

Perhaps the most important factor in the success of phone-based formative assessment relates to the learning content that is being assessed. Given the formative nature of phone-based assessment solutions, assessment items need to be aligned very closely to the learning resources that are being delivered in person or remotely to the student. Thus, in the context of school closures, existing distance learning initiatives in the country, as well as the type of technology used in distance learning, are critical determinants of the feasibility and success of phone-based assessment.

Countries that focus on teacher-guided home learning modalities, where teachers have remained in contact with students, can have higher take-up and engagement in phone-based formative assessment than countries where the learning modalities rely on self-paced learning or assisted learning with parental involvement at home, such as TV and/or radio learning lessons. Distance learning approaches that use any of the three technologies at the center of this guidance note (i.e., SMS, IVR, or direct phone calls) as teacher-guided modalities to reach and interact with students could increase the likelihood of a successful remote learning intervention.

In selecting the learning content to align with the phone-based formative assessment, it is important to consider the following factors:

- **Awareness and coverage of the learning content.** Any information, quantitative or qualitative, about the accessibility of this learning content can be useful. Of course, phone-based formative assessment activities can increase the awareness about and even provide a nudge to using the learning content being provided, but if the content is not reaching a critical mass of its target population, engagement with phone-based assessment is likely to be minimal.

- **General perception regarding the quality of the learning content.** Perceptions around quality can influence take-up and engagement with phone-based assessment. If the learning content is considered to be of low quality or not aligned to the learning needs of students, the recipients’ motivation to participate in assessment can be negatively affected.

Human resources

The critical human resources aspects that need to be considered for the implementation of phone-based assessments relate mainly to teachers’ ability to participate in or use the results from the assessment. Teachers are at the center of the instruction process, and ideally they should be familiar with the common misunderstandings students may have regarding the learning content. Therefore, teachers can play a critical role in ensuring learning progress if they can understand what students know and provide constructive feedback and support. It is essential, therefore, to engage teachers either in direct implementation of phone-based assessments or in using the data obtained from these assessments to support learning. Likewise, it is important that teachers coordinate with parents, caregivers or older siblings to deliver feedback indirectly to students and ensure continuity of learning at home.

In order to participate in the implementation of these assessments or use the resulting assessment data, teachers need to have access to smartphones or access to the internet via another device (e.g., a computer or a tablet). Internet access is necessary to facilitate the efficient remote dissemination of learning and assessment content to teachers through applications. In contexts where teachers do not have access to smartphones or other internet-connected devices, such devices can be provided to them, but in these situations special emphasis needs to be placed on configuring and testing procured phones and on training teachers in how to use these devices for phone-based assessment.

Other human resources factors to consider as part of the feasibility analysis are:

- **Teacher motivation and assessment competencies to engage.** Conducting phone-based formative assessment by direct calls can take up significant
time in a teacher’s day. The use of incentives may be necessary to motivate teachers to participate. In addition, teachers must acquire competencies in the use of formative learning assessments to inform remote instruction strategies and provide constructive feedback to students.

- **Assessment specialist capacity.** Developing, maintaining, and scaling up phone-based applications according to local needs is likely to require dedicated local technical experts, including specialists familiar with content design, learning assessment design, administration, and analysis, who can ensure compliance with important considerations for validity and reliability of phone-based assessment results (Luna Bazaldua, Liberman, & Levin 2021). (For more information on reliability and validity consideration, review our note on psychometric considerations for phone-based assessments, which is also part of the knowledge products developed to support the implementation of phone-based assessment activities.)

- **IT staff capacity.** A dedicated IT team is likely to be needed to support setting up and maintaining phone-based assessment activities.

Additionally, for large-scale adoption of phone-based formative assessments, it is critical for the Ministry of Education to partner with various actors, such as mobile service providers and assessment experts, to build their capacity and develop sufficient fluency in the software used to collect and analyze assessment data.

While data on digital literacy may not be available in most countries, adult literacy rates can serve as a good proxy for more advanced skills. The percentage of the population of a given age group that can read and write can provide an estimate for digital literacy and readiness to use digital devices as part of the phone-based assessment process.

Other demographic factors to consider:

- **Urban population share.** In many countries, there is a sharp divide in access, resources, and opportunities between urban and rural populations. Thus, the share of the population living in urban areas can provide information about both access to technological solutions and digital literacy of the targeted student population.

