

Impact of K-12 Reform on Functional Literacy

in the Philippines During Pandemic

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PHILIPPINE STATISTICS AUTHORITY



K-12 Reform Timeline

LEGISLATIVE REFORMS

► 2012

Universal Kindergarten Education Act or Republic Act (RA) No. 10157

► 2013

Enhanced Basic Education Act or Republic Act (RA) No. 10533

PHASED IMPLEMENTATION

► 2011–2012

Universal Kindergarten rolled out

► 2012–2013

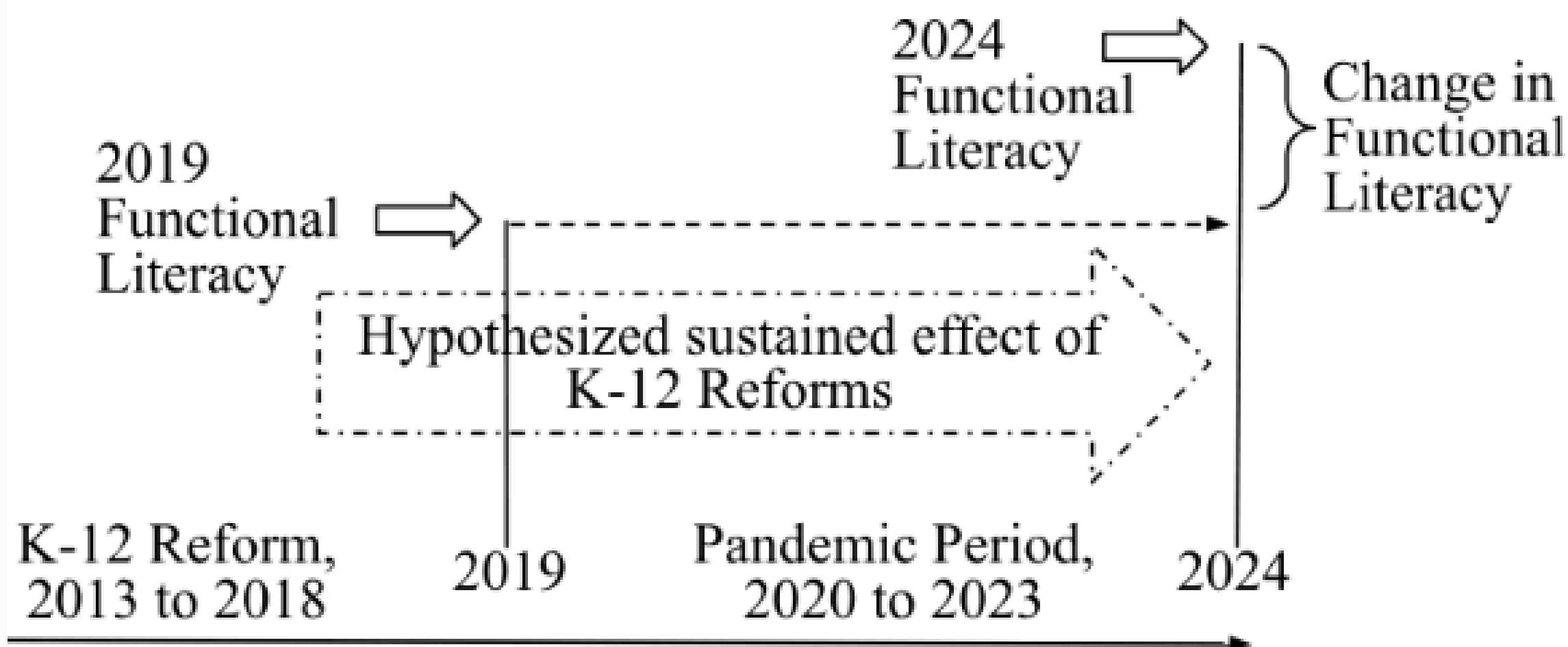
K-12 introduced: Grade 1 (Elementary) and Grade 7 (Junior High School)

► 2016–2017

Grade 11 introduced

Framework

Timeline



Conceptual Models

Functional Literacy = Educational levels + Control variables

Change in Functional Literacy =
Changes in Population Proportion
by Educational Levels and Control
Variables
+ Changes in Effects of
Educational Levels and Control
Variables

Note: Sustained effect of K-12 Reforms on functional literacy can be captured in Change in effects of Educational Levels.

