

Teacher shortage in Venezuela

Leveraging positive deviance in a humanitarian setting

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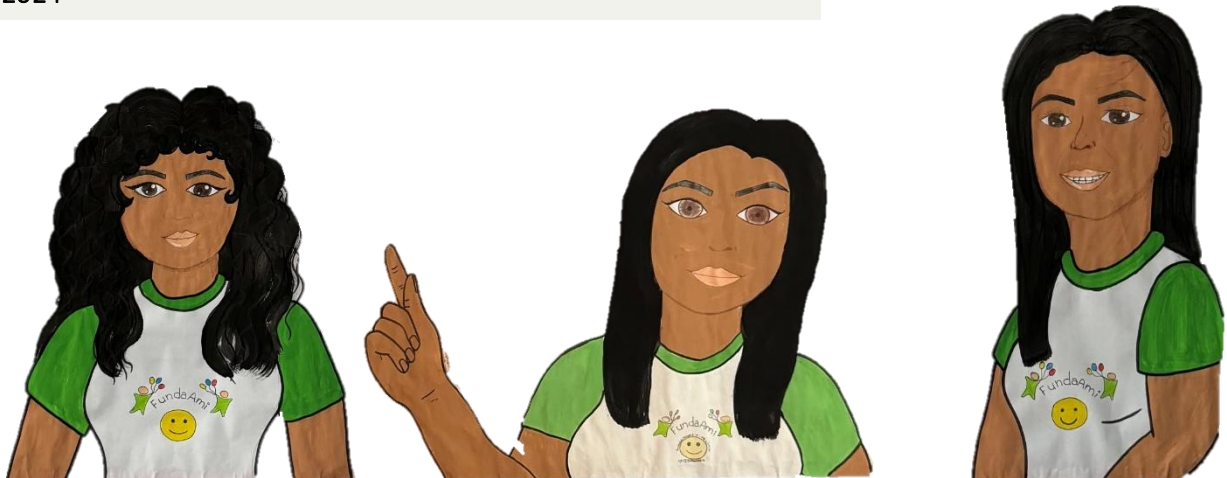
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Executive summary

Venezuela is grappling with an education crisis, marked by high teacher dropout rates and a threat to the next generation of educators. From 2018 to 2021, approximately 25% of teachers left the education system. Moreover, students are no longer attracted to pursue a career in education. The primary causes identified for these challenges include extremely low salaries, a lack of teaching resources, insufficient professional development, a feeling of being underappreciated, and the loss of benefits they previously enjoyed.

Teachers play a key role in student learning outcomes. Recent standardized test data reveals that students' performance in Venezuela falls below the regional average. **Recognizing the critical role educators play in learning, we identified grassroots strategies that have proven successful in the Venezuelan context for upskilling, attracting, and retaining teachers.** The goal is to provide the Observatory for Quality Education (OCEV) with policy recommendations that can temporarily alleviate the teacher shortage and ultimately prevent further learning losses.

We conducted a mixed-methods analysis to uncover successful strategies in a setting characterized by data scarcity. The quantitative component focused on characterizing schools and teachers while also attempting to understand which observable characteristics could potentially explain the teacher dropout rates. Given the low explanatory power of our regression analysis, we identified schools that were over- and underperforming in student learning through a positive deviance methodology. In a series of interviews, we delved deeper into teacher-related practices influencing their performance. We complemented and validated our findings by speaking with other relevant stakeholders in the education ecosystem such as NGOs, Universities, and the Ministry of Education.

Based on our analysis, **we proposed five recommendations to improve teacher attraction and retention in the immediate term.** We suggest maintaining flexible working conditions when there is no other alternative, providing monetary or in-kind compensation, enhancing professional development and academic training, reallocating resources, and increasing motivation through a media campaign. Alliances with all sectors are key, despite differing positions, there is a shared concern about the system providing a unique opportunity for collaboration. **In the medium term, comprehensive reforms will be needed to dignify and make the teaching profession more attractive**

PART I. Understanding the problem

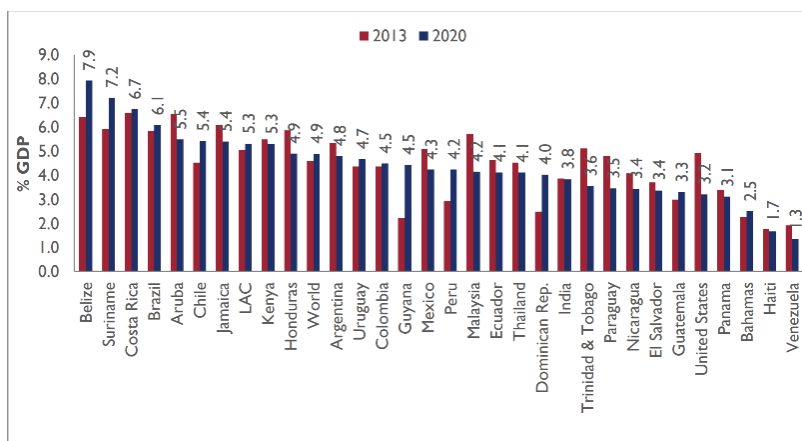
1.1. Background

Latin America is the second most unequal region in the world (UNDP, 2021) and one third of its total population leaves in poverty, with children and women being disproportionately affected (ECLAC, 2022). While inequality remains high, the region has made progress over time with researchers highlighting education as one of the main drivers of the decline “well designed policies can explain more than half of the decline in income inequality (averaging around 3 Gini points over the last decade) with education spending explaining almost one Gini point of the decline” (Tsounta & Osueke, 2014). The increases in education spending have ensured almost universal access to primary and secondary education with gross enrollment rates on average above 95% in the last decade (USAID, 2022).

Unfortunately, this regional trend does not hold for all countries. Venezuela is one of the outliers with the lowest education spending across Latin America accounting for 1.3% of its GDP in contrast to a regional average of 5.3% (USAID, 2022). The economic and social conditions have

negatively impacted the education sector with consequences further exacerbated by the COVID-19 pandemic. One of the most profoundly impacted areas is the education sector, characterized by low attendance rates, high dropout rates, and ultimately lower learning outcomes. Results from the Early Grade Reading Assessment (EGRA), the only standardized test that has been administered in a subsample of schools in the latest years, indicate that half of the students read at a rate that is 20% lower than international standards. The overall performance is below Honduras and El

Figure 1: Public expenditure on education as percent GDP, 2013 and 2020



Notes: Data within two years of date listed, except 2020 data for Venezuela (2017), Aruba (2016), and Latin America & the Caribbean and the world (2019). LAC average includes all 33 LAC countries plus seven dependencies or other territories.

Salvador, countries that have lower income levels than Venezuela (Devtech, Anova, & UCAB, 2021).

There are multiple causes linked to these poor education results, among the most outstanding ones is a teacher's crisis. A recent survey showed that Venezuelan schools are facing a decrease in attendance rates, a deterioration of infrastructure, and they are experiencing shortages of food and pedagogical supplies (Devtech, Anova, & UCAB, 2021). Moreover, the same survey showed Venezuela witnessed a 25% reduction in the number of teachers from 2018 to 2021, from 669,000 in 2018 to approximately 503,000 in 2021 with about 40% of them migrating. According to the Education Cluster, "the main problem of the education system is the lack of certified teachers" (Cluster de Educación Venezuela, 2022).

Many studies have shown the importance of teachers in student performance, therefore there is a pressing need to address this issue. Specifically, the OECD "Teachers Matter" publication acknowledges that research on student learning shows that "of those variables potentially open to policy influence, factors to do with teachers and teaching are the most important influences on student learning. In particular, the broad consensus is that "teacher quality" is the single most important school variable influencing student achievement" (OECD, 2005; Nye et al., 2004). Unfortunately, Venezuela's current problem is not only quality but also a deep gap in quantity.

1.2. Problem diagnosis

The exodus of educators could be explained by multiple factors which are difficult to identify with certainty due the inexistence of official data. Nonetheless, data collected by (Devtech, Anova, & UCAB, 2021) shows that 56,6% of schools have water shortages, 69,9% face electricity shortages, only 2% of schools offer transport services, and 32% of schools receive the national school food program every day. Furthermore, 85.7% of teachers reported not having health insurance, and often seek alternate forms of employment due to very low salaries and poor working conditions.

The average salary ranges from US\$20 to US\$60¹ monthly for a basic 40-hours schedule including bonus. At current rates, they would require 20 times their monthly salary to afford the basic food

¹ There have been salary increases but frequently inflation rates offset the real value.

basket. This could explain why 50% of surveyed teachers reported to have lost between 6 and 15 kg of weight in the last two years. In face of this reality, teachers are relying on alternative jobs to fulfill their basic needs, 32% reported working in 2 or more schools and of the teachers who have alternative jobs, 24% are not directly related with teaching or the education sector more broadly. The number of teachers relying on alternative jobs has ultimately led children to go to school twice or three times a week on average. In a recent survey, 46% of the families reported taking their child to school only three days a week (Consultores21, 2023)².

“We adopted ‘Horario Mosaico’ to be able to make a living through other income sources like tutoring or hair dressing, but that was not the only reason. We adopted this scheme because is our way to protest against our neglected salary, benefits and working conditions”. (Preschool teacher of a subsidized and a public school)

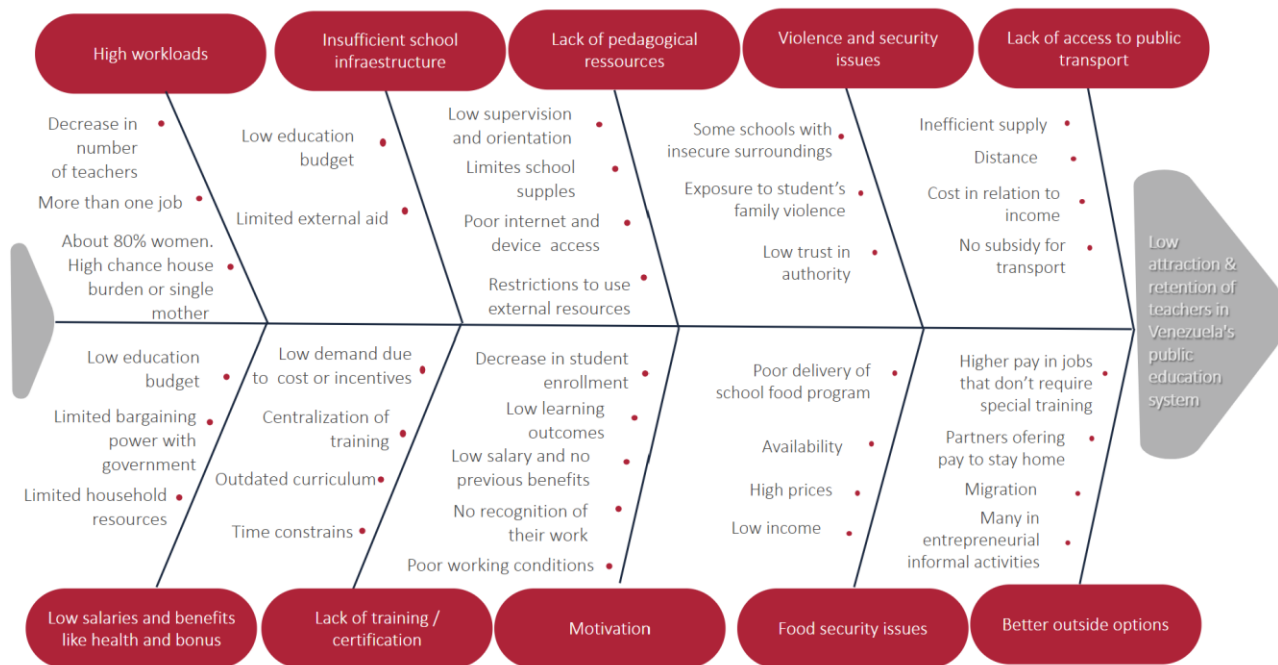
The challenges faced by current teachers are complemented by a threat to the availability of new teachers in the future. The Universidad Pedagógica Experimental Libertador (UPEL), which is one of the main institutions that graduate’s teachers, reported that in 2014, 15,000 students received their teacher degree while in 2021 this figure decreased to 1,400 (Diaz, 2023). A recent report by (Corrales, Costero, Goncalves, & Meneses, 2023) labeled the education major as being an endangered species. The document identified how the low expectations of future income and limited career path alternatives are among the main behind not wanting to become teachers.

“Schools are not the only affected by the teacher shortage, universities and specifically schools of education are also lacking teachers to train the new generation. I believe the reasons why people are not attracted anymore to study education is because of three reasons: they believe it doesn’t pay off, many see it as a temporary step while attaining something better, and because they think a career in education is only about being in a classroom with children.” (Rainer López, Dean of School of Education at Universidad Metropolitana)

A representation of the potential causes explaining the teacher’s crisis is shown in Figure 2. This figure is in line with our qualitative work findings.

² From a sample of 900 families

Figure 2. Fishbone diagram



The current conditions impacting both teacher attraction and retention are unlikely to change in the short to medium term. The nation's economy remains constrained, hindering the possibility for salary increases or improvements in school conditions. Despite 77% of the 2023 budget being dedicated to financing social expenditures, with education marked as a priority (Luján, 2022), the overall budget remains insufficient. With an average GDP per capita of USD\$3,470, this figure falls significantly short of the golden years at USD\$12,700, and even below the 2000's pre-oil boom levels of around USD\$4,000 (International Monetary Fund, 2023).

The close link between Venezuela's economy and its political landscape further complicates the prospect of alleviation in the teacher's and education crisis. The partial lifting of economic sanctions by the US seems fragile, as it depends on allowing previously barred candidates in the 2024 election—a development that has not yet occurred. This situation jeopardizes the stability of the Barbados Accord, a potential avenue for economic recovery. Moreover, with 2024 being a presidential election year, political efforts and intentions are predominantly centered around the election. Given the limited economic resources, it seems unrealistic to expect that investment in education will be leveraged as a strategy to gain votes.

PART II. Description of the policy analysis

2.1. Motivation and objective

We acknowledge that Venezuela's education sector requires a comprehensive set of reforms to improve the system in the long term. It seems an increase in budget and teacher salaries is imperative to make the profession viable in the future. However, we argue that a comprehensive reform is unlikely to happen in the short term, considering financial constraints and economic and political instability.