- **Number of spoken languages.** Multilingual settings can increase the complexity of administering phone-based assessments. Language considerations are important for access, costs, and time. In terms of access, take-up of the assessment may increase when an initial engagement with caregivers and children occurs in the language they speak at home and assessments can be delivered in that home language. Voice options are recommended in a multilingual setting. IVR solutions are particularly well-suited to such settings, because routing to the appropriate language can be easily set up and does not require synchronous matching of respondents’ home language to enumerators with fluency in that language.

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**Technological and logistical considerations**

### Demographics

One critical constraint related to access and usage of mobile phones can be the skills and competencies required to use these devices for the purposes of the assessment. Parental involvement is essential for remote learning and the formative assessment process, particularly for younger children. Digital literacy of users and caregivers impacts the take-up and effectiveness of phone-based assessments.

**Cultural and behavioral aspects** can affect the effective implementation of phone-based formative assessment. These aspects include students’ access to mobile phones, parents’ views on phone-based remote learning, parents’ attitudes towards phone sharing for learning and assessment at home, gender gaps in phone usage, and parental attitudes towards mobile phone use by boys and girls.

**Gender roles.** In many countries, due to religious and cultural constraints, girls or women are not allowed to own a mobile phone. This may affect their participation in various remote learning and assessment initiatives. In such cases, working through female operators, encouraging the use of
basic phones, making an effort to inform parents about how this will help their children's education, and building trust of the community through implementing partners by establishing transparent communication is critical to success.

**Technology**

The two most important factors for evaluating technological capacity are a country’s mobile phone penetration and network coverage. Implementing phone-based assessments requires students to have access to mobile phones at home. Mobile phone penetration can be measured as mobile cellular subscriptions (per 100 people), which means subscriptions to a public mobile telephone service that provide access to the Public Switched Telephone Network (PSTN) using cellular technology, based on data collected by the International Telecommunication Union (ITU) as part of the World Telecommunication/ICT Indicators Database.  

Given the prevalence of sharing mobile phones and connections, particularly in low-resource contexts, it is also important to consider indicators of household ownership of phones (i.e., the proportion of households with mobile-cellular telephones) and usage of mobile phones by individuals (i.e., the proportion of individuals using a mobile phone), as collected by ITU. The mobile network coverage indicator, also collected by ITU, is the percentage of inhabitants that are within range of a mobile cellular signal, irrespective of whether or not they are subscribers. This indicator is sometimes broken down by network type (2G/3G/4G/5G, as is done by GSMA Mobile Connectivity Index). This is an important indicator for the number of students that can potentially be reached through mobile phone technologies regardless of device ownership.

While the scope of this guidance note is on the use of feature phone solutions, the technology component may also consider the use of more advanced phones. For instance, the penetration rate of smart feature phones and smartphones is steadily growing around the world, in part due to the increase of low-cost smartphone options in developing countries. Smart feature phones and smartphones open doors to more efficient and scalable phone-based administration of learning assessments with the use of messaging and learning management applications. Some of these applications may also facilitate asynchronous and synchronous communication and learning-content sharing between a teacher and multiple students working together remotely.

In contexts where mobile phone penetration is low, education authorities can try to reach agreements with mobile providers to provide free or subsidized mobile phones for students (IICBA 2020), as in the case of China, where the Ministry of Education provided families with free SIM cards. Other countries, like Pakistan and Afghanistan (see Boxes 1-1 and 1-2 in Section 1), followed a similar approach to ensure remote learning continuity. While it would be most advantageous for students to possess their own device, previous experiences indicate that personal device ownership is not essential for effective remote assessment delivery: it is relatively easy for students without mobile phones to share devices or SIM cards in order to access learning experiences (GSMA 2012). However, sharing devices with others can introduce disparities in access as well as difficulties in reaching the right students at regular times. Moreover, phone-sharing solutions require extra planning and flexibility in the delivery of the assessment in order to reach the target student. When multiple members in a single household use the same device, unique identifiers are often necessary to attribute responses to a particular student.

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7 Readers are encouraged to also review mobile phone penetration information from national statistical agencies to validate penetration rates by country and disaggregated information on phone access by key demographic factors.

Other technological factors to consider are:

- **Access to electricity.** The proportion of the population with access to electricity can indicate whether the use of phones is viable for the targeted intervention, as phones require a relatively stable supply of electricity to be charged and used.

- **Mobile cellular subscriptions and mobile connections,** including those that are prepaid. The number of mobile cellular subscriptions and mobile connections that are prepaid can indicate actual utilization of mobile phones as well as the affordability of services.

- **Mobile accounts for financial transactions.** The percent of adults who used mobile phones to conduct a financial transaction shows utilization of mobile phone services and can provide insights into the likelihood of take-up of phone-based development solutions.

