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Education: An Analysis
based on the SERCE**

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Resumen

This study explores the state of infrastructure in the region's primary education schools, using the SERCE database, and analyzes the connection between school infrastructure conditions and language and mathematics tests results for third and sixth grade students. The results of the analysis indicate that school infrastructure and the access to basic services (electricity, water, sewerage and telephone) in the region's schools are highly deficient; there exists a large disparity between countries as well as between private urban, public urban and public rural schools; and there are large gaps between schools with children from high income families and schools with children from low income families. The analysis on the relationship between school infrastructure and academic results in the SERCE tests indicate that the highest factors most significantly associated with learning outcomes are: the presence of spaces that support teaching (libraries, science and computer labs); the connection to electric and telephone utilities; access to potable water, drainage and bathrooms. This indicates that countries in the region must strengthen investment geared towards improving school infrastructure in order to close the gaps that negatively affect rural areas, public sector schools, and schools with students from low income families. Likewise, public policies must prioritize infrastructure areas that have an impact on learning.

JEL code: I24

Keywords: Improving School Infrastructure, Learning in Latin American Elementary Education, SERCE, Learning Outcomes, Impact on Learning, and Educational Resources.

I. Introduction

School infrastructure has traditionally been analyzed as a factor that relates to school coverage. Recently, however, the number of studies showing positive associations between the physical conditions of schools and students' learning has increased. Berner (1993), Cash (1993), Earthman et al. (1996), Hines (1996) estimated statistically positive effects between variables of school infrastructure and standardized tests, in several cities and states of the United States (Washington D.C, Virginia, North Dakota and Virginia, respectively). Other similar studies in the United States have shown similar correlations (Andersen, 1999; Ayres, 1999, O'Neill, 2000, and Earthman, 1998). Rydeen (2009) evidences that new school buildings improved students' grades in tests and that some specific characteristics of these buildings, which are related to human comfort, can influence students' achievement. Others conclude that spatial set up, including noise, heat, cold, light and air quality, is related to the performance of both students and teachers (Mark Schneider 2002; AFT, 2006; among others).

There is also a consensus on the positive effects of small schools and their effect seems to be stronger on students from lower socio-economic groups (Earthman, 2002). In summary, empirical evidence from the United States indicates that students who attend schools with good conditions of infrastructure exceed, by several percentage points, the performance of students in lower quality buildings.

In Latin America and the Caribbean, the opportunities to study the relationship between infrastructure and learning in a comparative way have been very few, particularly, due to the absence of databases with a regional scope¹. However, the Second Regional Comparative and Explanatory Study (SERCE) including 16 Latin American countries in 2006, has helped overcome this limitation as it contains information on the variables of infrastructure and utilities from schools and the results of students standardized tests in Language, Mathematics and Science².

¹ Among the exceptions in the case of Latin America, the Paxson and Schady (2002) study revised the effect of investing in projects to build and renovate schools in poor districts of Peru and found positive results in school attendance rates.

² Participating countries in Reading, Mathematics and Science are: Argentina, Uruguay, Paraguay, Peru, Colombia, Panama, Dominican Republic, Cuba, El Salvador and the State of Nueva León, Mexico.

A study prepared by UNESCO using the data from the SERCE, reveals that the physical conditions of schools may have a significant effect on students' performance and can contribute significantly to the reduction of the learning gap that is associated with social inequality³. Another recent study also based on the SERCE (Duarte, Bos and Moreno 2010) sought to identify school factors that are associated with the learning of students in Latin America, particularly those factors related to teachers and the school context in which they teach. The study found that the physical infrastructure of schools and the presence of utilities (electricity, drinking water, sewerage and telephone) are highly associated with learning, even after the controls for teachers' age, teacher training, effective class time, index of violence and discrimination and other socio-economic variables of students' families. Both studies suggest that better facilities and utilities in schools could create teaching environments that are much more ideal to achieve better learning. These results are important because they indicate that investing in school infrastructure and basic physical conditions is not a luxury but a necessity.

This paper aims at exploring the information on school infrastructure contained in the database of the SERCE more in-depth, with the aim of: (i) knowing about the state of elementary schools infrastructure in the region; and (ii) taking advantage of the information regarding the results from the tests of the SERCE to analyze the relationship between schools' infrastructure and the academic results of students in the areas of Mathematics and Language in the Latin American elementary education. In the conclusions, guidelines are suggested for public policies in the area of school infrastructure.

Participating countries only in Languages and Mathematics are: Chile, Brazil, Ecuador, Costa Rica, Nicaragua, Guatemala and Mexico.

³ See UNESCO-LLECE. SERCE, Second Regional Comparative and Explanatory Study. First Report. June 2008.

II. State of Elementary Schools' Infrastructure in Latin America

The SERCE assessed the performance achieved by Latin American elementary school students (Third and Sixth grade) in the areas of Language, Mathematics and Science. The Test gave exams and collected information in 2006, to a representative sample of students in 16 Latin American countries. Through this study, there is information on almost 200 thousand students and more than 2.500 schools (Third Grade) and 2.300 (Sixth Grade). To evaluate the performance of students, the SERCE uses tests concerning common content from the official curricula of the countries in the region and the life-skills approach promoted by UNESCO. The set of data used for this study combines the database, containing students' results from the tests, with additional databases that include questions for students and their families about their socio-economic characteristics and for principals and teachers about the characteristics of their schools⁴.

a. Missing Data Management

To recover the missing values, the predictive variables used the multiple imputation method, specifically the chained equations technique. The method is based on the assumption that data omission can be predicted by using a set of variables that are observed, assuming that there is an arbitrary missing-data pattern *Missingness at Random (MAR)*. The chained equations technique allows imputations on variables that have different measurement levels. The process consists on estimating a separate imputation model for each variable; which uses the rest of variables included in the analysis as explanatory variables. Depending on the measurement level of variables, the imputation model considers linear regressions, logistic or multinomial logistic imputation methods according to whether the variables are continuous, dichotomous or categorical⁵.

⁴ For more details about the features of the SERCE, see reports of UNESCO on the SERCE in UNESCO-LLECE. SERCE (2008).

⁵ In this study, data was imputed using the implementation of the method available in ICE (*Imputing based on Chained Equations*) routine in Stata. See Royston, Patrick (2004) and Royston, Patrick (2009).

At first, a set of plausible values for the variables with missing data was considered. Then those values were imputed in the original base by creating a new "complete" database. All models are estimated using the "complete" database. The SERCE database contains information collected at different levels (schools, students) so the imputation process was conducted at each level. Finally, the number of cases that are subject to analysis before and after the imputation process is reported in Table 1. The initial sample indicates the number of cases available for analysis with available information in the explained variable (score observed in the test). This number includes cases with missing information in any of the explanatory variables. The final sample includes the total number of eligible cases for analysis after the imputation process with valid information in all important variables in this analysis. Average rates of valid cases after imputation exceed 90% of the entire region for both students and schools.

Table 1: Latin America, initial and final sample for the analysis

	Third Grade		Sixth Grade	
	Initial	Final	Initial	Final
Reading	2562	2409	2326	2138
Mathematics	2562	2427	2326	2129

b. Main Traits of Elementary Schools Infrastructure in Latin America

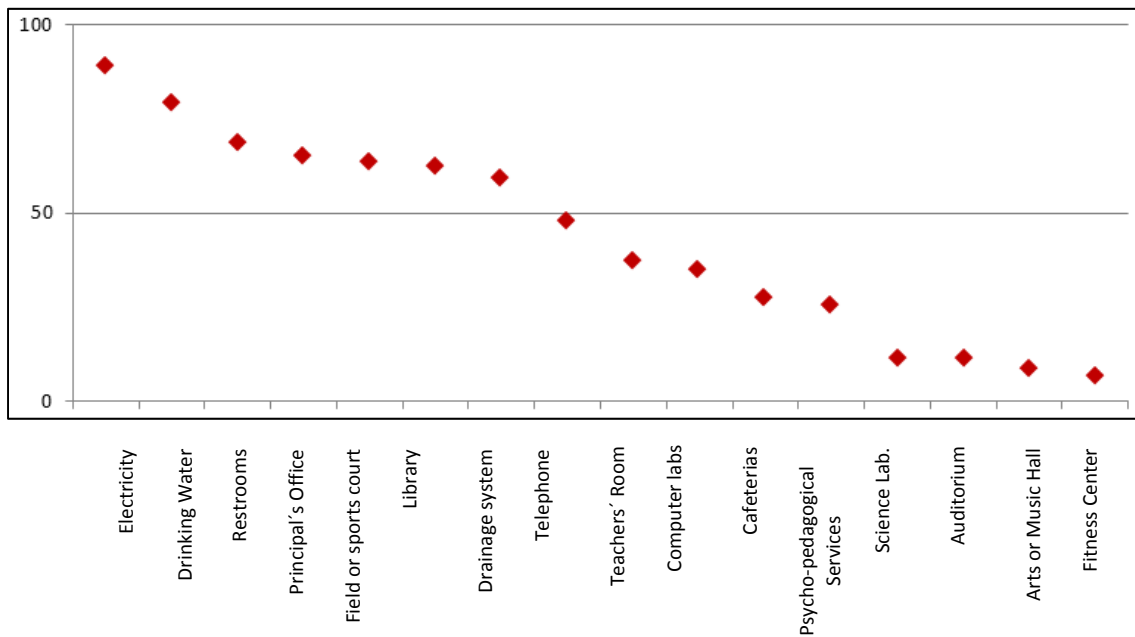
The main characteristics of the infrastructure of elementary schools in the region, as well as the differences according to the type of school (public and private), geographical location (urban and rural) and socio-economic groups were established by using the database with the final sample. For all countries, the availability of educational spaces such as classrooms, science and computer laboratories, library, hall of arts and music, sports court, and fitness center was analyzed. Administrative facilities, teachers' room and educational services room, as well as access to electricity, telephone, drinking water, toilets and drainage system was also highlighted.

The analysis of data from the schools participating in the SERCE indicates that educational infrastructure and access to utilities such as electricity, water, sewerage and telephone is deficient in the region. There is great disparity between the facilities and utilities of

private urban schools, public urban schools and rural public ones; and there are huge gaps in the infrastructure of schools that serve children from families of high and low socioeconomic incomes.

Figure 1 shows that, according to information from the database of the SERCE, infrastructure and access to utilities by Latin American schools fall short of the expectations. Among many other infrastructure deficiencies, the following stand out: about 40% of elementary schools do not have a library; 88% do not have science laboratories; 63% do not have spaces for meetings or offices for teachers; 73% do not have a cafeteria; 65% do not have computer labs; and 35% do not have any space to practice sports. On the other hand, 21% of schools have no access to safe drinking water; 40% have no drainage system; 53% do not have telephone lines; 32% have shortcomings in the number of restrooms; and 11% do not have any access to electricity.

