# DISTINGUISHING LEARNING LOSS AND LEARNING GAP: A PRELUDE TO THE LEARNING RECOVER EXPERIENCE IN THE PHILIPPINES

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# ADVANCE ORGANIZER

- Learning loss and gap

    - Conceptual

    - Statistical

- Learning recovery initiatives to mitigate learning loss and gap

# ASSUMPTIONS IN A LEARNING RECOVERY

**The plan and actions are going to address learning loss and gaps**

- Learning loss – unfinished learning (deterioration+cost)
- Learning gaps – not meeting the expected skills

**The RAPID model directed us to concentrate on fundamental skills and SEL**

- Focus on literacy and numeracy in the early grades
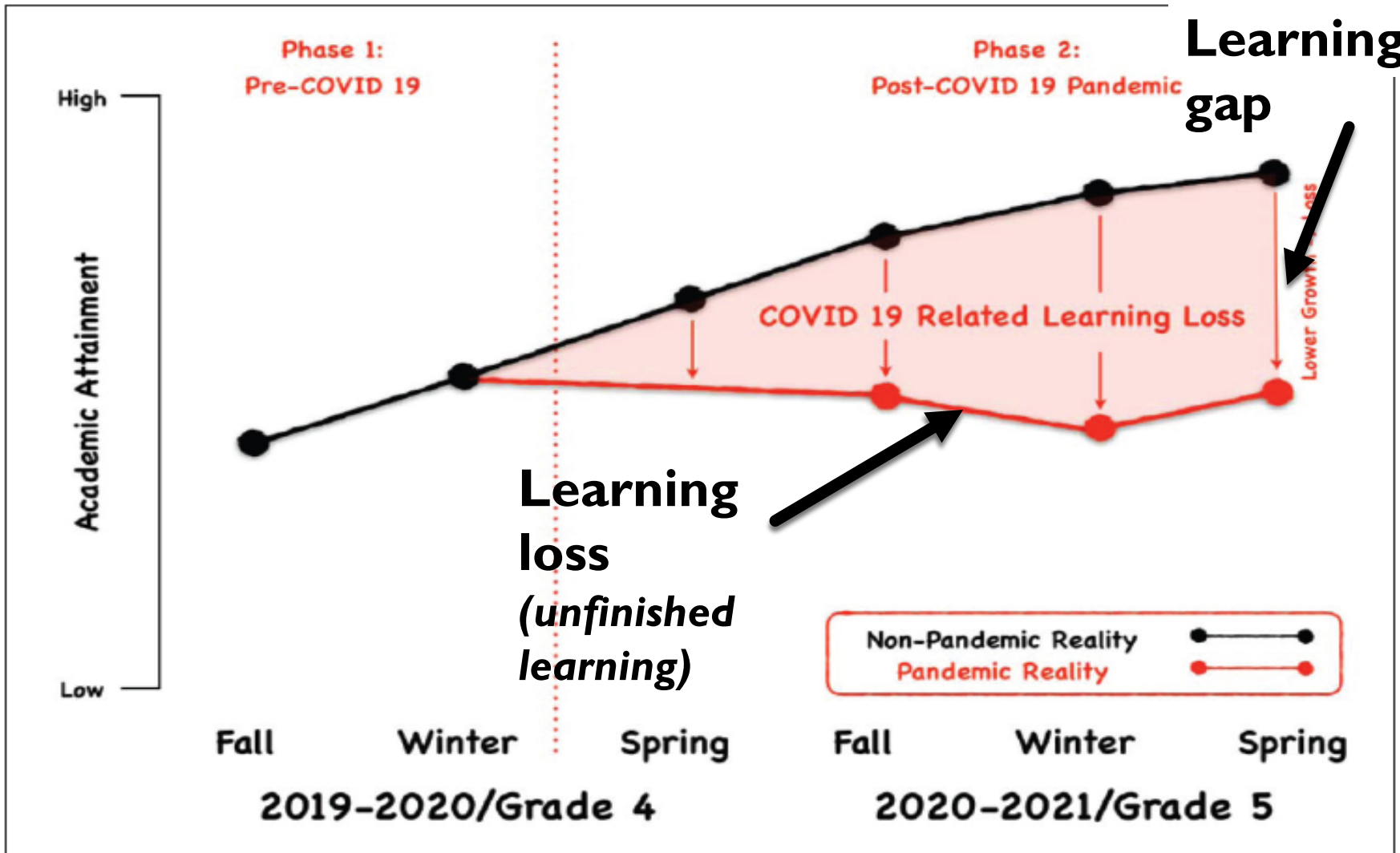- Integration of social and emotional learning