Based on these conditions, we aim to identify feasible "second best" solutions that can enable learning opportunities for children who are currently at school and who can't wait for the right political and economic circumstances to be in place. Evidence-based interventions that have proven to systematically work in different settings will be part of our foundation, and we argue that schools and teachers in country have found effective solutions that are largely unknown but can provide the bandwidth needed considering the country's circumstances.

Therefore, **this policy analysis aims to identify, compare and analyze grassroots and emergent strategies** currently implemented at the school level in Venezuela that address the shortage and quality of teachers in the education sector. The following are specific objectives:

- Describe the supply side barriers explaining teacher dropout and provide evidence of geographical state disparities.
- Identify, categorize, and analyze strategies focusing on teacher retention, attraction, quality, and school management based on positive deviant public schools.
- Combine evidence-based and emergent strategies to provide policy alternatives to mitigate the teacher shortage in the short term, thereby improving the quality of education for children currently enrolled in schools across Venezuela³.

³ These policy recommendations will be addressed to the Observatory for Quality Education within the Ministry of Education

2.2. Literature review

The literature review is divided in two sections, in the first we explore the role of teachers and what we know about programs that work to improve quality and retention. In this section we contrast it with what has and is being implemented in the country. We focus specifically on professional development, career progression, and incentives, aspects relevant to teachers after they have entered the profession. The second section offers an overview of the positive deviance methodology and its application in policymaking, with a specific focus on education.

Tackling teacher shortage and quality

The literature consistently demonstrates that teacher quality is one of the most significant predictors of student success. A review of interventions in low-and-middle-income countries found that the most effective strategies are primarily driven by teachers; structured pedagogy programs including lesson plans and training to deliver content tend to have larger impacts than community monitoring and school-based management interventions on student academic achievement (Snilstveit, et al., 2015). Moreover, research has shown that going from a low to a high-performing teacher significantly increases student learning (Popova et al., 2022; Araujo et al., 2016).

Considering the direct impact of teachers on children's learning outcomes, the following questions emerge: how do we address concerns about teacher quality when there are very few teachers in the labor force? What characteristics define a high-performing teacher? Moreover, how can their development be facilitated within a setting constrained by resources?

In a resource constraint setting, reducing teacher shortage and improving quality has been targeted through alternative contract agreements, professional development, and incentives. The supply and quality of teachers largely depend on the working conditions offered by the profession and the content and pedagogical knowledge they receive. Teacher salaries influence who decides to enter the field and how long they remain in it. Similarly, the more professional knowledge teachers have, the higher the levels of student achievement (Villegas-Reimers, 2003). On the job professional development (TPD) is frequently cited as one of the main tools that developing countries have to enhance teachers' skills and influence pedagogical approaches, classroom practices, and student achievement (Popova et al., 2022; Villegas-Reimers, 2003).

Alternative types of contracts can provide greater flexibility and tackle teacher shortage in the short term. Contract teachers are graduates of shorter training programs, frequently employed at lower wages than civil service salaries and without benefits. The effectiveness of this method has shown mixed results. For instance, in Pakistan, contract teachers have contributed to notable improvements in learning outcomes (Kingdon et al., 2013). However, in Togo it led to a reduced supply of high-quality candidates, increased absenteeism, and created a sense of resentment due to the disparity in pay. Ultimately, it did not impact student learning (Vegas & De Laat, 2003).

Another strategy involves the inclusion of assistant teachers, who are locally known by the community but do not necessarily have any teaching qualifications. In India, the program led to a substantial increase in basic literacy and numeracy skills among students, by 0.39 standard deviations over two years. This improvement was largely attributed to leveraging local staff, highlighting the potential of community-based human resources in educational interventions (Banerjee, et al., 2007). It is important to note that results could vary depending on the grade and age of students, as teaching at the secondary level demands higher capabilities that might not be effectively met by teachers who have not received adequate preparation.

Once additional teachers are in schools, in-service professional development can enhance teacher capacity under certain conditions, but large-scale government programs usually fail to meet them.

Key elements of successful professional programs include a mix of knowledge and practical application, emphasizing subject-specific content along with lesson planning and tangible instructional methods. In-person sessions are preferred but remote versions have also shown positive results and there is suggestive empirical evidence in the literature against brief, one-time workshops and in favor of sustained contact over a significant period of time (Popova, et al., 2022).

Training effectiveness increases when is complemented with mentoring, structured materials and in-class mentorship (Popova et al, 2022; Raubenheimer et al., 2020; UNESCO, 2022; Fuje, & Tandon, 2018). However, there's a gap between these characteristics and the reality of government-funded professional development programs. It is unclear what processes need to be in place to move to scale while ensuring implementation fidelity in large government programs.

Monitoring and accountability mechanisms along with linking professional development to career incentives could be essential to ensure the intended results.

Teacher motivation is also a key driver of their performance, influenced by a mix of salary structures, career progression, and working conditions. The norm in most developing countries involves a linear career progression based on seniority rather than merit, with limited opportunities for professional advancement or specialization. Incentive structures are tied to years of service, often failing to align with actual improvements in teaching quality or student outcomes (Vegas, 2007). This situation contributes to varying levels of teacher motivation and quality can easily lead to high turnover rates and teacher absenteeism.

Improving motivation often demands changes in career progression and underlying incentives, but there are several limitations. Rewards should be reformed to match more closely teaching quality and student outcomes, incorporating non-financial incentives like professional development opportunities and recognition programs (Popova, et al., 2022). However, there are important limitations on individual-based performance, such as the risk of fraudulent behavior, as teachers may become incentivized to manipulate student performance data. Additionally, there is the concern of “teaching to the test”, where teachers might focus solely on material that will be tested. In this setting, school-based incentives might be preferred (Beteille & Evans, 2021), comparing school-level performance with a cluster of other schools with similar characteristics.

Diversifying career paths to include specialization and leadership roles can further motivate teachers. However, implementing these changes faces significant barriers, including resource constraints in funding improved salary structures. Additionally, the lack of reliable data and monitoring and accountability systems for tracking teacher performance further complicates efforts to reform teacher career progression and incentivize systems in developing countries. *Appendix 1 provides an overview of interventions by the stages of teachers’ career.*

Positive deviance to shed light on emergent interventions

Most of the programs described by the literature have been implemented in some form in Venezuela, but effectiveness is unknown and teacher shortage and low quality remain salient. This encompasses initiatives led by the government as well as interventions by international and local

organizations, all aimed at enhancing teacher quality and working conditions. Despite alignment with the literature on effective educational interventions, there is a significant gap in information regarding their impact and reach in the country (see Annex 3 for program details).

The economic and social context in addition to the political regime are a barrier to the understanding of strategies' effectiveness. The economic distress, the fast pace of introduction of contingent measures, the limited access to official government data, and the emergence of informal and decentralized practices, are all factors affecting measurement.

In this context, positive deviance provides a promising methodology to identify locally emergent and effective solutions. Positive deviance is an approach focused on identifying and learning from individuals or groups within a community who, despite having access to the same resources and facing similar challenges as others, achieve better outcomes through unique, often unconventional behaviors or strategies (Andrews, 2015; Sternin & Choo, 2000) “The interest is not so much difference in performance but the variation in the performance of units within a group with shared characteristics, and factors that led to this variation” (Albanna, et al., 2022, p.2).

Our policy analysis will give some light on the effectiveness of teacher attraction and retention measures in a setting of humanitarian crisis and data scarcity. On one hand, it contributes to the positive deviance literature by using a mixed methods approach to identify the out or under performers. It will be also the first study to use a unique dataset making up for the absence of official data sources in Venezuela. The policy analysis also contributes by highlighting or proposing slight changes to solutions that emerged from the grassroots and that can potentially be scaled for greater impact in the country or in similar contexts.

2.3. Empirical strategy

The quantitative analysis will be undertaken in two main phases. The first phase involves a descriptive analysis to characterize schools across various dimensions including school size, teacher qualifications, professional development opportunities, incentives, infrastructure quality, safety, and access to basic services. We also include a visual geographical representation of the magnitude of teacher dropout by state between 2018 and 2021. We use a mixed-methods

approach to suggest possible factors that could be limiting the number of teachers in the system. Based on the characterization we will try to identify the solutions coming from the grassroots.

In the second part, we conduct regression analyses to identify the factors that could be explaining teacher dropout and positive deviant schools. In order to identify the explanatory factors behind schools with higher teacher dropout, we use the following OLS specification:

$$dropout_{ij} = B_0 teacher_{ij} + B_1 school_{ij} + \alpha_j + \varepsilon_{ij}$$

The key outcome of interest is the proportion of teachers who have left the school i in the last three years at the state j . The information is either provided by a lead teacher or principal working at the school during the data collection process, or directly by teachers. We use *school* and *teacher* level reported information as independent variables, including professional development opportunities, salaries and incentives, type of school, infrastructure, safety perceptions, and access to basic services. We also consider fixed effects at the state level α_j and ε_{ij} is the error term.

We acknowledge that the data reported directly by teachers might be biased since all respondents are teachers who decided to remain teaching. Note that the aim of the analysis is not to determine which teachers are more likely to leave nor to characterize teachers who left, but rather to understand the characteristics of the schools that had fewer dropouts between 2018 and 2021.

Considering the limited data to account for observed and unobserved characteristics, we conduct an additional regression model to identify deviant schools in relation to student outcomes. Ideally, we would have identified **positive deviants with respect to teacher dropout rates, taking into account student performance.** However, we were unable to get access to school identifiers from our main data source. Thus, we were not able to contact deviant schools that experienced less or higher dropout.

We leverage a data source that has student performance indicators and schools contact data. **As teacher performance is closely related to student performance, we will look at this proxy and then dig into the teacher's performance and dropout patterns during interviews with schools.**

Deviant schools are those in which a large variation behind student performance can't be explained by available observed variables, therefore it requires assessing the residuals, or the

variation that is not explained by the variables included in a regression model. Using a dataset that includes primary school literacy scores and a set of school characteristics, we first develop a regression model with literacy score as the dependent variable and school characteristics as independent variables. This model will enable us to understand the influence of school variables on student performance.

$$literacy_{ij} = B_0school_{ij} + \alpha_j + \varepsilon_{ij}$$

Where: $literacy_{ij}$ is the student performance in school i and state j , $school_{ij}$ includes a set of variables related to number of students, rural or urban setting, internet availability at school i and municipality j . Then, we consider α_j fixed effects for each parish to account for unobserved characteristics and ε_{ij} is the error term. Using the coefficients from the model above, we calculate the residual for each observation as follows:

$$residual_{ij} = literacy_{ij} - \widehat{literacy}_{ij}$$

To identify the group of deviant schools, we use the residuals, or the differences between actual and predicted student performance. Where $\widehat{literacy}_{ij}$ is the predicted student performance from the regression model. Schools with large positive residuals ($>+2SD$ above the mean) will be categorized as positive deviants, those with residuals close to zero (within $1SD$ from the mean) will be average performers, and schools with large negative residuals ($>-2SD$ below the mean). These schools perform worse than expected.

The qualitative section is the core of the policy analysis, where we map school and teacher-level deviant behaviors, strategies and practices that are not observed in our datasets. We conducted interviews with key stakeholders in the system including teachers and principals to understand the sources of outperformance of the positive deviant schools. We prepared guiding questions to capture perceptions about the problem, coping strategies, and ongoing and potential solutions. The direct interviews with the out and underperformers focused on peer-to-peer learning, principal leadership and management style, professional development, school infrastructure, access to basic services, monetary and non-monetary incentives, and community and parents'

engagement. We transcribed interviews and coded insights in categories to identify common patterns and differences based on school or stakeholder type.

While the methodology above offers a comprehensive approach to identify and systematize ongoing and grassroots solutions, there are limitations to consider. On the one hand, the regression analysis may be subject to multicollinearity, where highly correlated variables can influence the specific impact of each factor on performance, ultimately influencing the residuals which we will use to create the clusters. Furthermore, the regression models may encounter omitted variable bias, as key factors not captured in the dataset—such as socio-economic conditions or non-observables student characteristics—could lead to biased results. Lastly, the data on student outcomes is not representative at the state level, hence the identified deviance clusters do not illustrate the status in the country, as missing schools might be part of any of the three categories.

2.4. Data sources

For the quantitative analysis, we used the following data sources:

Encuesta nacional de establecimientos educativos 2021: information of schools and teachers who are currently in the system. These datasets were used to identify school characteristics and benefits reported by teachers that seem to explain teacher dropout (Devtech, Anova, & UCAB, 2021).

Schools: 395 schools. Data on services offered at the educational level, section, transportation, changes in teachers and students, safety conditions in the school, food program, infrastructure, government and external programs, and teacher incentives.

Teachers: 1937 teachers. It includes sociodemographic characteristics, education and professional background. We focus only on reported information about the school, such as provision of incentives, school safety, food benefits, and professional development opportunities.

Literacy results: Early Grade Reading Assessment scores of 7,305 first grade students from 228 schools currently participating in a reading program⁴. For each school, the dataset includes the

⁴ The program is called Leo, Juego y Aprendo, a professional development program directed for teachers to improve reading skills of children.

state, municipality, total number of students, and stakeholder implementing the program. We used the dataset to identify deviant schools based on their performance.

Insights from interviews: we conducted interviews with teachers from subsidized and public schools, school managers and principals, deans of schools of education, teacher union representative, non-profit program coordinators and one Ministry of Education representative. See Annex 4 for list of interviews and stakeholders.

PART III. Analysis

3.1. Descriptive analysis

3.1.1. School characteristics

In the following section, we describe teachers and schools included in the previous samples and explore key differences, such as public versus subsidized schools and rural versus urban.

There are 394 schools included in the sample of which the vast majority are public schools (84%), 44% of them are in rural areas. The schools have 500 students and 32 teachers on average. However, it is important to note that the school size in terms of students varies significantly, considering the standard deviation is almost 80% of the mean. In Anzoátegui state, the average number of students is approximately 800 while in Miranda the average is halved, to 400 students. In terms of the student to teacher ratio, the average in the sample is 28 which is just above the regional average of 21 students per teacher (Unesco Institute for Statistics, 2018).