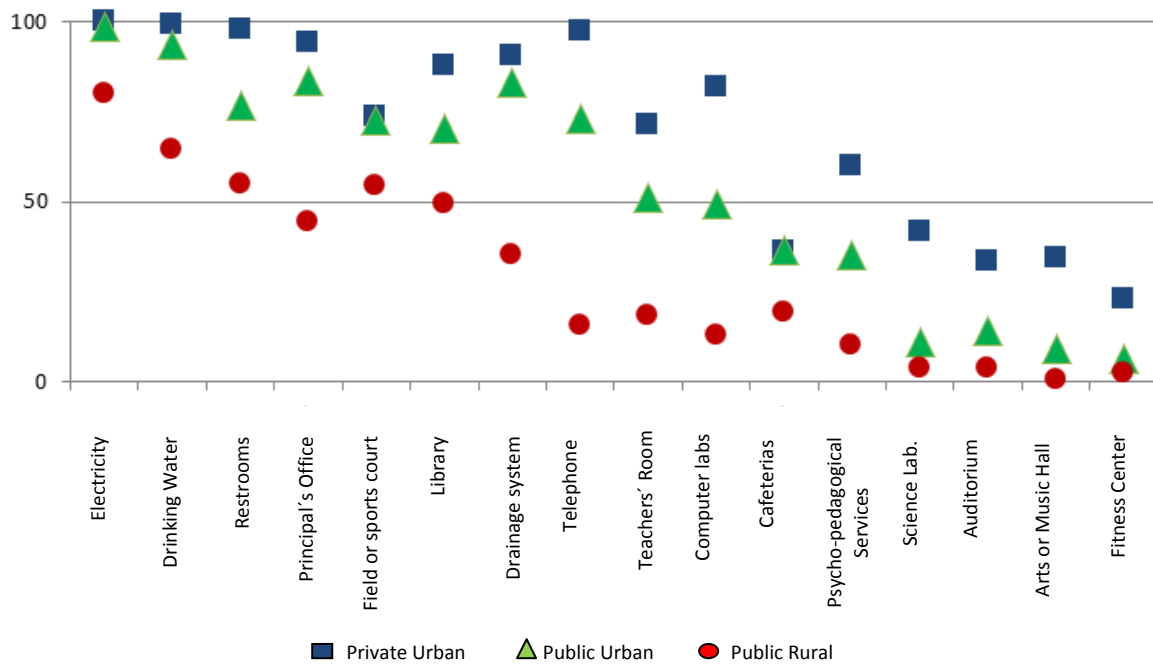
Figure 1. Infrastructure and Utilities in Latin American Elementary Schools



Both infrastructure and access to utilities have major differences when data is separated by urban area (private and public) and rural areas: the situation is better in urban private schools; and the deficit is greater in rural schools (Figure 2). For all variables mentioned, private schools have

significant advantages over urban public schools and these ones, in turn, over rural schools. There are great differences in physical infrastructure and easy access to utilities between private and public schools in urban areas: the former have significant disadvantages in terms of telephone services, computer labs, restrooms, libraries, teachers' rooms, psycho-pedagogical services, science laboratories, auditoriums, music halls and fitness center when compared with private schools. On the other hand, the situation of rural public schools is highly precarious, as illustrated in Figure 2: the presence of science laboratories, computer labs, auditoriums, spaces for arts or music or gyms is almost non-existent; only a small percentage have telephone lines, drainage systems or an office for the school principal; and only half have spaces for a library, sports court or an adequate amount of restrooms. The information, separated by type of school management and geographical area for each of the countries is given in Annex 1.

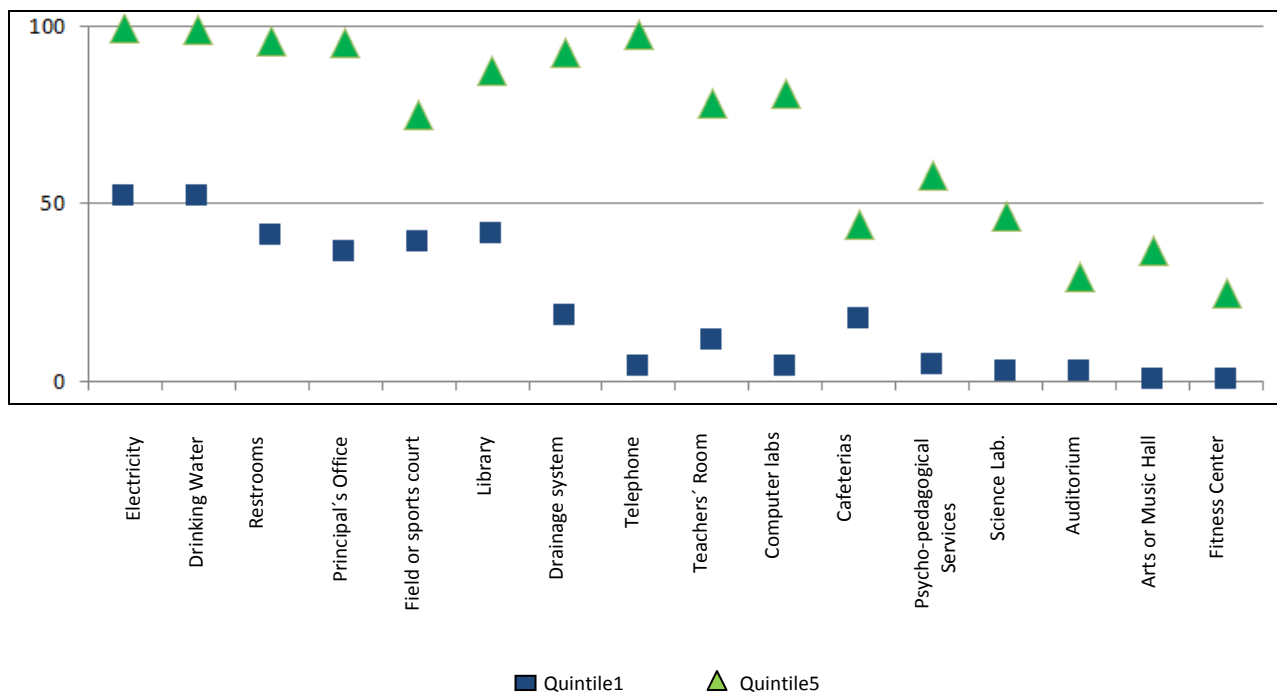
Figure 2: Differences in infrastructure in urban and rural schools (public and private)



Similarly, according to information from the database of the SERCE, there are large gaps in the conditions of schools that serve the poorest children compared with those of children from wealthier families. The conditions of schools that serve the poorest quintile are highly deficient: only half are equipped with electricity and water, 19% have drainage systems and 4% have

access to a telephone line; almost none of them have science laboratories, fitness center or computer labs; only 18% have a cafeteria and only 42% have a library (Figure 3). These deficiencies minimize the school's potential to mitigate or offset the inequities that children bring from outside, as many of these shortcomings are replicated in students' homes⁶.

Figure 3: Percentage of Schools with Utilities According to their Socio-Economic Status



c. Disaggregation by Country

According to the information in the database of the SERCE study, the situation of school infrastructure in the region evidences significant variations when divided by country. Figures 4, 5 and 6 show average figures by country, grouped according to different aspects of school infrastructure.

⁶ The socio-economic position of the families of students who participated in the tests of the SERCE, has been calculated by using the Index of Socio-Economic and Cultural status (ISEC), created by the SERCE and based on the education variables of parents, housing characteristics, access to utilities and family access to cultural goods (especially books existing at home). Using this index, the average ISEC for each school and the quintiles for the region as a whole were estimated, taking into account the importance of sample design for each country.

Figure 4 shows the variables related to schools' access to different utilities:

- Electricity is the most widely spread utility in Latin American schools. However, there are major gaps especially in some countries of Central America and in Peru: in Nicaragua almost 60% of the schools do not have electricity, 44% in Peru and in Panama and Guatemala approximately one of every three.
- While nearly 80% of the schools in the region have drinking water, there are significant lags in the access to this service in almost all Central American countries (with the exception of Costa Rica) and in Colombia, Peru, Ecuador and Paraguay.
- Latin American elementary schools rely on a mediocre access to drainage systems (on average less than 60 per cent have one), but the situation is much more critical in Nicaragua, Paraguay, Guatemala, Peru, Panama, Dominican Republic and El Salvador.
- The dial-up connection of schools in the region is poor (half of the schools do not have access). In Nicaragua and Guatemala less than 20% of the schools have a telephone. Less than 30% in Peru and Paraguay.
- A high proportion (nearly 70%) of schools in the region, report a deficit of restrooms for students, but the situation is worse in Central America, Mexico, Peru, Paraguay, Ecuador and Colombia.

Figure 4: Access to Utilities in Latin American Schools

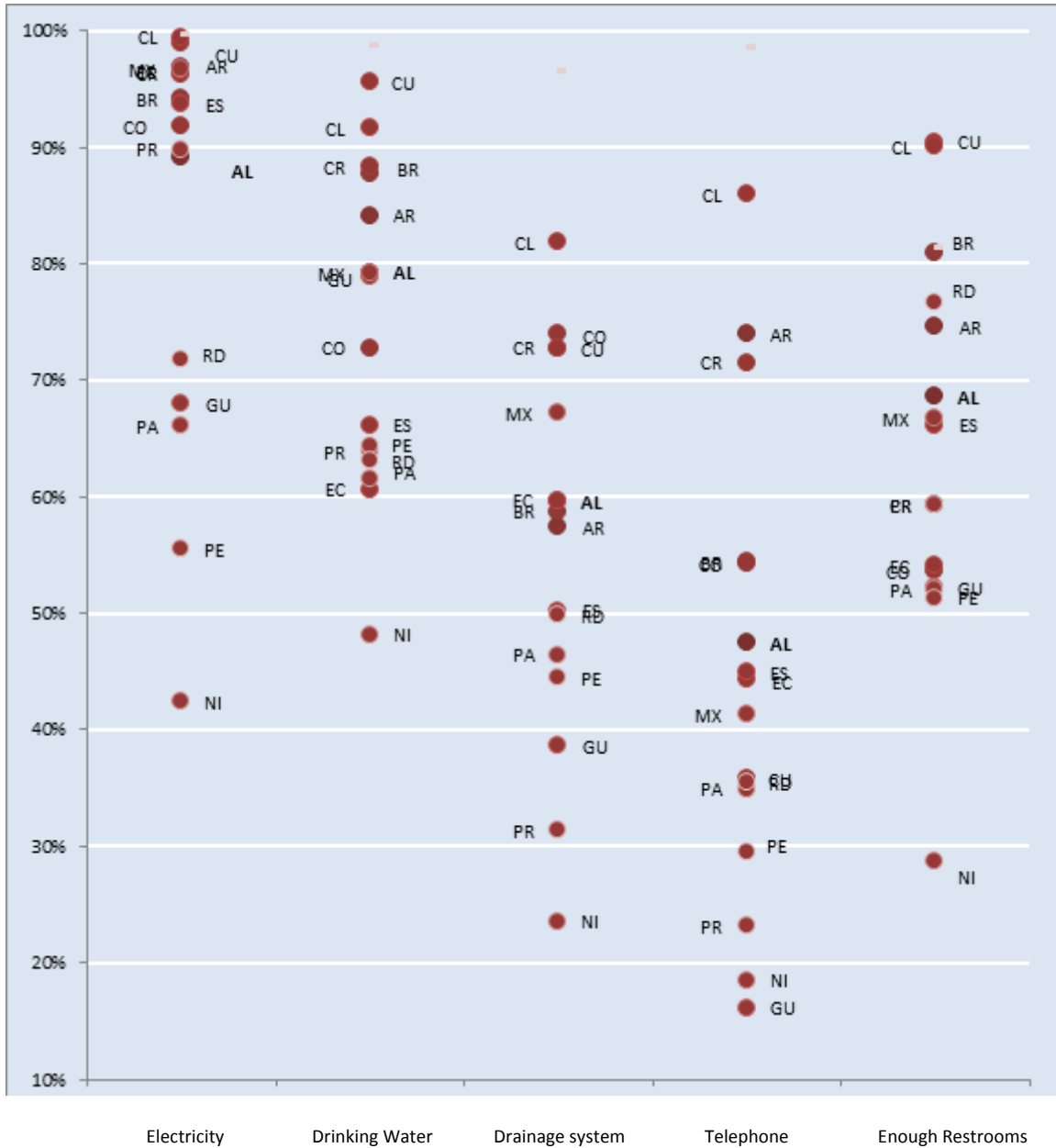


Figure 5 shows the situation of school infrastructure related to offices or spaces for principals and teachers, as well as the availability of spaces for libraries, computer labs, science laboratories and music or arts halls. The variation by country is broad, and the data indicates significant deficits in all areas:

- While in Cuba and Chile the great majority of schools (over 90%) have computer labs, in the rest of the countries the proportion of schools with such availability is generally low.

