

Language of Instruction and Student Learning: Evidence from an Experimental Program in Cameroon

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 - ▶ Learning outcomes across Sub Saharan Africa abysmally low.
[▶ figure](#) [▶ figure](#)
 - ▶ Number of rigorous randomized evaluation shows spending on conventional resources has no discernible impact on test scores (Banerjee et. al 2007; Muralidharan 2013).
- ▶ What factors affect student learning outcomes?
 - ▶ Explore the role and peculiarity of medium of instruction policies on the Sub-Saharan continent. [▶ figure](#) [▶ go](#)

Overview and preview of results

- ▶ Experimental mother tongue schooling program in the Boyo division of Northwestern Cameroon:
 - ▶ Introduction of local language instruction for the first 3 years of primary schooling in 12 experimental schools.
 - ▶ At the end of 3 years the students revert back to the standard practice of English medium instruction.
- ▶ Main findings:
 - ▶ In grade 1 and 3 assessments - treated students scores more than double the control students; gains of 1.2-1.4 of standard deviation.
 - ▶ At the end of grade 5 (two years after reverting to English language instruction):
 - ▶ Treated students still demonstrate a small statistically significant advantage in test scores.
 - ▶ However raw scores of both groups so low - suggests almost no learning taking place.

The Kom experimental mother tongue project

- ▶ The program involved the introduction of Kom, the local language of the area:
 - ▶ In 12 experimental for the first 3 years of primary schooling.
 - ▶ At the end of the 3 years students in the treated school revert to the standard practice of English medium instruction.
 - ▶ These 12 experimental schools *matched* to 12 comparison schools in the region.
 - ▶ The students in the control and treated schools followed for a period of 6 years.
 - ▶ At the end of each year student assessment tests carried out by independent evaluators:
 - ▶ Test in grades designed to be compatible with level of knowledge prescribed by the national curriculum.

Design of the intervention

- ▶ 12 schools perceived to be low performing were chosen by the local education inspectors as treatment schools.
- ▶ These 12 schools were then matched with 12 most similar comparison schools.
- ▶ The matching was heuristically driven and used three explicit criteria to identify similar schools:
 - ▶ Geographical proximity to the matched experimental school.
 - ▶ Similar size (no. of students and student teacher ratios).
 - ▶ Similar type - public, private or religious affiliation.

Design of the intervention

- ▶ Given randomization was not used we need to pay careful attention to possible sources of bias:
 - ▶ Show treated and control schools do not exhibit any differences on a host of available characteristics. [▶ table](#)
 - ▶ Treated and control students do not exhibit any differences on a host of available characteristics. [▶ table](#)
 - ▶ Treated, control and 'Other' schools exhibit no differences on the primary school leaving test scores. [▶ table](#)

Other important aspects of the design

- ▶ Teachers in the experimental schools were already working there before and no new teachers hired for the initiative.
- ▶ Teachers in the local language stream - provided training for 2 weeks to teach in the local language:
 - ▶ Corresponds to the normal length of teacher training in the English medium schools.
- ▶ As no local language textbooks were available on the market they were provided free of cost to experimental schools
 - ▶ Control students were expected to buy their own textbooks but often do not
 - ▶ Glewwe et. al (2009) find provision of textbooks in Kenya has no effect of student scores:
 - ▶ Argue most students are unable to use English language textbooks

Level of attrition by treatment status

	No. of Treated	Percentage of Attrition for the Treated	No. of Untreated	Percentage of Attrition for the Untreated
Present in Grade 1	323	..	335	..
Present in Grade 3	166	49 %	100	70%
Present in Grade 5	85	74 %	39	88 %

- ▶ Fact 1: Attrition is higher in the control group

Test scores and attrition by treatment status

	No. of Treated	Overall Score of Treated in Grade 1	No. of Untreated	Overall Score of Untreated in Grade 1
Present in Grade 1 but not in Grade 3 or 5	153	42.78	230	13.60
Present in Grade 1 and 3 but not in Grade 5	85	58.52	64	19.40
Present in Grade 1, 3 and 5	85	63.15	39	26.19
TOTAL	323	52.31	335	16.12

The scores are out of a total possible maximum of 100 points.

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- ▶ The level of attrition is much higher in the control rather than treatment group (1).
- ▶ The worst performing students are the ones who drop out (2).
 - ▶ (1) & (2) Identical ability distributions \Rightarrow Selection is working to downwardly bias our estimates.

