NOV2023

# Building Resilient Education Systems:

*Evidence of a Cost-effective Mobile Math Tutoring Program in the Philippines*

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IPA Philippines

# Introduction

# How we work

### Create Stronger Evidence

Conduct impact evaluations

*Research*

### Share Evidence Strategically

Disseminate and co-create evidence

*Policy*

### Equip Decision-makers to Use Evidence

Consulting, training and embedded learning labs

*Right-Fit evidence*
*Embedded Labs*

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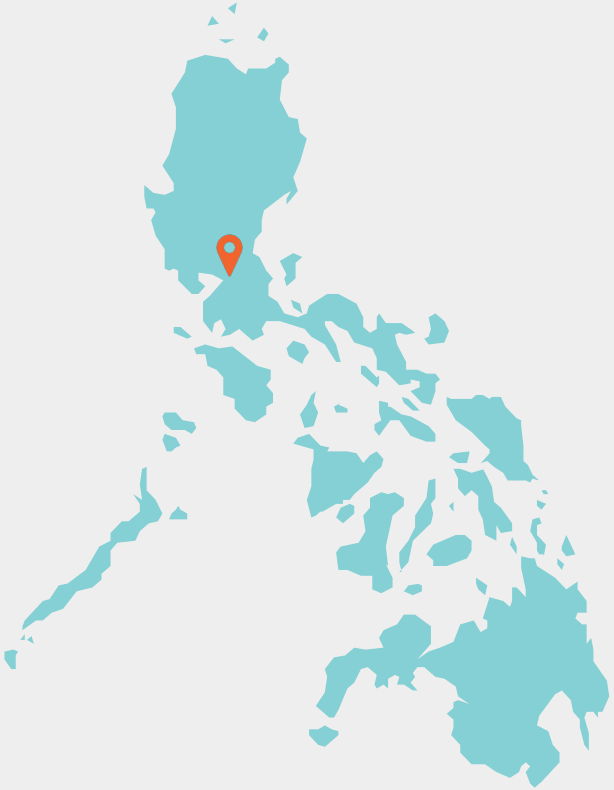
# IPA works with

# IPA Philippines

- Started work in the Philippines in **2002**
- Over **70 research projects** conducted in 83% of all provinces in the Philippines
- Main areas of focus include **Education, Financial Inclusion, Governance, Agriculture, Livelihoods, Social Protection**



# Our Partners

- **Government** | DepEd, DSWD, Supreme Court of the Philippines, DOLE, DAR, BSP, NNC, PIDS, NEDA, LBP, UP, PCIC
- **International** | ADB, UNDP, DFAT, World Bank, ILO, 3ie, Millennium Challenge Corporation
- **NGOs** | Youth Impact, Habitat for Humanity, International Care Ministries

# IPA-DepEd Partnership

- **Partnership building**: started in 2015
- **5-year MoU (2020-2024):** executed a second MOU to continue and deepen knowledge sharing and capacity building partnership
- **Data Sharing Agreement (2021-2024):** signed DSA to support DepEd in generating evidence on education programs using in-house data
- **Collaboration:** we work closely with the **Planning Service** and **Policy Research and Development Division** on research initiatives and M&E capacity building activities

# Projects with DepEd

1. Teacher needs assessment study (2021)
2. mEducation pilot study (2021-2022)
3. MTB-MLE evaluation study (ongoing)
4. Migration and education impact study (ongoing)
5. M&E Capacity Building Support (ongoing)
6. Research O'clock

mEducation Program

# Study Overview

# mEducation Implementation Partners

Innovations for Poverty Action

Youth Impact

DepED DEPARTMENT OF EDUCATION

Supported by:

J-PAL ABDUL LATIF JAMEEL POVERTY ACTION LAB

Wellspring Philanthropic Fund

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# A Promising Reform: Targeting Learning Levels

| | No Operations | Addition/ Subtraction | Multiplication/ Division |
|---|---|---|---|
| Grade 3 | 40% | 50% | 10% |
| Grade 4 | 30% | 55% | 15% |

# Teaching at the Right Level

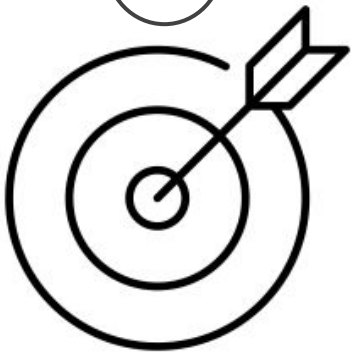
1

Use rapid tools to **assess student learning levels**.

2

**Group students according to ability** rather than age/grade.

3



Deliver fun & engaging **targeted instruction**.