In Central America, the Dominican Republic, Mexico, Brazil, Peru and Paraguay less than one-third of the schools have computer labs.

- The situation shows much more of a deficit when we observe the figures for science laboratories and spaces for the teaching of arts or music. In Brazil, El Salvador, Paraguay, Cuba, Costa Rica, Guatemala, Mexico and Nicaragua, less than 10% of schools have science laboratories. Only Argentina (one of every three schools) and Chile (one every five) show insufficient but remarkable amounts of schools that are equipped with arts or music halls; for the rest of the countries in the region this type of facility is almost non-existent.
- Despite the importance they have for the quality of education, it is evident that even less than half of the schools of some the countries in the region have libraries: Nicaragua, Costa Rica, Paraguay, the Dominican Republic and Ecuador.

Figure 5: Offices for Principals and Teachers, and Teaching Support Spaces

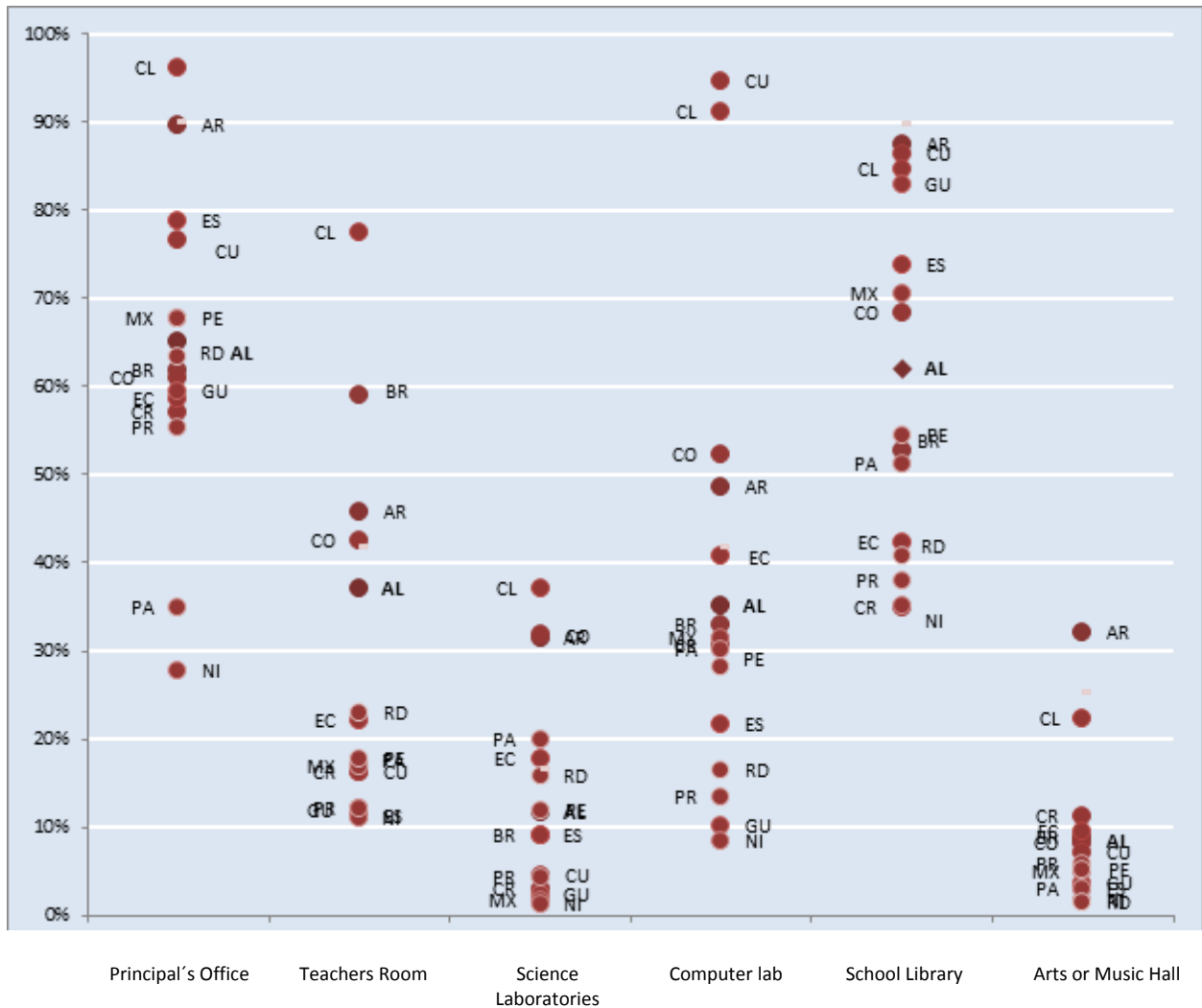
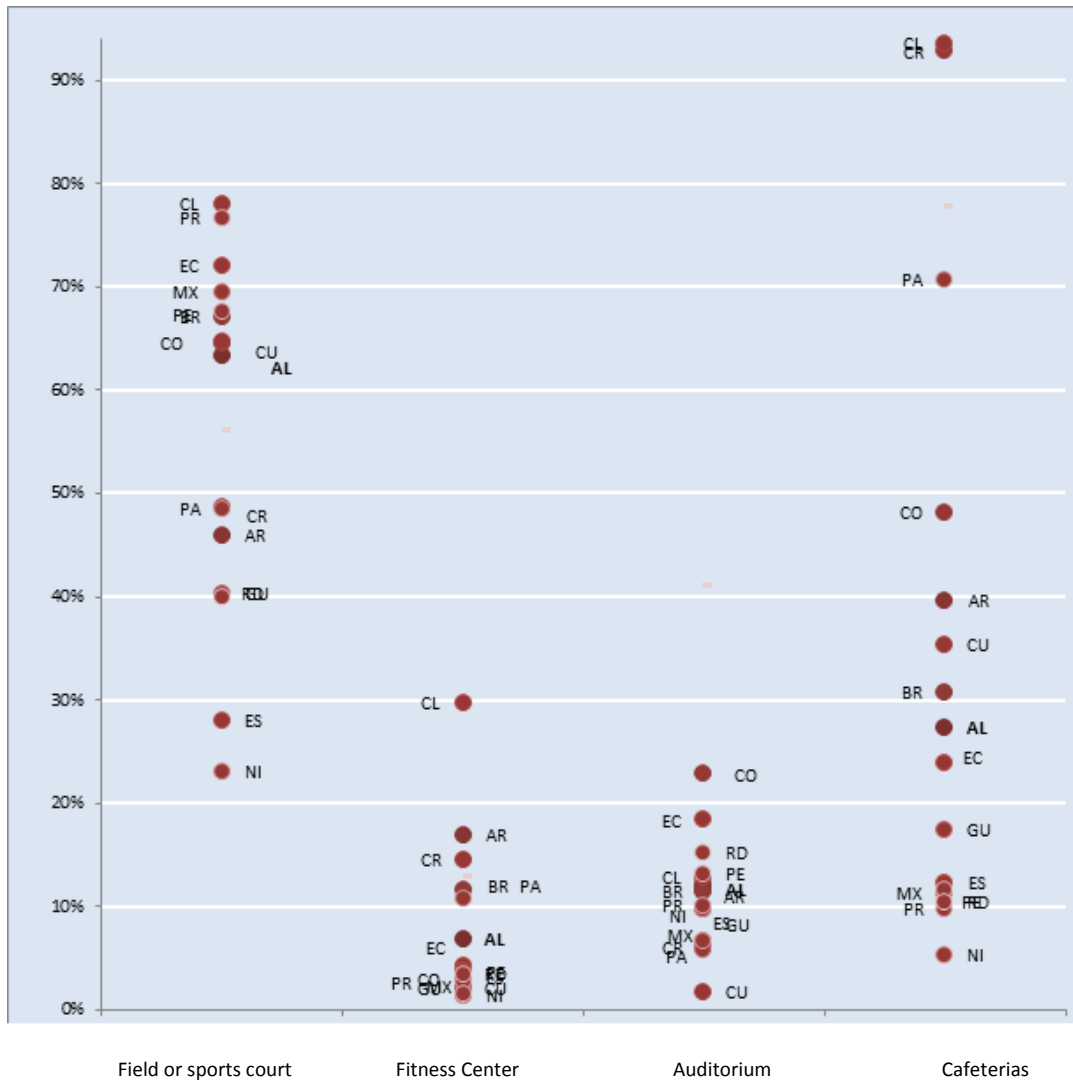


Figure 6 shows information on the availability of common areas for sports, physical education, auditoriums and cafeterias in elementary schools in Latin America. While there are large differences between countries, the existence of some kind of infrastructure for sports and school cafeterias, to a lesser extent, is highlighted. On the other hand, a general shortage of gyms and auditoriums is evident in almost all countries in the region. These facilities have a high association with private schools.

Figure 6: Spaces for Sports, Auditoriums and Cafeterias in Latin American Schools



Figures 4, 5 and 6 show little homogeneity in the educational infrastructure of the region and the existence of a group of countries whose schools have large gaps in terms of infrastructure resources. In particular, Central American countries (except Costa Rica) and the Dominican Republic show the highest deficits, followed by Paraguay and Ecuador in South America. The physical infrastructure of schools in the countries of the southern area of the continent (Chile, Argentina and Uruguay), in contrast, have better conditions. Mexico, Brazil and Colombia are located close to the average for the region in most of the analyzed variables. Similarly, data by country also shows wide differences when disaggregated by geographical areas (urban and rural) or by public and private schools. The disaggregated information for each of the countries is found in Annex 1.