### Service providers

Service providers and software platforms are also a key component to successful delivery of educational applications and should be evaluated in the context of usability, accessibility, and affordability.

At a minimum, the country must have at least one operational mobile aggregator that has capabilities to deliver at least one of the targeted solutions (i.e., SMS, IVR, direct phone call services). To assess the capacity of a mobile aggregator, it is necessary to review its capabilities, as certain features, such as two-way SMS, may not be available in mobile aggregators in all countries. Other considerations may include how easy it is for users to purchase SIM cards in the country, including access and identification requirements.

Another key factor to consider is whether toll-free numbers and short codes⁹ are available or can be set up easily through agreements with telecom providers in the country. Toll-free numbers are important to reach disadvantaged populations that cannot afford to pay for phone calls and SMS. When toll-free numbers cannot be easily set up, a missed-call solution may be an option for IVR and direct phone calls, wherein a call is placed without a connection and the caller receives an immediate call-back at no charge (Ozonetel 2020).

Other service provider factors to consider:

- **Frequency of internet outages/shutdowns in the country.** Frequent internet shutdowns due to infrastructure issues or government decisions can affect the service providers’ ability to deliver an effective service and may compromise the intervention.

### Financial considerations

Financial considerations will impact the feasibility and long-term sustainability of a phone-based assessment activity.

In terms of technology-related costs, selection of the most appropriate phone-based solution may depend on the relative costs of different phone-based technologies. In particular, the following costs could be considered in these decisions:

- **Average cost per SMS.** It is important to consider the potential costs of both sending and receiving SMS, and to make sure that students’ families are compensated for any costs involved in two-way SMS communications.

- **Average per-minute cost of different types of mobile phone calls.** The cost of mobile phone calls is most relevant for direct calls and IVR solutions, and includes the cost of 1-minute call time both in-network as well as out-of-network.

Other financial factors to consider:

- **Average cost of mobile data for 1GB.** Affordability of mobile data can be important for teachers’ or implementing partner’s use of software tools for

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⁹ Short codes are short digit numbers (significantly shorter than telephone numbers) used to send SMS and abbreviate dialing. Short codes facilitate reading and remembering telephone numbers.
managing SMS or calls. Countries like India and Israel have a very low cost of data due to the considerable market competition in each country. On the other hand, countries like Malawi, Benin, and Chad present the highest mobile data costs and very small market competition for telecom companies that offer mobile data services. To increase access to online resources for teachers or implementing partners, governments can either create or facilitate access to online educational resources by partnering with mobile service providers to not charge individual users for data usage on specific websites or platforms. For instance, the Ministry of Education in Colombia developed *Aprender Digital*, an online learning platform to access educational resources. In collaboration with the Ministry of Technology and Communications, a decree was published for mobile operators to provide zero-rating\(^{10}\) access to the *Aprender Digital* portal. Also, to reach areas with low or no connectivity, digital devices with preloaded educational materials were distributed to households by the government. A similar initiative was implemented in Pakistan (OECD et al. 2021)

### Time

Phone-based assessment activities can be essential to support learning continuity during school closures. In such situations, time is of the essence. The main question for implementation feasibility of phone-based assessments is the expected duration of school closures and the delivery of distance learning. Notably, gradual reopening using hybrid models of instruction can justify continuation of distance learning delivery and thus continuing phone-based formative assessments. A full reopening of schools may require rethinking the design of the phone-based formative assessment, for example switching to using it as a complementary intervention to support learning recovery and targeting it to students with observed learning losses.

One logistical factor that can significantly impact the time frame for implementation is access to a database of caregivers’ or students’ phone numbers. In an ideal scenario, such a phone number database already exists and is managed by the Ministry of Education, either centrally or at the school level. Currently, this is not the case for many countries, which means phone numbers need to be collected or requested from other ministries (e.g., Ministry of Information, Communication and Technology), international development organizations, or NGOs where available. Prior to any future school closures, phone numbers could be collected by students’ teachers either as part of teacher-parent interactions or as a form sent home with students. In addition to the existence of phone number data, the accuracy of such data can be another limiting factor, particularly in contexts where people change their phone numbers often or use shared phones.

Other time-related factors to consider:

- **Implementation timeline.** Depending on existing technical capacity and the countries’ previous experience with the use of phone-based technologies, each phone-based assessment solution (i.e., SMS, IVR, direct phone calls) would have different startup timelines. It is important to take these into account when designing solutions for coping with crisis situations. Still, it is important to note that once set up, phone-based formative assessments can support learning outside of the classroom even during normal times and/or can be ready to be deployed during the next school closure, thereby raising crisis preparedness of the education system.