Table 1: Schools characterization

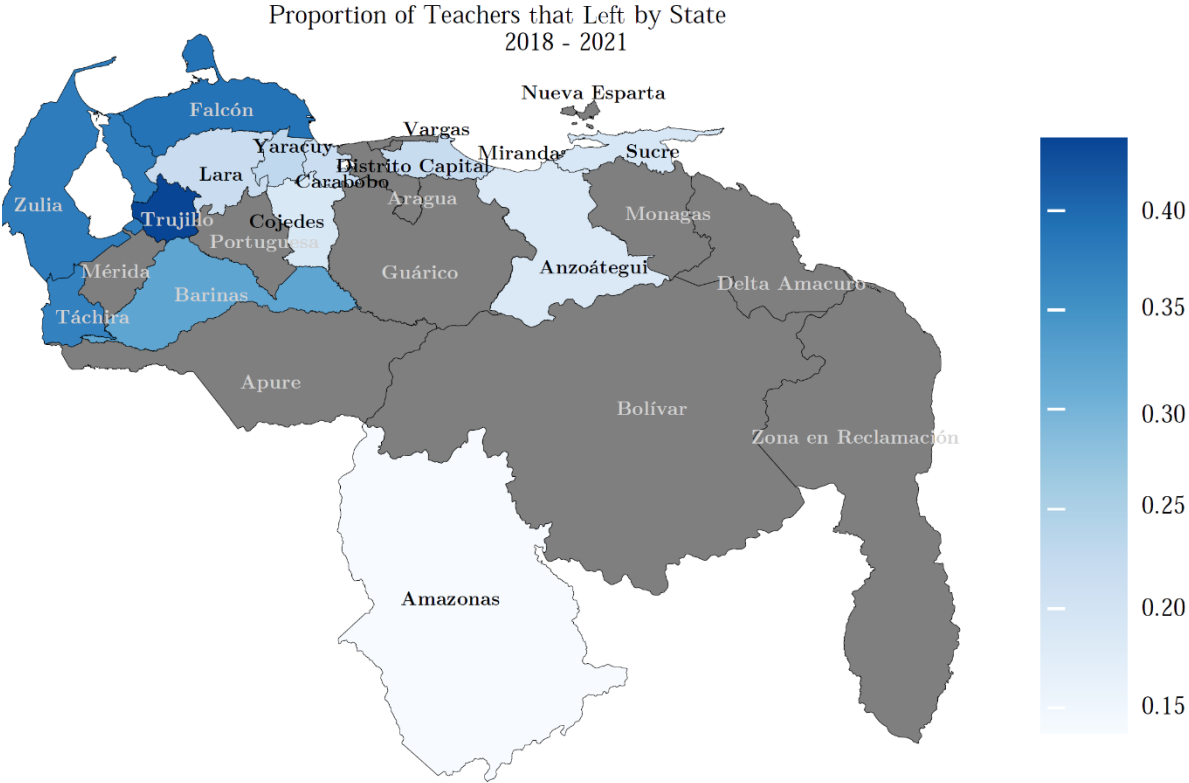
Variable	Statistics				
	Mean	SD	Min	Max	N
Public (%)	84.0	36.7	0.0	100.0	394
Subsidized (%)	16.0	36.7	0.0	100.0	394
Rural (%) ¹	44.9	49.8	0.0	100.0	394
Urban (%) ¹	39.1	48.9	0.0	100.0	394
Students	507.5	440.7	0.0	3,293.0	394
Teachers	31.9	23.4	1.0	150.0	391
Ratio	28.1	22.1	0.0	100.0	386
Teachers who left (%)	17.0	9.6	0.0	57.7	391

¹Note: urban and rural data are only available for public schools.

The proportion of teachers who left the school in the last three years is 17% on average. There is significant variation as seen in Figure 3, ranging from schools that have not been affected to others that have lost more than 50% of their teaching staff in the past three years. School managers reported that currently they need on average 3 teachers to function as expected, which represents approximately 10% of the total number of teachers based on the average school. Furthermore, the percentage of teachers who left in subsidized schools is 35% on average, and relatively smaller in public ones with 27%. The insight aligns with an interview with the Director of School Quality at Fe y Alegría, one of the largest and most well-known networks of subsidized schools in the country.

When the migration worsened, up to 15 teachers would leave regularly. It was a sort of “adventure” in search of better conditions. Fe y Alegría was not exempt, [we] experienced a decrease in teaching staff as well. We lost 30% of our personnel, particularly in secondary and technical schools, which require more specialized staff. (Director of Schools, Fe y Alegría)

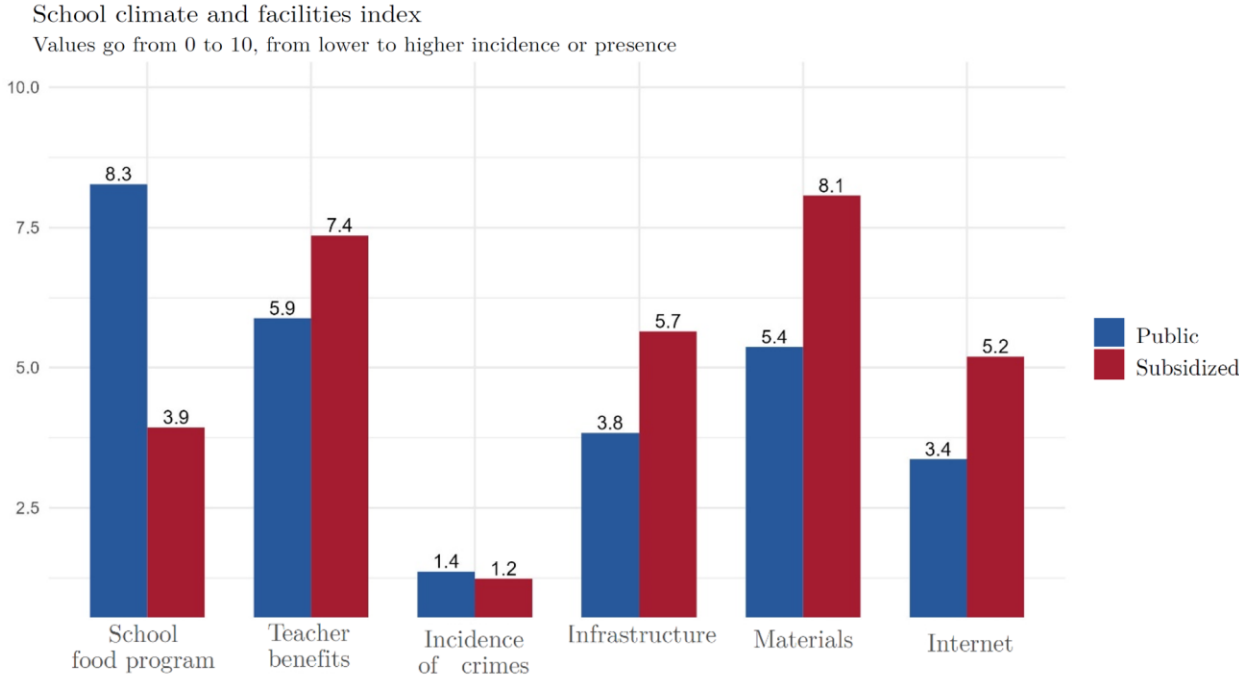
Figure 3: Geographical representation of teachers who left.



Source: Map created with data from ENEED
 Note: States with no information available are gray

There are gaps in terms of school safety, infrastructure quality, access to basic services, books and materials. In terms of infrastructure, school safety, and the quality of buildings, school managers report conditions as either “faulty” or “beyond repair”. Moreover, there are deficiencies in access to basic services, books, and materials. Only a quarter of schools report regular electricity, with the rest suffering from daily interruptions lasting several hours or a complete lack of electrical service. Similarly, internet connectivity is a major concern, with 78% of schools rating their internet quality as either non-existent or poor. Additionally, 18% of schools experience frequent or very frequent robberies in their vicinity. Public schools show greater deficiencies than subsidized schools in most of these areas as illustrated in Figure 4.

Figure 4: School conditions.



3.1.2. Teacher characteristics

Teachers on our studied ENEED sample are 40 years on average and a significant majority, 85.2%, are female. About half (48%) report to be beneficiaries of the school food program named PAE (*Programa de Alimentación Escolar*). Access to food is a major concern for teachers. In Table 2 we

see that regardless of the public/subsidized status of the school, teacher's main issue with food access is price.

Looking at transportation, 35.7% of teachers pay for some means of commuting to go to work, which implies that a majority may live close enough to walk. We are unaware if this observed pattern was held previously. Nonetheless, living near the school reduces transportation costs and implies proximity to the community, which might enable teacher retention. Mariano Herrera, Director of *Leo, Juego y Aprendo*, highlighted that one of the causes of shortage was that "teachers spend the USD\$7 they earn in transportation". Table 2 shows that among those teachers who don't walk or bike to school, they mainly use public transport which is the cheapest option among the paid transportation alternatives. Only a very small fraction, 0.8%, receive transportation from the school.

In terms of security, teachers on average rate their feeling of safety at school at 5 out of 10, suggesting a moderate level of concern. Moreover, the main issue in relation to crime near schools is theft and a few teachers report major frequent crimes, like homicides, near the schools.

Nearly one-fifth of the teachers, 19.7%, report teaching at a level they were not trained for. This could mean that an elementary school teacher might be teaching high school or that a science teacher might be teaching math. The vast majority, 87.9%, have studied to be a teacher and about 30% are specialized in a subject. The interview with Noëlbis Aguilar, the Director of one of the primary networks of subsidized schools, revealed that the first teachers who left the systems were the specialists who could find better alternatives. She also mentioned, "teachers were asked to teach subjects they had never previously taught as a resource allocation mechanism to make up for the teacher deficit".

A relatively small percentage, 13.6%, are pursuing higher education and 33.2% reported that their school encouraged them to pursue professional development in the last year. This low levels of academic training and in-service professional development are consistent with the highlights of Rainer López and Carlos Calatrava, the Deans of the Schools of Education of Universidad Metropolitana and Universidad Católica Andrés Bello. Both remarked the demand for the

undergraduate degree in education had plummeted and that despite having heavily subsidized programs, the career was not currently appealing to the youth.

From those teachers who remain in the system, 89.3%, report to be paid on time. Almost half receive benefits they are entitled to in addition to their salary, and 43.3% receive an extra incentive. In terms of health, 73.1% self-identify as healthy, and 85.7% have medical insurance which is usually tied to a government provision service. Our qualitative findings indicate this last indicator of high health coverage can be misleading. Teachers claim that although on paper they seem to have coverage of the HCM and IPASME, in reality they cannot easily access health services due to inability to pay their share of the costs or because the hospitals do not have equipment or doctors.

Table 2: Teacher's characterization

Variable	Statistics				
	Mean	SD	Min	Max	N
Age	40.9	8.5	19.0	80.0	1929
Female (%)	85.2	35.5	0.0	100.0	1929
PAE beneficiary (%)	48.0	50.0	0.0	100.0	1914
Pays for transportation to go to work (%)	35.7	47.9	0.0	100.0	1895
School provides transport (%)	0.8	9.1	0.0	100.0	1906
Safety feeling at school (1-10)	5.1	2.7	1.0	10.0	1856
Good internet access at home (%)	30.4	46.0	0.0	100.0	1894
Teaching at a level not trained (%)	19.7	39.8	0.0	100.0	1895
Studied to be a teacher (%)	87.9	32.6	0.0	100.0	1898
Pursuing higher education (%)	13.6	34.3	0.0	100.0	1892
School has provided training in last year (%)	33.2	47.1	0.0	100.0	1896
Paid on time (%)	89.3	30.9	0.0	100.0	1892
Receiving benefits additional to salary (%)	44.8	49.7	0.0	100.0	1893
Receiving an additional incentive (%)	43.3	49.6	0.0	100.0	1893
Self-identifies as healthy (%)	73.1	44.4	0.0	100.0	1898
Has medical insurance (%)	85.7	35.0	0.0	100.0	1883
School provides medical insurance	3.3	18.0	0.0	100.0	1883

	N Subsidized	% Subsidized	N Public Urban	% Public Urban	N Public Rural	% Public Rural
Difficulties accessing food						
Price	307	92.75	722	93.16	753	92.28
Time	9	2.72	13	1.68	11	1.35
No difficulty	3	0.91	13	1.68	9	1.10
Other	12	3.63	27	3.48	43	5.27
Teacher Type						
Especializado	100	30.40	186	24.47	175	21.82
Integral	229	69.60	574	75.53	627	78.18
Transport to School						
Ask for Ride	7	2.11	18	2.33	77	9.44
By foot or bike	177	53.47	419	54.13	520	63.73
Car	25	7.55	32	4.13	20	2.45
Paid transport	12	3.63	9	1.16	16	1.96
Public Transport	101	30.51	288	37.21	174	21.32
Other	9	2.72	8	1.03	9	1.10

3.2. Results

3.2.1. *Teacher dropout rates*

In this section we show the results of the two regression models that try to explain the teacher dropout rates by school. In the first model we consider only school variables and in the second we added teacher-reported information about working conditions and school benefits. The regression aims to understand school level factors that seem to be explaining the variation in teacher dropout.

Table 3 shows that the considered variables have low explanatory power of teacher dropout between 2018 and 2021. **We can see that schools with better infrastructure reported a lower teacher dropout rate, while subsidized schools showed a significantly higher one.** The negative correlation between better infrastructure and less school dropout is consistent with the literature. However, the higher dropout rates of subsidized schools seem counterintuitive given that those schools collect contributions from the community which can be used to provide bonus to teachers. Therefore, we assume these have better working conditions.

We lack quantitative evidence to explain the differential attrition between public and subsidized schools. Nonetheless, our descriptive analysis showed that subsidized schools tend to employ more specialized teachers. These teachers were the ones who had better opportunities to secure higher-paying jobs once the salary crisis began. Furthermore, our visit to a subsidized school, located in Petare—the poorest neighborhood of Caracas—, revealed that many of these schools have not adopted flexible working schemes. Consequently, the absence of opportunities to pursue other income-generating activities in a more flexible manner could have contributed to the increase in teacher dropout rates.

In Appendix 7, an extended version of the table shows that there is a negative correlation between being paid on time, having benefits additional to the salary, receiving in kind food benefits, and working in schools with better access to utilities and materials, and having lower teacher dropout rates. These findings are in line with the literature and with the interviews we held with teachers and school principals. Furthermore, dropouts tend to be fewer in places with better security conditions. However, our model lacks statistical significance in relation to these variables.

Table 3: Regression analysis on school factors explaining teacher dropout.