# ESTIMATIONS OF LEARNERS PERFORMANCE

USA: Center for Assessment has conducted statewide growth analysis after the pandemic from grades 4 to 7. They analyzed the magnitude of learning loss (Betebener, 2021).
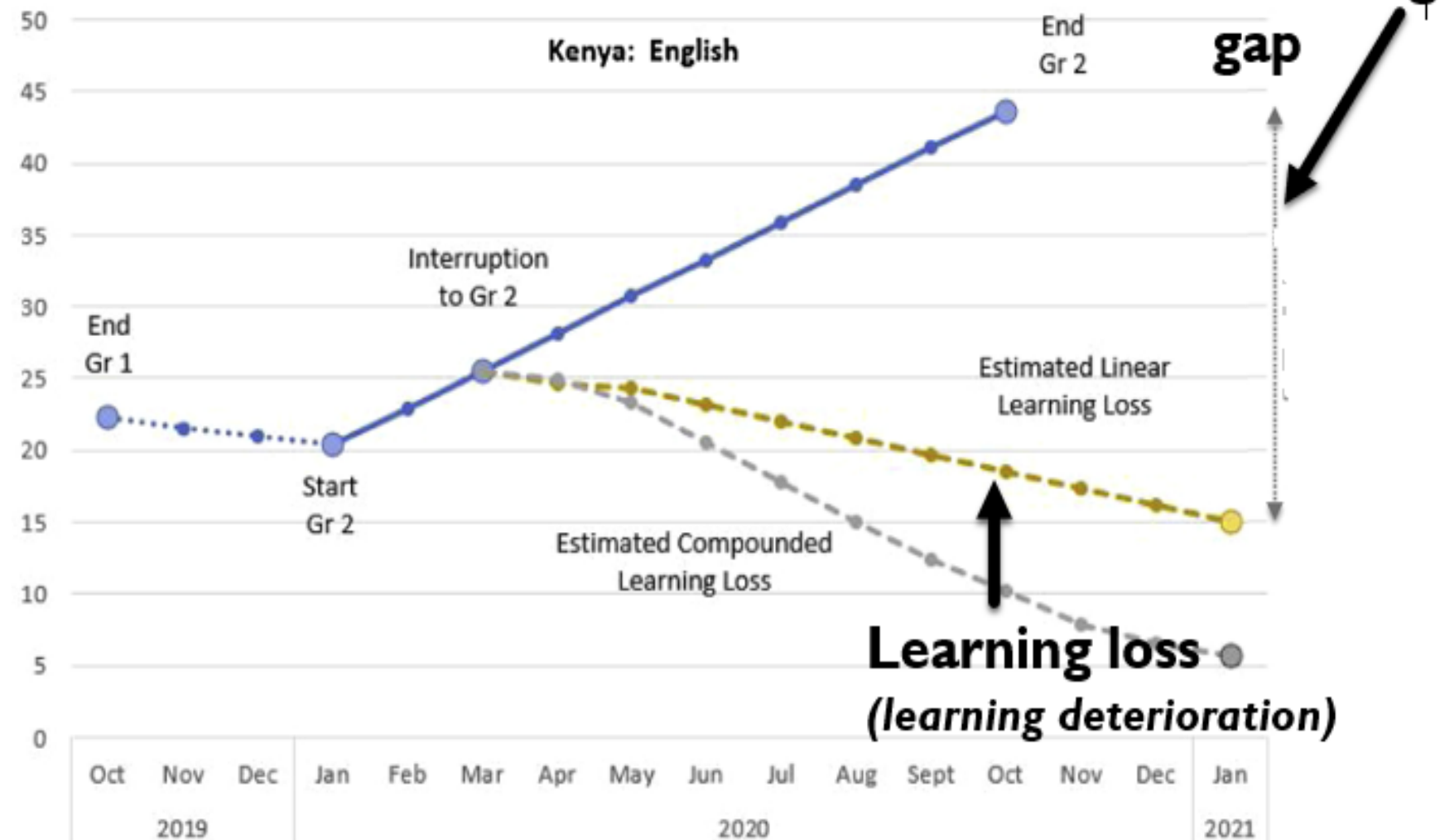
Africa: Estimated learning loss for grade 3 and projected loss for the succeeding years. Mitigation measures were documented in grade 4 (Angrist et al., 2021)

