



IT'S THE IMPLEMENTATION, STUPID! EVIDENCE ON IMPROVING LEARNING OUTCOMES FROM THE COLOMBIAN ESCUELA NUEVA SCHOOL MODEL

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Abstract

Escuela Nueva (New School), a school model designed to improve the learning outcomes of disadvantaged children, has officially been widely used in Colombia for years. However, the country's performance on international standardized tests of learning remains poor. This study uses a mixed methods approach to analyze program implementation and learning outcomes (as measured by the standardized test *Pruebas SABER* 2013) and finds that the model indeed improves learning outcomes, but that its effectiveness depends strongly on proper program implementation, which is found to be lacking.

BACKGROUND

While education has been a top priority on the International Development agenda for decades, only recently has the focus of research and policy interest shifted from questions of mere access to issues of quality and equity. Alas, evidence is accumulating that the link between school attendance and learning outcomes is often weak. In a seminal paper, Nancy Birdsall and Jere Behrman (1983) showed that estimates of returns to education are seriously biased if education is measured by years of schooling (which is a simple attendance measure), and not by education quality or learning outcomes. Since then, their finding has been replicated in many contexts, and the question of how to improve learning (rather than simply increase schooling) has become an issue of intense debate.

Colombia is a case in point. At first sight, official enrollment data for Colombia gives little reason to worry: the primary completion rate is at 100% (World Bank 2018). However, a closer look points towards some problems of quality and equity. Results from international school achievement tests suggest that Colombia's schools do a bad job in teaching children skills and knowledge. For instance, Colombian primary students showed below-low proficiency levels on the 2007 round of TIMSS (Trends in International Mathematics and Science Study), with only 10% of students reaching at least an intermediate level of understanding (level two out of four). Differences between gender, location, and wealth were staggering (UNESCO EFA 2018). Hence, while Colombia has by and large (though not entirely) solved the problem of low enrollment, the challenge of how to provide children with a quality education remains pressing.

One possible solution for the poor learning results is an innovative school model, Escuela Nueva (EN, "New School"), that emerged in Colombia as a grassroots project in the 1960s, and that, according to some empirical evidence, helps improve learning outcomes (formal evaluations include Rojas and Castillo 1988; cit. in Velez 1991; Psacharopoulos, Rojas, and Velez 1992; and McEwan 1998; indirect evidence comes from Casassus et al. 2000; Nuñez et al. 2002; and Uribe 1998; additionally, the broader education literature provides evidence for the effectiveness of specific

elements of the model). The EN model tries to address the specific needs of disadvantaged children in rural and, more recently, poor urban areas. According to Colbert (2009), EN's core assumption is that the overall quality of education can only improve if creative changes throughout the school model are made. From that, a number of key characteristics emerged, such as a student-centered education where teachers function as mentors in multi-grade classrooms; the use of learning guides that teach children to teach themselves; strong elements of school democracy; a characteristic classroom organization including flexible furniture, libraries, and learning corners; and more (Colbert 2009; McEwan 2008; Forero-Pineda, Escobar-Rodríguez, and Molina 2006). Today, EN has become national policy: EN schools are public schools that are financed by the government, but they use materials and approaches that often differ from "conventional" schools. There are around 20,000 EN schools across Colombia, most of them in rural areas—officially, they represent about half of the country's primary schools (ICFES 2010).

The evidence presented in the previous two paragraphs does not seem to add up. How can it be that learning outcomes are so poor, while at the same time the country prides itself with the development of a progressive, student-centered school model? There are two possible explanations: Either the EN model is not as effective as it is portrayed to be, or it is not being used as extensively as suggested. Clearly, an appropriate education policy response would look very different depending on which of these answers is more in line with empirical evidence. This study collects evidence on two sets of questions. The first one is related to the extent of EN program implementation: How many schools actually use the model, compared to the number of schools that report using it? How faithfully are the individual elements implemented? And how different are EN schools in practice from conventional schools? The second set of questions asks if learning outcomes are better in schools that implement the EN model, and to what extent faithful program implementation matters—for average outcomes, and specifically, given the persistent achievement gaps in the country, for children from disadvantaged socioeconomic backgrounds and for girls.

METHODS AND DATA

This study uses a mixed-methods design consisting of the following three elements:

1. A country-level analysis of learning outcomes in all Colombian primary schools based on test results from the standardized test Pruebas SABER 2013, using quantitative multilevel (ML) methods;
2. A department-level analysis of learning outcomes in a representative sample of rural schools from one department (Quindío) based on Pruebas SABER 2013 results and on new data on program implementation, using survey estimation techniques; and
3. The triangulation of the results based on a qualitative study of a small number of schools using interviews and observations, combined with key-informant interviews.