	(1)	(2)
School infrastructure	-0.014** (0.007)	-0.012* (0.007)
Government programs	0.004 (0.005)	0.004 (0.005)
Crime incidence	0.017 (0.017)	0.023 (0.018)
Subsidized school	0.151*** (0.046)	0.155*** (0.047)
Urban school	0.013 (0.031)	0.008 (0.031)
Number of teachers	-0.001 (0.001)	-0.001 (0.001)
Teachers benefit from PAE		-0.002 (0.037)
Government food benefit		-0.025 (0.059)
Incentives		-0.042 (0.036)
PD opportunities		0.054 (0.036)
Communication with parents		0.007 (0.034)
Num.Obs.	334	333
R2	0.166	0.198
R2 Adj.	0.059	0.063
FE states	Yes	Yes
Teachers reported benefits	No	Yes

We acknowledge that the models have limitations. First, the presence of multicollinearity between variables such as professional development, incentives, and PAE program, could negatively influence the reliability of the estimates. Second, **we note that the models explain only one fifth of the variation in teacher dropout rates across schools, indicating that there are other relevant observable and non-observables factors that influence this variable.** Therefore, in the next section, we conduct a positive deviance methodology to discover schools whose performance is very poorly explained by the observable variables. By identifying and interviewing teachers and school

principals from out and under performing schools, we uncover underlying practices, factors and strategies behind them.

3.2.2. Positive deviance

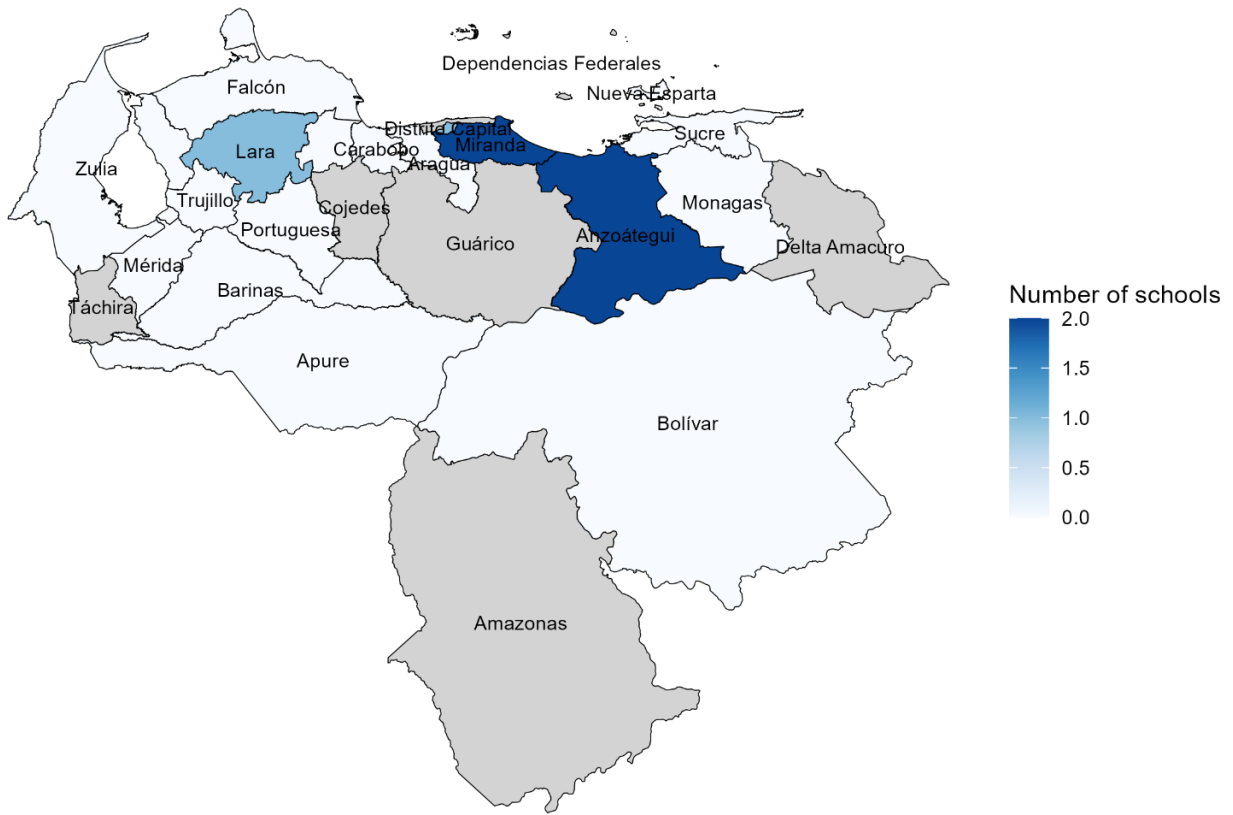
We use three specification models to identify deviant public schools in terms of student performance. Models 1 and 2 that consider who implements a reading program (1) and school characteristics (2) show that there is low explanatory power of the variables. Model 3 that adds the parish or neighborhood fixed effect, improves the explanatory power which is evidenced by a lower residual and variance (see Appendix 8). Nonetheless, the model's variables only explain about 20% of student performance. Therefore, we take advantage of this model to pick schools with large residuals.

We prioritized parish fixed effects as **it isolates the schools' specific contribution to literacy score allowing us to identify schools that out or underperform peers in similar conditions.** However, this approach has its limitations. By controlling parish-level characteristics, our conclusions are likely to be specific to the context within which the schools operate. Moreover, this method assumes that the primary effects of interest lie within school variations, underestimating the impact of broader community or regional factors⁵.

As described above, we categorized schools with large positive residuals (>+2SD above the mean) as positive deviants and those with residuals close to zero (within 1SD from the mean) will be average performers. We did not find schools with negative residuals larger than two standard deviations below the mean. Therefore, we consider instead schools with more than one standard deviation below the mean for the negative deviant group (>+1SD below the mean). Figure 5 shows the distribution by state of positive deviants.

⁵ For a more detailed overview of the process, please refer to Appendix 8.

Figure 5: Distribution of positive deviants



Data: Leo, juego y aprendo assessment & INE
 Note: Includes parish FE and states with no data are shown in grey.

We conducted interviews with teachers, principals, and managers within deviant schools to identify behaviors, strategies and practices being implemented. Similarly, we complemented the findings of this interviews with those that emerged from the conversations with key stakeholders, such as deans of the two main private Schools of Education⁶, staff from the Ministry of Education, coordinators of non-profit education programs, and a teacher union leader.

We report in

Table 4 characteristics of positive, average and negative deviant school groups. Positive deviant schools are smaller in size, and they maintain a lower student-to-teacher ratio of 11, in contrast to a ratio of 18 for average and 13 for negative deviant schools. Furthermore, teachers in positive

⁶ Universidad Metropolitana and Universidad Católica Andrés Bello

deviant schools have a higher average tenure in the profession, with 20.8 years at their current school on average. Our insights further reveal that teachers in positive deviants are committed to full attendance, indicating a potential shift away from the *Horario Mosaico* schedule. It is also these schools that experience the highest rate of teacher dropout, which goes in line with our finding of higher attrition in subsidized schools.

Table 4: Descriptives of positive deviant schools interviewed

Groups of schools	Positive	Average	Negative
<i>Characteristics</i>			
Number of students	179	516	315
Student to teacher ratio	11.19	18.44	13.14
Public schools	3	3	3
Subsidized schools	1	2	
<i>Teacher years of experience</i>			
As a teacher	25.0	22.4	17.7
In current role	8.3	3.4	4.7
In current school	20.8	18.0	6.0
<i>Attendance to school</i>			
2-times a week		40%	33%
Everyday	100%	60%	33%
3-times a week			33%
<i>Reported teacher dropout</i>			
No dropout	25%	0%	33%
Some dropouts	0%	40%	0%
High dropout	25%	40%	67%
Very high dropout	50%	20%	0%
Total interviews	4	5	3
Total schools by group	6	123	18
Number of states	3	4	3

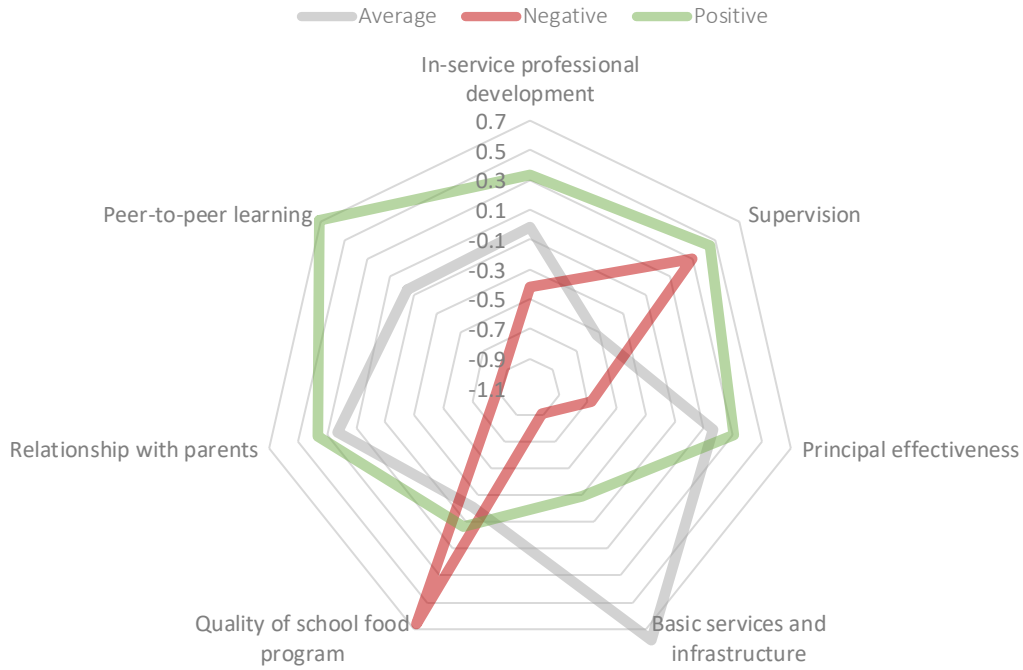
Following Torrecilla and Bernal (2007), we use their framework to synthesize our findings into categories associated with school effectiveness: principal, teacher professional development and peer to peer learning, parental involvement, and school facilities. We acknowledge that there are many other factors that might be explaining the performance -such as school climate or sociodemographic characteristics of the students and families (Aguerrondo, 2008). However, we intentionally focus on factors directly linked to within school and teacher dynamics.

Table 5: Qualitative insights categories

Category	Components
Teachers	In-service professional development
	Frequency of peer-to-peer learning
	Support supervision
Principal effectiveness	Teacher feedback
	Classroom observation
School facilities	Basic services
	Internet
	School infrastructure assessment
	Frequency and quality of food program PAE
Parental involvement	Monetary and non-monetary contributions
	Parental engagement

Figure 6 provides a comparative overview of the main categories of interest between positive deviant schools and the rest. Positive deviants typically outperform average and negative schools across most categories, particularly excelling in areas like peer-to-peer learning and professional development. Parental engagement and supervision are also higher, but the difference between positive and average schools seems smaller overall. It is striking to see that categories associated with infrastructure and basic services do not seem to show a clear tendency, on the contrary, average or negative deviants tend to self-report better conditions than the positive ones. This last finding can potentially indicate that despite being important for the learning environment (Snilstveit, et al., 2015), they are not the main drivers of student performance.

Figure 6. Deviance analysis and comparison between groups



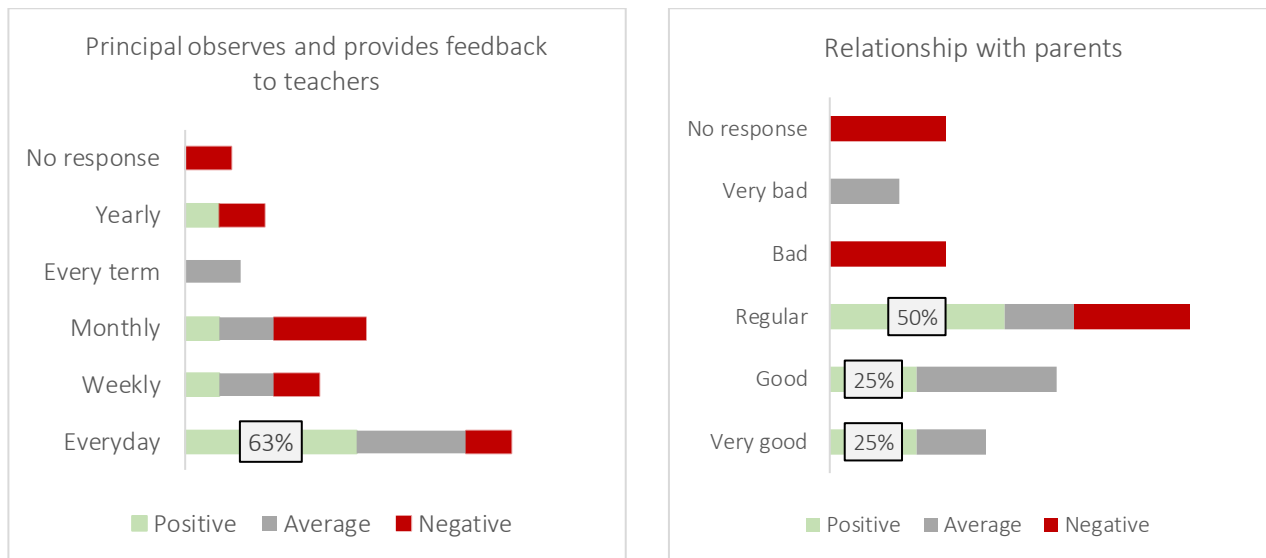
Professional development: Positive deviant schools put teachers at the center. They benefit from regular professional development sessions, and unlike other schools, respondents are less likely to report the training is being used for political ends. These schools also engage in regular peer-to-peer learning. Teachers dedicate time, typically once a week, to exchange best practices and collaboratively plan future lessons.

Leadership and management: The active involvement of principals is a defining characteristic of positive deviant schools. Principals are present, engaged and report routinely visiting classrooms to observe teaching and offer constructive feedback to teachers. Their hands-on approach seems to create a supportive environment and productive relationship with teachers.

