1 Descriptives

1.1 Details of the sample from the Global Teaching InSights (TVS) study.

	Number of teachers	Number of students	Student age (Mean)	Student age (SD)
BMV- Chile	98	2,675	16.58	0.72
Colombia	83	2,398	15.81	1.08
England	85	2,033	14.78	0.62
Germany	50	1,140	14.98	0.78
KST-Japan	89	2,501	14.80	0.36
Mexico	103	2,783	14.73	0.47
Shanghai	85	2,613	13.61	0.43

Note: Figures taken from OECD (2020a)

1.2 **Class Average Scores on the Pre-Test for each Context**

Context	Number of teachers	Number of students	Class mean Pre-test				
			Min	Median	Mean	Max	SD
BMV-Chile	98	2 675	167	194	196	236	16.2
Colombia	83	2 398	165	177	178	200	7.3
England	86	2 033	170	198	200	233	14.6
Germany	50	1 040	182	195	196	218	8.0
KST-Japan	89	2 501	197	215	216	237	8.0
Mexico	103	2 783	169	179	181	209	8.3
Shanghai	85	2 613	193	230	229	245	9.5

1.3 OTL measures descriptives

1.3.1 *BMV-Chile* – OTL measure descriptives

DV	Mean	SD	Min	Max	TVS min	TVS max	Relative mean	Relative SD
OTL_AR	0.27	0.16	0.00	0.90	0	1	0.27	0.16
OTL_AR_FUNCTIONS	0.10	0.19	0.00	0.88	0	1	0.10	0.19
OTL_AR_ALGEBRA	0.36	0.28	0.00	1.00	0	1	0.36	0.28
OTL_AR_REASONING	0.27	0.23	0.00	1.00	0	1	0.27	0.23
OTL_AR_APPLIED	0.29	0.31	0.00	1.00	0	1	0.29	0.31
VDOMAIN_CE	1.47	0.24	1.06	2.40	1	4	0.16	0.08
VDOMAIN_QS	1.36	0.22	1.00	2.05	1	3	0.18	0.11
OTL_TL_FUNCTIONS	2.53	2.13	0.00	7.50	0	12	0.21	0.18
OTL_TL_ALGEBRA	3.96	2.48	0.60	11.00	0	11	0.36	0.23
OTL_TL_REASONING	3.86	2.93	0.00	13.00	0	13	0.30	0.23
OTL_TL_APPLIED	3.03	2.73	0.00	12.00	0	12	0.25	0.23
OTL_SQB	9.00	0.66	7.30	10.62	0	11	0.82	0.06

OTL_SQB_FUNCTIONS	1.59	0.26	0.70	2.00	0	2	0.79	0.13
OTL_SQB_ALGEBRA	4.64	0.25	3.47	5.00	0	5	0.93	0.05
OTL_SQB_REASONING	1.83	0.13	1.35	2.00	0	2	0.91	0.06
OTL_SQB_APPLIED	0.95	0.37	0.21	1.81	0	2	0.47	0.19
SQE_COMP_SQUARE_RATE	0.53	1.01	0.00	4.00	0	4	0.13	0.25
SQE_FACTORIZING_RATE	1.26	1.18	0.00	4.00	0	4	0.32	0.30
SQE_QUADRATIC_RATE	1.44	1.26	0.00	4.00	0	4	0.36	0.32
SQE_FIND_ROOT_RATE	0.10	0.40	0.00	3.00	0	4	0.03	0.10

1.3.2 Colombia – OTL measure descriptives

DV	Mean	SD	Min	Max	TVS min	TVS max	Relative mean	Relative SD
OTL_AR	0.26	0.09	0.10	0.47	0	1	0.26	0.09
OTL_AR_FUNCTIONS	0.23	0.20	0.00	0.83	0	1	0.23	0.20
OTL_AR_ALGEBRA	0.34	0.15	0.00	0.72	0	1	0.34	0.15
OTL_AR_REASONING	0.15	0.14	0.00	0.50	0	1	0.15	0.14

OTL_AR_APPLIED	0.23	0.26	0.00	0.88	0	1	0.23	0.26
VDOMAIN_CE	1.50	0.26	1.03	2.16	1	4	0.17	0.09
VDOMAIN_QS	1.40	0.20	1.04	2.07	1	3	0.20	0.10
OTL_TL_FUNCTIONS	1.33	1.15	0.00	6.75	0	12	0.11	0.10
OTL_TL_ALGEBRA	1.68	0.97	0.30	5.80	0	11	0.15	0.09
OTL_TL_REASONING	2.30	1.43	0.00	11.00	0	13	0.18	0.11
OTL_TL_APPLIED	1.43	1.52	0.00	6.50	0	12	0.12	0.13
OTL_SQB	8.57	0.84	6.32	10.27	0	11	0.78	0.08
OTL_SQB_FUNCTIONS	1.64	0.19	1.15	2.00	0	2	0.82	0.10
OTL_SQB_ALGEBRA	4.20	0.34	3.08	4.90	0	5	0.84	0.07
OTL_SQB_REASONING	1.63	0.20	1.14	2.00	0	2	0.81	0.10
OTL_SQB_APPLIED	1.10	0.33	0.20	1.86	0	2	0.55	0.17
SQE_COMP_SQUARE_RATE	0.63	0.73	0.00	2.50	0	4	0.16	0.18
SQE_FACTORIZING_RATE	1.63	0.94	0.00	3.50	0	4	0.41	0.24
SQE_QUADRATIC_RATE	1.49	0.81	0.00	4.00	0	4	0.37	0.20
SQE_FIND_ROOT_RATE	0.54	0.69	0.00	3.00	0	4	0.13	0.17