# LEARNING LOSS AND GAP

- **Learning loss**

- Angrist et al (2021) – deterioration of knowledge overtime

- Pier, Hough, Christian, Bookman, Wilkenfeld, & Miller (2021) - declines in student knowledge and skills

- Center for Assessment (2021) – unfinished learning

- Pier et al.. (2021) - occurs when educational progress does not occur at the same rate at which it has historically compared to previous years

- **Learning Gap**

- Bonal & Gonzales (2020) – when learning opportunities are deprived

- Hughes (2020) - discrepancy of the learning process and the actual instruction received

Phase 1: Pre-COVID 19

Phase 2: Post-COVID 19 Pandemic

**Learning gap**

High

Academic Attainment

COVID 19 Related Learning Loss

Lower Growth / Loss

**Learning loss** *(unfinished learning)*

Non-Pandemic Reality
Pandemic Reality

Low

Fall　Winter　Spring　　Fall　Winter　Spring

2019-2020/Grade 4　　2020-2021/Grade 5

Center for Assessment (2021) – Mathematics Performance

Mean Oral Reading Fluency (Correct Words per Minute)

Kenya: English

End Gr 2

End Gr 1

Interruption to Gr 2

Start Gr 2

Estimated Linear Learning Loss

Estimated Compounded Learning Loss

Learning gap

Learning loss
*(learning deterioration)*

Angrist et al (2021)

# LEARNING LOSS AND GAP

- **Learning loss**
- Stable or decline in the actual performance as observed and measured
- Learning loss is represented by the Observed score
- > 0 = historical score – present observed score
- Currie and Thomas (2001) – pattern of .20 SD decline in scores

- **Learning Gap**
- Gap between the predicted performance and actual performance
- Predicted score is estimated
- Gap = Predicted score – learning loss

# LEARNING LOSS

$$> 0 = \text{Historical score} - \text{Present observed score}$$

- Measures of the historical and present score needs to be parallel or same measures

- Comparison of two cohorts with similar characteristics

- Stable result can occur for two different cohort but the same grade level.

- Can be estimated by tests of difference across between groups

# LEARNING GAP

Gap = Predicted score – learning loss

- Predicted score > learning loss estimation
- Predicted scores estimation
  - Regression using predicted Y (Y=a + b(historical score) + ε
  - Support Vector Machines (SVM regression)
  - Random Forests,
  - Rule-based classifier (OneR),
  - Trees (J48)
  - Part
  - IB1
  - Naive Bayes (NB)
- The larger the is the difference between predicted score and learning loss, the more intensive is the remediation

Table 1. Classification algorithms results

| Rank | Method | F1 | MAE | Sensitivity |
|------|--------|------|------|-------------|
| 1 | SVM | 0.559 | 0.161 | 0.444 |
| 2 | NB | 0.554 | 0.251 | 0.467 |
| 3 | J48 | 0.552 | 0.182 | 0.397 |
| 4 | Random Forests | 0.550 | 0.173 | 0.362 |
| 5 | Part | 0.543 | 0.202 | 0.417 |
| 6 | IB1 | 0.536 | 0.216 | 0.436 |
| 7 | OneR | 0.508 | 0.183 | 0.321 |
| 8 | Baseline | 0.326 | 0.822 | 1 |