Objectives of the Study

Evaluate the improvement in functional literacy over the five-year window using Blinder-Oaxaca decomposition

Decompose the improvement into two components

- 1 change in population averages or proportions (i.e., change in distribution of explanatory variables)
- 2 structural changes (i.e., change in coefficients)

F L E M M S

► Functional Literacy, Education and Mass Media Survey

a national survey, done every five years

basic and functional literacy, and the educational levels

mass media exposure, household/housing characteristics

SDG monitoring esp, 4.6: Universal Literacy and Numeracy

► 2019 FLEMMS and 2024 FLEMMS

L I T E R A C Y

➤ Basic Literacy

ability to read and write
with understanding, and

perform basic mathematical
calculations

➤ Functional Literacy

basic literacy + reading
comprehension skills



F L E M M S

2 0 1 9 v s 2 0 2 4

Table 1. Descriptive statistics of selected variables

Subset: Respondents aged 10 to 30, classified under basic and functional literacy levels

	2019 FLEMMS, subset		2024 FLEMMS, subset	
	Count (share, %)	% Functional Literacy	Count (share, %)	% Functional Literacy
Sample size	52,747 (100.0%)	69.7%	212,952 (100.0%)	77.3%
Educational attainment				
Grade 3 and below	1,530 (2.9%)	57.1%	7,029 (3.3%)	60.0%
Grade 4	3,125 (5.9%)	64.4%	11,356 (5.3%)	62.8%
Grade 5	3,848 (7.3%)	65.2%	16,686 (7.8%)	68.0%
Grade 6	5,219 (9.9%)	64.2%	14,553 (6.8%)	68.9%
Grade 7	4,719 (8.9%)	67.2%	14,582 (6.8%)	73.0%
Grade 8	4,856 (9.2%)	67.5%	15,493 (7.3%)	74.4%
Grade 9	4,273 (8.1%)	71.0%	21,477 (10.1%)	76.8%
Grade 10	9,406 (17.8%)	69.0%	18,103 (8.5%)	77.2%
Grade 11	2,643 (5.0%)	74.3%	18,033 (8.5%)	81.2%
Grade 12	2,039 (3.9%)	76.1%	18,356 (8.6%)	80.8%

Other Learning Pathways ^a	21 (0.0%)	85.7%	2,087 (1.0%)	74.4%
TVET ^b / Vocational	542 (1.0%)	71.0%	2,054 (1.0%)	83.9%
College Undergraduate	850 (1.6%)	73.4%	1,249 (0.6%)	83.7%
College Graduate	9,601 (18.2%)	77.3%	51,620 (24.2%)	87.5%
Post Graduate	75 (0.1%)	92.0%	274 (0.1%)	94.2%
Control Variables				
Female	26,309 (49.9%)	72.3%	105,170 (49.4%)	79.9%
Male	26,438 (50.1%)	67.0%	107,782 (50.6%)	74.8%
Currently attending school	30,191 (57.2%)	70.1%	130,457 (61.3%)	77.2%
With electricity	50,317 (95.4%)	70.2%	206,159 (96.8%)	77.7%
With internet	7,371 (14.0%)	75.8%	177,663 (83.4%)	79.1%
Strong wall	38,953 (73.8%)	71.5%	161,458 (75.8%)	79.5%
Has washing machine	22,954 (43.5%)	73.5%	107,225 (50.4%)	81.5%
Has refrigerator	22,022 (41.8%)	73.6%	103,747 (48.7%)	81.7%

Source: Subset of FLEMMS 2019 and 2024, includes aged 10 to 30 years and functional and basic literate.
Values in parenthesis are column percent relative to the sample size.

^aOther Learning Pathways include: Alternative Learning System (ALS), Indigenous Peoples Education (IPEd), Madrasah, Special Education (SPED).

^bTVET: Technical-Vocational Education and Training.

2019 sample size: 4 replicates vs 2016 sample size 16 replicates

$$\ln(p(y)/1 - p(y)) = \beta_0 + \beta_1 X_1 + \dots + \beta_k X_k$$

where:

$p(y)$ = probability of being functionally literate, $1 - p(y)$ = basic literate,

X_i = independent (educational attainment and control) variable, from 1 to k, and

β_i = the coefficient to be estimated from 0 to k.

**Logistic
Regression**

$$\bar{Y}_t - \bar{Y}_{t-1} = \sum_{i=1}^{i=k} (\bar{X}_{t,i} - \bar{X}_{t-1,i}) \hat{\beta}_{t,i} + \sum_{i=1}^{i=k} \bar{X}_{t-1,i} (\hat{\beta}_{t,i} - \hat{\beta}_{t-1,i})$$

where:

$\bar{Y}$ = is average functional literacy rate,

t = time, 2024 survey data, $t - 1$ = 2019 survey data,

$\bar{X}$ = average explanatory variable, and,

$\hat{\beta}$ = estimated coefficient.