### Local implementer capacity

Much of the success of the project implementation will depend on selecting the right implementing partner (e.g., NGO or development agency). In the process of identifying implementing partners, it is critical to consider whether the candidates have

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\(^{10}\) Zero-rating is a practice of providing cost-free access to certain websites or services, i.e. mobile service provider does not charge the user for data usage on specific websites. It is sometimes referred to as ‘toll-free data’ or ‘sponsored data’

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previous experience with implementing phone-based interventions or assessments. Other valuable attributes include current role in delivering distance learning interventions. It is particularly important to identify implementers' previous experience working with mobile network operators and mobile service providers (e.g., aggregators), as such expertise can accelerate the startup phase of the implementation. Likewise, understanding candidates’ ICT-related capacity can provide valuable insight into their ability to set up and test the system, configure phones, or carry out any additional ICT related activities for the duration of the project.
Conclusion

The assessment of student learning is a fundamental feedback mechanism in education, providing information on learning progress, areas of constraint, and uncovering what additional learning resources need to be provided. Remote formative assessment can support learning continuity as a response to prolonged school closures due to COVID-19 and improve the quality of education overall. Low-cost mobile technologies also offer a long-term opportunity to support learning outside of the classroom and to contribute to education systems’ resilience to future shocks, such as natural disasters and unrest in fragile contexts.

This guidance note analyzes the use of Short Message Service (SMS), Interactive Voice Response (IVR), and direct phone calls to students as three such solutions. It explores factors that may affect the feasibility of implementing such solutions in a low-resource context, and specifies conditions that may be needed for successful implementation of phone-based formative assessment solutions.

Given the formative nature of the assessment, close alignment of learning resources to the assessment intervention is important. In the context of school closures, existing distance learning initiatives in the country as well as the type of technology used in distance learning are critical determinants of the feasibility and success of phone-based assessment. An additional critical consideration pertaining to the capacity of the education system is the teachers’ ability to participate in or use the results from the assessment.

There are also technological and logistical considerations in assessing the feasibility of implementing phone-based assessments. It is essential to evaluate the technological capacity of a country, mainly mobile phone penetration and network coverage. In addition, a critical constraint is the access and usage of mobile phones, which includes a county’s mobile phone penetration rate as well as the skills and competencies required to use these devices for the purposes of the assessment. Service providers and software platforms are also a key component to successful delivery of educational applications. At a minimum, a country must have at least one operational mobile aggregator that has the capabilities to deliver at least one of the targeted solutions (i.e., SMS, IVR, direct phone call services).

Financial and time-related considerations will also impact the feasibility and long-term sustainability of a phone-based assessment activity. Finally, much of the success of the project implementation will depend on selecting the right implementing partner, one that has relevant previous experience with these interventions.
References


Ozonetel. (2020). *Pratham Books used Ozonetel’s “Missed call” feature along with a radio integration to provide storytelling to over 58528 children in 2 languages across 4 states of India*. Retrieved from https://ozonetel.com/blog/kb/pratham-books/