# Adaptation: New Model, Same Principles

1

**Meeting people where they are.**

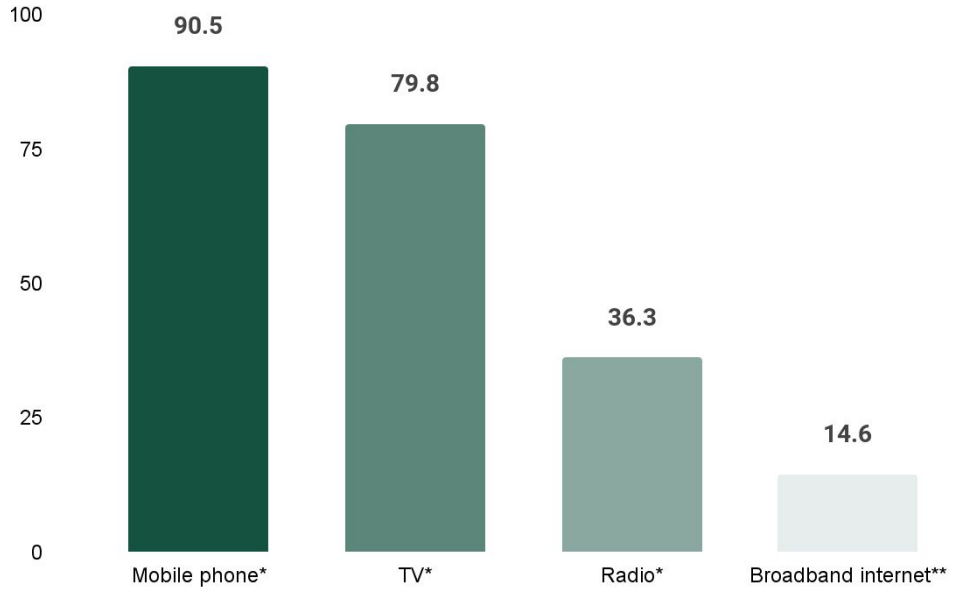
2

**Target instruction.**

3

**Focus on foundational skills.**

# Reach students using what is accessible to them

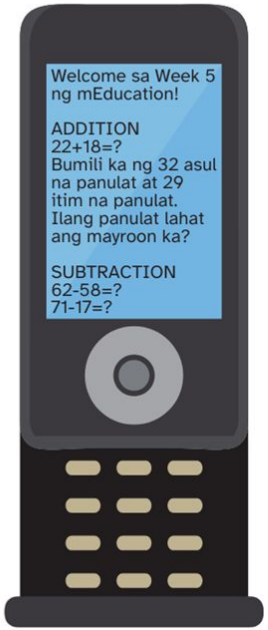



**Percentage of families owning household devices*
***Percentage of families with subscription*

Source: Philippine Statistics Authority. 2020. Annual Poverty Indicators Survey.

# mEducation: Phone-based Targeted Tutoring

**Text message 1x/week with practice math problems**




**20-minute weekly <u>TARGETED</u> tutoring calls to learners**

# How mEducation works

## SMS Exercises

Parent receives weekly math exercises via SMS to practice with their child at home.

## Phone Call

The teacher calls the parent weekly at the agreed tutorial schedule.

## Targeted instruction

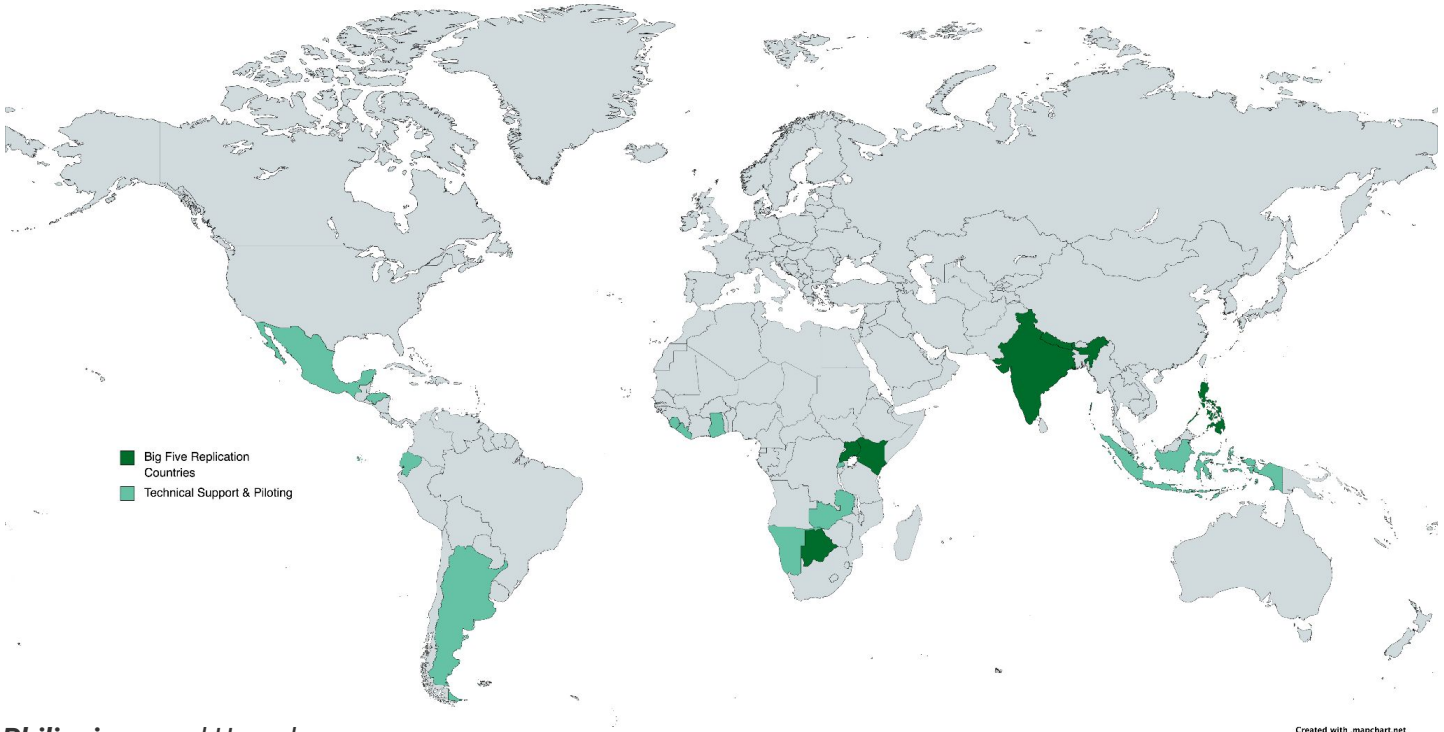
For 20 minutes, the teacher and the student discuss the math operation that matches the student's level.

## Schedule next call

The teacher schedules the date and time for the session next week.