Needs-based planning and pedagogy strategy: Teachers report planning cycles that are based on student needs. In three out of the four positive deviant cases, respondents emphasized the use of diagnostic assessments and mentorship, which are internally used to adjust class planning and continuous pedagogy support. Despite having different names, the practice serves the same purpose, to generate internal data to adapt their strategies based on student needs. *“We collect*

student needs every term, then we work with these needs-mapping to plan classroom activities” (Teacher, positive deviant school, Lara)

Figure 7. Principal and parent involvement categories



Parental involvement: a shared feature between average and positive deviant schools is the level of parental engagement. Respondents described a good relationship to be one in which parents are responsive and involved in children's education, ready to assist, primarily through non-monetary support, and participate when needed. *“Constant communication with families is key, especially when they [students] might be going through a difficult situation that may affect their attendance and performance” (Principal, positive deviant school, Distrito Capital).*

Quality supervision: The quality of supervision is perceived differently among the deviant categories. Average and negative deviants perceive supervision as a mere procedure to comply with the Ministry of Education. Positive deviants tend to report a more positive relationship with supervisors and perceive value added from their visits. The contrast suggests that the effectiveness of supervision extends beyond procedural checkmarks. *“The supervisors come to evaluate us and provide guidance. These are spectacular sessions, because if one has any shortcomings, it's good that they support us.” (Teacher, positive deviant school, Anzoátegui).*

Strategies that prioritize teachers generate a strong sense of commitment and belonging to the school and its culture. Moreover, effective monitoring and support systems seem to complement well the teacher centric practices that drive positive deviants in relation to students' performance.

3.2.3. Key stakeholder insights

Beyond the practices of deviant schools, we conducted interviews with key and well-known stakeholders in the system. This allowed us to further identify practices and strategies that leverage the attraction and retention of teachers. Table 6 shows the main categories of findings as well as the number of times the insights in each category were mentioned across interviews. For instance, 16 respondents spoke about monetary support but in total there were only 5 insights that were constantly supported.

Table 6. Insights key stakeholders' interviews

Categories	Support	Insights	% of insights
Academic training	2	2	4.26%
Alliances	3	3	6.38%
Gender	4	1	2.13%
Monetary support	16	5	10.64%
Monitoring, evaluation, and support	6	5	10.64%
Motivation	6	1	2.13%
Non-monetary support	15	8	17.02%
Parents and community	4	2	4.26%
Professional development	15	9	19.15%
Resource allocation	15	11	23.40%
Grand Total	86	47	100.00%

Within the alliances category the most outstanding discovery was that religious education networks, such as AVEC and Fe y Alegría, play an important role in the development of strategies to optimize staff and prevent *Horario Mosaico* scheme. These organizations leveraged their connections with the private sector and universities to get resources, professional development opportunities and support in adjusting pedagogical material to respond to the limited number of specialized teachers. Similarly, principals are temporarily taken to the classrooms to fill subject

vacancies and they use virtual classroom lessons prepared by private universities to give teachers additional tools for learning.

To adapt to the limited number of specialized teachers we had to merge courses, such as literacy and English. Instead of two teachers, we assigned one. If the teacher was not a specialist in English, we relied on virtual classes coordinated by UCAB [private university], which has always been a key supporter. That way we could make the most efficient use of teachers that were still attending schools. (Director of Schools Fe y Alegria, Miranda)

In relation to monetary support, we found that subsidized schools provide monetary incentives that attract teachers. They either ask for additional contributions from parents and/or look for external support from partner organizations. With the extra funds they provide support in different ways like salary bonus or stipends for transportation costs and health services⁷.

A teacher with a 40-hour schedule, postgraduate qualifications with more than 21 years of service earns around 36 dollars a month. Therefore, obviously, with such an income, no one is going to stay (...) A socioeconomic study is conducted, and families are charged differentiated fees. For instance, if you have five or four children studying in the school, you pay for two, and two are exempted. However, the school must seek allies to cover those 40 dollars that the family cannot pay. Funds go to the ordinary functioning of the school and to compensate for the low salaries of teachers. (Director of Schools Fe y Alegria, Miranda)

The motivation component of retaining teachers was unique and salient. Thirty-five percent of those interviewed spoke about the effectiveness of making teachers feel valued and respected. A principal at a subsidized school highlighted that respect and recognition of teachers are two of the core elements behind their successful retention rate. *“Teachers want to work at this school despite earning the same salary as in a public school, it is easy for us to find a replacement given our reputation of caring for staff and our efforts to procure their wellbeing” (Principal, subsidized school Miranda).*

This finding is in line with School effectiveness literature highlighting school management style as one of the key factors behind high performance (Torrecilla & Bernal, 2007). Among the most

⁷ Subsidized schools are usually preferred over public ones because they tend to provide higher quality education. Therefore, we can expect families from subsidized schools to be different from the ones in public schools. potentially more involved and more willing to pay for education.

relevant positive practices are: leaders committed to the school, high technical capacity, participative and pedagogical management style, and good relationship with the school community.

Parents and community dynamics are key in providing support and generating additional incentives to retain teachers and attract new ones. The “Teacher Tenure Award”, a community-funded initiative by Fe y Alegría schools, began as a joint effort with families to incentivize teachers. The rewards range from US\$20 to US\$70, depending on the socioeconomic background of the families (Director of Schools Fe y Alegría, Miranda). The award reinforces the appreciation toward teachers, a feature which is generally lacking as highlighted by a public-school teacher who we spoke to. Mothers from the community are also key in filling out the vacancies of teachers. In well-functioning schools we found that school mothers are being recruited and trained in house to serve as educators.

Conversely, public schools adopt a distinct strategy focused on addressing teacher shortages which favors teachers’ retention but could potentially affect student learning. Teachers often work on flexible schedules, attending school only a few days a week, which allows them to pursue alternative employment opportunities. In addition, these schools are introducing recent graduates as teaching assistants and are reallocating current staff throughout the system. Furthermore, through the Chamba Juvenil government program, some young people are being assigned to teach at schools, a job for which many are not necessarily trained for.

Professional development was highlighted as an important factor to motivate and engage teachers. Schools with teachers that praised the in-house professional development usually leveraged their alliances with private or non-governmental organizations to provide the training. On the other hand, a public-school teacher, manifested training was provided by the Ministry of Education but usually had a political component which discouraged her because it was not applied knowledge. The Observatory for Quality Education coordinates in-person and remote opportunities for teachers. More recently, that have also taken a decentralized approach in which teachers self-organize into research groups or centers (known as CLIF)⁸ within the same context and design their

⁸ CLIF: Centros locales de investigación y formación.

own training based on their specific needs. The Ministry of Education then reviews and certifies it (Observatory for Quality Education representative, Ministry of Education). Despite there is information about the number of nationwide centers and teachers engaged, to our knowledge, there is limited information about the quality of those trainings and the extent to which these are positively influence teaching practices and student learning outcomes.

Figure 8. Synthesis of qualitative insights

	Public schools <i>System strategies</i>	Positive deviance analysis <i>In school strategies</i>	Subsidized schools <i>System strategies</i>
Professional development	Decentralized, teacher-led NGOs programs reach some	Frequent, high quality and apolitical	Frequent in alliance with private universities and NGOs
Coping mechanisms	Reallocation and local young professionals, flexible schedule	Limited flexibility, local young professionals	No flexibility, within school reallocations, hiring and training community members
School management	Supervision focuses on reporting on regular attendance only and implementation	Effective principals, supportive supervision, peer to peer learning	Effective principals, supportive supervision, peer to peer learning, teacher recognition
Parental involvement	High variation, non-monetary support to school	High engagement and responsiveness, primarily non-monetary support to school	High engagement and responsiveness, primarily in kind and monetary support to school

PART IV. Policy recommendations

We propose five recommendations that leverage the existing strategies that are perceived as **effective** in attracting and retaining teachers in Venezuela. We acknowledge these are second-best alternatives, under the understanding that comprehensive reform of the education system is unfeasible now amidst the economic and political conditions the country is facing.

Each recommendation stands on its own, but we perceive them as complementary to one another. They are most influential when implemented together. These are designed for the Observatory for Quality Education⁹ (OCEV) within the Ministry of Education (MPPE), a government research group that gathers education experts and institutions to inform quality education policy. Our recommendations are evaluated with respect to technical correctness, administrative feasibility,

⁹ Observatorio Nacional por la Calidad Educativa

and political fit. Technical correctness assesses the policy's likelihood of success in improving teacher attraction and retention. Administrative feasibility evaluates the capacity for effective policy implementation or delivery. Finally, political fit measures the level of political support for the alternative.

Table 7: Recommendations

Summary Recommendations			
Recommendation	Technically correctness	Administrative feasibility	Political fit
Preserve status quo flexible working conditions	○ ● ○	● ○ ○	○ ● ○
Provide bonus and in-kind assistance	● ○ ○	○ ● ○	○ ○ ●
Academic training and professional development	● ○ ○	○ ● ○	○ ● ○
Within school systems reallocations	○ ● ○	○ ● ○	○ ● ○
Motivation and recognition	● ○ ○	● ○ ○	● ○ ○

4.1. Preserve status quo on flexible working conditions in public schools

The adoption of the Horario Mosaico informal scheme in 2022 introduced flexible working conditions for teachers, which has now become a widely accepted practice among public schools. It allows teachers extra time to engage in other income-generating activities. **We recommend that the government maintains the status quo regarding the approval status of this practice.**

This flexible schedule is administratively viable, already being a reality in public schools. Some institutions have successfully coordinated their teachers, organizing homework for students to complete during off-school hours. **Due to its informal and autonomous nature, the scheme relies on each school's capacity and initiative to self-organize.** From the government perspective is an alternative that does not require an increase in salaries and overall benefits, which favors budget constraints.

From a technical standpoint, there's a trade-off between retaining teachers and ensuring quality education. Although flexibility helps keep teachers in the system, it may negatively impact

education quality. Our analysis has shown that schools with the best student performance have higher teacher dropout rates, partly due to this lack of flexibility. Therefore, **the Horario Mosaico scheme is a preferable option only if the alternative is the absence of instruction altogether.**

To optimize the learning experience on days when teachers are absent, schools can use free existing resources, such as the e-classrooms developed by experts at UCAB University. However, it is important to recognize that research indicates remote learning alternatives cannot fully replace in-person teaching (Lichand, Doria, Leal-Neto, & Fernandes, 2022).

An interview with a government official revealed **significant opposition to the flexible schedule measure** (Observatory for Quality Education, 2023). This stance is understandable, as prioritizing children's learning at school is essential. However, the government currently lacks the bargaining power to prevent the practice. We do not recommend the Ministry of Education to formally approve the measure, as it could be perceived as an acknowledgment of systemic failures and a deliberate undermining of children's education.

Given the limited political and administrative feasibility of formally adopting Horario Mosaico or renegotiating teacher benefits, maintaining the status quo seems necessary, but providing tools or remote learning alternatives and more targeted support is essential to ensure quality.

4.2. Teacher bonus and In-kind assistance

Schools and communities should be encouraged to seek voluntary or external contributions to secure additional resources to compensate teachers. These incentives would not only enable teachers to earn a living but also **reinforce their sense of belonging, which is crucial for their continued commitment.**

To ensure the technical fit of this measure **contributions should be voluntary and in accordance with the socioeconomic conditions of each family.** Although the legal regime of public schools prevents them from utilizing some funding mechanisms, communities are always free to do fundraising and schools can also seek alliances to secure in-kind benefits for teachers.

For instance, an administrative official in a public and a subsidized school, mentioned that having access to food, health services, among other in-kind benefits in the subsidized school, was an important aspect that compensated for the low salaries.

The inherently free nature of public schools and the pride the government takes in this status present challenges to the political feasibility of this recommendation. Should fundraising efforts be perceived as mandatory, the government could face accusations of privatizing education and deviating from its core values. Furthermore, it is essential to **form alliances with organizations that do not pose a threat to the establishment**, such as UNICEF, Save the Children, or universities.

From an implementation standpoint, both community-led and centralized strategies could emerge. Families could organize fundraising activities or establish a school fund to provide monetary and non-monetary support, eliminating the need for government intervention. Additionally, the OCEV could collaborate with the Education Cluster to facilitate alliances with NGOs, universities, the private sector, and local organizations. To ensure resources are effectively directed according to school needs, the Education Cluster could assess the socioeconomic status of communities and the OCEV could offer insights into which schools are most in need.

4.3. Academic training and professional development

We recommend that the OCEV review existing tools and programs for teacher training and promote their approval and ensure broader access to schools. Our interviews revealed that teachers value non-political training that provides clear guidance and delivers short-term improvements in student learning. We also discovered that programs like "Leo, Juego y Aprendo," which have some level of governmental approval and dissemination, are more readily adopted by public schools that feel authorized to do so. Given the diversity of schools and regions, coupled with the already high workloads of teachers, training should not be mandatory but highly encouraged especially for schools with low performance or highly affected by teacher shortage. These options should be easily available for schools to adopt at their discretion.

Evidence shows mixed results for professional development programs, merely providing training is insufficient. Effective programs typically feature ongoing support, resources, and formative

assessments. However, large-scale government initiatives often face challenges with consistent monitoring and implementation fidelity when moving to scale (Popova et al., 2022; Raubenheimer, et al., 2020). It is crucial that all programs included in this pool of training incorporate components of supportive supervision. OCEV could centralize these efforts by assigning its parish coordinators to provide recurrent guidance to principals and teachers in order to ensure effective implementation, gather information about their needs and connect them with the material and trainings that better align with the same.

Based on the positive deviant analysis, the topics that should be prioritized for professional development include foundational learning, effective school management, and mentoring practices for principals, as well as strategies to encourage peer-to-peer learning. This is particularly relevant given the increasing number of recent graduates or young professionals entering schools in response to teacher shortages.

From an administrative and political feasibility perspective, centralizing and disseminating quality opportunities can be both feasible and desirable. Free materials and workshops, many of which are available online, have already received official approval from the Ministry of Education (Observatory for Education Quality, December 2023). Moreover, government approval in the education sector could improve if educators and school officials feel the government is providing them with useful resources to enhance teaching and school management.

Besides centralizing and promoting professional development training, it's crucial for individuals teaching without any formal education training to pursue formal academic qualifications. Private universities, such as Universidad Metropolitana, have adapted their schedules and curriculum to accommodate individuals working full-time on weekdays. The Dean of the School of Education highlighted their success in doubling the number of students enrolled in the professionalization program within two years. However, only 10 of the 170 students enrolled are public school teachers, indicating a potential lack of awareness about these opportunities and the availability of some fully funded scholarships. **We recommend promoting these funding opportunities and encouraging other universities to adopt similarly flexible programs.**

The administrative viability of this proposal depends on the availability of data on teachers' educational credentials and on the ability to leverage alliances with the Education Cluster. Ideally, the OCEV could identify teachers lacking the required qualifications and target them individually to promote the opportunities. Furthermore, through the Education Cluster, it could encourage donors to provide scholarships for public school teachers eager to professionalize at universities offering flexible schedules and applied curriculums.