III. Relationship between Infrastructure and Student Learning in Latin America

The results shown in the previous section evidence the main characteristics of the infrastructure of elementary schools at a regional level and disaggregated by country. This section analyzes the correlations between the main factors of school infrastructure and test results of students in the SERCE.

a. School Infrastructure Indicators

To study the correlation between school infrastructure and learning, the different variables of infrastructure and utilities were grouped by thematic indexes; which are shown in Table 2.

Table 2: Indicators of School Infrastructure and Components

Indicators	Indicators included
Sports Areas Index	Field or sports court
Common Use Areas Index	Fitness Center
	Auditorium
Office Areas Index	Principal's Office
	Additional Offices
	Teachers Conference Room
Psycho/Pedagogical Areas Index	Science Laboratory
	Computer lab
	Library
	Arts or Music Hall
Health Areas Index	Nurse's Office
	Psycho-pedagogical Services
Utilities Index	Electricity
	Telephone
Water and Sanitation Index	Drinking Water
	Drainage system
	Enough Restrooms

Indexes were built by using the Principal Component Analysis (PCA). This method allows the extraction of information that is common to all variables and the identification of the best linear

combination between them. The result is a set of indexes that contains the weighted sum of the standardized indicators in each group. Due to the discrete nature of indicators, dichotomous variables that indicate the presence or not of an environment or service, the variant based on the analysis of a matrix of polychoric correlations was used⁷. PCA confirms the presence of multiple dimensions in the groups of indicators which allows the identification of 7 components or indexes (five related to infrastructure and 2 to the group of utilities). Each index summarizes 2 to 4 indicators, except for the sports areas index that appears with a single indicator. The indexes that were created allow the identification of the first main component which captures between 50 and 60 per cent of the common variance.

Once indexes were estimated, they were standardized so that they would have a mean value of zero and a standard deviation value of one. These indexes allow information to be summarized and estimate to be performed to establish the magnitude of association with the learning of students.

When exploring the indexes estimates in detail, major differences (and shortcomings) in school infrastructure by geographical area, type of management and socio-economic groups mentioned in the previous section, are confirmed. Figure 7 shows the differences between public and private, and urban and rural schools. Rural schools are in disadvantage in all indexes when compared to schools that are located in urban areas. This suggests the need for targeted interventions to improve the conditions of infrastructure in rural areas of the continent. But, likewise, Figure 7 evidences large gaps in specific areas of infrastructure between public and private schools in the cities. In particular, deficits in urban public schools are evident in: key areas related to teaching (index of academic and educational areas) such as libraries, science laboratories and computer labs; internal common use areas (auditoriums and gyms); and in spaces for a nurse's office and psycho-pedagogical support.

⁷ The matrix of polychoric correlations and the use of factor analysis were estimated using the *polychoricpca* routine implemented in Stata.

Figure 7: Gaps in Indexes by School Type and Geographical Area (Third Grade)

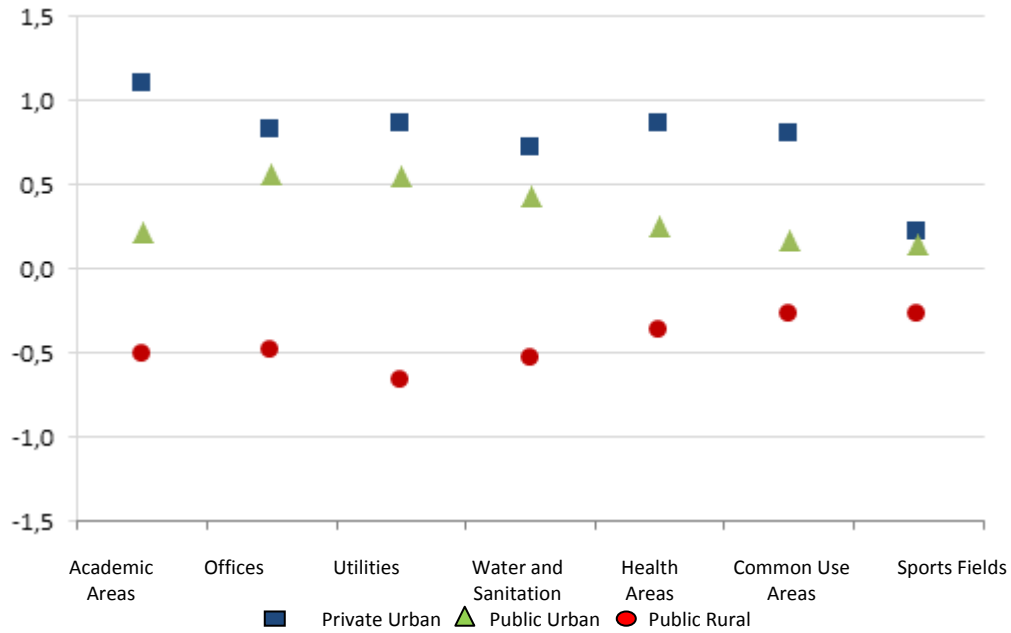
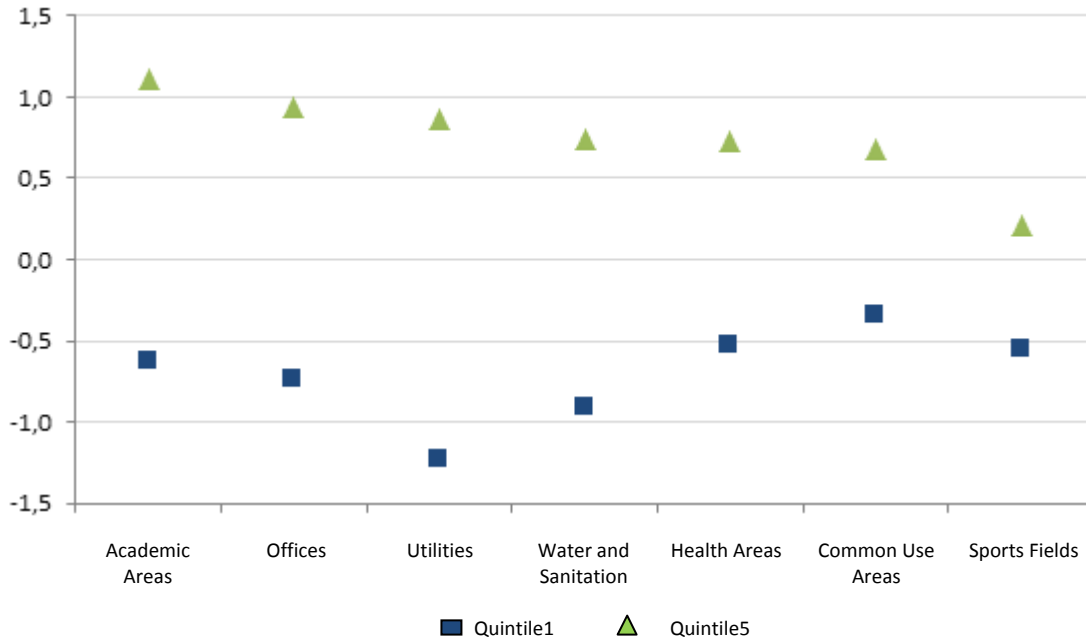


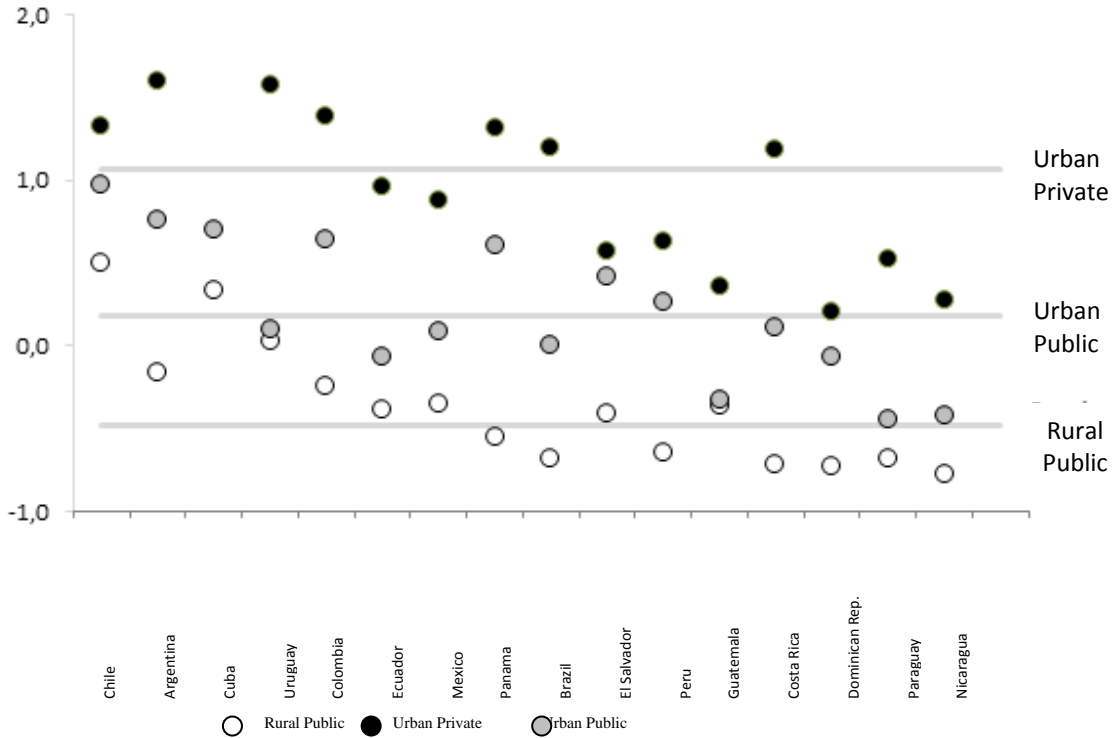
Figure 8 shows the gaps in infrastructure according to the socio-economic status of schools. Similarly to what is presented in section II. b, the differences in the value of the indexes for the conditions of infrastructure in schools that serve the richest and the poorest quintiles are extremely marked. This indicates unequal conditions of the educational offerings by socio-economic group. The biggest gaps are found in: access to utilities; availability of areas for teaching support (library, science laboratories, and computer labs); access to water and sanitation; offices for principals and teachers; and spaces for nurses and psychological services offices. The figure shows the result for the Third Grade school sample, but the results for Sixth Grade schools are similar.

Figure 8: Gaps in School Infrastructure Indexes per Students Socio-Economic Status (Third Grade)



When we look at the estimates for each index disaggregated by country, the disparity between urban and rural, and public and private schools is evident. Figure 9 presents this information to the sub-index of Academic and Pedagogical Areas and relative positioning of countries with respect to the Latin American average, showed in the horizontal lines for private urban, public urban and rural public schools. It can be observed that in the cases of Chile, Argentina and Cuba, the three types of schools are above average in the region. On the contrary, in countries such as Nicaragua, Paraguay, and the Dominican Republic, the three types of schools are below average in the region. Likewise, the gap between the situation of private and public schools is remarkable, even those located in urban areas, in almost all countries with the exception of Chile, for countries with a higher average than that of the region, and the Dominican Republic, for countries in which all kinds of schools are below regional average values.