# Global evidence-based movement

- **5** global trials
- **15,000+** students
- **500+** educators




*Kenya, Nepal, India, **Philippines**, and Uganda*

# 1st evidence on distance education during covid-19

nature human behaviour

ARTICLES

https://doi.org/10.1038/s41562-022-01381-z

Check for updates

## Experimental evidence on learning using low-tech when school is out

Noam Angrist[1,2,3], Peter Bergman[4,5] and Moitshepi Matsheng[1,6]

**School closures occurred extensively during the COVID-19 pandemic, and occur in other settings, such as teacher strikes and natural disasters. The cost of school closures has proven to be substantial, particularly for households of lower socioeconomic status, but little evidence exists on how to mitigate these learning losses. This paper provides experimental evidence on strategies to support learning when schools close. We conduct a large-scale randomized trial testing two low-technology interventions—SMS messages and phone calls—with parents to support their child in Botswana. The combined treatment improves learning by 0.12 standard deviations, which translates to 0.89 standard deviations of learning per US$100, ranking among the most cost-effective interventions to improve learning. We develop remote assessment innovations, which show robust learning outcomes. Our findings have immediate policy relevance and long-run implications for the role of technology and parents to support education provision during school disruptions.**

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## Building Resilient Education Systems: Evidence from Large-Scale Randomized Trials in Five Countries

Noam Angrist, Micheal Ainomugisha, Sai Pramod Bathena, Peter Bergman, Colin Crossley, Claire Cullen, Thato Letsomo, Moitshepi Matsheng, et al. (View all)

WORKING PAPER 31208 DOI 10.3386/w31208 ISSUE DATE May 2023

The 5-country replication studies were conducted over 18 months and reached over 25,000 children globally, representing some of the **largest multi-country evidence base ever generated in education**

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# Philippines Pilot

**Participating Regions**

- Regions IV-B, VI, and IX
- (5 School Division Offices in each region)

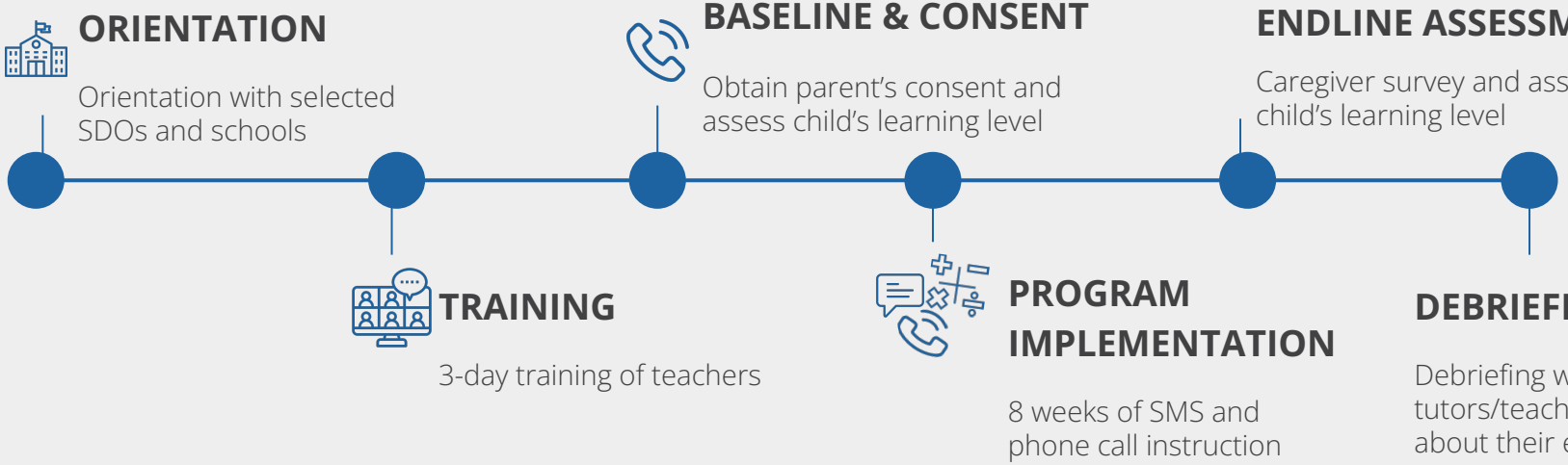
**Participating Schools**

- 110 schools

**Participating Students**

- 3,395 learners

# Implementation Timeline



# Implementation Design: Two Models

## TEACHER-AIDE ARM (NGO)

- **40 IPA-hired tutors** conducted the weekly tutorials
- These tutors were DepEd teacher applicants who were recommended by SDOs
- 1 tutor: 20 students per week

- October to December 2021

## DEPED TEACHER ARM (GOV'T)

- **130 volunteer** teachers from participating schools conducted the weekly tutorials
- Each teacher allotted only around **1.5 hours per week** on the program
- 1 teacher: 3-4 students per week

- May to July 2022

# Teacher-aide Arm

| | |
|---|---|
| 33 | schools in enrolled sample |
| 2,530 | households participated |
| 40 | teaching aides delivered phone instruction |
| 53% | of pupils are female |
| 49% | of pupils in grade 3, remaining in grade 4 |
| 56% | of students had no communication with the school teacher in the last quarter of 2021 |
| 97% | of parents are interested in receiving phone-based education support in the future |

# DepEd Teacher Arm

| | |
|---|---|
| 77 | schools in enrolled sample |
| 962 | households participated |
| 130 | teaching aides delivered phone instruction |
| 52% | of pupils are female |
| 50% | of pupils in grade 3, remaining in grade 4 |
| 56% | of students had no communication with the school teacher in the last quarter of 2021 |
| 99% | of parents are interested in receiving phone-based education support in the future |