The political feasibility of the proposal could be threatened by the alliances with potential funders and the pool of universities offering flexible academic training for teachers. Promoting education training in private universities, currently offering flexible schedules, could be perceived as a betrayal of the public system and an acknowledgment that they lack programs suited to the current context. More information is needed to understand the availability of programs, schedules within the public system and recent adaptations that have been taken place to respond to the teacher shortage. We anticipate backlash if the initiative is led in isolation, solely by private universities. It should be an alliance between private and public institutions, which leverages the existing arrangements in private universities while public universities adapt their curriculum to current needs and circumstances.

4.4. Resource reallocation and community teacher attraction

This recommendation emphasizes **encouraging the reallocation of school staff within schools or school networks to optimize the distribution of teaching resources and engage community members in roles that require less formal training.** Successful models, such as Fe y Alegría, have already experimented with teacher reallocation. For example, they have asked principals to teach or transferred teachers within their own network to schools facing the highest deficits. Additionally, other schools coping well with teacher shortage have successfully involved mothers or young professionals, providing in-house training for tasks that do not require extensive academic training.

Reallocations should be data-driven and should involve prior consultation with teachers. Public schools require a nationwide analysis by the OCEV to identify potential efficiencies. This analysis should identify schools that are over or under performing in teacher availability, dropout rates, and administrative staff. The assessment and reallocation suggestions must consider factors such as

geographical location, education level, subjects taught, school size, student-teacher ratios, and community characteristics. For instance, Appendix 13 illustrates reported teacher shortages and variations within states. When the value exceeds 1 standard deviation (SD) from the mean and the student-to-teacher ratios are below average, this could indicate underutilized resources. **We highly advise this process to occur within the same school networks, parishes, and municipalities to minimize teacher dropout.**

Interviews indicated that **leveraging the availability of community mothers, young professionals, and recent graduates could be advantageous**, particularly in lower grades or as temporary support in schools undergoing teacher reallocation. These individuals could assist with administrative tasks or serve as aides in primary grades. It is essential to monitor teacher and student satisfaction in the short term with this recommendation. Doing so would allow the system to adapt the policy based on monitoring and evaluation findings.

In terms of technical correctness, we acknowledge education quality could be jeopardized by the introduction of non-education professionals and that reallocation can result in teacher dropout. Introducing less experienced individuals into the system could affect quality and exacerbate inequalities, as we would expect more disadvantaged places to be the ones more in need of teachers. Therefore, the recommendation should necessarily go hand in hand with professional development and support supervision. The prior consultation of reallocation suggestions with teachers and schools could also help mitigate the dropout risk.

This policy could be politically difficult if not implemented and communicated effectively. Many teachers have spent decades at the same school, and there can be reluctance from them and the community itself towards these changes (public school teacher, positive deviant school, January 2024). If the implementation of this recommendation results in teacher dropout, there will be increased disapproval of the government's handling of education. However, if reallocation reduces the number of days children stay home, and teachers are adequately supported throughout the process, it could lead to an improvement in government perception.

4.5. Motivation and teacher recognition

A national *Heroes Campaign* aimed at teacher recognition, involving children, parents, school officials, and community members, could significantly boost morale and elevate the teaching profession. The focus would be on highlighting outstanding teachers through media recognition which offers a cost-effective solution with potential for high impact. Both government and non-government stakeholders have access to radio, TV channels, TikTok, and Instagram accounts, making these ideal platforms to launch the initiative.

Despite many teachers being intrinsically motivated by their passion for the profession and love for students, **many feel undervalued**. One teacher mentioned that if parents truly cared, they would be protesting with them or making them feel special in some way (public school teacher, Miranda). Others mentioned that receiving training or inclusion in health brigades made them feel cared for, positively influencing their sense of belonging to their jobs.

Evidence from other countries shows that public recognition of effective teachers can be as effective as in-kind rewards (Barrera-Osorio, Cilliers, Cloutier, & Filmer, 2022). The Heroes Campaign is inspired in the yearly “Hazañas Maestras” program conducted by a private TV channel in Colombia. In this version, however, the OCEV should ensure coverage with the broader community to make the recognition by tagging their favorite teacher or by calling the local radio station and telling a story of why certain teachers deserve to be recognized.

Assessing the political and administrative feasibility requires consideration of public trust in the government, support for educational policies, and the broader education system. While there is agreement on the latter points, the broader economic and political context raises doubts that a campaign led solely by the Ministry of Education would achieve the desired outcomes in terms of motivation and recognition. In fact, it could even prove counterproductive.

To ensure political support and administrative feasibility, **the OCEV should forge alliances with the Education Cluster and other civil society actors heavily involved in the education sector to collectively launch the campaign.** By doing so and ensuring the campaign's apolitical nature, its acceptance and effectiveness would be enhanced. We believe such a campaign could improve the

government's efforts to find a cost-effective alternative for teacher retention. Moreover, it would not require significant administrative capacity beyond pitching the idea to partners and there is generally an agreement among key stakeholders that the education system in Venezuela needs immediate action and joint effort.

5. Final remarks and limitations

Our recommendations focus on immediate and short-term strategies to tackle the need for teachers, while acknowledging that the education system in Venezuela needs a comprehensive reform for sustainable and meaningful change. Our analysis faced technical constraints in relation to data analysis and the administrative and political feasibility is limited in scope, primarily due to a reliance on discussions that offered limited perspectives from the Ministry of Education (MPPE). Additionally, qualitative data was disproportionately influenced by inputs from the capital city, thus not fully capturing the diverse perspectives across different states.

Similarly, recommendations are based on the perceived effectiveness of ongoing solutions. However, **the reality is that the impact of these measures on learning outcomes and teaching pedagogy has not been assessed and, to our knowledge, is not readily available.** These nuances underscore the need to view the proposed measures as interim solutions, pending a more robust and inclusive reform of the education system.

Our recommendations involve maintaining flexible working conditions, engaging in strategic reallocation, enhancing teacher professional development and academic training, and promoting motivation through recognition. We believe that adopting some or all of these recommendations can initiate a cycle of continuous system improvement, elevating the quality of teaching and ultimately benefiting student learning (See Appendix 14 for synthesis).

The sustainability and feasibility of the recommendations heavily depend on the foundational setup. First, strengthening alliances and taking forward a participatory process with the private sector, universities and international organizations is key in this complex and highly resource-scarce setting. Even with differing positions, there is currently a shared concern about the education system in Venezuela providing a unique opportunity for effective collaboration and an informed decision making (Reimers et al., 2000). Second, it is crucial to introduce support, supervision, and

a comprehensive information management system to track implementation and enable continuous adaptation. There are 6 million children in school, joint effort from all sectors is necessary to give them the learning opportunities that they deserve.

In the long term, more comprehensive reforms will be needed to dignify and make the teaching profession more attractive. Such reforms could include incentives for teachers in hard-to-reach areas and subjects that are difficult-to-staff, regular performance assessments, and, more importantly, salary increases potentially tied to teacher performance. These long-term reforms will need to be informed by data and findings that are relevant at the time. **For now, we believe that positive changes can be achieved by leveraging existing resources in a manner that aligns with the current political and economic context.**

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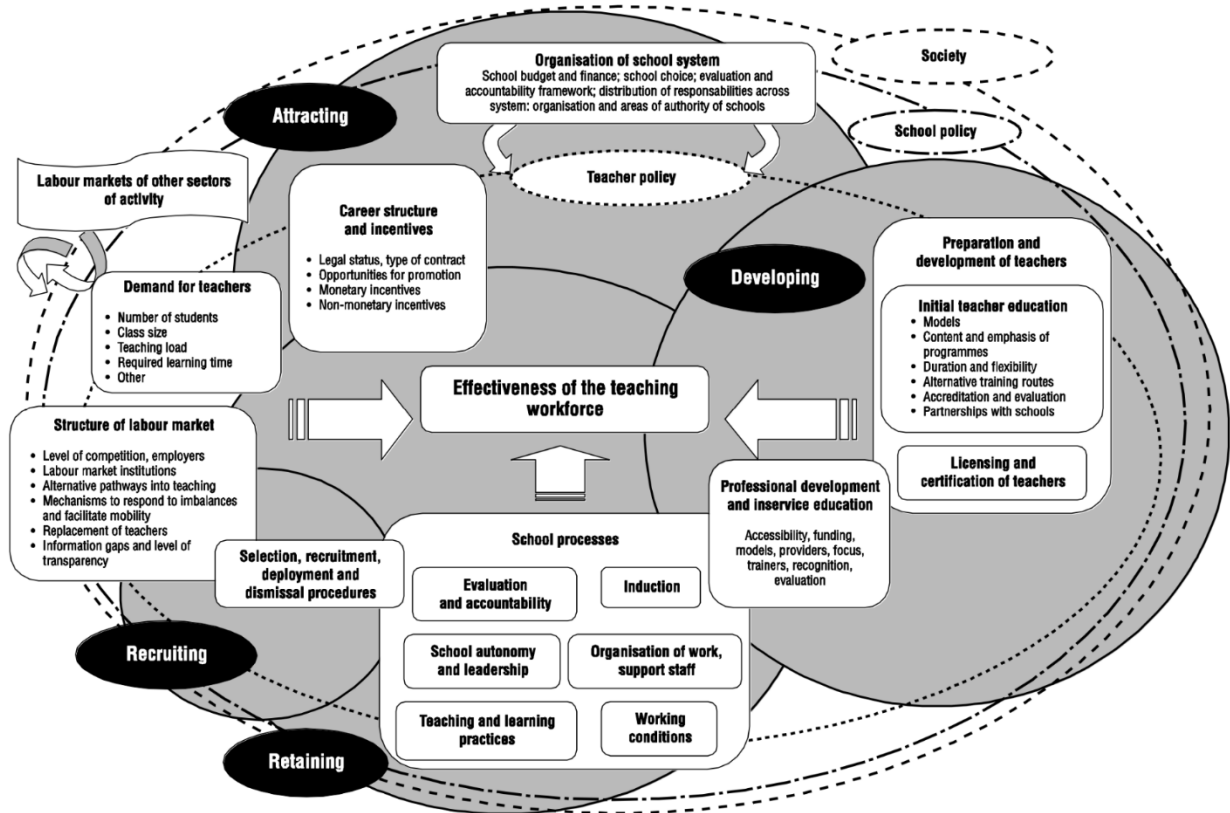
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APPENDIX

Appendix 1. Strategies for attraction, development, recruitment, and retaining of teachers



Source: OECD Teachers Matter: Attracting, Developing and Retaining Effective Teachers

Appendix 2. The education system and teacher profession in Venezuela

The education path begins with preprimary targeting children up to 6 years old, primary from 6 to 12 years old. Secondary education is divided into lower and upper from 12 to 18 years old, culminating in higher education with universities and technical institutes. The system is supported by a mix of public schools, private institutions, and subsidized schools such as *Fe y Alegría*, offering education in underprivileged areas with government support.

The main bodies are the Ministry of Education, regional and local education authorities, supervisors, and school-level administrators. The Ministry of Education, at the national level, sets educational policies and standards, guiding the overall direction of public education. State education departments adapt these policies to regional contexts, managing education at the state level, while municipal education authorities implement these policies locally, addressing specific community needs and managing resources. Supervisors bridge the gap between these different levels, ensuring policy implementation at schools, supporting school administrators, and providing feedback to higher authorities. School principals manage daily operations and work in collaboration with teachers to implement educational programs and policies. The structure is intended to maintain consistent educational standards while addressing diverse regional and local educational needs, although it faces challenges like resource constraints and political influences.

Teacher training is conducted through four to five years of university-level education programs. More recently, shorter programs have been designed to address teacher shortages. The selection of teachers, overseen by the Ministry of Education, involves assessing qualifications and may include additional examinations or interviews. Once recruited, teachers are allocated to schools, with placements influenced by qualifications, school needs, and geographic preferences. Professional development is facilitated through various Ministry-led programs, focusing on enhancing pedagogical skills and subject-specific knowledge. A teacher's career progression is typically linked to years of service, additional qualifications, and performance, with incentives primarily in the form of salary increments. The effectiveness of teacher assessments, focusing on classroom performance and student outcomes, varies and is often affected by broader socio-political factors.

Appendix 3. List of initiatives targeting teacher shortage and quality

Target	Description	Type	Program name
Teacher quality	Leo, juego y aprendo (I read, play, and learn) is a teaching and learning program for basic literacy, involves teacher training programs nationwide and pedagogical material for students and teachers (Universidad Metropolitana, NA)	International/local organizations	Leo, juego y aprendo
Working conditions	Military Community Brigades for Education and Health (Bricomiles) are dedicated to recovering, maintaining, and conditioning the spaces of public schools	Government program	Bricomiles
Teacher shortage	TV program broadcasted at national channels as a remote educational modality for primary and secondary students (Universidad Católica Andrés Bello, 2020)	Government program	Cada familia una escuela
Teacher quality	Several training courses have been conducted, either led by the Ministry of Education or international/local organizations. There is limited information on whether these programs include additional support in the classroom (OCHA, 2023)	Government program and international/local organizations	In-service training
Working conditions	Scholarship (similar to cash) for educational personnel to contribute to retention (OCHA, 2023)	UN Agencies	Scholarships
Teacher shortage	Based on the idea that teachers only give classes two days a week, so that they can dedicate the rest of their time to work activities that allow them to complement their income (Diario, 2023)	Emergent strategy	Flexible schedule “Horario mosaico”
Working conditions	The government provides occasional bonuses to respond to ongoing inflation and economic situation	Government program	Cash transfers
Working conditions	There is a nationwide school food program coordinated by the government, although frequency and quality has received consistently mixed results. Additionally, UN agencies and local organizations lead similar interventions in selected states.	Government program and international/local organizations	School food program
Teacher shortage	“Territorial School Production Units” aim to develop and implement socio-productive projects in schools to facilitate the acquisition of goods and services. Follows a school-based management approach	Government program	UPETA (Ministerio del Poder Popular para la Educación, 2022)