Regression estimates of the effect of local language instruction

- ▶ We estimate a reduced form regression given by:
$$Score_{ijk} = \alpha + \varphi Treated_{ij} + v_{ij}$$
 - ▶ $Score_{ijk}$ - test score on the overall standardized achievement test in Math and English of student i from school j , in Grade k .
 - ▶ $Treated_{ij}$ is a dummy indicating whether student i in school j was part of the experimental program
- ▶ Account for serial correlation through a clustered bootstrap with 1000 repetitions and report normal based and BCa confidence intervals.

Effect of local language instruction on standardized overall test score in Grade 1, 3 and 5

	(1)	(2)	(3)	(4)	(5)	(6)
	Std. Overall Score - Grade 1	Std. Overall Score - Grade 1	Std. Overall Score - Grade 3	Std. Overall Score - Grade 3	Std. Overall Score - Grade 5	Std. Overall Score - Grade 5
Treated	1.44*** (0.13) {1.17 - 1.71}	1.44*** (0.13) {1.18 - 1.70} [1.18 - 1.71]	1.11*** (0.20) {0.68 - 1.53}	1.11*** (0.20) {0.72 - 1.49} [0.72 - 1.50]	0.42* (0.24) {-0.079 - 0.93}	0.42* (0.24) {-0.056 - 0.90} [-.03 - 0.93]
Observations	658	658	266	266	124	124
R-squared	0.518	0.518	0.290	0.290	0.041	0.041

▸ controls

▸ attr

Interpreting the importance of treatment effects

- ▶ The estimation results show:
 - ▶ Grade 1: Treated Students overall raw score - **52%**; Control Students overall raw score - **17%**.
 - ▶ Grade 3: Treated Students overall raw score - **45%**; Control Students overall raw score - **23%**.
 - ▶ Grade 5: Treated Students overall raw score - **28%**; Control Students overall raw score - **24%**.
- ▶ Data suggests people in the English stream are passing through without accumulating any useful knowledge.
 - ▶ Low levels of learning in the colonial language, consistent with evidence from other independent studies (Blimpo et al. 2011, DHS 2011, Glewwe et al. 2009).

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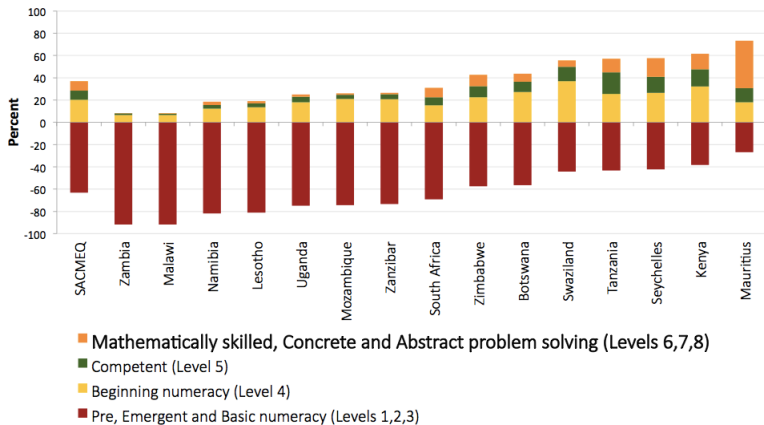
The political-economy of the language of instruction

- ▶ Banerjee and Duflo (2011) argue that school systems remain elitist in many post-colonial states.
 - ▶ Curriculum was developed for a small elite.
 - ▶ Unsuitable for first generation learners.
- ▶ We suggest not only the curriculum but also the language of instruction might be favoring a tiny elite:
 - ▶ The language policy demonstrates a large amount of continuity from the colonial past (Albaugh 2014)
 - ▶ Driven by policy inertia - lack of need for internal taxation or stable borders.
 - ▶ Designed by the colonists to train a small elite to help administer the country (Fabunmi 2009, Whitehead 2005).
 - ▶ Less than 3 % Africa's school-aged population enrolled in schooling at independence.
 - ▶ Not a single country in Sub-Saharan Africa even today provides secondary schooling or higher in a local language.
- ▶ Interest of France in maintaining French as a global language

- ▶ Explored the role of language of schooling as an input to improve student learning:
 - ▶ Results show large positive effects of local language instruction in Grades 1 and 3.
 - ▶ In Grade 5, two years after reverting to English instruction, small positive effect but absolute learning very low.
- ▶ Initial analysis suggest that local language instruction might be necessary for much longer.
- ▶ The results from this intervention, if upheld in better identified treatments, suggest a radical redirection of educational funding in Africa.