Academic performance is the result of a wide range of factors. Some of these factors are characteristics of the individual student or their home and family environment; some of them are characteristics of the school; and some of them are characteristics of the municipality or department, or even of the country as a whole. A ML framework is a research design that addresses these empirical relationships by explicitly taking into account the ML structure, using random intercepts for each level of analysis (Raudenbush and Bryk 2002; Snijders and Bosker 2011; Rabe-Hesketh and Skrondal 2012). An alternative technique to account for the data clustering is the use of survey estimation techniques with clustered standard errors. While this technique also provides unbiased estimates, it treats the clustered data structure as a nuisance to be corrected, rather than as a source for further insights. ML estimation, by contrast, allows to analyze heterogeneities between schools or regions and draw further conclusions. This study uses primarily ML techniques for the country-level analysis and survey estimation techniques in the department-level study, as ML techniques require large datasets.



Learning outcomes are modeled as a function of the school model (Escuela Nueva or conventional school), gender, school location (rural versus urban), school type (private or public), the average socioeconomic level of the school, the presence of students of ethnic background, the presence of students who are victims of Colombia's internal conflict, the session type (full day, morning, or afternoon), and quality of municipal governance. There are also two interaction terms to test the hypotheses that the effect of EN differs by gender, and that the model is particularly beneficial for children from lower socioeconomic levels. The country-level model has four levels (students, schools, municipalities, and departments), each of which is assumed to have a random intercept. There are also two random coefficients of EN to reflect the assumption that the effect of the EN model might vary between municipalities and departments.

The quantitative analysis is based on data from a variety of sources:

- Data on learning outcomes for mathematics, language, and civic competencies from the standardized test *Pruebas SABER*, covering all 3rd and 5th grade students in 2013 (ICFES 2015). The analysis is based on data from over 810,000 students in 21,235 schools across Colombia.
- Administrative school data provided by the national statistics bureau DANE, which includes an official Escuela-Nueva classifier (DANE 2013).
- Primary data on program implementation, collected from a representative sample of rural schools in one Colombian department, Quindío. Data is available for 76 schools, representing a total of 1,068 students from the Pruebas SABER database.
- Data on municipal governance from the National Planning Department (DNP 2014)

Qualitative data was collected through focus group interviews with students, semi-structured interviews with teachers, and non-participatory observations in six primary schools in Quindío. These schools were purposefully selected to cover schools with particularly high and particularly low levels of observed program implementation.

RESULTS

1. Country-level analysis of the effect of EN classification on learning outcomes

For lack of country-wide implementation data, the official EN classifier from the administrative school database was used to identify EN schools. As shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**, a statistically significant, positive effect of EN was found for all grade levels and subject areas (language grades 3 and 5; mathematics grade 3 and 5; and civic competencies grade 5). Country-wide, the expected *ceteris paribus* difference in exam scores between a student in an EN school and a student in a conventional school is, depending on the testing area, between 10 and 23 points. For comparison: the mean score in the sample is at around 280 points for all exams, the standard deviation is around 75 points. This EN effect is comparable in size to the effect of the difference of one socioeconomic level (out of four official levels), and up to a third of the size of the distance between two achievement levels as defined by ICFES. There is also evidence that the EN model helps to reduce inequalities: The predicted exam score for students in schools of low average socioeconomic level is higher if the school implements the EN model, and the EN model helps to diminish gender gaps in some areas.

The analysis reveals sizable differences in the effect of the EN model on learning across municipalities and departments (the statistical significance of these random slopes was confirmed using LR tests). These variations may indicate that local policies and support for the EN model matter for the success of the model. Unfortunately, no data was available to further test this hypothesis. A tentative analysis suggests that the EN effect tends to be stronger in departments with a longer history of program implementation, and weaker in departments without political support for the model.



2. Department-level analysis of the effect of EN implementation on learning outcomes

Program Implementation. The results of the implementation evaluation show that there are indeed large differences in classroom practices across the department that was studied, both overall and with regard to the individual model elements. Even though most of Quindío's rural schools are officially classified as EN schools, they achieve, on average across schools, just over 60 points on the implementation index, meaning that they implement just over 60% of the model's elements. The index has a theoretical range from 0 to 100 points, and ranges in the sample from 22.5 points to 83.8 points. Implementation varies between the different aspects of the model, too. Furthermore, schools that are officially classified as EN do, in fact, implement a larger share of the model's elements than conventional schools, but variation within each group is very large and the difference in means is small.