**Additional resources for consideration**


### Annex 1. Examples of phone-based formative assessments using SMS, IVR and direct phone calls

<table>
<thead>
<tr>
<th>Country</th>
<th>Region</th>
<th>Project Name</th>
<th>Implementor/ Donor</th>
<th>Year of implementation</th>
<th>Short Message Service (SMS)</th>
<th>Interactive Voice Response (IVR)</th>
<th>Phone Calls</th>
<th>Grade/Level of education</th>
<th>Skills assessed</th>
<th>Assessment procedure</th>
<th>Link/Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>SAR</td>
<td>Mobile Literacy Project</td>
<td>Afghan Institute of Learning (AIL), UNESCO, U.S. Afghan Women's Council, Creating Hope International</td>
<td>2011</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Adult education</td>
<td>Literacy</td>
<td>Each student received a handset (that ran on the standard 2G system), a phonecard, and a notebook. Teachers sent daily texts to the students, who read the incoming message and responded via return text message—demonstrating reading comprehension and writing skills. Students attended twice-monthly evaluation sessions to monitor progress and receive assistance, in addition to attending classes. Primarily, the messages comprised three types of questions: 1) fill in the blank type sentences which students had to rewrite with the word filled in; 2) open-ended questions to facilitate critical thinking and writing skills; and 3) reordering the jumbled sentence into its correct structure to practice comprehension and grammar.</td>
<td><a href="https://uil.unesco.org/case-study/effective-practices-database-litbase-0/mobile-literacy-programme-afghanistan-afghanistan">https://uil.unesco.org/case-study/effective-practices-database-litbase-0/mobile-literacy-programme-afghanistan-afghanistan</a></td>
</tr>
<tr>
<td>Africa (Rwanda, Kenya, Ghana, Ivory Coast)</td>
<td>AFR</td>
<td>Eneza Education</td>
<td>No information</td>
<td>2013-present</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Primary and Secondary</td>
<td>All subjects</td>
<td>Rwanda: quizzes were aligned to the Rwandan curriculum. Kenya: Mock papers were designed to be as much like the real exam as possible (KCSE and KCPE exams). It is comprehensive, meaning that it tests all that has been taught in the previous classes.</td>
<td><a href="https://enezaeducation.com/#impact">https://enezaeducation.com/#impact</a></td>
</tr>
<tr>
<td>Africa (Uganda, Rwanda, and Kenya)</td>
<td>AFR</td>
<td>Educate!</td>
<td>No information</td>
<td>No information</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Secondary education</td>
<td>Socioemotion- al skills (such as communication, teamwork, creativity, and grit) and entreprenuership training</td>
<td>Learning assessments are provided through SMS</td>
<td><a href="https://www.experienceeducate.org/covid-19-response">https://www.experienceeducate.org/covid-19-response</a></td>
</tr>
<tr>
<td>Country</td>
<td>Region</td>
<td>Project Name</td>
<td>Implementor/Donor</td>
<td>Year of implementation</td>
<td>Short Message Service (SMS)</td>
<td>Interactive Voice Response (IVR)</td>
<td>Phone Calls</td>
<td>Grade/Level of education</td>
<td>Skills assessed</td>
<td>Assessment procedure</td>
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<tr>
<td>Bangladesh</td>
<td>SAR</td>
<td>Bangladesh Virtual Interactive Classrooms (BVIC)</td>
<td>Catholic Relief Services/Niger, (CRS/Niger), Tufts University, the University of Oxford, and Système d’Information sur les Marchés Agricoles (SIMA), Örebro University (Sweden) and Bangladesh Open University, with, support from the Swedish Program for ICT in Developing Regions (Spider) at Stockholm University</td>
<td>No information</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Grade 9-Higher Education</td>
<td>Literacy</td>
<td>SMS was used to answer questions during lectures by students. They also were able to provide interaction through voice calls.</td>
<td><a href="http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.625.5535&amp;rep=rep1&amp;type=pdf">http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.625.5535&amp;rep=rep1&amp;type=pdf</a></td>
</tr>
<tr>
<td>Bangladesh</td>
<td>SAR</td>
<td>BBC Janala</td>
<td>BBC in partnership with the UK Department for International Development (DFID)</td>
<td>2008-2013</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Adult education</td>
<td>English (Literacy)</td>
<td>No information</td>
<td><a href="https://www.gsma.com/mobilefordevelopment/resources/bbc-janala/">https://www.gsma.com/mobilefordevelopment/resources/bbc-janala/</a></td>
</tr>
<tr>
<td>Botswana</td>
<td>AFR</td>
<td>No information</td>
<td>Center for Global Development, University of Oxford, University of Colombia, RTI International and Young Love</td>
<td>2020-present</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Grade 5</td>
<td>Numeracy</td>
<td>Student learning outcomes were collected by directly assessing the child or children over the phone: 1) Number operations task: Reading out loud the numeracy questions by assessor in ascending order of difficulty: addition, subtraction, multiplication and division. 2) Timed word problem task: Texting word problems to the student and asking them to read it out loud and solve them. 3) Explanation of the solution: the students explaining their work to check for understanding.</td>