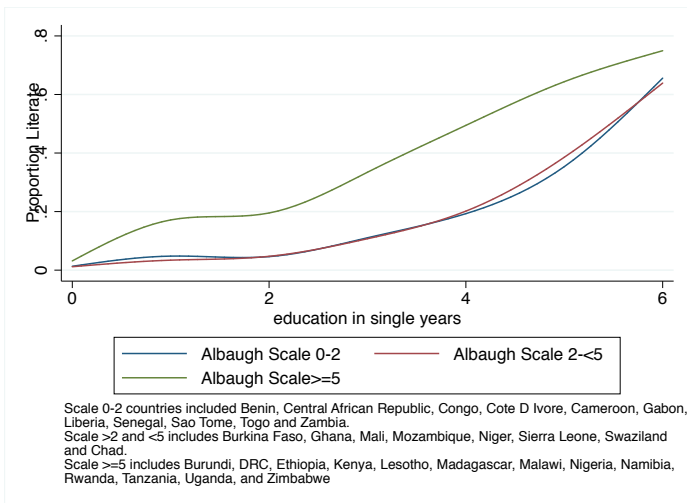
THANK YOU

Student performance in Grade 6



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Ability to read an entire sentence by years of schooling: Classification by prevalence of local language usage



Baseline Group Comparison on School Characteristics - Test of Means

Variable	Control School Mean	Treated School Mean	Diff	p-value
Total Students	163.08	153.33	9.75	0.80
Toilet Dummy	1	0.75	0.25	0.07
Separate Toilet For Girls Dummy	0.58	0.67	-0.08	0.69
Toilet Student Ratio	99.46	102.03	-2.57	0.93
Library Dummy	0	0	0	.
Playground Dummy	0.75	0.83	-0.08	0.63
Roof	2	2	0	.
No. of Rooms	6.83	6.58	0.25	0.80
No. of years of operation	24.5	28.5	-4	0.62
Primary building material	4.33	3.5	0.83	0.04
State of school	1.5	1.75	-0.25	0.36
Avg. years of educ. of Teachers	13.35	14.03	-0.68	0.22
Avg. Years of exper. of Teachers	12.38	14.69	-2.32	0.42
Subjective Rating of Teachers	4.56	4.54	0.01	0.92
Mean primary school leaving score	159.02	158.59	0.43	0.97

2-group Hotelling's T-squared = 30.986956
F test statistic: $((22-13-1)/(22-2)(13)) \times 30.986956 = .95344481$
H0: Vectors of means are equal for the two groups
 $F(13, 8) = 0.9534$
 $Prob > F(13, 8) = 0.5495$

Baseline Group Comparison on Student Characteristics - Test of Means

Variable	Control Students Observations	Control Students Mean	Treated Students Observations	Treated Students Mean	Diff	p-value
Years of educ of Mother	26	4.65	49	4.04	0.61	0.33
Years of educ of Father	27	5.30	63	5.81	-0.51	0.56
Age	35	10.83	76	10.97	-0.15	0.64
Student has a cellphone	36	0.06	85	0	0.06	0.03
Compound has a cellphone	35	0.60	84	0.83	-0.23	0.01
Compound has a radio	36	0.72	84	0.71	0.01	0.93
Compound has a television	36	0.56	84	0.33	0.22	0.02
Compound has a motorcycle	36	0.33	84	0.38	-0.05	0.62
Compound has a car/truck	36	0.44	83	0.46	-0.01	0.89
Compound has a refrigerator	36	0.33	84	0.13	0.20	0.01
Compound has a gas stove	36	0.31	84	0.29	0.02	0.83
Someone in the compound have a business	36	0.44	84	0.52	-0.08	0.43
Someone in the compound have a govt. job	36	0.39	83	0.30	0.09	0.35
Compound has a cement floor	36	0.53	84	0.55	-0.02	0.84
Compound has a metal roof	36	0.61	84	0.48	0.13	0.18
Compound has a toilet	36	0.39	84	0.23	0.16	0.07
Compound has electricity	36	0.36	84	0.24	0.12	0.17

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Comparing schools allocated to treatment, control and not participating in the pre-intervention primary school leaving exam results

	(1)	(2)
Experimental Schools	-2.763 (8.519)	-0.506 (9.057)
'Other' Schools	-0.167 (6.074)	-0.208 (6.314)
School Type Dummies	No	Yes
Observations	102	102
R-squared	0.001	0.041
Average of dependent variable	159.70	159.70

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Effect of local language instruction on standardized overall test score in Grade 1, 3 and 5