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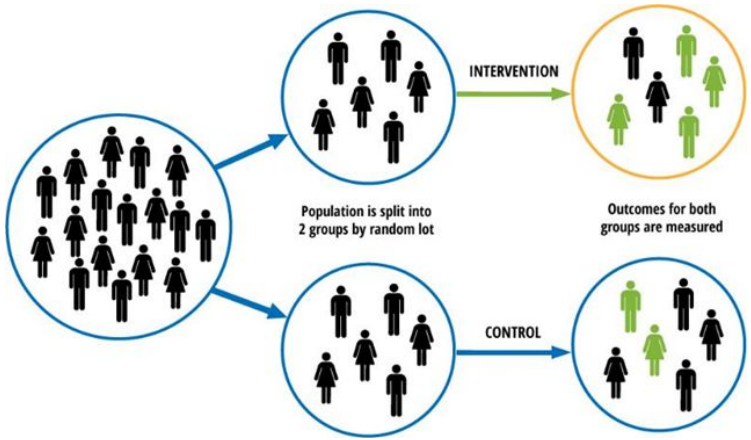
# Methodology: Randomized Controlled Trial

Individuals, schools, districts are **randomly** selected to receive the treatment and those not selected serve as a comparison.

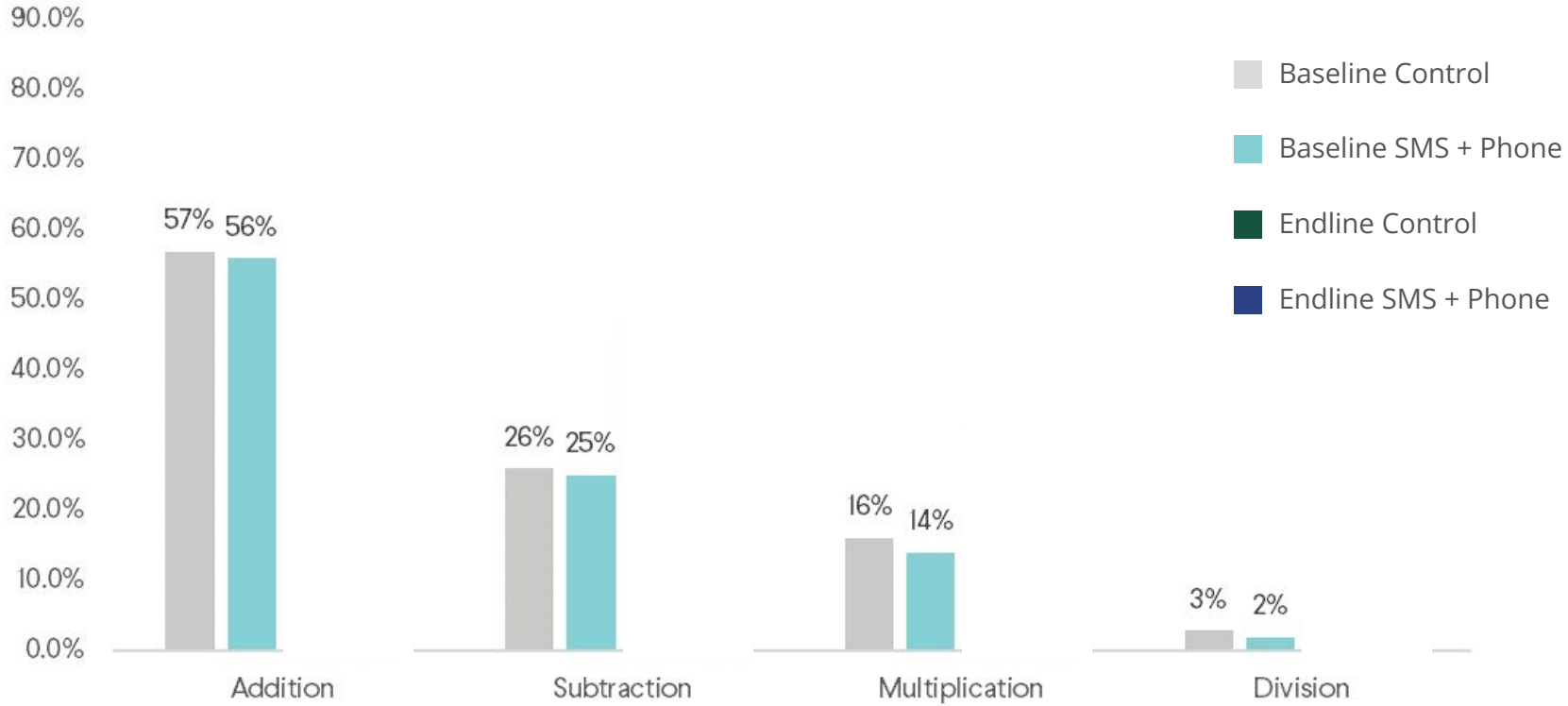



Because members of the groups (treatment and control) do not differ systematically at the outset of the experiment, **any difference** that subsequently arises between them **can be attributed to the program** rather than to other factors.