1.3.3 England – OTL measure descriptives

DV	Mean	SD	Min	Max	TVS min	TVS max	Relative mean	Relative SD
OTL_AR	0.30	0.10	0.07	0.68	0	1	0.30	0.10
OTL_AR_FUNCTIONS	0.26	0.22	0.00	0.88	0	1	0.26	0.22
OTL_AR_ALGEBRA	0.48	0.17	0.09	0.88	0	1	0.48	0.17
OTL_AR_REASONING	0.06	0.09	0.00	0.44	0	1	0.06	0.09
OTL_AR_APPLIED	0.18	0.20	0.00	0.75	0	1	0.18	0.20
VDOMAIN_CE	1.89	0.39	1.25	3.33	1	4	0.30	0.13
VDOMAIN_QS	1.77	0.36	1.13	2.74	1	3	0.38	0.18
OTL_TL_FUNCTIONS	1.76	1.50	0.00	7.75	0	12	0.15	0.13
OTL_TL_ALGEBRA	2.48	1.02	0.50	6.40	0	11	0.23	0.09
OTL_TL_REASONING	2.21	1.82	0.00	7.00	0	13	0.17	0.14
OTL_TL_APPLIED	0.86	0.92	0.00	3.50	0	12	0.07	0.08
OTL_SQB	7.37	0.73	5.23	8.54	0	11	0.67	0.07

OTL_SQB_FUNCTIONS	1.35	0.29	0.53	2.00	0	2	0.67	0.14
OTL_SQB_ALGEBRA	4.11	0.34	2.45	4.61	0	5	0.82	0.07
OTL_SQB_REASONING	1.44	0.32	0.46	2.00	0	2	0.72	0.16
OTL_SQB_APPLIED	0.47	0.24	0.00	1.30	0	2	0.24	0.12
SQE_COMP_SQUARE_RATE	1.16	1.23	0.00	4.00	0	4	0.29	0.31
SQE_FACTORIZING_RATE	2.30	1.01	0.00	4.00	0	4	0.58	0.25
SQE_QUADRATIC_RATE	1.25	1.03	0.00	3.50	0	4	0.31	0.26
SQE_FIND_ROOT_RATE	1.05	0.88	0.00	3.00	0	4	0.26	0.22

1.3.4 Germany – OTL measure descriptives

DV	Mean	SD	Min	Max	TVS min	TVS max	Relative mean	Relative SD
OTL_AR	0.37	0.10	0.14	0.69	0	1	0.37	0.10
OTL_AR_FUNCTIONS	0.42	0.24	0.00	1.00	0	1	0.42	0.24
OTL_AR_ALGEBRA	0.42	0.17	0.09	0.94	0	1	0.42	0.17
OTL_AR_REASONING	0.19	0.12	0.00	0.56	0	1	0.19	0.12

OTL_AR_APPLIED	0.40	0.29	0.00	1.00	0	1	0.40	0.29
VDOMAIN_CE	1.81	0.35	1.26	2.81	1	4	0.27	0.12
VDOMAIN_QS	1.51	0.22	1.08	2.05	1	3	0.26	0.11
OTL_TL_FUNCTIONS	3.99	2.20	0.00	12.00	0	12	0.33	0.18
OTL_TL_ALGEBRA	4.31	1.81	1.70	8.70	0	11	0.39	0.16
OTL_TL_REASONING	3.31	2.09	0.00	8.00	0	13	0.25	0.16
OTL_TL_APPLIED	3.14	2.05	0.00	7.00	0	12	0.26	0.17
OTL_SQB	8.92	0.68	7.00	10.14	0	11	0.81	0.06
OTL_SQB_FUNCTIONS	1.77	0.32	0.43	2.00	0	2	0.89	0.16
OTL_SQB_ALGEBRA	4.72	0.16	4.05	5.00	0	5	0.94	0.03
OTL_SQB_REASONING	1.39	0.16	0.95	1.73	0	2	0.69	0.08
OTL_SQB_APPLIED	1.05	0.43	0.25	1.81	0	2	0.53	0.21
SQE_COMP_SQUARE_RATE	1.45	1.02	0.00	4.00	0	4	0.36	0.25
SQE_FACTORIZING_RATE	0.88	0.76	0.00	3.00	0	4	0.22	0.19
SQE_QUADRATIC_RATE	1.68	1.07	0.00	4.00	0	4	0.42	0.27
SQE_FIND_ROOT_RATE	1.07	0.89	0.00	4.00	0	4	0.27	0.22