<td><a href="https://www.csae.ox.ac.uk/materials/papers/csae-wps-2020-13.pdf">https://www.csae.ox.ac.uk/materials/papers/csae-wps-2020-13.pdf</a></td>
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<tr>
<td>Country</td>
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<td>Project Name</td>
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</tr>
<tr>
<td>Côte d'Ivoire</td>
<td>AFR</td>
<td>Allô Alphabet</td>
<td>Jacobs Foundation Fellowship, Institute of Education Sciences, U.S. Department of Education, Eneza Education</td>
<td>Feb-May 2019 Dec 2019-Feb 2020</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Grade 5</td>
<td>Literacy: Targeted phonological awareness and print-sound mapping, gradually increasing in complexity and difficulty, from simple phoneme and syllable awareness, to mappings between letters, words, and sounds. In this study, users only experienced the first 2 of 8 units, which ask learners to match words or syllables that share a sound or a combination of sounds, to choose the word or sound that “does not belong”, and others.</td>
<td>IVR plays a pre-recorded audio message with the question and response options. Questions have either two or three responses, depending on the type of question, with most questions having three options. Students receive feedback upon responding; correct responses prompt new questions, while incorrect ones provide a hint and an opportunity to respond again to the question, focusing their attention on a particular part of the word or syllable. If incorrect, they receive the same question again, with a hint message explaining the concept or prompting the student to focus their attention on a particular part of the word or syllable. After one or two wrong attempts (depending on the question type), the answer is provided, with a brief explanation. Questions are given to students based on their mastery of the concepts.</td>
<td><a href="https://dl.acm.org/doi/pdf/10.1145/3314344.3332504">https://dl.acm.org/doi/pdf/10.1145/3314344.3332504</a></td>
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<td>Ghana</td>
<td>AFR</td>
<td>Viamo</td>
<td>Viamo</td>
<td>No information</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No information</td>
<td>English (Literacy) Tested children’s speaking skills through a series of audio quizzes.</td>
<td></td>
<td><a href="https://viamo.io/case-studies/classroom-palm-hand-lessons-via-mobile/">https://viamo.io/case-studies/classroom-palm-hand-lessons-via-mobile/</a></td>
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<tr>
<td>India</td>
<td>SAR</td>
<td>Pratham</td>
<td>No information</td>
<td>2020</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>All</td>
<td>literacy, numeracy, and life-skills Conducted through activities sent to children via SMS. Each SMS targeted a competency.</td>
<td></td>
<td><a href="https://drive.google.com/file/d/1KAPEROLASE6quw-3sL-7oTlpL7mTv0lG/view">https://drive.google.com/file/d/1KAPEROLASE6quw-3sL-7oTlpL7mTv0lG/view</a></td>
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<tr>
<td>India</td>
<td>SAR</td>
<td>No information</td>
<td>Central Square Foundation (CSF) and Saarthi Education</td>
<td>2020</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Ages 2-11</td>
<td>early grade numeracy skills After asking the parents a few background questions, parents were requested to pass on the phone to the child for administering the phone-based assessment. Enumerators were trained to and were tasked with calling the parents, seeking their consent for the survey and for assessment of the child, and it was explained to them that these assessments would not adversely affect the child in any way.</td>
<td></td>
<td><a href="https://www.centralsquarefoundation.org/wp-content/uploads/2021/06/ASSESSMENTS-IN-THE-TIMES-OF-COVID-19.pdf">https://www.centralsquarefoundation.org/wp-content/uploads/2021/06/ASSESSMENTS-IN-THE-TIMES-OF-COVID-19.pdf</a></td>
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<td>India</td>
<td>SAR</td>
<td>Digital School Program</td>
<td>Pratham and Education Above All (EAA)</td>
<td>2019-present</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Secondary education (Grade 8 and 10)</td>
<td>Language (English, Hindi), Mathematics</td>
<td>Remote assessments were conducted for students who could only read words. The assessment tool was sent to students as an image via WhatsApp, and facilitators assessed the students over a phone call.</td>
<td><a href="https://resources.educationaboveall.org/sites/default/files/ngo/attachments/2020-08/09.%20Pratham.pdf">https://resources.educationaboveall.org/sites/default/files/ngo/attachments/2020-08/09.%20Pratham.pdf</a></td>
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<tr>
<td>Kenya</td>
<td>AFR</td>
<td>M-Shule</td>
<td>No information</td>
<td>No information</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Grades 4-8</td>
<td>No information</td>
<td>Student progress is tracked through continuous assessment. Students interact with the platform in a series of responses to questions that determine how the learner is progressing through a learning pathway. M-Shule uses a notification system to encourage learners to return to the application.</td>