# Baseline and Endline Assessment

| Baseline result | Math learning level (Week 1 operation) |
|---|---|
| ✔/□ Place Value<br>□ Addition | Addition (Beginner) |
| ✔/□ Place Value<br>✔ Addition<br>□ Subtraction | Addition |
| ✔/□ Place Value<br>✔ Addition<br>✔ Subtraction<br>□ Multiplication | Subtraction |
| ✔/□ Place Value<br>✔ Addition<br>✔ Subtraction<br>✔ Multiplication<br>□ Division | Multiplication |
| ✔/□ Place Value<br>✔ Addition<br>✔ Subtraction<br>✔ Multiplication<br>✔ Division | Division |

# Baseline vs endline: learning gains



# Curriculum Mapping: DepEd MELCs

| Math Topic | | MELC Target | | mEducation Content |
|---|---|---|---|---|
| **Addition** | ✔ | M3NS - Id - 27.6 | ✔ | Place value |
| | ✔ | M3NS - Ie - 31 | ✔ | 2 -digit and 1 -digit addition |
| | ✔ | M3NS - If -29.3 | ✔ | Routine word problems featuring the use of money |
| **Subtraction** | ✔ | M3NS-Ig-32.6 | ✔ | Place Value |
| | ✔ | M3NS-Ih-36 | ✔ | 2 -digit and 1 -digit subtraction |
| | ✔ | M3NS - Ii -34.5 | ✔ | Routine word problems featuring the use of money |
| **Multiplication** | ✔ | M3NS - IIa - 41.3 | ✔ | Place Value |
| | ✔ | M3NS - IIe - 45.3 | ✔ | Basic multiplication tables up to 10 |
| | ✔ | M4NS - Id -45.4 | ✔ | 2 -digit and 1 -digit multiplication |
| | | | ✔ | Routine word problems featuring the use of money |
| **Division** | ✔ | M3NS - IIj-56.2 | ✔ | Place Value |
| | ✔ | M3NS - IIj-56.2 | ✔ | 2 -digit and 1 -digit division |
| | ✔ | M4NS - Ih -56.4 | ✔ | Routine word problems featuring the use of money |

***Reviewed by Bureau of Curriculum Development before program implementation***

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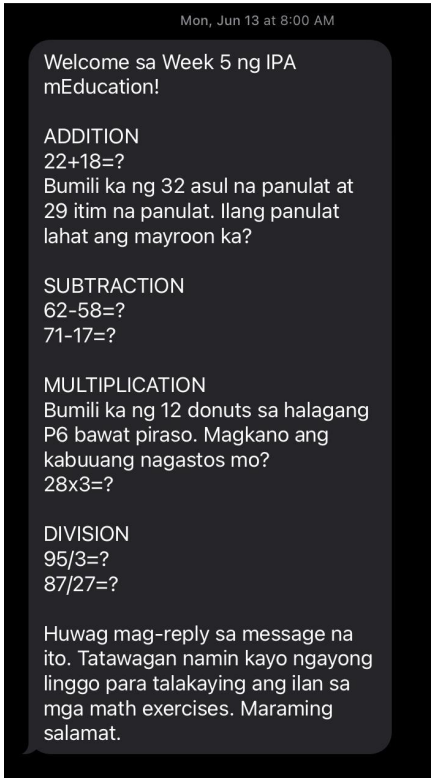
# Weekly SMS Exercises




**SMS content**

- **Simple** and **self-explanatory**
- Translated to Filipino
- Response is not required
- Intended to encourage caregivers to practice math with their child (increase engagement)

# Weekly Phone Calls (1/3)

## INTRODUCTION

- Good morning/afternoon! I'm Teacher {name} of {school}. I'm calling for our math learning program.
- Did you receive a text message from us with a set of math problems?
    - If **NO**: That's okay! We will send the text message again after this call.
- Has your child been able to practice any of the problems in the text message?
    - If **NO**: Don't worry we will practice the exercises with your child during this call.

## PREPARING FOR TARGETED INSTRUCTION

- Are you with {student's name} right now? We would like to speak with {student's name} to play a math learning game.
    - If **NO**: ask when would be the best time to call back when parent is with the student
- Can you please:
    - have a pencil and paper ready,
    - call {student's name} over,
    - and put me on speaker?

***Note to teacher:*** *Remind the parent that they are encouraged to listen but not coach*

- Hi {student name} how are you? This is Teacher {name}. I will be your teacher for this learning program. I would like to ask you to play some learning games with me. Are you ready?

- Encourages to **build rapport** with caregiver and child
- Delivers **targeted Instruction**
- Encourages teachers to provide **affirmation and approval** throughout tutoring to engage student