1.3.5 KST-Japan – OTL measure descriptives

DV	Mean	SD	Min	Max	TVS min	TVS max	Relative mean	Relative SD
OTL_AR	0.32	0.08	0.08	0.50	0	1	0.32	0.08
OTL_AR_FUNCTIONS	0.00	0.01	0.00	0.13	0	1	0.00	0.01
OTL_AR_ALGEBRA	0.60	0.15	0.19	1.00	0	1	0.60	0.15
OTL_AR_REASONING	0.01	0.03	0.00	0.13	0	1	0.01	0.03
OTL_AR_APPLIED	0.48	0.32	0.00	1.00	0	1	0.48	0.32
VDOMAIN_CE	2.11	0.40	1.28	3.28	1	4	0.37	0.13
VDOMAIN_QS	1.71	0.29	1.17	2.54	1	3	0.36	0.15
OTL_TL_FUNCTIONS	0.15	0.49	0.00	2.50	0	12	0.01	0.04
OTL_TL_ALGEBRA	2.65	1.29	0.60	6.30	0	11	0.24	0.12
OTL_TL_REASONING	0.93	1.12	0.00	4.00	0	13	0.07	0.09
OTL_TL_APPLIED	3.58	1.70	0.50	8.50	0	12	0.30	0.14
OTL_SQB	7.80	0.87	5.64	9.89	0	11	0.71	0.08

OTL_SQB_FUNCTIONS	1.15	0.42	0.14	1.92	0	2	0.58	0.21
OTL_SQB_ALGEBRA	4.70	0.21	4.16	5.00	0	5	0.94	0.04
OTL_SQB_REASONING	1.36	0.23	0.76	1.82	0	2	0.68	0.11
OTL_SQB_APPLIED	0.59	0.34	0.00	1.70	0	2	0.30	0.17
SQE_COMP_SQUARE_RATE	0.88	0.54	0.00	2.00	0	4	0.22	0.14
SQE_FACTORIZING_RATE	1.61	0.46	0.00	2.00	0	4	0.40	0.12
SQE_QUADRATIC_RATE	0.51	0.58	0.00	2.00	0	4	0.13	0.14
SQE_FIND_ROOT_RATE	0.00	0.00	0.00	0.00	0	4	0.00	0.00

1.3.6 Mexico – OTL measure descriptives

DV	Mean	SD	Min	Max	TVS min	TVS max	Relative mean	Relative SD
OTL_AR	0.22	0.12	0.00	0.56	0	1	0.22	0.12
OTL_AR_FUNCTIONS	0.10	0.17	0.00	0.88	0	1	0.10	0.17
OTL_AR_ALGEBRA	0.24	0.16	0.00	0.72	0	1	0.24	0.16
OTL_AR_REASONING	0.15	0.17	0.00	0.50	0	1	0.15	0.17

OTL_AR_APPLIED	0.49	0.34	0.00	1.00	0	1	0.49	0.34
VDOMAIN_CE	1.63	0.28	1.10	2.42	1	4	0.21	0.09
VDOMAIN_QS	1.54	0.36	1.00	2.58	1	3	0.27	0.18
OTL_TL_FUNCTIONS	1.38	2.03	0.00	11.00	0	12	0.12	0.17
OTL_TL_ALGEBRA	2.32	1.64	0.00	8.30	0	11	0.21	0.15
OTL_TL_REASONING	3.02	2.42	0.00	13.00	0	13	0.23	0.19
OTL_TL_APPLIED	2.98	2.41	0.00	12.00	0	12	0.25	0.20
OTL_SQB	9.16	0.70	6.64	10.40	0	11	0.83	0.06
OTL_SQB_FUNCTIONS	1.67	0.20	1.04	2.00	0	2	0.84	0.10
OTL_SQB_ALGEBRA	4.31	0.29	3.40	4.82	0	5	0.86	0.06
OTL_SQB_REASONING	1.75	0.16	1.18	2.00	0	2	0.88	0.08
OTL_SQB_APPLIED	1.43	0.24	0.78	1.84	0	2	0.71	0.12
SQE_COMP_SQUARE_RATE	0.12	0.38	0.00	2.50	0	4	0.03	0.10
SQE_FACTORIZING_RATE	0.65	0.91	0.00	3.50	0	4	0.16	0.23
SQE_QUADRATIC_RATE	2.02	1.31	0.00	4.00	0	4	0.51	0.33
SQE_FIND_ROOT_RATE	0.21	0.58	0.00	3.50	0	4	0.05	0.14

1.3.7 Shanghai – OTL measure descriptives

DV	Mean	SD	Min	Max	TVS min	TVS max	Relative mean	Relative SD
OTL_AR	0.32	0.09	0.10	0.51	0	1	0.32	0.09
OTL_AR_FUNCTIONS	0.00	0.02	0.00	0.06	0	1	0.00	0.02
OTL_AR_ALGEBRA	0.50	0.17	0.00	0.84	0	1	0.50	0.17
OTL_AR_REASONING	0.31	0.13	0.00	0.63	0	1	0.31	0.13
OTL_AR_APPLIED	0.23	0.26	0.00	1.00	0	1	0.23	0.26
VDOMAIN_CE	1.70	0.26	1.25	2.50	1	4	0.23	0.09
VDOMAIN_QS	1.97	0.22	1.33	2.49	1	3	0.49	0.11
OTL_TL_FUNCTIONS	0.12	0.35	0.00	2.75	0	12	0.01	0.03
OTL_TL_ALGEBRA	3.70	1.23	0.70	6.20	0	11	0.34	0.11
OTL_TL_REASONING	4.41	2.08	0.00	9.00	0	13	0.34	0.16
OTL_TL_APPLIED	1.86	1.92	0.00	11.00	0	12	0.16	0.16
OTL_SQB	7.78	0.45	6.92	9.49	0	11	0.71	0.04