Working conditions	The purpose is to attend to provide and promote health care in school (vaccination, and informational talks)	Government program	Salud va a la escuela
Teacher shortage	Although the law is subject to somewhat ambiguous interpretation, it appears to enable older students to support teachers in the lower grades, such as at the primary level.	Government program	Ley de participación estudiantil
Working conditions	Similar to the bonuses above, the government has increased salaries on several occasions but is not enough to offset inflation.	Government program	Salary increases
Teacher shortage	The government employs youth between the ages of 15 and 35 to support their income, training and at the same time provide them with an opportunity to acquire work experience. Some of this young people are assigned to be teachers at schools.	Government program	Teen jobs “Chamba juvenil”
Teacher quality	Develops academic training programs for education professionals along all their professional careers	Government program	Experimental University for the Education “UNEM”
Teacher shortage	Private institutions send their students to teach some classes to public or subsidized schools. For example, English classes.	Private schools and universities	Community service

Appendix 4. Key informant interviews

Stakeholder	Interviews
NGOs	2
Teachers	5
School directives	4
Private schools of education in universities	2
Current and former government officials	2
Representative of teacher’s union	1
Social workers	1
Total	17

Appendix 5. Teacher characteristics, overall and by state

Table 8. Teacher categories

Variable	Statistics				
	Mean	SD	Min	Max	N
Type 1. General (%)	70.99	25.50	0.00	100.00	352
Type 1. Specialist (%)	28.63	24.69	0.00	100.00	344
Type 2. Contract (%)	10.90	21.73	0.00	100.00	339
Type 2. Permanent (%)	85.38	25.71	0.00	100.00	352
Type 2. Volunteers (%)	3.25	10.60	0.00	83.33	325
Teachers	31.94	23.44	1.00	150.00	391
Vacancies	3.64	6.70	0.00	50.00	362

Table 9. Teacher categories by state

State	Contract		Permanent		Volunteers	
	%	N	%	N	%	N
Amazonas	20.0	2	80.0	2	NaN	0
Anzoátegui	3.7	17	96.3	17	1.5	17
Apure	33.3	13	70.7	14	2.2	10
Aragua	25.2	15	67.6	15	0.6	15
Barinas	6.2	22	89.3	22	0.0	21
Bolívar	11.9	20	82.7	20	5.5	18
Carabobo	17.3	18	74.1	18	15.5	18
Cojedes	5.6	9	94.4	9	0.0	8
Delta amacuro	15.0	4	85.0	4	0.0	3
Distrito capital	17.5	11	71.7	11	1.7	11
Falcón	14.5	13	89.5	18	3.8	11
Guárico	4.9	10	96.0	12	0.8	11
Lara	4.8	24	87.3	26	6.9	26
Miranda	19.9	26	74.6	26	3.2	26
Monagas	4.6	12	92.1	12	0.0	9
Mérida	3.9	14	80.5	14	0.3	14
Nueva esparta	0.0	4	100.0	4	0.0	4
Portuguesa	0.0	10	96.0	10	4.0	10
Sucre	2.4	21	93.8	21	2.5	20
Trujillo	0.0	6	100.0	6	0.0	6
Táchira	0.0	19	97.6	19	2.5	18
Vargas	87.3	5	12.7	5	0.0	5
Yaracuy	8.9	10	88.6	10	2.5	10
Zulia	6.9	34	91.4	37	3.7	34

Appendix 5. School characteristics by state

Table 10. School characteristics by state

State	N°	Public	Subsidized	Rural	Urban	Students	Teachers	Teacher gap	Ratio
Amazonas	3	100.00	0.00	66.67	33.33	575.67	46.67	11.17	12.34
Anzoátegui	18	77.78	22.22	38.89	38.89	814.61	30.44	20.11	26.76
Apure	14	100.00	0.00	71.43	28.57	411.07	26.29	13.48	15.64
Aragua	21	76.19	23.81	23.81	52.38	606.24	36.29	31.74	16.71
Barinas	22	95.45	4.55	72.73	22.73	343.45	25.82	32.72	13.30
Bolívar	21	80.95	19.05	38.10	42.86	681.29	27.38	32.02	24.88
Carabobo	18	83.33	16.67	16.67	66.67	547.67	34.06	23.54	16.08
Cojedes	9	100.00	0.00	55.56	44.44	383.78	38.56	21.54	9.95
Delta amacuro	4	100.00	0.00	75.00	25.00	492.50	32.75	44.62	15.04
Distrito capital	23	52.17	47.83	0.00	52.17	883.13	44.13	26.16	20.01
Falcón	19	89.47	10.53	68.42	21.05	328.53	25.84	36.07	12.71
Guárico	15	93.33	6.67	53.33	40.00	362.80	30.67	23.57	11.83
Lara	26	88.46	11.54	53.85	34.62	535.65	32.77	27.41	16.35
Miranda	28	71.43	28.57	25.00	46.43	409.11	31.11	24.81	13.15
Monagas	13	92.31	7.69	38.46	53.85	563.46	55.69	27.44	10.12
Mérida	17	94.12	5.88	58.82	35.29	301.71	29.59	28.86	10.20
Nueva esparta	4	100.00	0.00	25.00	75.00	312.75	31.00	7.80	10.09
Portuguesa	14	92.86	7.14	57.14	35.71	335.43	22.57	32.94	14.86
Sucre	21	90.48	9.52	66.67	23.81	614.57	46.90	20.88	13.10
Trujillo	13	92.31	7.69	69.23	23.08	360.62	29.38	27.39	12.27
Táchira	19	89.47	10.53	52.63	36.84	329.21	25.95	38.40	12.69
Vargas	5	80.00	20.00	20.00	60.00	665.40	30.00	22.50	22.18
Yaracuy	10	90.00	10.00	50.00	40.00	400.20	19.50	25.45	20.52
Zulia	37	70.27	29.73	35.14	35.14	566.49	26.14	35.85	21.68

Appendix 6. School climate and facilities index by state, values go from 0 to 10, higher values indicate more presence

Table 11. School climate index

Variable	Mean	SD	Min	Max	N
Electricity	4.84	4.46	1.00	10.00	363
Infrastructure	4.12	2.25	1.00	10.00	394
Internet	3.66	3.22	1.00	10.00	394
School food program	7.58	3.35	1.00	10.00	394
Presence of security forces	1.84	1.69	1.00	10.00	394
Incidence of crime	3.45	2.59	1.00	10.00	394
Absenteeism-economic	1.35	0.83	1.00	10.00	394
Absenteeism-teachers and school	1.81	1.95	1.00	10.00	394
Material availability	5.80	3.06	1.00	10.00	394
Medical services	5.87	4.49	1.00	10.00	394
Benefits for teachers	6.12	2.43	1.00	10.00	394
Government programs	6.40	2.75	1.00	10.00	394

Appendix 7. Complete regression results on prediction of teacher dropout.

The models show the relationship between school level characteristics and reported benefits by teachers with teacher dropout. As describe in the main text, the only statistically significant factors are school infrastructure and subsidized schools and the available factors in our datasets can only explain 20% of the variation in teacher dropout.

Table 12. Complete regression results on prediction of teacher dropout.

	(1)	(2)
School infrastructure	-0.014** (0.007)	-0.012* (0.007)
School receives PAE	0.000 (0.004)	0.001 (0.005)
Crime incidence	0.017 (0.017)	0.023 (0.018)
Books and materials	-0.006 (0.005)	-0.007 (0.005)
Internet school	-0.004 (0.005)	-0.005 (0.004)
Presence of the police	-0.009 (0.008)	-0.009 (0.008)
Pre-primary offered	-0.050* (0.028)	-0.049* (0.028)
Subsidized school	0.151*** (0.046)	0.155*** (0.047)
Urban school	0.013 (0.031)	0.008 (0.031)
Teacher benefits PAE		-0.002 (0.037)
Government food benefit		-0.025 (0.059)
Incentives		-0.042 (0.036)
PD opportunities		0.054 (0.036)
Extra benefits		0.000 (0.037)
School provides insurance		0.024 (0.114)
Num.Obs.	334	333
R2	0.166	0.198
R2 Adj.	0.059	0.063
FE states	Yes	Yes
Teachers characteristics	No	Yes

Appendix 8. Positive deviance analysis

The table shows the regression models used to identify deviant schools. Model 1 includes state fixed effects and program implementer dummies, Model 2 introduces student gender, beneficiaries of the program and access to internet. Model 3 all the variables described, plus parish fixed effects. Incorporating parish-level fixed effects in Model 3 leads to a more consistent prediction of literacy scores across schools within parishes. It is important to acknowledge that while Models 1 and 2 show greater variability, the shift in the spread implies that parish characteristics play a meaningful role. Finally, the presence of outliers across all models signals that there are many unexplained factors which are not captured by parish-level controls alone.

Table 13. Deviance analysis model results

	(1)	(2)	(3)
Implementer	-0.047 (0.047)	-0.044 (0.049)	-0.064 (0.058)
Girl		0.014 (0.011)	0.017 (0.012)
Internet available			0.007 (0.026)
Num.Obs.	892	892	892
R2	0.059	0.068	0.197
R2 Adj.	0.036	0.041	0.101
FE municipality	No	No	Yes
School characteristics	No	Yes	Yes

Figure 9. Boxplot of model residuals, showing outliers for each

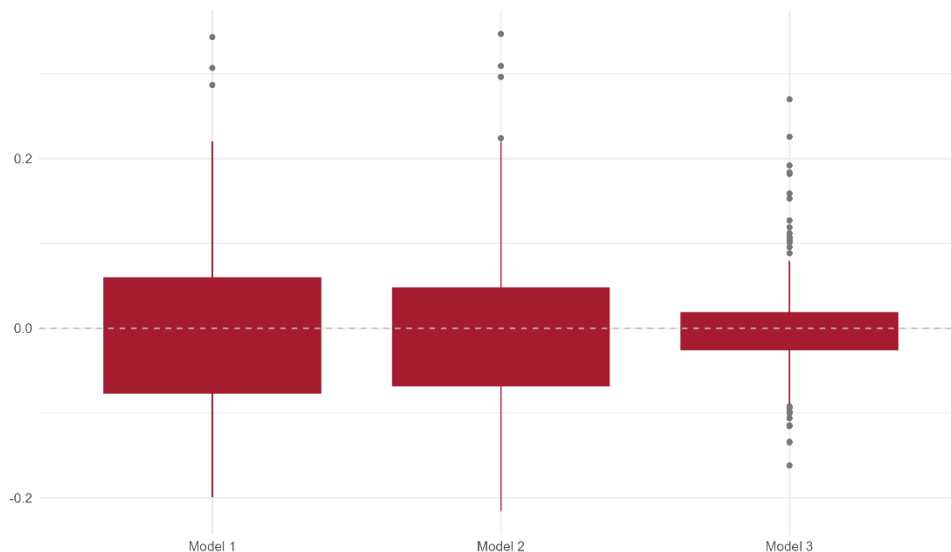
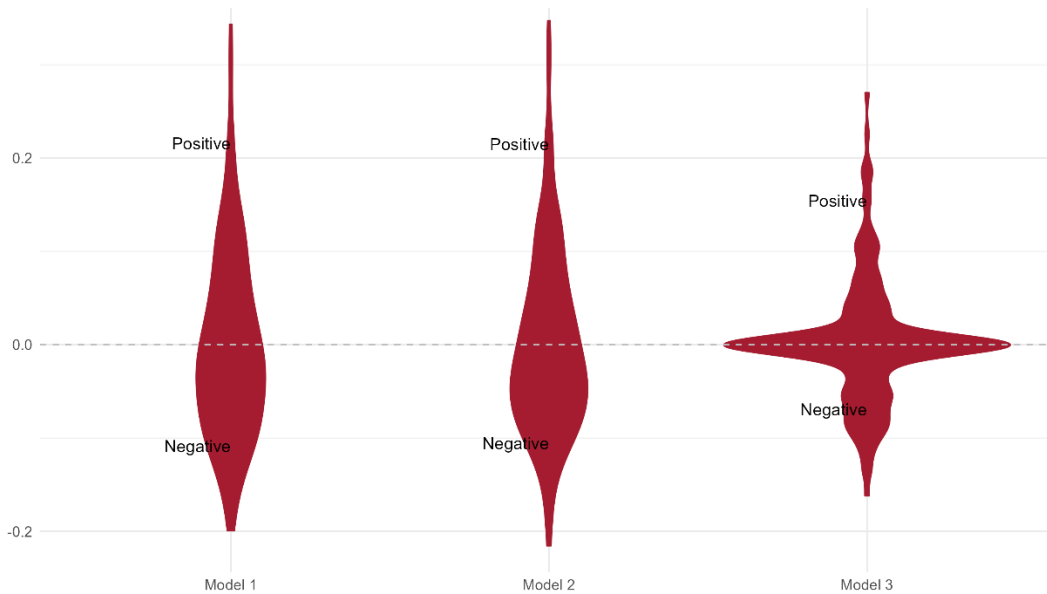


Figure 10. Distribution residuals, showing threshold for each



Appendix 9. Deviant analysis sample

Table 14. Deviance analysis school and student sample by state

State	Schools	Students	% students
ANZOÁTEGUI	22	90	7.4%
APURE	15	89	7.3%
ARAGUA	9	44	3.6%
BARINAS	3	22	1.8%
BOLÍVAR	26	139	11.5%
CARABOBO	10	51	4.2%
DISTRITO CAPITAL	21	135	11.1%
FALCÓN	2	9	0.7%
LARA	16	81	6.7%
MIRANDA	62	343	28.3%
MONAGAS	7	43	3.6%
MÉRIDA	2	6	0.5%
NUEVA ESPARTA	1	5	0.4%
PORTUGUESA	4	29	2.4%
SUCRE	6	26	2.1%
TRUJILLO	1	4	0.3%
YARACUY	2	5	0.4%
ZULIA	13	90	7.4%

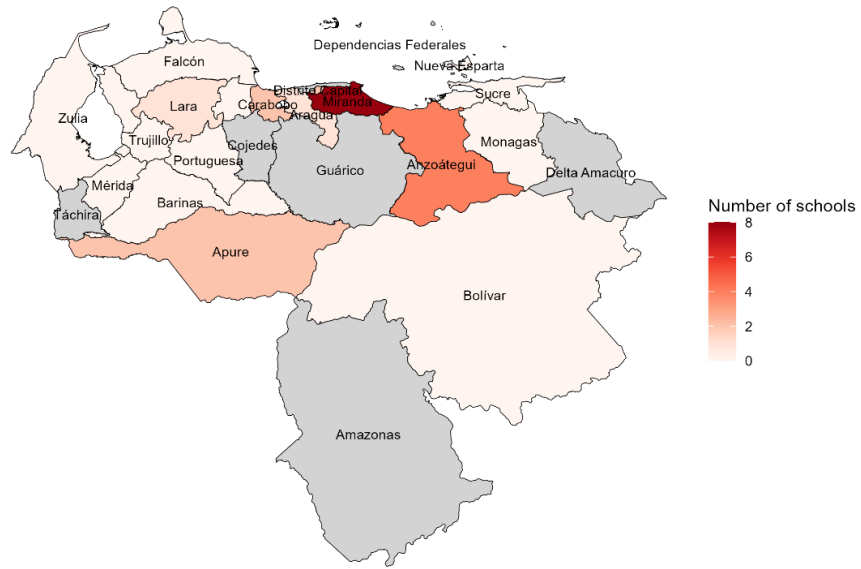
Appendix 10. Deviant schools by state

The table shows the number of schools from the sample that fall under each of the clusters or groups, ie. positive, average, or negative. Below the maps also show the distribution. Note that there is no clear trend in the location of schools. States such as Anzoátegui, Miranda and Distrito Capital are consistently present, this can be due to a larger representation of schools in the program and therefore in the sample we are using for determining the outperformers.