Figure 9: Infrastructure in Academic Areas in Latin American Schools by Country (Third Grade)



b. Multilevel Model to Estimate the Correlation between Infrastructure and Average School Performance

This study estimates the correlation between learning and infrastructure at a school level using a multilevel model. Because of the nature of the dependent variable and the average score obtained by the school in each test, a linear model may be suitable. However, since the collected information corresponds to a hierarchical data structure with schools clustered by country, it was considered appropriate to use multilevel linear regression models (at two levels: schools and countries)⁸. Multilevel regression models help shape the variance of academic performance in schools; which are part of a common educational system: it is assumed that schools within the same country tend to be more similar to each other than they do with respect to schools in another country. Multilevel models allow estimating standard adjusted errors that reflect the

⁸ These models are also known as Hierarchical Linear Models (HLM) or Mixed Models.

impact of clustering and calculate more precise significance levels to avoid rejecting a null hypothesis incorrectly (Type I or II errors)⁹.

The relationship between the performances of schools is represented schematically by equations (1) and (2):

At the school level or level 1.

$$Y_{ij} = \beta_{0j} + r_{ij} \quad (1)$$

At a country level or level 2.

$$\beta_{0j} = \gamma_{00} + U_{0j} \quad (2)$$

By replacing (2) for (1) we obtain an expanded model

$$Y_{ij} = \gamma_{00} + U_{0j} + r_{ij} \quad (3)$$

Assumptions:

$$r_{ij} \sim \text{NID}(0, \sigma^2)$$

$$U_{0j} \sim \text{NID}(0, \tau_{00})$$

$$\text{Cov}(\varepsilon_{ij}, U_{0j}) = 0$$

Where:

Y_{ij} : the performance of school i in country j

γ_{00} : the global intercept (overall average or performance for all schools in all countries)

β_{0j} : the intercept of country j, average performance of all schools in country j

r_{ij} : the residue of school i in country j

⁹ The relationship between infrastructure and test results was also estimated by using an OLS model with fixed effects and the results are similar and consistent with those of the multilevel model. The OLS model with fixed effects estimates is available to interested readers.

U_{0j} : distance (residue) to the average performance of country j with respect to the overall or regional intercept

Equation (3) shows the score in any of the tests without including any control variable. This first model, known in multilevel literature as null or empty model, is the starting point for the sequence of carried out analyzes (results not reported, but available upon request). Estimates obtained from such model allow i) to get an idea on the average value of the score (intercept); ii) establish a baseline on which to perform comparisons with more complex models; and iii) break down the variance of the obtained score and how much of it is associated with the level of the school and the country.

Then, we estimate a model that includes the indexes of infrastructure of a school as explanatory variables. Coefficients for these estimates approximate the correlation that each index has with performance; controlling by the effect of the other indexes evaluated at their mean values (assuming that all indexes are centered). It is important to mention that the econometric estimation we performed, may be subject to endogeneity problems (wealthier schools with the best academic results could tend to have access to better resources; which in turn ensure they have access to better infrastructure), or may be subject to self-selection problems (students with better learning styles are "selected" or seek to register in schools with better infrastructure, thus complicating the separation of the impact of infrastructure on learning and of learning on school choice). Despite the fact that we estimated a model that included socio-economic controls (Socio-Economic and Cultural Index [ISEC] calculated by the SERCE, added to the school level), this does not solve all the statistical problems mentioned, so the results must be interpreted only as correlations that are subject to verification with more robust data or through impact evaluations; which are expressly designed for the purpose of measuring the effect of infrastructure on learning. Our analysis for the correlations is therefore descriptive, but it constitutes a first attempt to explore the correlation between infrastructure and academic performance; which is extremely low for Latin America.

Formally, the model is expressed as follows:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(INDEXES_j) + r_{ij} \quad (4)$$

Where:

$$\beta_{1j} = \gamma_{10} \quad (5)$$

e $INDEXES_{ij}$: represents a vector of indexes of school infrastructure

Reordering (2) and (5), equation (4) can be re-expressed as:

$$Y_{ij} = \gamma_{00} + \gamma_{10}(INDEXES_{ij}) + r_{ij} + U_{0j} \quad (6)$$

The model controlling by socio-economic background, can be expressed as follows:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(INDEXES_{ij}) + \beta_{2j}(ISEC_{ij}) + r_{ij} \quad (7)$$

Where:

$$\beta_{2j} = \gamma_{20} \quad (8)$$

AND:

$ISEC_{ij}$: represents a vector of socio-economic background of the schools

When re-expressing (2), (5) and (8) in a single equation, we obtain:

$$Y_{ij} = \gamma_{00} + \gamma_{10}(INDEXES_{ij}) + \gamma_{20}(ISEC_{ij}) + r_{ij} + U_{0j} \quad (9)$$

c. Results of the Analysis

Table 3 shows the results of the estimates of multilevel models for schools in Third and Sixth Grade, in the Reading test, considering the set of data from the region, but controlling it by the effects of the participating countries¹⁰. Separate models were calculated for schools according to their geographic location (rural and urban). Likewise, estimates were made without controls (column labeled "Without ISEC"), but given that the infrastructure of schools varies according to the socio-economic background of their students, estimates were also modeled by the average ISEC of students by school and by the type of school management, public or private (column

¹⁰ The results of the analysis correspond to the relation between factors of school infrastructure and students performance while considering all countries in the region. As mentioned above, the impact each national education system can have on regional data is captured when estimating the models; incorporating a country as an additional level of analysis. One advantage of this approach is that the estimated results are net representations of the differences between schools and between educational systems at each country.

"With ISEC")¹¹. In the SERCE, tests scores are based on 500 points on average for the region and each standard deviation is equal to 100 points.

Table 3: Correlation between School Infrastructure and Learning in Reading in Latin America according to the SERCE

	Third Grade				Sixth Grade			
	Rural Schools		Urban Schools		Rural Schools		Urban Schools	
	Without Isec	With Isec	Without Isec	With Isec	Without Isec	With Isec	Without Isec	With Isec
	b/p	b/p	b/p	b/p	b/p	b/p	b/p	b/p
Sports Index	1.56	1.14	-1.96	1.19	3.47*	3.00*	-4.04***	-0.91
	.39	.52	.15	.30	.07	.10	.00	.44
Common Use Areas Index	2.71	2.74	3.56***	2.28**	-3.02	-2.89	3.33***	1.86*
	.35	.33	.01	.03	.28	.28	.01	.08
Offices Index	-4	-4.32	5.41**	0.19	-4.67	-4.55	6.49***	0.64
	.17	.13	.01	.92	.13	.13	.00	.73
Academic/Educational Areas Index	7.56**	6.38**	12.61***	5.57***	8.08***	6.66**	13.38***	6.01***
	.01	.03	.00	.00	.01	.02	.00	.00
Health Areas Index	-0.6	-0.26	5.59***	1.65	3.64	4.04	4.91***	0.51
	.85	.94	.00	.16	.24	.18	.00	.66
Water and Sanitation Index	2.45	0.1	7.95***	-0.74	5.51***	2.18	8.42***	-1.38
	.22	.96	.00	.71	.01	.30	.00	.50
Utilities Index	5.60**	-0.37	8.00***	-3.47*	9.90***	1.86	6.41**	-4.88**
	.01	.88	.00	.09	.00	.45	.01	.03
Socio-economic and Cultural (ISEC) Status Index		17.47***		45.16***		22.70***		48.45***
		.00		.00		.00		.00
Public School				-20.07***				-19.02***
				.00				.00
Constant	476.49***	479.73***	495.22***	495.84***	472.14***	479.75***	489.57***	497.97***
	.00	.00	.00	.00	.00	.00	.00	.00
Variance (Country) %	50	49	49	62	44	44	41	56
Variance (School) %	50	51	51	38	56	56	59	44
N	1084	1084	1325	1325	888	888	1250	1250

Levels of significance: * .10 ** .05 *** .01

¹¹ The sample design of the SERCE does not consider rural private schools, so the analysis of rural schools does not include controls by school management.

The most evident results that arise from the estimates presented in Table 3, are as follows:

- The index of academic and pedagogic areas in schools (which includes areas for libraries, science laboratories, computer labs, and arts and music halls) is the factor that is more consistent and positively correlated with the scores of students in both in Third and Sixth grade, as well as in rural and urban schools. The coefficients of this factor are higher in socio-economic models without controls or school management types, but they continue to be positive with an equal degree of significance even after introducing the controls.
- The existence of drinking water, drainage systems and an adequate amount of restrooms (index of water and sanitation) and the connection to electric power or to telephone lines (index of Utilities) is positively and significantly associated with higher test scores in rural and urban schools, but only in socio-economic models without controls. In models with ISEC, this relation ceases to be significant. Given the high relation between ISEC and learning, the change of significance between the two types of models would in turn reflect the high correlation between the indexes of water and sanitation and the connection to electricity and telephone services and schools' ISEC.
- In urban schools, the presence of common use areas (gym and/or auditorium) has a positive effect on test results for both models without controls, and those models after controlling for the socio-economic conditions of students or by type of school management.
- In urban schools, the presence of spaces for nurse's offices or psycho-pedagogical services is positively and significantly associated with learning in the model without controls, but the opposite occurs when controls are introduced, just like in the case of water and sanitation, and utilities, indicating a high correlation of their absence with schools that serve the most vulnerable students.

Estimates of models for Mathematics, present similar results and can be observed in Table 4¹².

Table 4: Correlation between School Infrastructure and Learning in Mathematics in Latin America according to the SERCE

	Third Grade				Sixth Grade			
	Rural Schools		Urban Schools		Rural Schools		Urban Schools	
	Without Isec	With Isec	Without Isec	With Isec	Without Isec	With Isec	Without Isec	With Isec
	b/p	b/p	b/p	b/p	b/p	b/p	b/p	b/p
Sports Fields Sub-Index	1.56	1.14	-1.96	1.19	3.47*	3.00*	-4.04***	-0.91
	.39	.52	.15	.30	.07	.10	.00	.44
Common Use Areas Sub-Index	2.71	2.74	3.56***	2.28**	-3.02	-2.89	3.33***	1.86*
	.35	.33	.01	.03	.28	.28	.01	.08
Offices Sub-Index	-4	-4.32	5.41**	0.19	-4.67	-4.55	6.49***	0.64
	.17	.13	.01	.92	.13	.13	.00	.73
Academic/Pedagogic Areas Sub-Index	7.56**	6.38**	12.61***	5.57***	8.08***	6.66**	13.38***	6.01***
	.01	.03	.00	.00	.01	.02	.00	.00
Health Areas Sub-Index	-0.6	-0.26	5.59***	1.65	3.64	4.04	4.91***	0.51
	.85	.94	.00	.16	.24	.18	.00	.66
Water and Sanitation Index	2.45	0.1	7.95***	-0.74	5.51***	2.18	8.42***	-1.38
	.22	.96	.00	.71	.01	.30	.00	.50
Utilities Index	5.60**	-0.37	8.00***	-3.47*	9.90***	1.86	6.41**	-4.88**
	.01	.88	.00	.09	.00	.45	.01	.03
Socio-economic and Cultural (ISEC) Status Index		17.47***		45.16***		22.70***		48.45***
		.00		.00		.00		.00
Public School				-20.07***				-19.02***
				.00				.00
Constant	476.49***	479.73***	495.22***	495.84***	472.14***	479.75***	489.57***	497.97***
	.00	.00	.00	.00	.00	.00	.00	.00
Variance (Country)	2986.90***	2797.14***	2086.65***	2415.38***	2027.30***	1894.16***	1444.58***	1705.98***
	0	0	0	0	0	0	0	0
Variance (School)	2998.79***	2874.02***	2145.43***	1491.51***	2627.09***	2431.79***	2064.64***	1427.97***
	0	0	0	0	0	0	0	0
N	1084	1084	1325	1325	888	888	1250	1250