# Monitoring

## mEducation tracker

1. List of all participants
2. Attendance status
3. Progress of lessons
4. Comments from teachers

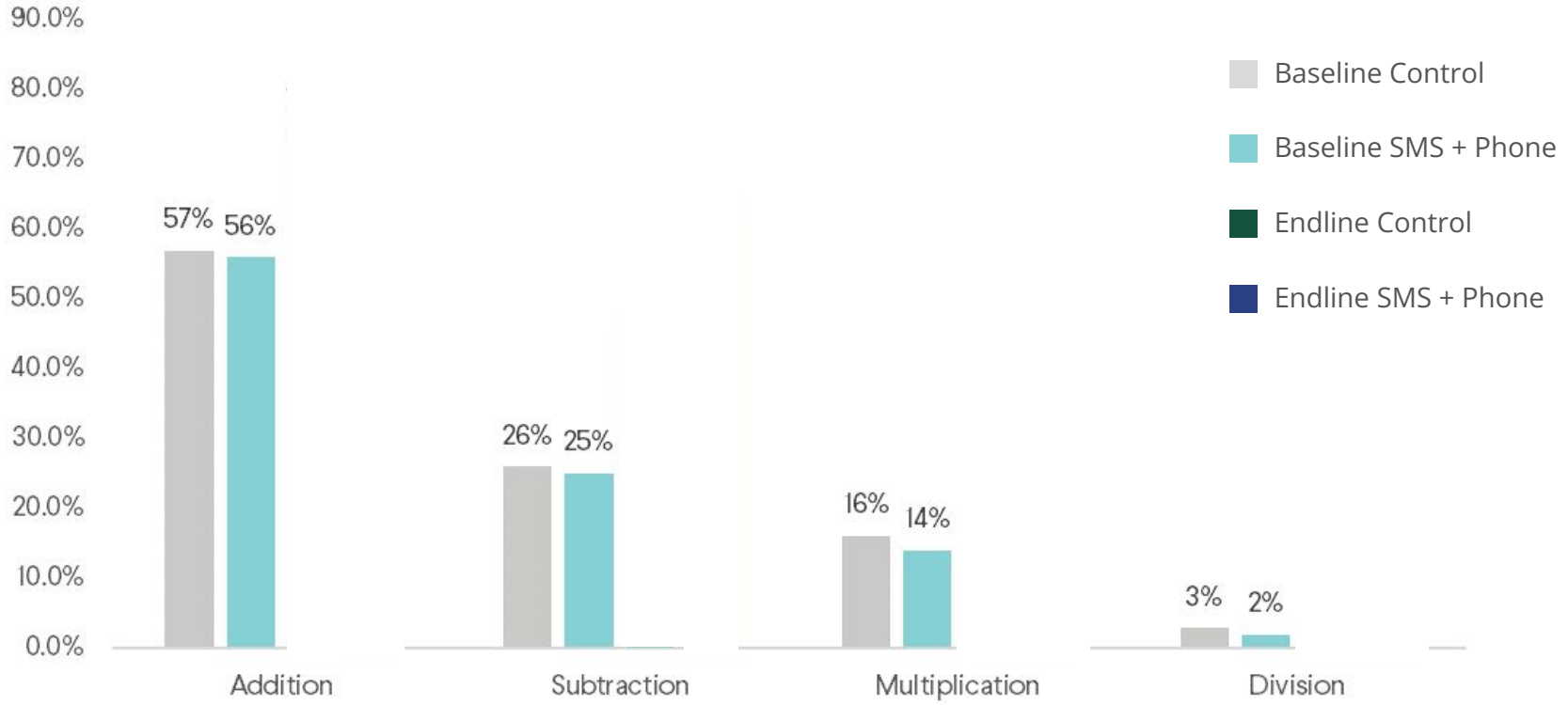
**TUTORIAL SESSIONS**

| | Week 1 | | Week 2 | | Week 3 | | Week 4 | |
|---|---|---|---|---|---|---|---|---|
| **Operation discussed** | Freq | Percent | Freq | Percent | Freq | Percent | Freq | Percent |
| Addition | 372 | 88.15% | 142 | 32.05% | 54 | 11.92% | 16 | 3.60% |
| Subtraction | 9 | 2.13% | 259 | 58.47% | 164 | 36.20% | 115 | 25.90% |
| Multiplication | 28 | 6.64% | 30 | 6.77% | 207 | 45.70% | 159 | 35.81% |
| Division | 12 | 2.84% | 12 | 2.71% | 22 | 4.86% | 148 | 33.33% |
| Mixed operations | 1 | 0.24% | 0 | 0.00% | 6 | 1.32% | 6 | 1.35% |
| Total | 422 | 99.76% | 443 | 100.00% | 453 | 100.00% | 444 | 100.00% |

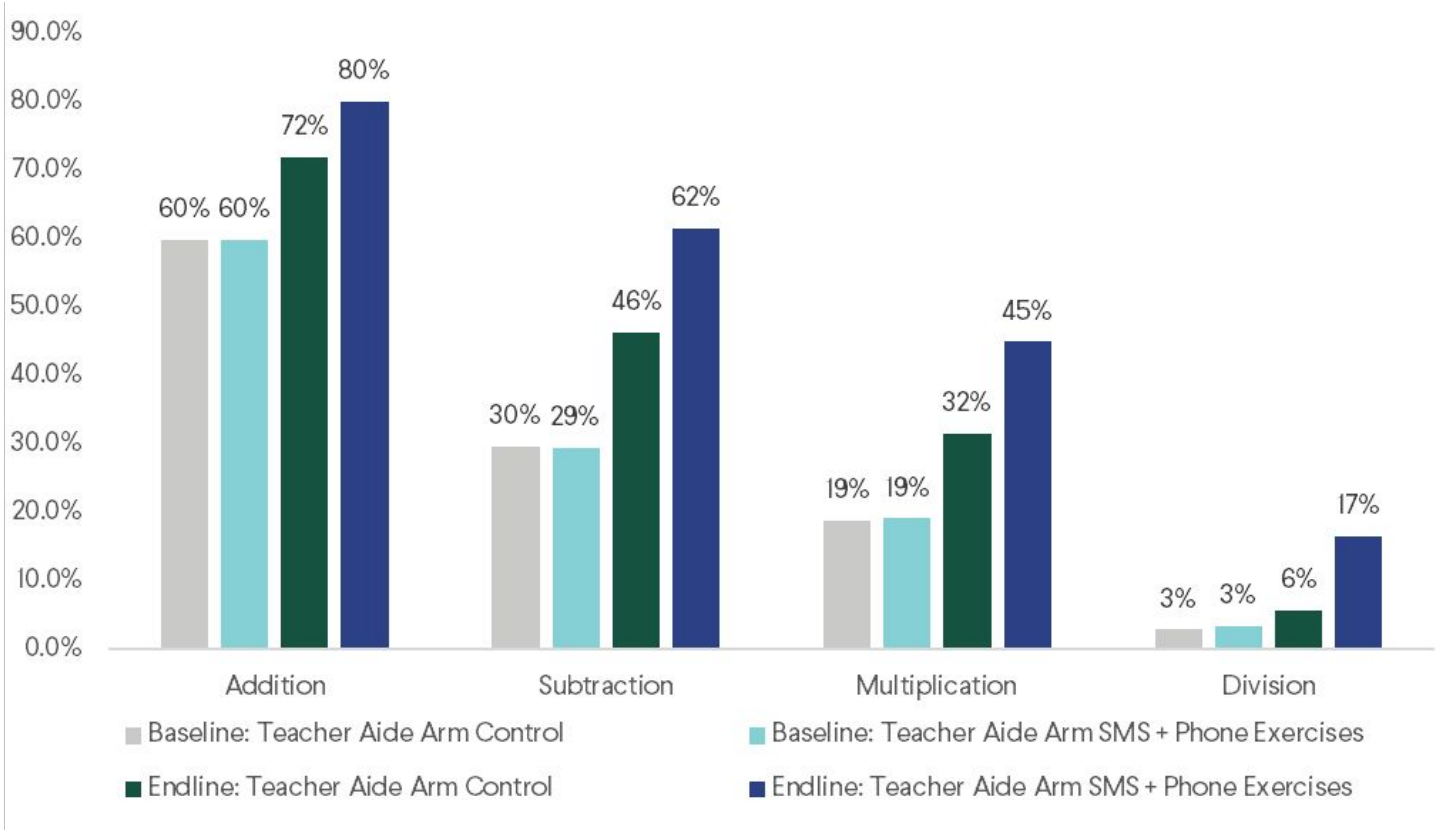
| | Week 1 | | Week 2 | | Week 3 | | Week 4 | |
|---|---|---|---|---|---|---|---|---|
| **Check-in question** | Freq | Percent | Freq | Percent | Freq | Percent | Freq | Percent |
| Correct answer and correct explanation | 370 | 87.68% | 382 | 86.23% | 384 | 84.77% | 342 | 77.03% |
| Correct answer but wrong explanation | 20 | 4.74% | 28 | 6.32% | 22 | 4.86% | 43 | 9.68% |
| Wrong answer | 32 | 7.58% | 33 | 7.45% | 47 | 10.38% | 59 | 13.29% |
| Total | 422 | 100.00% | 443 | 100.00% | 453 | 100.00% | 444 | 100.00% |