OTL_SQB_FUNCTIONS	0.45	0.25	0.08	1.46	0	2	0.22	0.13
OTL_SQB_ALGEBRA	4.81	0.13	4.36	5.00	0	5	0.96	0.03
OTL_SQB_REASONING	1.91	0.08	1.65	2.00	0	2	0.96	0.04
OTL_SQB_APPLIED	0.62	0.20	0.29	1.24	0	2	0.31	0.10
SQE_COMP_SQUARE_RATE	1.89	0.75	0.00	4.00	0	4	0.47	0.19
SQE_FACTORIZING_RATE	2.00	1.01	0.00	4.00	0	4	0.50	0.25
SQE_QUADRATIC_RATE	1.60	0.91	0.00	4.00	0	4	0.40	0.23
SQE_FIND_ROOT_RATE	0.01	0.08	0.00	0.50	0	4	0.00	0.02

1.4 Correlations between class average student-reported measures of OTL and class average attainment on the pre-test

OTL Measure	BMV-BMV-Chile		Colombia		England		Germany	
	r	p	r	p	r	p	r	p
OTL functions	-.04	.366	.03	.379	.13	.191	.25	.084
OTL algebra	.42	<.001	.24	.032	.24	.033	.02	.395
OTL reasoning	.33	.001	.13	.197	.44	<.001	.04	.385
OTL applied	-.25	.019	-.03	.385	-.20	.071	.03	.389
	df = 96		df = 81		df = 83		df = 47	

OTL Measure	KST-Japan		Mexico		Shanghai	
	r	p	r	p	r	p
OTL functions			.22	.028		
OTL algebra	.21	.058	.31	.002	.23	.041
OTL reasoning	.15	.150	.29	.005	.36	.001
OTL applied	-.16	.120	.09	.267	-.02	.388
	df = 87		df = 101		df = 83	

1.5 Proportion of Teachers Not Including each Solution Method for Classes with Above and Below Median Class Attainment on the Pre-Test

1.5.1 BMV-Chile

Solution method	All classes (%)	Above median class average pre-test score (%)	Below median class average pre-test score (%)
Completing the square	14	8	19
Factorising	0	0	0
Quadratic formula	1	2	0
Finding roots	22	22	21
Number of classes	79	41	39

1.5.2 Colombia

Solution method	All classes (%)	Above median class average pre-test score (%)	Below median class average pre-test score (%)
Completing the square	25	23	27
Factorising	6	7	4
Quadratic formula	6	4	9
Finding roots	19	14	24
Number of classes	41	26	22

1.5.3 England

Solution method	All classes (%)	Above median class average pre-test score (%)	Below median class average pre-test score (%)
Completing the square	23	6	34
Factorising	1	0	3
Quadratic formula	14	5	21
Finding roots	12	7	17
Number of classes	84	39	49

1.5.4 Germany

Solution method	All classes (%)	Above median class average pre-test score (%)	Below median class average pre-test score (%)
Completing the square	2	5	0
Factorising	5	7	3
Quadratic formula	2	5	0
Finding roots	10	9	12
Number of classes	32	19	20

1.5.5 KST-Japan

Solution method	All classes (%)	Above median class average pre-test score (%)	Below median class average pre-test score (%)
Completing the square	0	0	0
Factorising	0	0	0
Quadratic formula	0	0	0
Finding roots	-	-	-
Number of classes	88	52	56

1.5.6 Mexico

Solution method	All classes (%)	Above median class average pre-test score (%)	Below median class average pre-test score (%)
Completing the square	36	37	34
Factorising	15	12	17
Quadratic formula	5	6	3
Finding roots	33	34	32
Number of classes	96	49	57

1.5.7 Shanghai

Solution method	All classes (%)	Above median class average pre-test score (%)	Below median class average pre-test score (%)
Completing the square	1	0	2
Factorising	0	0	0
Quadratic formula	2	3	2
Finding roots	-	-	-
Number of classes	85	45	51

1.6 Intraclass Correlation Coefficients (ICC) – Class-level OTL Measures

Dependent Variable ~ 1 + (1|COUNTRY)

1.7 Intraclass Correlation Coefficients – Student-level OTL Measure

$$\text{Yijk} = \gamma 000 + \text{u00k} + \text{u0jk} + \text{eijk}$$

where:

- Yijk = student-reported OTL for student *I* in classroom *j* in country *k*
- u_{00k} = country-level random intercept for country *k*,
- u_{0jk} = classroom-level random intercept for classroom *j* in country *k*,
- e_{ijk} = student-level residual error

with:

$$u00k \sim N(0, \tau^2_{country})$$

$$u_{0jk} \sim N(0, \tau^2_{class})$$

$$e_{ijk} \sim N(0, \sigma^2)$$

	SD	Variance
(Intercept)	8.59	
	(0.33)	
SD (Intercept T_IDCOUNTRY)	0.62	0.38
SD (Intercept COUNTRY)	0.74	0.55
SD (Observations)	1.87	3.50
Number of observations	9,830	

2 Linear Regression Models

Base model:

$$Y_j = \beta_0 + \beta_1(\text{Class Mean Pre-test score for class j}) + e_j$$

Full model:

$$Y_j = \beta_0 + \beta_1(\text{Class Mean Pre-test score for class j}) + \beta_2(\text{Class average home possessions}) + \beta_3(\text{Proportion of female students in class } j)$$
$$+ \beta_4(\text{Class average parental education}) + e_j$$

SD model:

$$Y_j = \beta_0 + \beta_1(\text{Class standard deviation of pre-test score for class j}) + \beta_2(\text{Class average home possessions})$$
$$+ \beta_3(\text{Proportion of female students in class } j) + \beta_4(\text{Class average parental education}) + e_j$$

Interaction model:

$$Y_j = \beta_0 + \beta_1(\text{Class Mean Pre-test score for class j})$$
$$+ \beta_2(\text{Class SD of pre-test score for school j}) + \beta_3(\text{Class average home possessions for class j})$$
$$+ \beta_4(\text{Proportion of female students in class } j)$$
$$+ \beta_5(\text{Class average parental education}) + \beta_6(\text{Class mean pre-test score for class j} \times \text{Class SD pre-test score for class j}) + e_j$$

Where:

Y_j = Class-level OTL measure

β_0= Intercept

e_j= residual error term

2.1 *BMV-Chile* - Aggregated OTL observed in lesson materials

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	0.27	0.02	<.001	0.49	0.28	.080	0.47	0.28	.094	0.5	0.29	.090
Class mean pre-test score[a]	0.00	0.02	.992	0.02	0.04	.589				0.02	0.12	.852
Proportion female				-0.04	0.08	.620	-0.04	0.08	.627	-0.04	0.08	.625
Class mean home possessions				0.01	0.06	.927	0.02	0.06	.718	0.01	0.06	.932
Class mean parental education				-0.01	0.02	.463	-0.01	0.02	.483	-0.01	0.02	.473
Class pre-test standard deviation							0.01	0.11	.920	-0.01	0.12	.925

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										0.00	0.18	.980
Number of observations	96			96			96			96		
R2	0.00			0.01			0.01			0.01		
Adj. R2	-0.01			-0.03			-0.03			-0.05		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.2 *BMV-Chile* - OTL Instructional quality observed in videos - Cognitive Engagement Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.48	0.02	<.001	1.72	0.39	<.001	1.59	0.39	<.001	1.72	0.40	<.001
Class mean pre-test score[a]	0.13	0.03	<.001	0.06	0.05	.186				0.29	0.17	.095
Proportion female				0.05	0.11	.674	0.05	0.11	.672	0.02	0.11	.826
Class mean home possessions				0.16	0.09	.069	0.2	0.08	.014	0.18	0.09	.048
Class mean parental education				-0.02	0.03	.478	-0.02	0.03	.441	-0.02	0.03	.384
Class pre-test standard deviation							0.24	0.15	.109	0.14	0.16	.365

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										-0.37	0.25	.132
Number of observations	100			100			100			100		
R2	0.14			0.18			0.19			0.22		
Adj. R2	0.14			0.15			0.16			0.17		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.3 *BMV-Chile* - OTL Instructional quality observed in videos - Quality of Subject Matter Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.36	0.02	<.001	1.8	0.38	<.001	1.79	0.39	<.001	1.79	0.40	<.001
Class mean pre-test score[a]	0.04	0.03	.225	0.02	0.05	.722				-0.06	0.17	.738
Proportion female				-0.11	0.11	.320	-0.11	0.11	.321	-0.1	0.11	.361
Class mean home possessions				0.11	0.09	.227	0.12	0.08	.135	0.1	0.09	.251
Class mean parental education				-0.03	0.03	.302	-0.03	0.03	.326	-0.03	0.03	.329
Class pre-test standard deviation							-0.02	0.14	.891	-0.03	0.16	.846
Class mean pre-test score[a]*Class										0.12	0.25	.626

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
pre-test standard deviation												
Number of observations	100			100			100			100		
R2	0.01			0.04			0.04			0.04		
Adj. R2	0.00			0.00			0.00			-0.02		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.4 Colombia - Aggregated OTL observed in lesson materials

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	0.26	0.01	<.001	0.46	0.09	<.001	0.5	0.10	<.001	0.5	0.11	<.001
Class mean pre-test score[a]	0.02	0.01	.100	0.03	0.02	.142				0.07	0.07	.357
Proportion female				-0.08	0.06	.182	-0.08	0.06	.170	-0.1	0.06	.123
Class mean home possessions				0.03	0.03	.295	0.05	0.03	.055	0.03	0.03	.354
Class mean parental education				-0.01	0.01	.079	-0.01	0.01	.063	-0.01	0.01	.116
Class pre-test standard deviation							-0.03	0.05	.477	-0.06	0.05	.312