Levels of significance: * .10 ** .05 *** .01

¹²

To detect multicollinearity in the models, various tests were conducted estimating the following indicators: VIF (*variance inflation factor*), *Tolerance* (tolerance indicator) and *Condition number*. The results suggest no problem of multicollinearity. In all cases, the values observed in the statistical diagnostic are lower than the cutoff values which are often used as a reference. On the other hand, sensitivity analyses were performed for the sample, with and without imputation (see also Annex 2 with the omissions for the various indicators of the analysis according to management/area and ISEC quintile of the school). Analyses were run on both samples and the results are highly similar. In general, they are not sensitive to the use of a sample with or without imputed data (see Annexes 3 and 4 with the results of the estimates for the sample without imputation).

d. Infrastructure in Academic and Pedagogic Areas and Learning

Given that in the models of analysis, the index of academic and pedagogic areas is the biggest and more consistently correlated aspect of school infrastructure with learning, we sought to establish the magnitude in accounting terms to determine the effect that infrastructure changes may have on test results. For this purpose, different scenarios were built to predict the variance of the mean scores of the school by using variations in the combinations of indicators that make up the index as an input. The results are shown in Table 5.

The analysis indicates that, on average for Latin America, a school without any of the variables (indicator) that make up the sub-index will have a value of "-1,03"; and one that has all variables will have a sub-index value of "2.67". Intermediate values of this index are associated with all possible combinations observed (remember that the index has a mean value of zero and a standard deviation value of one). In Table 5, values of zero correspond to the absence of an indicator and one represents its occurrence. For example, if a school had a combination of a computer lab and a library, the value of the sub-index would be "0.67". If, in addition, that school had a science lab, the value of the sub-index would increase to "1.68". We repeat these results must be observed with caution and that they are only indicative of possible associations, due to the econometric problems that the estimate faces.

Table 5: Value of the Index of Academic and Pedagogic Areas according to Possible Combinations of Its Indicators

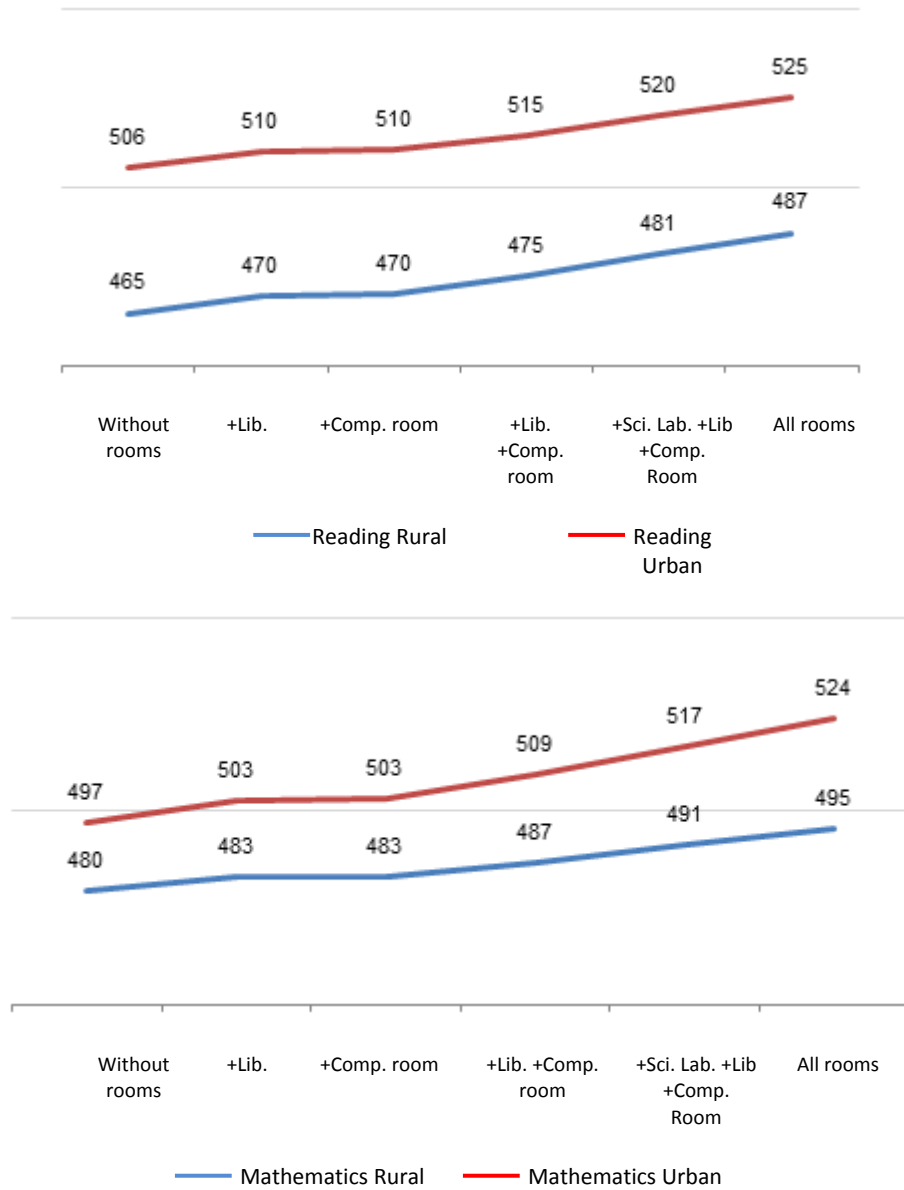
Sub-index Value	Science Laboratory	Computer lab	Arts or Music Hall	Library	Number of Schools
-1.03	0	0	0	0	645
-0.21	0	0	0	1	669
-0.15	0	1	0	0	134
-0.04	0	0	1	0	9
-0.02	1	0	0	0	5
0.67	0	1	0	1	452
0.78	0	0	1	1	22
0.80	1	0	0	1	38
0.85	0	1	1	0	7
0.86	1	1	0	0	18
1.67	0	1	1	1	61
1.68	1	1	0	1	147
1.79	1	0	1	1	11
1.85	1	1	1	0	2
2.67	1	1	1	1	123

Given the positive and statistically significant correlation between the presence of this type of infrastructure in schools and learning, in practice, the difference in the results of tests of the SERCE for Third Grade between a rural school with all the components of the index for academic and learning areas and one without any of these, suggests that its students would have a score of 465 to 487 points on average, in Reading; at an urban school it would be between 506 to 525 points. In Mathematics at urban schools, the variance is 497 to 524 points, and 480 to 495 points in rural schools; which in all cases means approximately one fifth of standard deviation in the test scores (See Figure 10). In the SERCE tests, 20 points could be interpreted as a quarter of the gap that exists between a school with insufficient learning and another with proper learning. In schools serving children with low economic resources, such difference would help to significantly reduce the learning differences that are present in Latin American schools, not only because of the inequalities related to the socio-economic situation of students families, but also to the uneven quality of the schools they must attend

Figure 10 presents the estimates of the effect on learning (Reading and Mathematics) when adding the different components of the sub-index to an average Third Grade Latin

American school (according to the regression model with the previously presented controls). The figure makes a difference between urban and rural schools.

Figure 10: Differences in the Results on the Reading and Mathematics Test in Third Grade with Changes in the Index of Academic and Pedagogical Areas



IV. Conclusions

The objective of this study was to explore the database of the SERCE to present a glimpse of the state of infrastructure in elementary schools in the region, on the one hand. On the other hand, the objective was to analyze the relationships between the conditions of school infrastructure and the results of students' tests.

The results of the analysis indicate that the conditions of educational infrastructure and the access to utilities, such as electricity, water, drainage system and telephone, for elementary schools in the region are highly deficient. There is great disparity between the facilities and utilities of urban private, urban public and rural public schools. There are great gaps in the infrastructure of schools that take care of children with families that have high and low incomes. In addition, there are large differences in the educational infrastructure when the data is disaggregated by country: in particular, countries in Central America (except Costa Rica) and the Dominican Republic evidence the highest deficits, followed by Paraguay and Ecuador in South America, while countries of the southern area of the continent have better conditions.

When studying the correlations between school infrastructure and academic results, the SERCE tests evidence that the factors that are highly and significantly associated with learning are the presence of teaching support areas (libraries, science laboratories and computer labs), utilities in places such as electricity and telephone lines and the existence of drinking water, drainage systems and adequate amounts of restrooms. In urban schools, in addition to the above, the presence of common use areas (gym and/or auditorium) and spaces for a nurse's office or psycho-pedagogical services are associated with better student learning.

Although these results are tentative and descriptive of the possible relationships between infrastructure and academic performance, they suggest that strengthening the investments aimed at improving schools' infrastructure can contribute to close the wide gaps that adversely affect rural areas, public schools and schools serving students from families with lower socio-economic resources.

According to our analysis, infrastructure investments should prioritize the interventions aimed at improving infrastructure factors that are more directly associated with learning, i.e.

building libraries, science laboratories, computer labs or common use spaces. Similarly, investments must seek to resolve the major existing deficits for schools in the region, especially for those located in rural areas, related to the lack of drinking water and drainage systems and insufficient restrooms, as well as the connection to electrical power and telephone lines.

Finally, in order to have better tools to guide public policies in the field of school infrastructure, it is necessary to improve the information about the physical characteristics of schools by country and to promote more studies at regional and comparative levels in individual countries to analyze the connections between school infrastructure and student learning.