Bydžovská, 2016

# ESTIMATING LEARNING LOSS AND GAP

- Linear Mixed model
- Extension of linear models where the observations belong to smaller subgroups that are nested within the bigger population.
- The variances may explain by the subgroups within.
- The random effects allows to model within subject factors (type of school and location)
- Controlling for the non independence of random effects (account for potential differences in the subgroups)
  - Fixed effects 1: Face to face vs. remote
  - Random effects: schools, location of schools
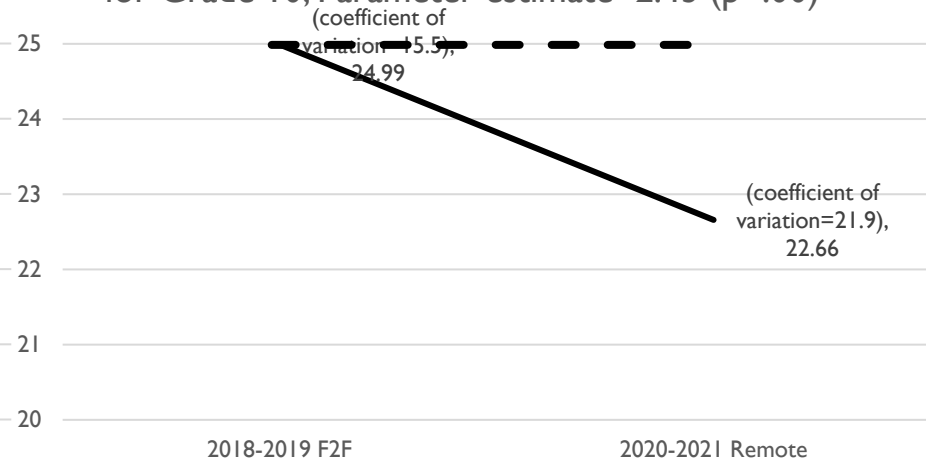  - Dependent variable: test performance in math and English

# LEARNING LOSS

- Grade 10 (Cohort that graduated this SY)
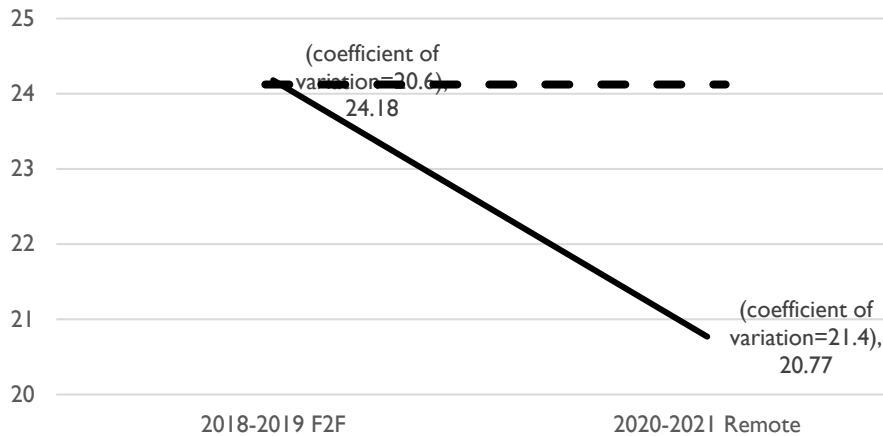
FIxed Effect of Modality on Math Performance for Grade 10, Paremeter estimate=3.99 (p=.00)



Fixed Effect of Modality on English Performance for Grade 10, Parameter estimate=2.43 (p=.00)



Random Effects (parameter estimates)
School=5.06
Location/modality=.26
Estimate of loss = 3.99 points (fixed effect)

Random Effects (parameter estimates)
School=2.42
Location/modality=.13
Estimate of loss = 2.43 (fixed effect)

# LEARNING GAP

**Math Grade 10**

- Predicted performance in SY 2020-2021 (coefficient of variation=24.6)

- Actual Math performance = 20.77

- Gap = 3.83, p<.01

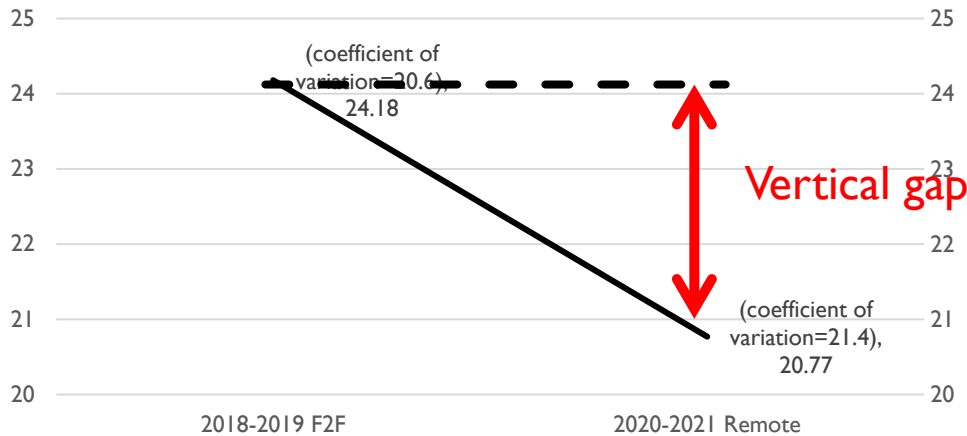- *About 4 competencies not learned for 1 year and 1 quarter on top of the 25 more*