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										-0.04	0.09	.645
Number of observations	97			97			97			97		
R2	0.03			0.08			0.06			0.1		
Adj. R2	0.02			0.04			0.02			0.04		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.5 Colombia - OTL Instructional quality observed in videos - Cognitive Engagement Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.49	0.03	<.001	1.8	0.28	<.001	1.87	0.31	<.001	1.92	0.34	<.001
Class mean pre-test score[a]	0.06	0.05	.161	-0.02	0.05	.767				-0.1	0.22	.663
Proportion female				0.18	0.18	.333	0.15	0.19	.415	0.15	0.19	.444
Class mean home possessions				0.22	0.08	.010	0.22	0.08	.006	0.24	0.09	.010
Class mean parental education				-0.03	0.02	.142	-0.03	0.02	.142	-0.04	0.02	.130
Class pre-test standard deviation							-0.08	0.15	.583	-0.1	0.17	.552

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										0.11	0.27	.676
Number of observations	97			97			97			97		
R2	0.02			0.1			0.1			0.1		
Adj. R2	0.01			0.06			0.06			0.04		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.6 Colombia - OTL Instructional quality observed in videos - Quality of Subject Matter Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.4	0.02	<.001	1.24	0.22	<.001	1.3	0.25	<.001	1.33	0.27	<.001
Class mean pre-test score[a]	0.04	0.03	.214	0.03	0.04	.448				0.04	0.17	.810
Proportion female				-0.02	0.14	.874	-0.03	0.15	.824	-0.05	0.15	.731
Class mean home possessions				-0.02	0.07	.749	0.01	0.06	.925	-0.02	0.07	.780
Class mean parental education				0.01	0.02	.420	0.01	0.02	.458	0.01	0.02	.448
Class pre-test standard deviation							-0.06	0.11	.621	-0.1	0.13	.463
Class mean pre-test score[a]*Class pre-test standard deviation										0.00	0.21	.987

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Number of observations	97			97			97			97		
R2	0.02			0.03			0.02			0.03		
Adj. R2	0.01			-0.02			-0.02			-0.03		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.7 England - Aggregated OTL observed in lesson materials

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	0.31	0.01	<.001	0.34	0.27	.203	0.24	0.27	.378	0.32	0.27	.237
Class mean pre-test score[a]	0.03	0.01	.033	0.04	0.02	.038				0.13	0.06	.049
Proportion female				0.00	0.05	.993	-0.01	0.05	.892	0.00	0.05	.955
Class mean home possessions				-0.01	0.04	.719	0.00	0.04	.919	-0.02	0.04	.615
Class mean parental education				0.00	0.02	.900	0.00	0.02	.860	0.00	0.02	.890
Class pre-test standard deviation							0.04	0.06	.491	-0.07	0.08	.400

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										-0.14	0.10	.166
Number of observations	89			89			89			89		
R2	0.05			0.05			0.01			0.08		
Adj. R2	0.04			0.01			-0.04			0.01		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.8 England - OTL Instructional quality observed in videos - Cognitive Engagement Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.87	0.04	<.001	0.32	0.91	.724	0.09	0.91	.924	0.36	0.95	.704
Class mean pre-test score[a]	0.1	0.05	.045	0.08	0.06	.192				0.02	0.22	.924
Proportion female				0.01	0.17	.954	-0.01	0.17	.967	0.01	0.18	.953
Class mean home possessions				-0.11	0.14	.436	-0.08	0.14	.571	-0.11	0.14	.468
Class mean parental education				0.11	0.06	.088	0.12	0.06	.061	0.11	0.06	.109
Class pre-test standard deviation							0.16	0.21	.458	0.00	0.27	.997

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										0.09	0.35	.792
Number of observations	89			89			89			89		
R2	0.05			0.08			0.07			0.08		
Adj. R2	0.03			0.04			0.02			0.01		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.9 England - OTL Instructional quality observed in videos - Quality of Subject Matter Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.76	0.04	<.001	0.98	0.91	.281	0.93	0.90	.304	1.13	0.94	.233
Class mean pre-test score[a]	0.06	0.05	.214	0.03	0.06	.651				-0.02	0.22	.937
Proportion female				0.05	0.17	.786	0.04	0.17	.804	0.05	0.17	.755
Class mean home possessions				0.04	0.14	.803	0.06	0.14	.659	0.05	0.14	.746
Class mean parental education				0.05	0.06	.397	0.06	0.06	.340	0.05	0.06	.456
Class pre-test standard deviation							-0.05	0.21	.822	-0.15	0.27	.578

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										0.11	0.35	.741
Number of observations	89			89			89			89		
R2	0.02			0.04			0.04			0.04		
Adj. R2	0.01			-0.01			-0.01			-0.03		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.10 Germany - Aggregated OTL observed in lesson materials