Effect on learning outcomes. The effect of the school model on learning outcomes is analyzed using an implementation index instead of the official classifier. As reported in **Fehler! Verweisquelle konnte nicht gefunden werden.**, survey estimation techniques reveal a large effect of EN implementation for grade 3 mathematics and for civic competencies. The coefficients describe the effect of a 1-point increase in the 100-point implementation index. Hence, the difference in the expected score between a school with a particularly low and one with a particularly high implementation index is between 140 and 220 points—a large difference on a 600-point achievement scale, enough to bridge two achievement levels. The department-level analysis also confirms that the EN model helps to close gaps between socioeconomic levels (but shows no such effect for gender gaps).

3. Qualitative analysis of program implementation

The qualitative evidence backs up the finding that model implementation is very heterogeneous and confirms that the official EN classifier is not a precise way of identifying EN schools. Additionally, it shows that the ways in which the same elements are being used in different schools, and the reasons for why they are being used (or not used), vary widely. The interviews also revealed shortcomings in teacher training and in other support resources provided to teachers.

DISCUSSION

The results from the different levels of analysis are largely coherent: the EN model is indeed associated with improved learning outcomes, controlling for a range of other factors of influence; the effect is stronger when considering actual implementation levels instead of the imprecise official classifier; the model tends to especially benefit students in schools of lower socioeconomic level; and it tends to decrease differences in achievement scores between genders. In light of the global challenge to identify educational strategies that improve learning outcomes, not just school attendance, the EN model might thus be a possible strategy.

However, the analysis also shows the importance of proper program implementation. This includes the provision of sufficient funds for teacher training and learning resources, but is not limited to purely financial issues: a proper definition of the key inputs and their respective purpose, consistent support for schools and teachers, and an effective monitoring system also need to be in place. In that light, it is not clear how successful the model can be in environments with weak institutional capacity or without strong political support. While the available evidence suggests that the model can flourish even in the absence of these factors, its success then largely depends on teacher capacity and motivation.



SUMMARY

In the study of education outcomes, the focus of research and policy making has shifted from issues of mere quantity (school attendance and completion) to issues of quality and equity (learning outcomes and the reduction of disadvantages based on sociodemographic and socioeconomic characteristics). The Colombian Escuela Nueva (EN) school model claims to improve both quality and equity, against the background of poor average learning outcomes in Colombia. This is said to be achieved through a student-centered learning model, where teachers take the role of mentors and students learn to teach themselves in a flexible multilevel classroom environment that emphasizes collaboration, school democracy, and self-responsibility. This study uses data from over 800,000 students in over 21,000 Colombian primary schools to analyze whether the EN model indeed improves learning outcomes. The results of a multilevel estimation show that scores on the standardized test *Pruebas SABER* 2013 are indeed better in schools that are officially classified as EN schools. However, new quantitative and qualitative data, collected in one Colombian department in a representative sample of almost 80 rural schools, show that program implementation is often poor, and that the distinction between EN and non-EN schools is not clear. In a next step, the study uses a program implementation index to identify the school model when estimating EN's effect on learning outcomes. As a result, the estimated program effect increases dramatically, implying that the model, when properly implemented, has a strong effect on learning. This suggests that more attention should be put on making sure that the model is being properly used. More generally, this study shows the importance of improving implementation capacity.

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Table 1: Results of the country-level four-level random coefficient model. Dependent variable: Score on respective standardized test