**Blinder-
Oaxaca
Decomposition
(M L R)**

Partially Linearized Blinder-Oaxaca Decomposition

$$\bar{Y}_t - \bar{Y}_{t-1} = \sum_{i=1}^{i=k} W_{\Delta X, i} [L(\bar{X}_t \hat{\beta}_t) - L(\bar{X}_{t-1} \hat{\beta}_t)] + \sum_{i=1}^{i=k} W_{\Delta \beta, i} [L(\bar{X}_{t-1} \hat{\beta}_t) - L(\bar{X}_{t-1} \hat{\beta}_{t-1})],$$

where:

$$W_{\Delta X, i} = (\bar{X}_{t, i} - \bar{X}_{t-1, i}) \hat{\beta}_{t, i} / \sum_{i=1}^{i=k} (\bar{X}_{t, i} - \bar{X}_{t-1, i}) \hat{\beta}_{t, i},$$

$$W_{\Delta \beta, i} = \bar{X}_{t-1, i} (\hat{\beta}_{t, i} - \hat{\beta}_{t-1, i}) / \sum_{i=1}^{i=k} \bar{X}_{t-1, i} (\hat{\beta}_{t, i} - \hat{\beta}_{t-1, i}), \text{ and } W_{\Delta X, i} = W_{\Delta \beta, i} = 1.$$

$L(X\beta)$ be the logistic function, W be the weight

Decomposition Interpretation

Multiple Linear Regression Decomposition

$$\bar{Y}_t - \bar{Y}_{t-1} = \underbrace{\sum_{i=1}^{i=k} (\bar{X}_{t,i} - \bar{X}_{t-1,i}) \hat{\beta}_{t,i}}_{\text{Changes in Averages}} + \underbrace{\sum_{i=1}^{i=k} \bar{X}_{t-1,i} (\hat{\beta}_{t,i} - \hat{\beta}_{t-1,i})}_{\text{Structural Changes}}$$

Changes in Averages

Structural Changes
Changes in Coefficients

$$\bar{Y}_t - \bar{Y}_{t-1} = \sum_{i=1}^{i=k} W_{\Delta X,i} [L(\bar{X}_t \hat{\beta}_t) - L(\bar{X}_{t-1} \hat{\beta}_t)] + \sum_{i=1}^{i=k} W_{\Delta \beta,i} [L(\bar{X}_{t-1} \hat{\beta}_t) - L(\bar{X}_{t-1} \hat{\beta}_{t-1})]$$

Logistic Regression Decomposition

Logistic Regression

Table 2. Logistic regression results, ages 10 to 30

Dependent variable: functional literate = 1; basic literate = 0

2019 FLEMMS			2024 FLEMMS	
	Coefficient (SE)	Odds Ratio	Coefficient (SE)	Odds Ratio
Intercept	-0.26*** (0.065)	[0.8]	-0.25*** (0.035)	[0.8]
Educational attainment (base, grade 3 and below)				
Grade 4	0.18** (0.064)	[1.2]	0.00< (0.032)	[1.0]
Grade 5	0.23*** (0.062)	[1.3]	0.23*** (0.03)	[1.3]
Grade 6	0.23*** (0.06)	[1.3]	0.34*** (0.031)	[1.4]
Grade 7	0.32*** (0.061)	[1.4]	0.47*** (0.031)	[1.6]
Grade 8	0.33*** (0.061)	[1.4]	0.56*** (0.031)	[1.8]
Grade 9	0.49*** (0.062)	[1.6]	0.68*** (0.03)	[2.0]
Grade 10	0.45*** (0.058)	[1.6]	0.76*** (0.031)	[2.1]
Grade 11	0.58*** (0.069)	[1.8]	0.89*** (0.032)	[2.4]
Grade 12	0.71*** (0.074)	[2.0]	0.96*** (0.032)	[2.6]

Other Learning Pathways ^a	1.52* (0.628)	[4.6]	0.67*** (0.057)	[1.9]
TVET ^b / Vocational	0.55*** (0.11)	[1.7]	1.17*** (0.066)	[3.2]
College Undergraduate	0.64*** (0.096)	[1.9]	1.18*** (0.082)	[3.3]
College Graduate	0.80*** (0.06)	[2.2]	1.39*** (0.029)	[4.0]
Post Graduate	1.99*** (0.43)	[7.3]	2.22*** (0.258)	[9.2]