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Annex 1: Table of Indicators that Make Up the Levels of Infrastructure and Utilities

Third Grade Schools Profile | Presence of Facilities (in percentages) | Disaggregated by Management and Area

	Latin America	Argentina	Brazil	Colombia	Costa Rica	Cuba	Chile	Ecuador	El Salvador	Guatemala	Mexico	Nicaragua	Panama	Paraguay	Peru	Dominican Republic	Uruguay
Field or sports court																	
<i>Country's Total</i>	63.4%	45.9%	67.1%	64.5%	48.6%	64.6%	78.1%	72.1%	28.0%	40.3%	69.5%	23.0%	48.4%	76.6%	67.5%	39.9%	56.1%
Private Urban Schools	73.5%	58.0%	94.5%	62.1%	84.4%	100.0%	82.9%	83.3%	36.0%	72.3%	57.2%	56.3%	72.5%	74.3%	45.8%	54.4%	59.3%
Public Urban Schools	72.8%	30.1%	82.7%	62.9%	50.0%	70.9%	73.6%	75.5%	54.5%	69.0%	77.7%	46.8%	68.7%	66.1%	68.7%	52.4%	49.2%
Public Rural Schools	54.4%	61.9%	45.6%	66.3%	43.8%	58.2%	76.1%	66.3%	21.7%	32.8%	64.6%	17.0%	40.0%	79.1%	73.6%	30.4%	90.7%
Fitness Center																	
<i>Country's Total</i>	6.8%	16.8%	11.5%	2.9%	14.4%	2.1%	29.7%	4.2%	3.7%	2.2%	1.3%	1.3%	10.7%	2.7%	1.5%	3.4%	12.9%
Private Urban Schools	23.1%	52.7%	34.3%	8.8%	66.7%	100.0%	37.6%	11.0%	21.0%	7.6%	5.1%	12.5%	42.3%	0.0%	6.3%	3.6%	35.0%
Public Urban Schools	6.7%	11.0%	10.8%	4.9%	25.6%	1.9%	36.2%	4.8%	2.9%	0.0%	0.0%	1.6%	20.3%	0.0%	1.8%	7.6%	7.6%
Public Rural Schools	2.5%	2.0%	4.6%	0.0%	4.4%	2.2%	14.3%	1.8%	1.2%	1.8%	1.7%	0.0%	3.6%	3.7%	0.0%	1.7%	3.8%
Auditorium																	
<i>Country's Total</i>	11.6%	12.2%	11.4%	22.9%	6.0%	1.7%	12.7%	18.3%	9.8%	6.6%	5.8%	9.7%	6.6%	10.0%	13.2%	15.2%	41.2%
Private Urban Schools	33.5%	30.0%	34.9%	42.3%	27.3%	100.0%	15.6%	51.3%	19.1%	27.0%	29.5%	50.2%	27.3%	41.9%	27.5%	33.6%	72.4%
Public Urban Schools	14.4%	11.3%	12.3%	35.0%	11.7%	3.3%	9.0%	15.3%	28.9%	22.0%	6.1%	8.5%	14.7%	10.5%	28.9%	20.6%	35.6%
Public Rural Schools	4.1%	2.0%	3.6%	9.9%	1.5%	0.0%	12.4%	8.5%	4.5%	2.4%	1.7%	5.4%	1.8%	4.6%	3.5%	7.4%	17.0%
Principal's Office																	
<i>Country's Total</i>	65.1%	89.5%	61.9%	61.0%	57.1%	76.5%	96.1%	58.6%	78.7%	59.3%	67.6%	27.7%	34.9%	55.3%	67.7%	63.4%	90.1%
Private Urban Schools	93.9%	100.0%	89.1%	95.1%	100.0%	100.0%	100.0%	92.0%	95.7%	95.8%	100.0%	82.7%	95.3%	89.3%	93.1%	100.0%	100.0%
Public Urban Schools	83.8%	91.0%	77.7%	81.2%	82.0%	100.0%	100.0%	60.1%	97.1%	92.5%	90.8%	80.5%	84.3%	69.5%	81.8%	82.5%	94.6%
Public Rural Schools	44.6%	80.0%	40.1%	37.6%	43.4%	52.0%	88.2%	44.5%	72.5%	50.8%	41.9%	15.5%	14.5%	46.7%	54.7%	42.8%	45.3%
Additional Offices																	
<i>Country's Total</i>	40.4%	53.9%	66.5%	42.6%	19.7%	44.4%	70.3%	18.9%	21.3%	9.0%	14.3%	12.2%	21.7%	19.7%	21.8%	32.3%	39.1%
Private Urban Schools	78.6%	100.0%	83.6%	82.2%	84.4%	100.0%	88.9%	59.0%	57.4%	57.2%	81.2%	61.4%	95.0%	73.1%	55.1%	60.0%	88.1%
Public Urban Schools	57.6%	64.5%	90.7%	59.0%	44.3%	67.9%	86.1%	8.7%	40.0%	15.3%	12.6%	31.9%	56.0%	28.3%	36.0%	55.2%	30.7%
Public Rural Schools	18.7%	6.0%	41.1%	19.8%	3.8%	19.9%	35.3%	8.3%	12.1%	1.8%	3.4%	4.5%	1.8%	9.2%	6.4%	13.6%	0.0%
Teachers Conference Room																	
<i>Country's Total</i>	37.1%	45.9%	59.0%	42.5%	16.3%	16.2%	77.5%	22.0%	11.1%	12.2%	16.8%	11.1%	16.9%	12.2%	17.8%	23.0%	41.9%
Private Urban Schools	71.2%	84.3%	83.6%	74.2%	68.8%	100.0%	95.9%	56.4%	16.9%	59.6%	57.7%	50.3%	77.2%	44.1%	40.8%	59.3%	75.3%
Public Urban Schools	51.2%	48.4%	76.9%	56.5%	27.1%	24.9%	85.4%	16.9%	34.2%	25.3%	21.3%	14.6%	25.2%	14.5%	33.0%	25.4%	36.3%
Public Rural Schools	18.6%	15.7%	36.5%	23.6%	6.4%	6.9%	48.2%	11.0%	5.5%	4.2%	6.6%	6.2%	3.6%	6.5%	5.7%	10.3%	17.0%

Third Grade Schools Profile | Presence of Facilities (in percentages) | Disaggregated by Management and Area

	Latin America	Argentina	Brazil	Colombia	Costa Rica	Cuba	Chile	Ecuador	El Salvador	Guatemala	Mexico	Nicaragua	Panama	Paraguay	Peru	Dominican Republic	Uruguay
Science Laboratory																	
<i>Country's Total</i>	11.7%	31.5%	9.0%	32.0%	2.9%	4.4%	37.2%	17.7%	9.0%	2.3%	1.6%	1.3%	19.9%	4.2%	11.9%	15.8%	16.7%
Private Urban Schools	41.8%	56.9%	47.4%	64.6%	35.1%	100.0%	55.1%	29.7%	23.3%	7.3%	18.3%	15.1%	67.8%	21.5%	34.4%	21.7%	47.4%
Public Urban Schools	11.2%	34.8%	2.0%	43.6%	0.0%	4.4%	34.0%	15.9%	22.1%	0.9%	0.0%	0.0%	54.5%	2.0%	23.6%	28.9%	8.7%
Public Rural Schools	3.9%	10.0%	1.8%	15.0%	0.0%	4.4%	18.8%	14.6%	4.1%	1.8%	0.0%	0.0%	5.4%	1.9%	1.1%	8.7%	7.5%
Computer lab																	
<i>Country's Total</i>	35.1%	48.6%	32.9%	52.2%	30.7%	94.6%	91.2%	40.8%	21.7%	10.1%	31.3%	8.4%	30.0%	13.3%	28.3%	16.4%	41.9%
Private Urban Schools	81.7%	100.0%	83.6%	83.3%	100.0%	100.0%	97.5%	83.3%	76.8%	70.5%	75.4%	52.8%	100.0%	70.0%	74.1%	47.0%	87.9%
Public Urban Schools	49.4%	43.1%	45.9%	79.0%	58.8%	98.9%	100.0%	44.5%	55.9%	16.1%	41.5%	17.8%	60.4%	8.3%	53.8%	27.9%	28.1%
Public Rural Schools	12.9%	21.8%	6.6%	26.2%	12.9%	90.1%	76.1%	23.0%	6.5%	1.8%	14.6%	2.4%	11.4%	5.5%	6.2%	1.6%	40.3%
Arts or Music Hall																	
<i>Country's Total</i>	8.4%	32.1%	8.9%	8.1%	11.3%	7.2%	22.3%	9.5%	2.9%	3.6%	4.8%	1.7%	2.9%	5.8%	5.2%	1.4%	25.4%
Private Urban Schools	34.4%	58.5%	38.3%	33.0%	49.3%	100.0%	29.9%	34.7%	12.6%	20.0%	35.2%	12.5%	23.2%	20.5%	21.9%	5.0%	72.4%
Public Urban Schools	9.2%	40.3%	7.9%	6.5%	18.9%	14.2%	21.9%	2.3%	9.9%	0.0%	3.8%	1.6%	0.0%	4.2%	6.7%	2.3%	14.3%
Public Rural Schools	0.9%	2.0%	0.0%	2.2%	4.2%	0.0%	13.8%	4.9%	0.0%	1.8%	0.0%	0.5%	0.0%	3.7%	0.0%	0.0%	3.9%
School Library																	
<i>Country's Total</i>	62.0%	87.4%	52.7%	68.4%	34.9%	86.4%	84.7%	42.2%	73.8%	82.9%	70.5%	35.0%	51.1%	37.9%	54.5%	40.8%	89.9%
Private Urban Schools	87.9%	89.7%	94.5%	100.0%	76.6%	100.0%	90.1%	80.4%	83.2%	68.0%	92.0%	76.7%	75.1%	66.3%	59.0%	74.1%	96.2%
Public Urban Schools	70.5%	92.4%	66.6%	69.6%	60.8%	96.8%	83.7%	32.6%	90.7%	77.4%	70.2%	57.8%	73.2%	47.9%	75.2%	48.5%	89.7%
Public Rural Schools	49.4%	78.0%	28.0%	57.0%	21.5%	75.7%	79.0%	31.5%	68.9%	85.5%	67.1%	28.2%	42.6%	30.8%	45.8%	26.3%	79.7%
Nurse's Office																	
<i>Country's Total</i>	5.8%	5.2%	2.1%	15.9%	6.2%	13.0%	38.4%	10.5%	2.6%	2.9%	3.7%	0.9%	5.3%	3.1%	6.6%	5.5%	4.1%
Private Urban Schools	26.1%	15.7%	13.1%	60.2%	43.2%	100.0%	49.4%	32.8%	19.1%	11.8%	33.4%	10.5%	30.9%	8.6%	25.6%	15.3%	6.4%
Public Urban Schools	4.2%	1.6%	0.0%	12.4%	8.1%	23.7%	36.8%	6.9%	3.1%	2.6%	2.0%	0.0%	10.5%	0.0%	10.1%	11.8%	4.0%
Public Rural Schools	1.2%	3.9%	0.0%	3.5%	1.2%	2.2%	26.4%	4.8%	0.0%	1.8%	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%
Psycho-pedagogical Services																	
<i>Country's Total</i>	25.8%	34.4%	41.4%	25.6%	17.2%	37.3%	48.3%	17.3%	4.5%	4.6%	11.7%	5.6%	8.2%	5.9%	15.1%	23.6%	23.7%
Private Urban Schools	59.9%	58.3%	69.2%	64.3%	88.7%	100.0%	54.2%	49.9%	25.3%	26.1%	41.0%	31.4%	59.8%	30.1%	71.8%	67.8%	73.1%
Public Urban Schools	35.4%	42.0%	53.3%	36.7%	23.3%	51.1%	63.6%	20.2%	11.0%	4.5%	15.4%	21.7%	2.9%	2.1%	10.4%	34.6%	11.9%
Public Rural Schools	10.5%	7.9%	23.9%	6.4%	6.6%	23.3%	28.5%	5.2%	0.0%	1.8%	3.5%	1.1%	0.0%	2.8%	0.0%	3.9%	1.9%

Third Grade Schools Profile | Presence of Utilities (in percentages) | Disaggregated by Management and Area