	(1) Std. Overall Score Grade 1	(2) Std. Overall Score Grade 3	(3) Std. Overall Score Grade 5	(4) Std. Overall Score Grade 1	(5) Std. Overall Score Grade 3	(6) Std. Overall Score Grade 5	(7) Std. Overall Score Grade 1	(8) Std. Overall Score Grade 3	(9) Std. Overall Score Grade 5
Treated	1.44*** (0.13) {1.19 - 1.69} [1.15 - 1.66]	1.14*** (0.22) {0.71 - 1.56} [0.71 - 1.59]	0.65*** (0.22) {0.22 - 1.09} [0.24 - 1.11]	1.56*** (0.16) {1.23 - 1.88} [1.12 - 1.81]	1.18*** (0.41) {0.37 - 1.99} [.31 - 1.89]	0.44* (0.26) {-0.067 - 0.95} [-0.16 - 0.89]	1.48*** (0.16) {1.16 - 1.79} [1.16 - 1.79]	1.20*** (0.38) {0.45 - 1.94} [0.27 - 1.82]	0.52* (0.29) {-0.050 - 1.10} [-0.10 - 1.07]
Standardized school leaving exam scores	0.17** (0.067) [0.037 - 0.30]	-0.029 (0.12) [-0.26 - 0.21]	-0.19* (0.10) [-0.39 - 0.010]						
Years of educ of Father				0.022 (0.019) [-0.016 - 0.060]	-0.011 (0.037) [-0.083 - 0.061]	0.0038 (0.026) [-0.047 - 0.054]			
Assets	No	No	No	No	No	No	Yes	Yes	Yes
Observations	586	253	119	90	85	90	117	111	117
R-squared	0.530	0.287	0.116	0.613	0.243	0.046	0.617	0.342	0.193

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Effect of local language instruction on standardized overall test score in Grade 1 and 3 - Sample of students present in Grade 5

	(1)	(2)	(3)	(4)
	Std. Overall Score - Grade 1	Std. Overall Score - Grade 1	Std. Overall Score - Grade 3	Std. Overall Score - Grade 3
Treated	1.51*** (0.15) {1.21 - 1.81}	1.51*** (0.15) {1.22 - 1.80} [1.14 - 1.76]	1.20*** (0.31) {0.56 - 1.84}	1.20*** (0.30) {0.61 - 1.79} [0.60 - 1.79]
Observations	124	124	118	118
R-squared	0.563	0.563	0.283	0.283

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Early vs. Late exit programs

- ▶ The findings are also relevant for the debate regarding early or immersion vs late exit local language instruction:
 - ▶ Late exit programs are those which provide local language instruction for at least 6-8 years.
 - ▶ Late exit programs - have higher and longer lasting effects on minority student achievement in developed countries (Cummins 1979, Thomas and Collier 2002).
 - ▶ Early exit programs typically involve 1-3 years of local language instruction.
 - ▶ Typically find that in early exit programs any initial gains fade away rapidly.

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Early vs. Late exit programs

- ▶ The setting we analyze compared to the developed countries:
 - ▶ Level of exposure for students in Cameroon (Sub-Saharan Africa) much lower than for language minority students such as Hispanics in the US (1)
 - ▶ Teachers having less than perfect command of the dominant colonial language (2)
 - ▶ (1) & (2) \Rightarrow Local language instruction necessary for longer than in developed countries..

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Summary Statistics on Outcomes by Treatment Status in Grade 5

	Mean	SD	N	Min	Max
Panel E: Treated Students - Grade 5					
Standardized values of overall score - Grade 5	0.18	0.96	85.00	-2.00	2.72
Standardized values of English score - Grade 5	0.20	0.98	85.00	-1.98	2.71
Standardized values of Math score - Grade 5	0.03	0.96	85.00	-2.18	2.90
Raw Overall Score Grade 5	27.78	7.81	85.00	10.00	48.57
Raw Score English Grade 5	35.59	11.47	85.00	10.00	65.00
Raw Score Math Grade 5	17.37	7.58	85.00	0.00	40.00
Panel B: Control Students - Grade 5					
Standardized values of overall score - Grade 5	-0.25	0.97	39.00	-2.18	2.20
Standardized values of English score - Grade 5	-0.33	0.91	39.00	-1.98	1.85
Standardized values of Math score - Grade 5	0.06	1.06	39.00	-2.18	1.63
Raw Overall Score Grade 5	24.32	7.90	39.00	8.57	44.29
Raw Score English Grade 5	29.36	10.68	39.00	10.00	55.00
Raw Score Math Grade 5	17.61	8.34	39.00	0.00	30.00

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- ▶ Developing countries - Ramachandran (2016); Laitin and Ramachandran (2016); Taylor (2016); Eriksson (2014); exception - Angrist and Lavy (1997)
- ▶ Developed countries - Dustmann et. al (2010, 2012); Thomas and Collier (2002); Slavin et. al 2011; Chin et. al 2013

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