| | Week 1 | | Week 2 | | Week 3 | | Week 4 | |
|---|---|---|---|---|---|---|---|---|
| **Level after discussion** | Freq | Percent | Freq | Percent | Freq | Percent | Freq | Percent |
| Addition | 329 | 77.96% | 131 | 29.57% | 68 | 15.01% | 33 | 7.43% |
| Subtraction | 51 | 12.09% | 241 | 54.40% | 148 | 32.67% | 99 | 22.30% |
| Multiplication | 31 | 7.35% | 54 | 12.19% | 187 | 41.28% | 172 | 38.74% |
| Division | 11 | 2.61% | 16 | 3.61% | 44 | 9.71% | 132 | 29.73% |
| Mixed operations | | | 1 | 0.23% | 6 | 1.32% | 8 | 1.80% |
| Total | 422 | 100.00% | 443 | 100.00% | 453 | 100.00% | 444 | 100.00% |

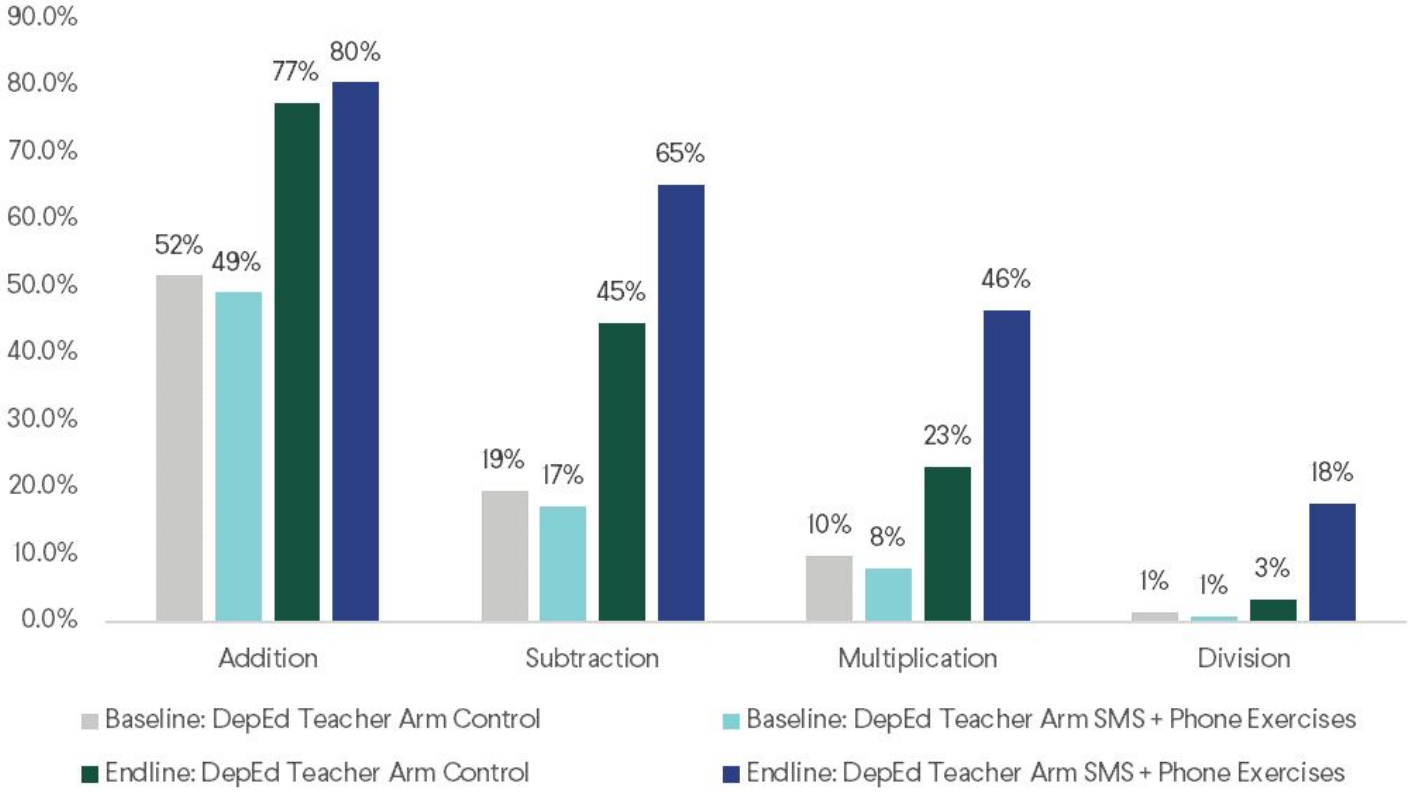
# Baseline vs endline: learning gains



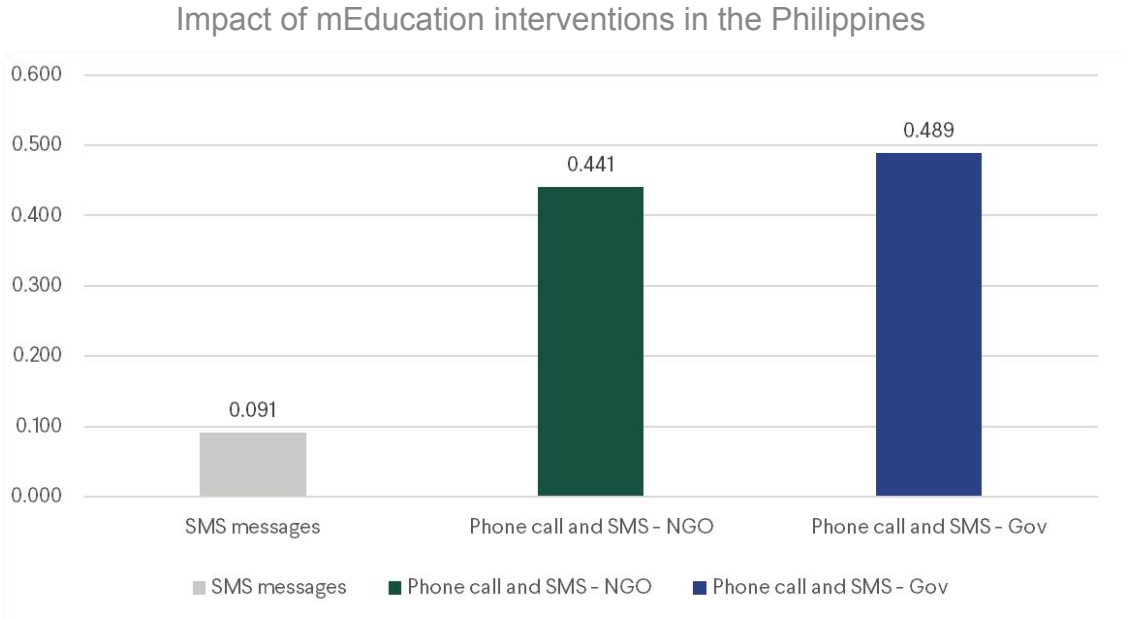
# Baseline vs endline: Teacher Aide



# Baseline vs endline: DepEd Teacher



# Teacher Delivery is Equally Effective




**Key results**

1. It works!
2. Phone Calls + SMSes ***are more effective than simple SMS messages***.
3. mEducation when delivered by teachers is ***equally (or more) effective*** than when delivered by NGOs.

# Representativeness checks at endline:

1. Male vs female
2. Grade 3 vs Grade 4
3. Baseline learning

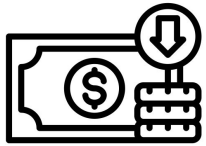
# Robustness checks:

1. Remote vs in-person assessment
2. Different problems of the same level of difficulty
3. Effort test

# Other Outcomes from the Philippines

**Phone tutoring is popular.** Among households that did not receive the program, **97 percent of caregivers reported an interest in receiving the phone call tutorials.**

**mEducation has benefits beyond learning.** The program had a range of positive effects such as on **perseverance and ambition and enjoyment school**.



**mEducation is extremely cost-effective.