Table 15. Number of schools within each group by state

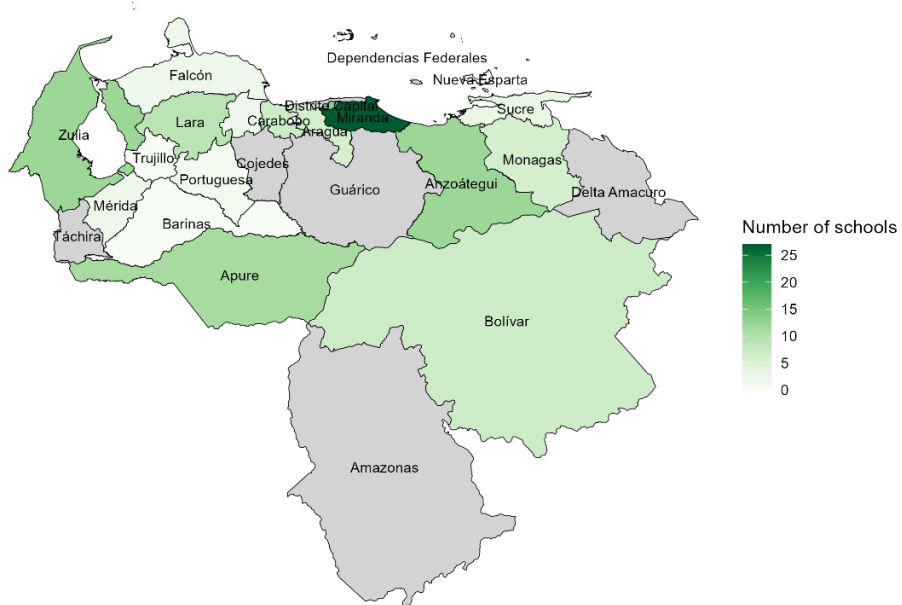
State	Positive	Average	Negative
Anzoátegui	2	12	4
Apure		11	2
Aragua		6	1
Bolivar		7	
Carabobo		7	2
Distrito Capital	1	14	2
Falcón		2	
Lara	1	9	1
Miranda	2	28	6
Monagas		6	
Mérida		2	
Nueva Esparta		1	
Portuguesa		1	
Sucre		3	
Yaracuy		2	
Zulia		12	

Figure 11. Distribution of negative deviant schools



Data: Leo, juego y aprendo assessment & INE
 Note: Includes parish FE and states with no data are shown in grey

Figure 12. Distribution of average schools

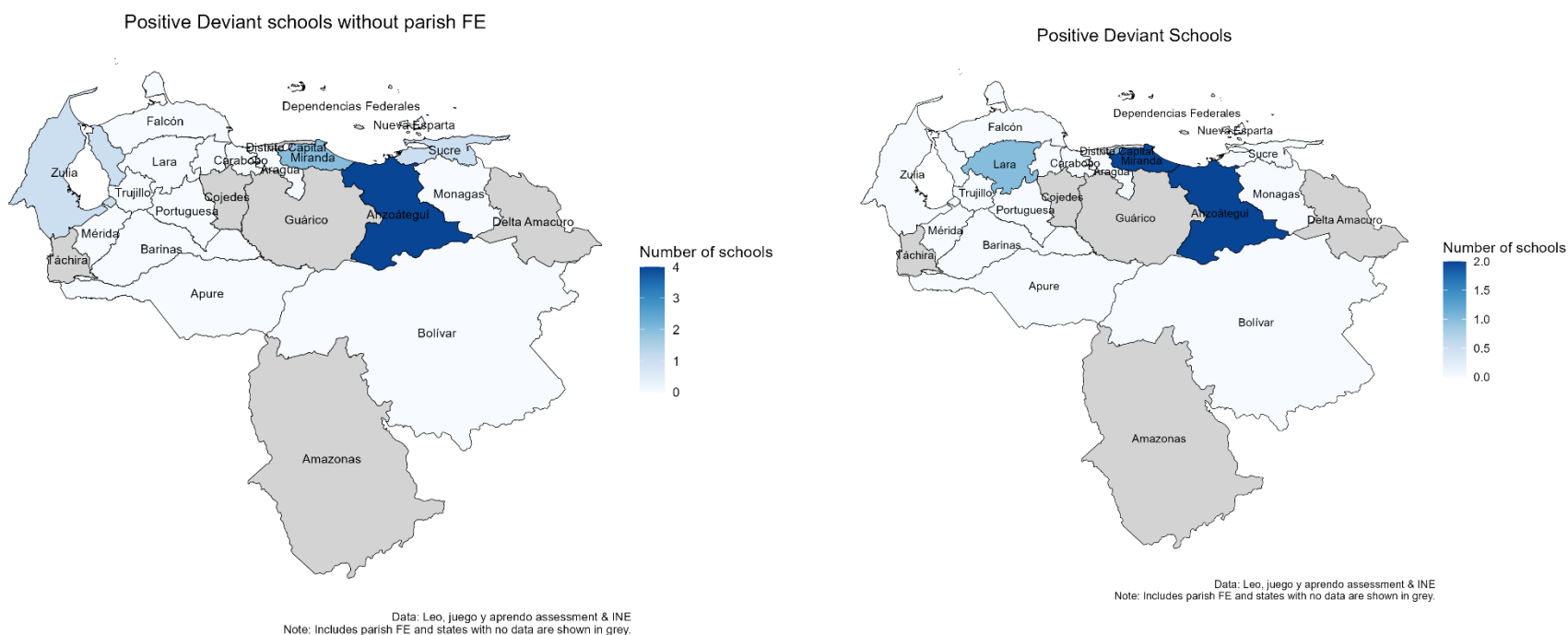


Data: Leo, juego y aprendo assessment & INE
 Note: Includes parish FE and states with no data are shown in grey

Appendix 11. Distribution of positive deviant schools with and without fixed effects

In the graphs below, we show how the positive deviant schools vary when including parish fixed effects into the models. Including fixed effects allows to control unobserved heterogeneity at the parish level that might affect literacy levels, allowing for a clearer analysis of school-level characteristics. The appearance of schools in Zulia and Sucre without fixed effects, versus Miranda and Lara with them, indicates significant parish-level variations. We prioritized parish fixed effects as it isolates the schools' specific contribution to literacy score, which is the goal of this methodology in our study. However, this approach has its limitations. By controlling parish-level characteristics, our conclusions are likely to be specific to the context within which the schools operate. Moreover, this method assumes that the primary effects of interest lie within school variations, underestimating the impact of broader community or regional factors.

Figure 13. Positive deviant school distribution by state with and without fixed effects



Appendix 12. Descriptives of deviance analysis interviews

Figure 14. Years of experience deviant schools

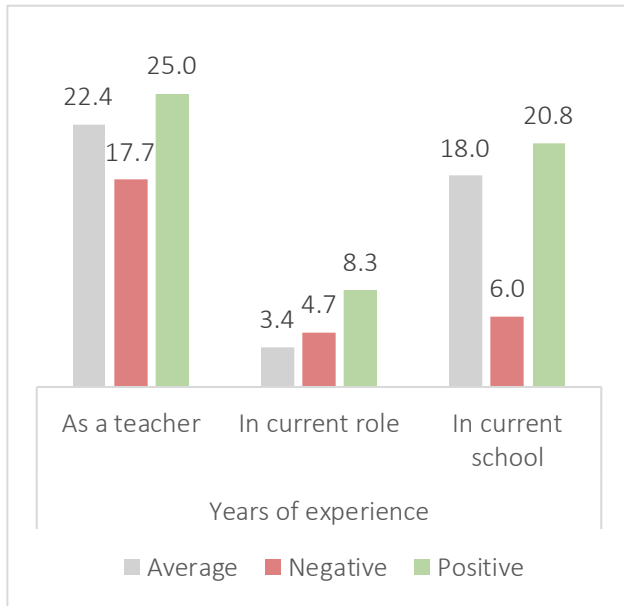


Figure 15. Total students and student to teacher ratio

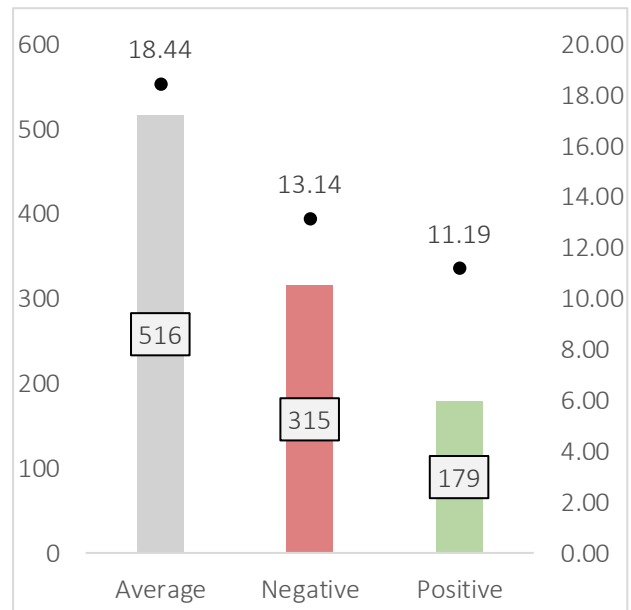


Figure 16. How many days a week do teachers attend school on average?

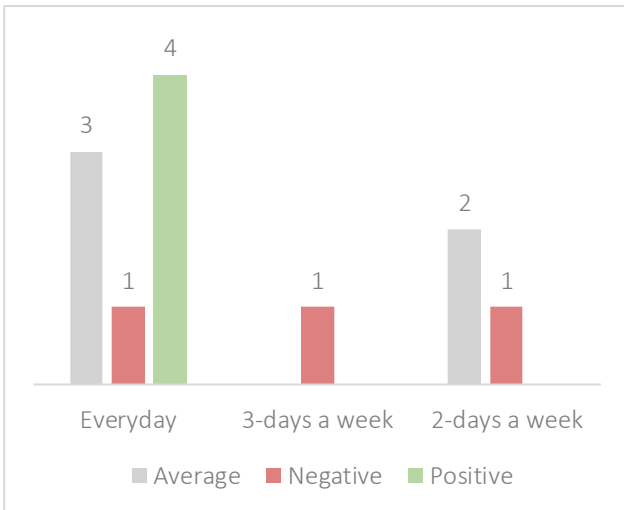
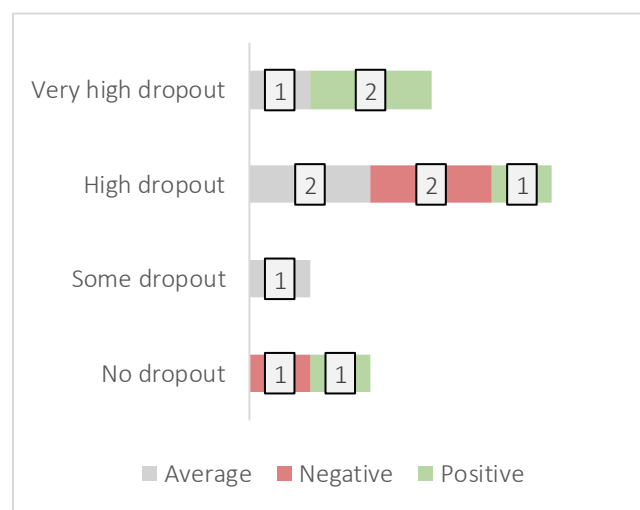


Figure 17. How would you assess teacher dropout in the last three years at this school?



Appendix 13. Opportunities for reallocation by state

Table 16. Teacher shortage by state

State	N°	Students	Teachers	Teacher gap	SD gap	Ratio
Amazonas	3.00	575.67	46.67	11.17	0.14	12.34
Anzoátegui	18.00	814.61	30.44	20.11	0.15	26.76
Apure	14.00	411.07	26.29	13.48	0.14	15.64
Aragua	21.00	606.24	36.29	31.74	0.31	16.71
Barinas	22.00	343.45	25.82	32.72	0.25	13.30
Bolívar	21.00	681.29	27.38	32.02	0.20	24.88
Carabobo	18.00	547.67	34.06	23.54	0.17	16.08
Cojedes	9.00	383.78	38.56	21.54	0.13	9.95
Delta amacuro	4.00	492.50	32.75	44.62	0.21	15.04
Distrito capital	23.00	883.13	44.13	26.16	0.19	20.01
Falcón	19.00	328.53	25.84	36.07	0.23	12.71
Guárico	15.00	362.80	30.67	23.57	0.24	11.83
Lara	26.00	535.65	32.77	27.41	0.18	16.35
Miranda	28.00	409.11	31.11	24.81	0.21	13.15
Monagas	13.00	563.46	55.69	27.44	0.26	10.12
Mérida	17.00	301.71	29.59	28.86	0.30	10.20
Nueva esparta	4.00	312.75	31.00	7.80	0.09	10.09
Portuguesa	14.00	335.43	22.57	32.94	0.30	14.86
Sucre	21.00	614.57	46.90	20.88	0.21	13.10
Trujillo	13.00	360.62	29.38	27.39	0.22	12.27
Táchira	19.00	329.21	25.95	38.40	0.16	12.69
Vargas	5.00	665.40	30.00	22.50	0.10	22.18
Yaracuy	10.00	400.20	19.50	25.45	0.20	20.52
Zulia	37.00	566.49	26.14	35.85	0.22	21.68

Appendix 14. Synthesis of policy recommendations

Figure 18. Diagram synthesis of policy recommendations