**English Grade 10**

- Predicted performance in SY 2020-2021 (coefficient of variation=25.5)

- Actual Math performance = 22.66

- Gap = 2.84, p<.01

- *About 4 competencies not learned for 1 year and 1 quarter on top of 25 more*

# LEARNING LOSS

- Grade 10 (Cohort that graduated this SY)

FIxed Effect of Modality on Math Performance for Grade 10, Paremeter estimate=3.99 (p=.00)

Fixed Effect of Modality on English Performance for Grade 10, Parameter estimate=2.43 (p=.00)



(coefficient of variation=20.6), 24.18

(coefficient of variation=21.4), 20.77

Vertical gap

2018-2019 F2F     2020-2021 Remote

(coefficient of variation=15.5), 24.99

(coefficient of variation=21.9), 22.66

Vertical gap

2018-2019 F2F     2020-2021 Remote

Random Effects (parameter estimates)
School=5.06
Location/modality=.26
Estimate of loss = 3.99 points (fixed effect)
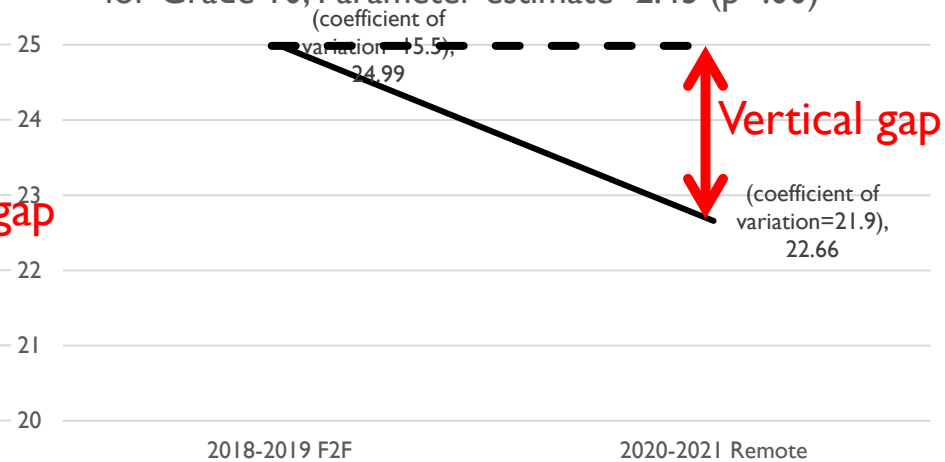
Random Effects (parameter estimates)
School=2.42
Location/modality=.13
Estimate of loss = 2.43 (fixed effect)

# RAPID LITERACY ASSESSMENT

- Grade 2 (expected to reach reading comprehension in English)

- N=825,094 grade 2

- Regions = 7 regions (NCR, CAR, R3, 4A, R5, R6, R10)

- Data from USAID and CLAD-Asia

```
MEASURE     PERSON - MAP - ITEM
                <more>|<rare>
    6 .############# +
                     |
                     |
                     |
    5          .###  +
                     |   Can write phrase or sentence
                     |
                    S|
    4          .###  +   Make inferences
                     |
                     |   Note details
                    S|
    3           .#   +
                     |   Give main idea
                     |
               .##   |
    2                +
                     |
                    M|   Read sentences
               .##   |   Recognize words
    1                +
                     |
               .###  |
    0                +M
                     |
                .    |
                     |
   -1           S+   Blend CVC
                .    |   Blend VC
                     |   Produce consonant sound
                     |
   -2           .  + Blend CV
                     |   Produce vowel sound
                     |
                .  + |
   -3                +
                    S|
                     |
                T|
   -4           .  + +
                     |
                     |
                     |
   -5                +   Recognize small letters
                     |   Recognize capital letters
                .    |
                     |
   -6           .  + +
                <less>|<freq>
EACH "#" IS 269: EACH "." IS 1 TO 268
```