<td><a href="https://resources.educationaboveall.org/sites/default/files/ngo/attachments/2020-08/07.%20M-Schule.pdf">https://resources.educationaboveall.org/sites/default/files/ngo/attachments/2020-08/07.%20M-Schule.pdf</a></td>
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<tr>
<td>Kenya</td>
<td>AFR</td>
<td>ElimuLeo</td>
<td>Center for Reinventing Public Education (CRPE), Innovations for Poverty Action (IPA), NewGlobe Education, Brown University</td>
<td>October-November 2020 (7 weeks)</td>
<td>No</td>
<td>Yes</td>
<td>Grade 3, 5, and 6</td>
<td>Numeracy/mathematics</td>
<td>A phone-based assessment took place in December 2020 with 2,652 students. It was conducted by hired enumerators and consisted of 14 questions, covering two predetermined sections on (1) core numeracy, and (2) curriculum-aligned standards based on what students would have been learning had schools been open and what they were supposed to be learning as part of the phone-based interventions. The curriculum-aligned questions varied across grades while the core numeracy section and survey questions were the same across grades. In addition, in-person assessments were conducted in February and March 2021.</td>
<td><a href="https://www.edworkingpapers.com/sites/default/files/ai21-432.pdf">https://www.edworkingpapers.com/sites/default/files/ai21-432.pdf</a></td>
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<tr>
<td>Kenya</td>
<td>AFR</td>
<td>ElimuLeo</td>
<td>Precision Development (PxD), Young Tove, IPA, and the Kenya Institute for Curriculum Development (KICD)</td>
<td>2020 (two weeks)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Primary education (Number operations tasks)</td>
<td>The two-week pilot sent trial math exercises to children to assess their skill level and, thereafter, sent them math exercises pitched to their abilities. As children master exercises of a certain difficulty, they receive more challenging exercises. Conversely, if a child is struggling with their current set of exercises, they receive easier exercises.</td>
<td><a href="https://2uy7xawu7lg2zqdax41x9oc1-wpengine.netdna-ssl.com/wp-content/uploads/2020/11/2020_Q3_PAD-report.pdf">https://2uy7xawu7lg2zqdax41x9oc1-wpengine.netdna-ssl.com/wp-content/uploads/2020/11/2020_Q3_PAD-report.pdf</a></td>
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<td>Nepal</td>
<td>SAR</td>
<td>Low-tech Intervention for Foundation Education (LIFE)</td>
<td>Ministry of Education, Science and Technology, Local Govt, Teach for Nepal</td>
<td>November 2020-present</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Grades 3-5</td>
<td>Numeracy</td>
<td>As a part of the phone survey (Baseline assessment), a short Math test was administered (5 questions). This test is based on the ASER test and was adapted for phone delivery (Angrist et. al 2020). The test includes place value, addition, subtraction, multiplication and division questions that Grade 2 students are expected to answer. As per Angrist et al. (2020), student learning outcomes were collected by directly assessing the child or children over the phone: 1) Number operations task: Reading out loud the numeracy questions by assessor in ascending order of difficulty: place value, addition, subtraction, multiplication and division. 2) Timed word problem task: Texting word problems to the student and asking them to read it out loud and solve them. 3) Explanation of the solution: the students explaining their work to check for understanding.</td>
<td><a href="https://openknowledge.worldbank.org/bitstream/handle/10986/35384/Learning-in-the-Time-of-COVID-19-Insights-from-Nepal.pdf?sequence=1&amp;isAllowed=y">https://openknowledge.worldbank.org/bitstream/handle/10986/35384/Learning-in-the-Time-of-COVID-19-Insights-from-Nepal.pdf?sequence=1&amp;isAllowed=y</a></td>
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<tr>
<td>Niger</td>
<td>AFR</td>
<td>Alphabétisation de Base par Cellulaire (ABC): Mobiles 4 Literacy</td>
<td>Catholic Relief Services, Tufts University, Oxford University, UC-Davis Hitachi Foundation CITRIS</td>
<td>2008-2010</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Adult education</td>
<td>Literacy and numeracy</td>
<td>No information on assessment procedure but the students were tested (1) in the beginning (January of each year), (2) end of the course, and (3) the following January (sought to determine whether the acquired literacy and numeracy skills had endured over time)</td>
<td><a href="https://uil.unesco.org/case-study/effective-practices-database-litbase-0/alphabetisation-base-cellulaire-abc-mobiles-4">https://uil.unesco.org/case-study/effective-practices-database-litbase-0/alphabetisation-base-cellulaire-abc-mobiles-4</a></td>
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<tr>
<td>Nigeria</td>
<td>AFR</td>
<td>EdoBest Program</td>
<td>Ministry of Education, Universal Basic Education Board (SUBEB), LGEAs, World Bank</td>
<td>2018-present</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Primary and Junior Secondary</td>
<td>No information</td>