Control Variables				
Female	0.21*** (0.019)	[1.2]	0.23*** (0.011)	[1.3]
Currently attending school	0.18*** (0.023)	[1.2]	0.27*** (0.012)	[1.3]
With electricity	0.26*** (0.044)	[1.3]	0.11*** (0.028)	[1.1]
With internet	0.09** (0.032)	[1.1]	0.14*** (0.014)	[1.1]
Strong wall	0.13*** (0.023)	[1.1]	0.15*** (0.013)	[1.2]
Has washing machine	0.14*** (0.023)	[1.1]	0.19*** (0.013)	[1.2]
Has refrigerator	0.07** (0.024)	[1.1]	0.13*** (0.013)	[1.1]

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.10 ' ' 1; values in parenthesis are standards errors; values in brackets are odds ratios relative to be functionally literate or exp(β)

^aOther Learning Pathways include: Alternative Learning System (ALS), Indigenous Peoples Education (IPEd), Madrasah, Special Education (SPED)

^bTVET: Technical-Vocational Education and Training.

↑ coefficients in 2024 for all educational levels except Grade 4-5 and OLPs

Partially Linearized Decomposition

Table 3. Partially linearized Blinder-Oaxaca decomposition

Dependent variable: change in functional literacy rate over time, for two age groups
Change (Δ) in functional literacy between 2024 and 2019: $0.7730 - 0.6967 = 0.0763$

	Due to Δ in Averages (SE)	Due to Δ in Coefficients (SE)
Decomposition, in pp	0.0335*** (0.0019)	0.0428*** (0.0029)
Contribution to Δ in functional literacy		
<i>Educational attainment (base, Grade 3 and below)</i>		
Grade 4	0.0000< (0.0000<)	-0.0019. (0.0029)
Grade 5	0.0002*** (0.0000<)	-0.0001 (0.0016)
Grade 6	-0.0017*** (0.0002)	0.0019. (0.0013)
Grade 7	-0.0017*** (0.0001)	0.0024* (0.0011)
Grade 8	-0.0018*** (0.0001)	0.0037* (0.0019)
Grade 9	0.0023*** (0.0001)	0.0028* (0.0014)
Grade 10	-0.0121*** (0.0005)	0.0098* (0.0054)
Grade 11	0.0052*** (0.0002)	0.0027* (0.0016)
Grade 12	0.0077*** (0.0003)	0.0016* (0.0009)

Other Learning Pathways ^a	0.0011*** (0.0001)	-0.0001 (0.0003)
TVET ^b / Vocational	-0.0001*** (0.0000<)	0.0011* (0.0007)
College Undergraduate	-0.002*** (0.0001)	0.0015* (0.0012)
College Graduate	0.0142*** (0.0003)	0.0188* (0.0132)
Post Graduate	-0.0001*** (0.0000<)	0.0001 (0.0003)
<i>Control Variables</i>		
Female	-0.0002*** (0.0000<)	0.0011 (0.0027)
Currently attending school	0.0018*** (0.0001)	0.0089* (0.0059)
With electricity	0.0003*** (0.0001)	-0.0252. (0.0373)
With internet	0.0162*** (0.0018)	0.0011 (0.0016)
Strong wall	0.0005*** (0.0000<)	0.0036 (0.0051)
Has washing machine	0.0022*** (0.0001)	0.0044. (0.0049)
Has refrigerator	0.0015*** (0.0002)	0.0045. (0.0054)

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.10 ' ' 1; values in parenthesis are standard errors.
^aOther Learning Pathways include: Alternative Learning System (ALS), Indigenous Peoples Education (IPEd), Madrasah, Special Education (SPED).
^bTVET: Technical-Vocational Education and Training.

focus our interpretation on change in coefficient

- ▶ **7.6pps increase in functional literacy:** 3.35 pps due to change in population proportion; 4.28 due to structural shifts
- ▶ **Grades 7 through 12, and TVET/Vocational tracks:** structural change an evidence on an impact due to K-12 reforms
- ▶ **Deterioration of functional literacy for Grade 4 and 5 and non-traditional learning paths** although not statistically significant (i.e., stagnant)
- ▶ Targeted recovery programs for younger cohorts affected by the pandemic
- ▶ Continued investments in non-traditional learning paths



Thank You!
for listening