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	0.37	0.01	<.001	0.01	0.33	.965	-0.07	0.33	.824	-0.14	0.37	.709
Class mean pre-test score[a]	0.04	0.03	.109	0.02	0.03	.522				-0.07	0.13	.609
Proportion female				-0.02	0.10	.816	-0.03	0.10	.750	-0.02	0.10	.809
Class mean home possessions				0.02	0.05	.645	0.02	0.05	.724	0.02	0.05	.731
Class mean parental education				0.02	0.02	.265	0.03	0.02	.213	0.03	0.02	.193
Class pre-test standard deviation							0.07	0.06	.223	0.08	0.07	.287

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										0.07	0.15	.612
Number of observations	60			60			60			60		
R2	0.04			0.1			0.12			0.13		
Adj. R2	0.03			0.04			0.06			0.03		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.11 Germany - OTL Instructional quality observed in videos - Cognitive Engagement Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.81	0.04	<.001	3.71	1.09	.001	3.74	1.08	.001	3.91	1.20	.002
Class mean pre-test score[a]	0.00	0.08	.970	-0.01	0.09	.932				0.21	0.44	.641
Proportion female				-0.68	0.31	.035	-0.67	0.31	.036	-0.7	0.32	.036
Class mean home possessions				0.28	0.16	.084	0.28	0.16	.083	0.29	0.16	.087
Class mean parental education				-0.1	0.07	.147	-0.1	0.07	.137	-0.11	0.07	.133
Class pre-test standard deviation							-0.03	0.19	.892	-0.04	0.24	.883

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										-0.23	0.48	.628
Number of observations	60			60			60			60		
R2	0.00			0.1			0.1			0.11		
Adj. R2	-0.02			0.04			0.04			0.01		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.12 Germany - OTL Instructional quality observed in videos - Quality of Subject Matter Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.51	0.03	<.001	1.94	0.70	.007	1.93	0.70	.007	2.27	0.76	.004
Class mean pre-test score[a]	0.00	0.05	.931	0.00	0.06	.975				0.4	0.28	.156
Proportion female				-0.21	0.20	.297	-0.21	0.20	.294	-0.26	0.20	.211
Class mean home possessions				0.06	0.10	.549	0.06	0.10	.551	0.07	0.10	.535
Class mean parental education				-0.02	0.04	.633	-0.02	0.04	.632	-0.04	0.04	.413
Class pre-test standard deviation							0.01	0.12	.965	-0.02	0.15	.917

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										-0.45	0.30	.142
Number of observations	60			60			60			60		
R2	0.00			0.02			0.02			0.06		
Adj. R2	-0.02			-0.05			-0.05			-0.05		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.13 Mexico - Aggregated OTL observed in lesson materials

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	0.22	0.01	<.001	0.41	0.15	.009	0.28	0.17	.104	0.36	0.17	.038
Class mean pre-test score[a]	0.02	0.02	.221	0.07	0.02	.010				0.04	0.07	.580
Proportion female				0.16	0.10	.114	0.13	0.10	.195	0.16	0.10	.119
Class mean home possessions				0.00	0.04	.907	0.01	0.04	.756	-0.01	0.04	.747
Class mean parental education				-0.02	0.01	.062	-0.02	0.01	.186	-0.02	0.01	.092
Class pre-test standard deviation							0.09	0.06	.117	0.04	0.06	.533

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										0.02	0.07	.750
Number of observations	114			114			114			114		
R2	0.01			0.09			0.06			0.1		
Adj. R2	0.00			0.06			0.02			0.05		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.14 Mexico - OTL Instructional quality observed in videos - Cognitive Engagement Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.63	0.03	<.001	2.42	0.39	<.001	1.89	0.41	<.001	2.01	0.42	<.001
Class mean pre-test score[a]	0.06	0.05	.178	0.11	0.06	.091				0.31	0.17	.068
Proportion female				0.11	0.25	.665	0.07	0.24	.780	0.07	0.24	.770
Class mean home possessions				0.12	0.10	.248	0.07	0.10	.469	0.08	0.11	.427
Class mean parental education				-0.06	0.03	.024	-0.05	0.03	.077	-0.06	0.03	.047
Class pre-test standard deviation							0.42	0.14	.003	0.42	0.15	.006

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										-0.28	0.16	.087
Number of observations	114			114			114			114		
R2	0.02			0.06			0.12			0.14		
Adj. R2	0.01			0.03			0.08			0.1		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

2.15 Mexico - OTL Instructional quality observed in videos - Quality of Subject Matter Domain

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
(Intercept)	1.53	0.03	<.001	2.18	0.48	<.001	1.52	0.48	.002	1.41	0.49	.005
Class mean pre-test score[a]	0.04	0.06	.479	0.01	0.08	.865				0.07	0.20	.725
Proportion female				-0.25	0.31	.416	-0.25	0.29	.388	-0.3	0.29	.299
Class mean home possessions				0.16	0.13	.223	0.00	0.12	.974	0.06	0.13	.648
Class mean parental education				-0.04	0.03	.247	-0.03	0.03	.423	-0.02	0.03	.536
Class pre-test standard deviation							0.6	0.16	<.001	0.71	0.18	<.001