	Language				Mathematics				Civic Competencies	
	Grade 3		Grade 5		Grade 3		Grade 5		Grade 5	
Fixed part:										
Escuela Nueva (EN)	14.97 ***	(2.64)	11.64 ***	(2.46)	23.24 ***	(2.78)	15.38 ***	(2.22)	10.47 ***	(1.96)
Male	-10.24 ***	(0.32)	-13.55 ***	(0.29)	0.59	(0.32)	7.22 ***	(0.30)	-18.61 ***	(0.30)
EN*Male	1.49	(0.93)	-0.28	(1.01)	-1.84	(1.11)	-3.03 ***	(0.88)	2.72 **	(0.86)
Rural	1.36	(1.51)	3.88 ***	(1.21)	3.88 *	(1.68)	4.03 **	(1.31)	3.58 ***	(1.06)
Private	39.20 ***	(1.97)	25.52 ***	(1.56)	41.34 ***	(2.15)	26.42 ***	(1.71)	25.33 ***	(1.42)
Socioeconomic level	14.84 ***	(0.79)	18.85 ***	(0.64)	12.00 ***	(0.89)	16.51 ***	(0.72)	15.74 ***	(0.57)
EN*Socioecon. level	-10.37 ***	(1.69)	-13.38 ***	(1.41)	-9.76 ***	(1.86)	-12.17 ***	(1.57)	-10.40 ***	(1.30)
has ethnic students	-4.48 ***	(1.26)	-4.57 ***	(1.04)	-3.75 **	(1.43)	-4.85 ***	(1.13)	-3.49 ***	(0.91)
has conflict victims	-5.98 ***	(1.06)	-3.23 ***	(0.89)	-7.84 ***	(1.21)	-2.44 *	(0.96)	-2.86 ***	(0.81)
Morning session ⁺	-2.39	(1.70)	-5.53 ***	(1.42)	-0.74	(1.91)	-4.01 **	(1.53)	-4.06 ***	(1.27)
Afternoon session ⁺	-8.34 ***	(1.79)	-12.46 ***	(1.48)	-6.87 ***	(1.96)	-11.02 ***	(1.56)	-8.61 ***	(1.30)
Governance Index	0.24 ***	(0.07)	0.18 **	(0.06)	0.23 **	(0.08)	0.19 **	(0.07)	0.13 *	(0.06)
Grand mean	279.48 ***	(3.10)	280.00 ***	(3.13)	277.52 ***	(3.59)	269.09 ***	(3.63)	279.67 ***	(3.06)
Random part (sd):										
EN [department]	9.01	(2.33)	8.95	(2.07)	7.67	(2.46)	6.60	(1.97)	6.37	(1.68)
Intercept [Department]	11.12	(1.85)	13.56	(2.01)	13.48	(2.27)	16.02	(2.38)	13.82	(1.99)
Correlation [EN, dep.]	0.02	(0.30)	0.14	(0.29)	-0.13	(0.34)	0.11	(0.33)	-0.05	(0.30)
EN [municipality]	18.21	(1.89)	16.96	(1.65)	26.87	(1.99)	21.03	(1.69)	14.85	(1.39)
Intercept [Municipality]	12.78	(0.91)	12.22	(0.80)	15.97	(1.05)	14.24	(0.88)	11.82	(0.71)
Correlation [EN, muni.]	0.14	(0.15)	-0.08	(0.14)	0.08	(0.11)	0.02	(0.12)	-0.01	(0.12)
Intercept [School]	42.60	(0.43)	32.25	(0.37)	48.20	(0.44)	36.14	(0.37)	27.24	(0.31)
Residual [Student]	59.46	(0.12)	67.36	(0.16)	61.58	(0.12)	63.92	(0.11)	64.53	(0.12)
n (students)	197,234		277,179		195,978		274,404		276,169	
j (schools)	17,652		17,586		17,475		17,200		17,533	
m (municipalities)	1,007		1,011		1,009		1,009		1,010	
d (departments)	33		33		33		33		33	

Standard errors in parenthesis. For fixed part of the model: ***: $p \leq 0.001$, **: $p \leq 0.01$, *: $p \leq 0.05$.) + Base category: Full-day session.



Table 2: Results of the department-level survey estimation model. Dependent variable: Score on respective standardized test

	Language Grade 3		Language Grade 5		Mathematics Grade 3		Mathematics Grade 5		Civics Grade 5	
EN Index (ENI)	1.34	(0.75)	-1.36	(0.68)	3.70 *	(1.46)	0.74	(0.66)	2.26 **	(0.68)
male	-12.34	(16.11)	-14.42	(13.99)	35.20 *	(12.43)	15.41	(12.71)	-17.60 *	(8.37)
ENI*male	-0.11	(0.39)	-0.31	(0.31)	-0.94	(0.38)	-0.28	(0.35)	-0.46 *	(0.21)
Socioeconomic Level	56.13 *	(25.51)	-32.40	(22.20)	122.07 **	(38.99)	33.30	(27.89)	113.43 ***	(24.72)
ENI*Socioec. level	-1.11	(0.61)	1.22	(0.58)	-2.88 **	(1.03)	-0.59	(0.59)	-2.09 ***	(0.57)
has ethnic students	-32.35 **	(11.09)	-58.97 ***	(10.24)	-40.64 *	(16.01)	-19.15 *	(8.43)	-44.12 ***	(9.21)
has conflict victims	-16.11	(9.48)	-17.15 *	(7.80)	-1.95	(12.69)	-52.6 ***	(7.96)	-9.73	(6.73)
Governance	0.63	(0.95)	-0.67	(0.95)	1.62	(1.32)	-3.18 ***	(0.81)	-0.55	(0.87)
Intercept	262.12 ***	(30.84)	378.24 ***	(27.91)	166.59 **	(55.10)	288.38 ***	(30.98)	223.24 ***	(29.14)
R ²	0.133		0.131		0.154		0.202		0.228	
N (students)	252		376		254		318		378	

Standard errors in parenthesis. ***p≤0.001; ** p<0.01; * p<0.05