<td>Text-based assessments are distributed via SMS or WhatsApp. The state is developing interactive quizzes delivered to parents' mobile phones. These quizzes are aligned with the state curriculum, and they interrelate with other resources such as digital storybooks and lesson guides delivered to parents.</td>
<td><a href="https://blogs.worldbank.org/education/learning-despite-crisis-case-edo-state-nigeria">https://blogs.worldbank.org/education/learning-despite-crisis-case-edo-state-nigeria</a></td>
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<td>Pakistan</td>
<td>SAR</td>
<td>Broad Class: Listen to Learn</td>
<td>The Communicators (Pvt.) Limited, POWER99 Foundation, Marymount University</td>
<td>2014-present</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Kindergarten, Grade 1</td>
<td>Literacy and numeracy</td>
<td>During short pauses built into radio scripts, teachers and students participate in program, reacting verbally and physically to questions and exercises posed by radio characters.</td>
<td><a href="https://www.globalinnovationexchange.org/innovation/broad-class-listen-to-learn">https://www.globalinnovationexchange.org/innovation/broad-class-listen-to-learn</a></td>
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<td>Pakistan</td>
<td>SAR</td>
<td>Bunyad: Mobile-Based Post Literacy Programme</td>
<td>Punjab Department of Literacy and Non-Formal Basic Education, Lahore; BUNYAD Foundation, Lahore; Dhaka Ahsania Mission Pakistan, Islamabad; Mobilink Pakistan; Nokia Pakistan</td>
<td>2009-present</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>adolescent girls</td>
<td>Literacy</td>
<td>Monitoring the learners’ participation in the mobile-based programme is done by the web-based system which is used to send text messages to the learners. In addition, newly literates respond to questions/multiple-choice-questions (MCQs) or tests sent by SMS, and the results of these tests are summarised and recorded in the web-based system. Learners also report to literacy centres on regular bases. A monthly exam is given to learners at learning centres to track their retention rate and the development of their literacy skills.</td>
<td><a href="https://uil.unesco.org/case-study/effective-practices-database-litbase-0/mobile-based-post-literacy-programme-pakistan">https://uil.unesco.org/case-study/effective-practices-database-litbase-0/mobile-based-post-literacy-programme-pakistan</a></td>
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<tr>
<td>Sierra Leone</td>
<td>AFR</td>
<td>Rising Academy Network</td>
<td>Rising Academies May 2020-August 2020</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td>Primary</td>
<td>Numeracy-counting and simple arithmetic, Literacy-vocabulary, spelling, and aural comprehension.</td>
<td>Learning assessments are provided through SMS for a small subsample. For the rest, it’s an in-person assessment.</td>
<td><a href="https://www.cgdev.org/publication/teaching-and-testing-phone-pandemic">https://www.cgdev.org/publication/teaching-and-testing-phone-pandemic</a></td>
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<tr>
<td>United States</td>
<td>NA</td>
<td>Mobile Learning for All (Cell-Ed)</td>
<td>Cell-Ed, Centro Latino in Los Angeles</td>
<td>2014-present</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Adult education</td>
<td>Literacy, Job-skills</td>
<td>SMS or IVR quizzes are prompted to participants. A correct response to the question triggers the beginning of the next micro-module, whereas an incorrect response leads to a repetition of the same micro-module until the user succeeds. Content is delivered at the learner’s pace and is able to track their responses and scores.</td>
<td><a href="https://edtech.worlded.org/wp-content/uploads/2018/12/Cell-Ed-Report-final-012319-2-1.pdf">https://edtech.worlded.org/wp-content/uploads/2018/12/Cell-Ed-Report-final-012319-2-1.pdf</a></td>
</tr>
<tr>
<td>Zambia</td>
<td>AFR</td>
<td>Makhalidwe Athu</td>
<td>USAID, Creative Associates</td>
<td>2015-2016</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Grades 2-3</td>
<td>Literacy</td>
<td>Assessment was done by phone through a questionnaire that tracked how many days did parents and children use the tools to read together.</td>
<td><a href="https://pdf.usaid.gov/pdf_docs/PA00SZJS.pdf">https://pdf.usaid.gov/pdf_docs/PA00SZJS.pdf</a></td>
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<td>Zimbabwe</td>
<td>AFR</td>
<td>Viamo</td>
<td>World Vision, Ak-</td>
<td>No information</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>ECCE</td>
<td>Literacy and numeracy</td>
<td>Using simple IVR formative assessments &amp; retention surveys. For example, a nursery rhyme is told about what sounds animals make, and then the student is asked, “What sounds does this animal make?” so they check via these mini assessments if students have listened and are still present.</td>
<td><a href="https://pubdocs.worldbank.org/en/685691598013656403/pdf/WorldBank-EdTech-Team-Knowledge-Pack-MobileDistance-HybridEducationSolutions-version2.pdf">https://pubdocs.worldbank.org/en/685691598013656403/pdf/WorldBank-EdTech-Team-Knowledge-Pack-MobileDistance-HybridEducationSolutions-version2.pdf</a></td>
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