	Base			Full Model			SD Model			Interaction Model		
Variables	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Class mean pre-test score[a]*Class pre-test standard deviation										-0.18	0.19	.353
Number of observations	114			114			114			114		
R^2	0.00			0.03			0.13			0.15		
Adj. R^2	0.00			-0.01			0.1			0.11		

[a] standardised within countries to have a mean of 0 and a standard deviation of 1

3 Multilevel models

Baseline Model:

$$Y_{ij} = \gamma_{00} + \gamma_{10}(\text{Class mean pre-test score}) + \gamma_{20}(\text{within-class relative pre-test score}) + u_{0j} + e_{ij}$$

Model 1:

$$Y_{ij} = \gamma_{00} + \gamma_{10}(\text{Class mean pre-test score}) + \gamma_{20}(\text{within-class relative pre-test score}) + \gamma_{30}(\text{Student is female}) + \gamma_{40}(\text{Student home possessions}) + \gamma_{50}(Parental\ Education) + u_{0j} + e_{ij}$$

where:

- Y_{ij}= student-reported OTL
- u_{0j}= classroom-level random intercept
- e_{ij}= student-level residual

3.1 *BMV-Chile* - Student-reported OTL

	Baseline			Model 1		
Variables	*b*	*SE*	*variance*	*b*	*SE*	*variance*
Fixed Effects						
(Intercept)	9.01	0.07		9.06	0.24	
Class mean pre-test score	0.07	0.07		0.00	0.08	
within-class relative pre-test score	0.02	0.05		-0.01	0.06	
Female				0.03	0.08	
Home possessions				0.14	0.05	
Parental education				0.00	0.02	
Random Effects						
Between-class variance			0.31			0.33
Within-class variance			3.21			3.08
Number of observations	2215			2144		
ICC	.088			.096		

	Baseline			Model 1		
Variables	*b*	*SE*	*variance*	*b*	*SE*	*variance*
R2 marginal	.001			.004		
R2 conditional	.089			.100		

3.2 Colombia - Student-reported OTL

	Baseline			Model 1		
Variables	*b*	*SE*	variance	*b*	*SE*	variance
Fixed Effects						
(Intercept)	8.58	0.09		8.94	0.21	
Class mean pre-test score	0.18	0.10		0.15	0.10	
within-class relative pre-test score	0.10	0.06		0.10	0.06	
Female				0.09	0.10	
Home possessions				0.18	0.07	
Parental education				-0.03	0.02	
Random Effects						
Between-class variance			0.49			0.52
Within-class variance			4.32			4.19
Number of observations	1994			1939		
ICC	.103			.111		

	Baseline			Model 1		
Variables	*b*	*SE*	variance	*b*	*SE*	variance
R2 marginal	.006			.011		
R2 conditional	.108			.121		

3.3 England - Student-reported OTL

	Baseline			Model 1		
Variables	*b*	*SE*	variance	*b*	*SE*	variance
Fixed effects						
(Intercept)	9.17	0.07		8.78	0.22	
Class mean pre-test score	0.23	0.07		0.15	0.07	
within-class relative pre-test score	0.06	0.05		0.06	0.05	
Female				0.33	0.08	
Home possessions				0.19	0.05	
Parental education				0.02	0.02	
Random Effects						
Between-class variance			0.29			0.27
Within-class variance			4.04			4.02
Number of observations	2358			2327		
ICC	.067			.062		

	Baseline			Model 1		
Variables	*b*	*SE*	variance	*b*	*SE*	variance
R2 marginal	.010			.023		
R2 conditional	.076			.084		

3.4 Germany - Student-reported OTL

	Base			Model 1		
Variables	*b*	*SE*	*variance*	*b*	*SE*	*variance*
Fixed effects						
(Intercept)	7.36	0.07		7.81	0.33	
Class mean pre-test score	0.37	0.08		0.34	0.08	
within-class relative pre-test score	0.14	0.06		0.11	0.07	
Female				-0.23	0.09	0.05
Home possessions				0.15	0.06	0.02
Parental education				-0.02	0.02	0.00
Random effects						
Between-class variance			0.31			0.31
Within-class variance			3.01			3.01
Number of observations	1753			1614		
ICC	.095			.093		

	Base			Model 1		
Variables	*b*	*SE*	*variance*	*b*	*SE*	*variance*
R2 marginal	.034			.039		
R2 conditional	.125			.129		

3.5 Mexico - Student-reported OTL

	Base			Model 1		
Variables	*b*	*SE*	*variance*	*b*	*SE*	*variance*
Fixed effects						
(Intercept)	8.95	0.10		8.92	0.33	
Class mean pre-test score	0.07	0.10		0.07	0.10	
within-class relative pre-test score	0.00	0.05		0.01	0.05	
Female				0.00	0.09	
Home possessions				0.02	0.06	
Parental education				0.00	0.02	
Random effects						
Between-class variance			0.37			0.37
Within-class variance			1.84			1.83
Number of observations	945			924		
ICC	.167			.169		

	Base			Model 1		
Variables	*b*	*SE*	*variance*	*b*	*SE*	*variance*
R^2 marginal	.002			.002		
R^2 conditional	.169			.170		