Proximal gap
Proximal gap

```
MEASURE     PERSON - MAP - ITEM
                <more>|<rare>
    5 .############ +T
                     |
                     |
            .##  |
    4           S+
                     |
                     |   Nakapagsusulat ng parirala
            .#   |
    3                +
                     |   Nabibigay ang inference sa  Nakukuha ang detalye sa bi
                     |
                    S|
                .    |   Nabibigay ang pangunahing
    2                +
                    M|
            .#   |
                     |
                     |   Nababasa ang pangungusap
    1           .  + +
                     |
                     |
                .    |   Nababasa ang salita
                     |
    0           +M Napagsasama ang tunog ng P
                .    |   Napagsasama ang tunog ng C
                    S|
                .    |
                     |   Nabibigay ang tunog ng kat
   -1           .  + +
                     |   Napagsasama ang tunog ng K
                .    |
                     |   Nabibigay ang tunog ng pat
   -2                +
                .    |
                    S|
                T|
   -3                +
                     |
                .    |
                     |
   -4                +
                     |
                     |   Natutukoy ang maliliit na
                     |
                     |   Natutukoy ang malalaking t
   -5           .  +T
                <less>|<freq>
EACH "#" IS 436: EACH "." IS 1 TO 435
```

Proximal gap

# UNDERSTAND THE UNDERLYING SKILLS

**English**
**2x-3x Instruction**

**Filipino**

Word recognition

Language complexity
-Syllable naming, stress, word stretching

2.5 logits

Blending

Phonemic awareness

Language complexity
-slower rate (grapheme-phoneme correspondence: variety of vowel sounds, digraphs
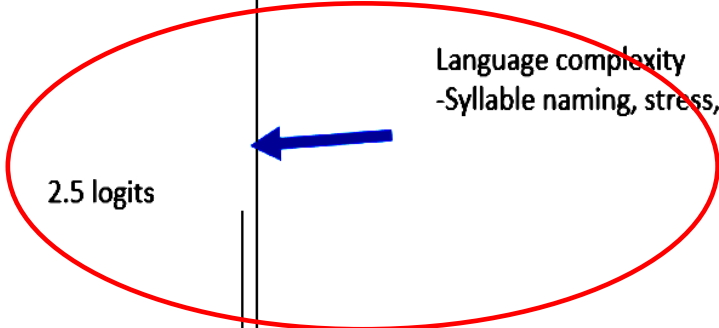
3 logits