** The program improved learning for **USD 12 (PHP 650) per child**, placing it among the **top 10 out of 150 education interventions evaluated**.

# Thematic areas for adoption in the Philippines

### Remedial education and targeted instruction

Could be part of DepEd's remedial education program to target instruction of learners, especially those who are falling behind in classes

### Education in emergencies

Could be a learning delivery modality not only during school closures for COVID-19 but also for other forms of disruptions.

### Accessible and affordable blended learning modality

Could be adopted as one of DepEd's blended learning strategies to provide additional learning support for learners

# PDP and 8-point Development Agenda

**Promote human and social development**
Outcome: Quality, inclusive, adaptive, resilient, and future-ready basic education for all achieved

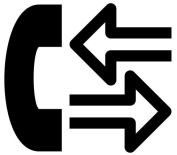
**Advance Research and Development, Technology, and Innovation**
Outcome: Basic research and development and knowledge creation strengthened

**Reduce vulnerability and mitigate scarring from the Covid-19 pandemic**

# **Next Steps**: Continued testing and scaling

**Test mEducation in various settings.** Work with Ministry of Basic, Higher, and Technical Education (MBHTE) and UNICEF BARMM to implement mEducation in Bangsamoro Autonomous Region of Muslim Mindanao.


Collaborate with DepEd and education partners in **scaling and adapting mEducation program to the local context** to reach more students and ensure the program fits the needs of learners.



**Build the capacity** of mEducation volunteer teachers and program supervisors and set up monitoring systems to track implementation progress.

# Work with us!

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Maraming salamat po!