Alphabet knowledge

Word recognition

Language regularity

0.5 logits

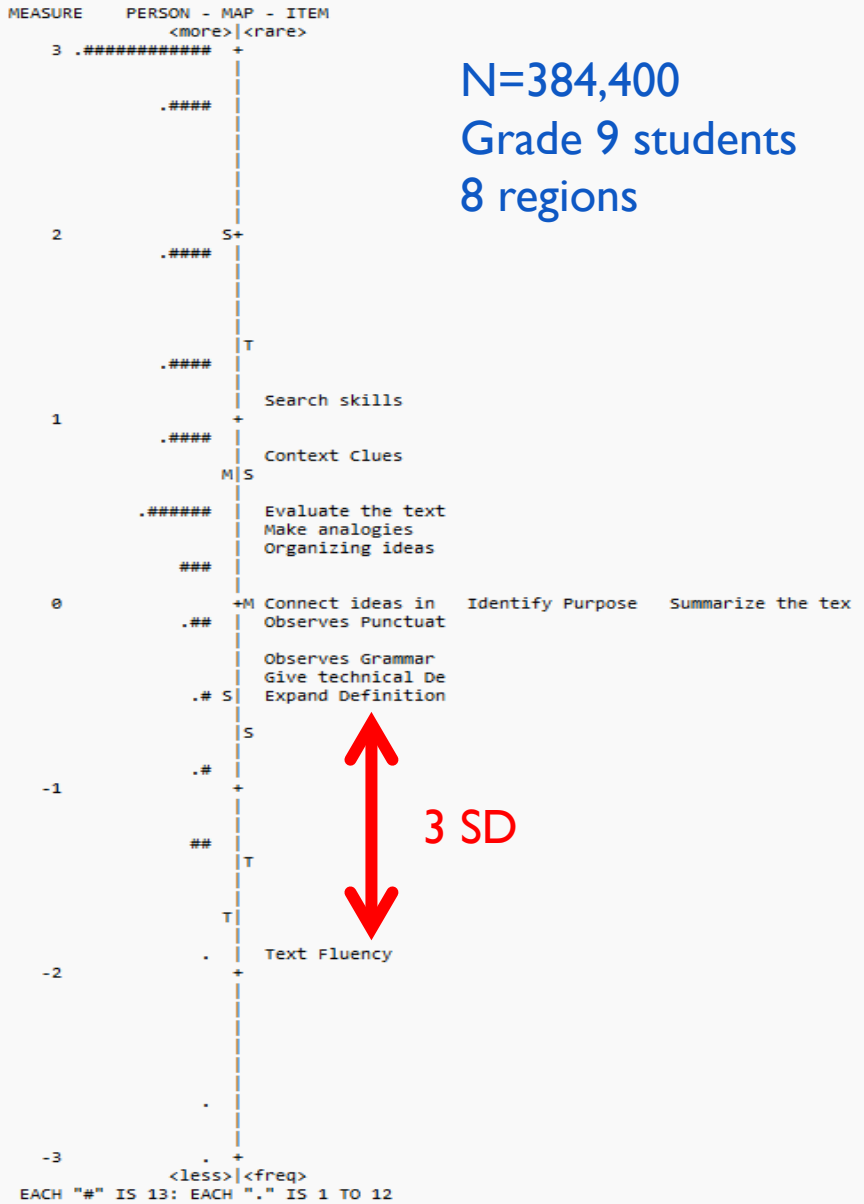-Transparent orthography/
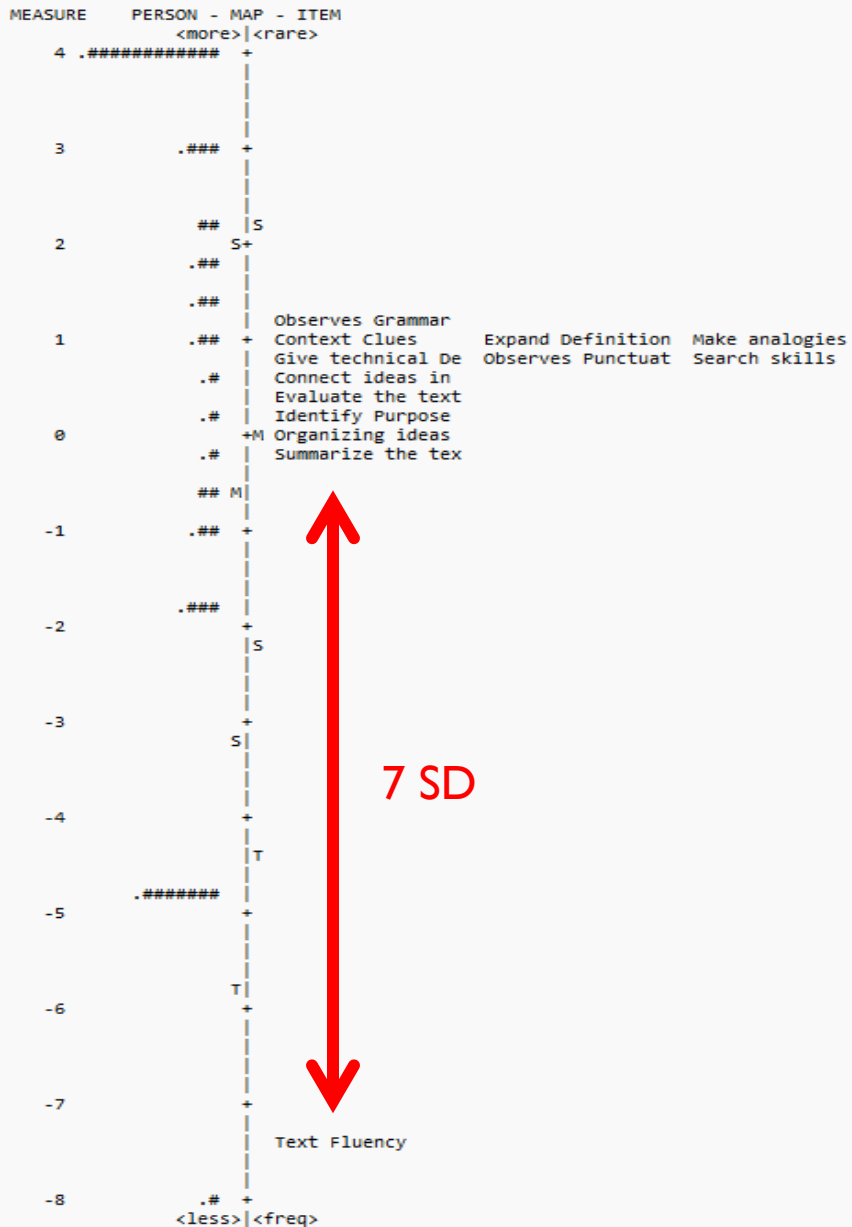Phonetically spelled language (i. e. Spanish)

Blending

Phonemic awareness

3 logits

Alphabet knowledge

SOCIAL AND EMOTIONAL LEARNING OF HS LEARNERS

```
MEASURE        PERSON - MAP - ITEM
              <more>|<rare>
    1              + Atten    Helpsee   IdEmo     grit
                   | Cour     DecMak    DelGrat   EmoSA      ImpCon
                   | Lead     Metacog   Orgskill  ReProb     ResOthe
                   | SerLear  resili    sharing   stressMa
    0            +M CivicRes  Comm      EthiRes   Id_Ag      ProSkill
                   | StrengRe Team      coping    empath     goalSe
                   | relBuil  selfEff
                   | SocJus   growth
   -1              +
              .   |S
   -2              +
              .   |
   -3         .   +
              .  T|T
   -4          .#  +
             .## S|
   -5       .##### +
           .######## |
   -6 ############# M+
          .######### |
   -7        .#### S+
             .##   |
   -8         .  T+
              .   |
   -9          .  + PR
              .   |
  -10          .  +
             <less>|<freq>
```

All Social and Emotional Learning skils are too difficut to be manifested by HS stuidents with all positive logits.

Social and Emotioanl skiils of learners are very low from -4 to -8 logits

# PROXIMAL LEARNING GAP

- When learners are not reaching the required competency at a given period (zone of proximal development)

- Proximal gap = log (target performance) – log (prerequisite performance)

- Large proximal gaps are more difficult to address:

  - Instructional programs need to identify subskills to be taught in between gaps

  - Design of instruction needs to be specific for the identified skills

# LEARNING RECOVERY MITIGATIONS

Turkey – leveling

Ethiopia and Brazil – acceleration

Spain and Colombia – tutoring

India and Mexico – teaching at the right level

France and Dominican Republic – Extended teaching time

India and Uruguay – Computer Assisted learning

# LEARNING RECOVERY MITIGATIONS

### Leveling
Short-term interventions based on curricular adaptation aimed at students who need to recover content or skills in order to continue with the regular education program.

### Acceleration
Short-term interventions based on the principle of Accelerated Learning and aimed at students who are over-age or disaffiliated from the system.

### Tutoring
Specific support delivered to students by tutors that complements the regular teaching they receive in order to facilitate the achievement of learning objectives.

### Teaching at the Right Level
Assignment of students to groups based on skill level, especially in literacy and math.

### Extended Teaching Time
Increase in teaching time through extracurricular activities or a variety of other opportunities.

### Computer-based Learning
Use of specialized software with adapted content and learning activities.

# INSIGHTS

- Estimation of learning loss and gaps allows us to:

- Pinpoint how many and what competencies needs to be taught (again)

- Rethink effective and appropriate instructional designs to close gaps

- Assess our capacity to address such gaps (resources and skills needed)

# FULL PAPER

## Distinguishing Learning Loss and Learning Gap: A Prelude to Learning Recovery in the Philippines

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### Abstract
The report distinguishes learning loss and learning gap conceptually and statistically. Data fro[m] assessment on fundamentals skills involving literacy, numeracy, and Social and Emotional L[...] used to demonstrate the difference between learning loss and gap. Estimation of learning los[s] from actual performance of learners resulting to no progress or decline on performance. T[...] learning gap is observed, vertical and proximal gaps. Vertical learning gap is estimated given t[...] between the projected performance and the actual performance. Proximal gap is estimated[...] response theory, the difference between of the logits for the easiest skills and logits for the m[...] skill is obtained. Given such results, initiatives on the learning recovery priorities of eight re[gions in the] Philippines are aligned.

The post pandemic has brought initiatives to address the effects of school closure. One of the initiatives that are implemented in a large scale is the Learning Recovery Plan. The learning recovery plan

■ https://cladasia2015.wixsite.com/cladasia/lrp

| Rapid Literacy Assessment | Grade 10 Math and English Assessment |
|:---:|:---:|
|  |  |