	Latin America	Argentina	Brazil	Colombia	Costa Rica	Cuba	Chile	Ecuador	El Salvador	Guatemala	Mexico	Nicaragua	Panama	Paraguay	Peru	Dominican Republic	Uruguay
Drinking Water																	
<i>Country's Total</i>	79.1%	83.6%	87.8%	72.5%	87.5%	95.6%	91.7%	60.1%	66.5%	79.2%	78.8%	49.9%	61.5%	64.2%	64.6%	63.2%	98.5%
Private Urban Schools	99.0%	100.0%	100.0%	94.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	92.6%	100.0%	100.0%	100.0%	93.1%	100.0%
Public Urban Schools	92.9%	94.0%	94.0%	91.7%	96.1%	98.9%	100.0%	81.2%	98.7%	92.6%	92.9%	92.6%	100.0%	86.2%	89.5%	76.1%	100.0%
Public Rural Schools	64.6%	56.0%	79.1%	53.6%	83.2%	92.3%	74.6%	34.2%	55.1%	75.0%	63.4%	40.5%	46.9%	53.3%	44.8%	47.9%	87.0%
Drainage system																	
<i>Country's Total</i>	59.9%	56.6%	59.0%	74.1%	72.5%	72.8%	81.9%	59.7%	50.3%	39.9%	67.5%	25.2%	47.2%	32.2%	44.3%	50.4%	96.5%
Private Urban Schools	90.3%	77.7%	83.6%	97.2%	92.2%	100.0%	97.8%	88.6%	91.4%	100.0%	100.0%	88.6%	100.0%	79.6%	93.6%	97.9%	96.2%
Public Urban Schools	83.4%	77.1%	82.0%	90.2%	83.1%	95.8%	93.4%	81.0%	87.8%	92.6%	84.5%	62.2%	89.7%	34.9%	85.9%	64.5%	97.3%
Public Rural Schools	36.2%	10.0%	33.3%	56.7%	66.7%	49.2%	52.8%	38.2%	36.7%	26.4%	47.7%	14.2%	29.2%	23.6%	14.2%	28.5%	92.6%
Enough Restrooms																	
<i>Country's Total</i>	68.6%	75.2%	80.9%	54.1%	58.1%	90.5%	90.3%	53.7%	66.2%	52.1%	66.9%	30.2%	51.4%	59.9%	51.3%	76.7%	81.3%
Private Urban Schools	97.9%	99.2%	100.0%	94.3%	100.0%	100.0%	100.0%	88.5%	95.7%	98.2%	100.0%	70.4%	90.1%	100.0%	96.5%	100.0%	96.2%
Public Urban Schools	76.4%	75.8%	86.9%	55.6%	70.6%	89.6%	89.7%	55.6%	74.7%	58.0%	72.5%	54.7%	84.6%	62.7%	69.3%	68.3%	76.1%
Public Rural Schools	55.4%	57.7%	70.2%	39.9%	49.1%	91.4%	78.8%	38.3%	60.1%	45.4%	56.5%	23.1%	37.7%	52.6%	31.1%	72.0%	85.2%
Electricity																	
<i>Country's Total</i>	89.0%	96.3%	94.2%	91.9%	95.4%	98.9%	99.4%	96.6%	93.9%	68.2%	96.7%	42.6%	66.5%	89.5%	54.4%	72.7%	99.8%
Private Urban Schools	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	96.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Public Urban Schools	98.7%	100.0%	100.0%	97.4%	98.2%	100.0%	100.0%	100.0%	100.0%	94.5%	98.1%	89.3%	100.0%	96.1%	96.5%	86.1%	100.0%
Public Rural Schools	79.6%	88.0%	87.8%	85.9%	94.0%	97.8%	98.2%	93.7%	91.7%	61.2%	95.0%	31.6%	53.8%	86.2%	25.3%	57.9%	98.1%
Telephone																	
<i>Country's Total</i>	47.5%	74.3%	54.8%	54.5%	70.5%	36.1%	86.1%	44.2%	45.4%	17.2%	41.5%	20.8%	36.2%	24.8%	28.5%	36.4%	98.3%
Private Urban Schools	97.3%	100.0%	100.0%	97.2%	100.0%	100.0%	100.0%	92.3%	100.0%	89.4%	100.0%	88.6%	95.3%	86.7%	89.9%	90.4%	100.0%
Public Urban Schools	73.2%	93.8%	79.5%	80.7%	88.8%	65.0%	100.0%	50.3%	97.2%	47.8%	64.4%	55.9%	88.6%	49.1%	43.3%	51.9%	99.5%
Public Rural Schools	17.0%	26.0%	21.1%	24.6%	60.9%	6.3%	57.5%	21.3%	26.9%	4.4%	12.3%	9.5%	15.1%	9.0%	4.6%	11.6%	88.9%

Sixth Grade Schools Profile | Presence of Facilities (in percentages) | Disaggregated by Management and Area

	Latin America	Argentina	Brazil	Colombia	Costa Rica	Cuba	Chile	Ecuador	El Salvador	Guatemala	Mexico	Nicaragua	Panama	Paraguay	Peru	Dominican Republic	Uruguay
Field or sports court																	
<i>Country's Total</i>	70.1%	47.5%	85.7%	71.8%	50.0%	62.9%	78.8%	75.5%	29.6%	43.1%	71.1%	34.7%	47.8%	75.3%	75.3%	56.0%	56.4%
Private Urban Schools	75.7%	54.8%	100.0%	72.7%	91.5%	100.0%	84.8%	79.2%	38.7%	70.0%	52.0%	63.3%	72.1%	70.5%	56.9%	53.0%	59.3%
Public Urban Schools	73.7%	31.6%	82.8%	75.3%	47.5%	70.0%	74.7%	77.6%	56.9%	70.8%	77.0%	50.7%	68.7%	66.9%	71.4%	70.7%	49.2%
Public Rural Schools	64.9%	64.8%	77.3%	68.0%	46.3%	55.7%	75.3%	73.0%	22.1%	35.6%	69.2%	26.9%	40.0%	78.0%	82.4%	49.4%	92.7%
Fitness Center																	
<i>Country's Total</i>	10.8%	18.4%	24.4%	3.7%	14.6%	2.5%	30.5%	7.9%	5.2%	3.4%	4.3%	2.4%	9.6%	3.6%	1.7%	10.6%	12.8%
Private Urban Schools	26.9%	55.7%	42.4%	6.0%	80.8%	100.0%	40.7%	14.7%	24.3%	14.7%	5.1%	10.5%	33.4%	5.1%	7.3%	17.5%	35.0%
Public Urban Schools	10.6%	12.6%	18.6%	6.3%	25.9%	2.8%	37.6%	11.5%	2.7%	0.9%	3.8%	1.6%	22.5%	2.0%	1.8%	11.9%	7.6%
Public Rural Schools	5.0%	1.8%	19.3%	0.0%	3.3%	2.1%	13.1%	3.5%	2.6%	2.1%	4.6%	1.0%	3.3%	3.7%	0.0%	6.1%	3.6%
Auditorium																	
<i>Country's Total</i>	16.6%	12.8%	26.2%	35.3%	8.0%	2.7%	12.5%	22.6%	12.0%	7.8%	9.6%	13.8%	7.8%	11.1%	13.5%	21.0%	42.4%
Private Urban Schools	37.7%	30.4%	42.5%	60.9%	38.0%	100.0%	16.1%	55.1%	22.5%	30.1%	29.5%	52.9%	34.2%	44.9%	23.2%	28.1%	72.4%
Public Urban Schools	20.8%	10.9%	26.5%	37.6%	12.7%	4.2%	8.6%	20.9%	31.6%	21.7%	13.7%	11.8%	17.4%	13.9%	29.6%	28.6%	36.8%
Public Rural Schools	5.4%	3.6%	7.6%	17.0%	2.9%	1.1%	11.6%	10.3%	6.0%	2.8%	3.1%	6.9%	1.6%	4.6%	4.1%	13.1%	21.8%
Principal's Office																	
<i>Country's Total</i>	74.1%	90.3%	85.0%	80.5%	60.1%	76.3%	95.7%	58.3%	80.2%	61.1%	67.4%	38.8%	34.4%	54.2%	70.3%	86.3%	90.1%
Private Urban Schools	96.0%	100.0%	93.3%	96.9%	100.0%	100.0%	100.0%	91.7%	95.9%	95.4%	100.0%	88.2%	95.0%	89.8%	95.9%	100.0%	100.0%
Public Urban Schools	88.2%	90.7%	86.1%	81.0%	81.0%	100.0%	100.0%	57.9%	97.2%	93.5%	92.3%	84.5%	84.9%	70.7%	85.1%	93.0%	94.6%
Public Rural Schools	54.0%	83.3%	73.1%	69.6%	48.3%	52.4%	87.3%	45.0%	73.9%	52.0%	42.2%	22.5%	15.2%	44.4%	56.6%	75.4%	47.3%
Additional Offices																	
<i>Country's Total</i>	43.1%	53.5%	84.4%	69.8%	20.8%	44.2%	70.7%	25.1%	23.2%	10.2%	19.7%	20.0%	22.3%	20.4%	23.4%	45.1%	39.4%
Private Urban Schools	83.8%	100.0%	93.3%	90.9%	100.0%	100.0%	90.7%	66.7%	63.2%	53.1%	78.9%	69.1%	95.0%	74.5%	60.1%	75.9%	88.1%
Public Urban Schools	57.7%	65.5%	92.3%	75.9%	43.7%	67.4%	86.9%	15.0%	41.0%	16.2%	25.1%	36.4%	57.9%	28.6%	36.2%	59.5%	30.8%
Public Rural Schools	15.8%	5.5%	54.5%	50.9%	3.8%	20.7%	34.7%	13.0%	12.7%	3.2%	6.2%	8.4%	3.7%	9.2%	7.2%	20.8%	3.7%
Teachers Conference Room																	
<i>Country's Total</i>	42.6%	45.3%	86.7%	66.3%	17.9%	16.1%	78.1%	26.5%	13.3%	14.4%	23.4%	13.5%	17.7%	14.2%	15.9%	34.8%	41.9%
Private Urban Schools	75.9%	85.0%	93.3%	87.8%	83.1%	100.0%	97.5%	62.5%	20.3%	60.6%	57.7%	48.5%	76.1%	47.0%	43.2%	59.7%	72.4%
Public Urban Schools	54.4%	48.4%	87.5%	65.2%	25.7%	24.8%	86.1%	20.9%	36.7%	25.3%	30.9%	19.5%	31.3%	19.5%	35.0%	35.4%	36.4%
Public Rural Schools	20.2%	14.6%	77.3%	53.8%	7.9%	7.4%	49.8%	14.6%	7.0%	6.2%	12.1%	6.1%	5.3%	7.3%	0.1%	21.3%	20.0%

Sixth Grade Schools Profile | Presence of Facilities (in percentages) | Disaggregated by Management and Area

	Latin America	Argentina	Brazil	Colombia	Costa Rica	Cuba	Chile	Ecuador	El Salvador	Guatemala	Mexico	Nicaragua	Panama	Paraguay	Peru	Dominican Republic	Uruguay
Science Laboratory																	
<i>Country's Total</i>	18.4%	32.2%	28.5%	51.4%	3.4%	5.2%	38.9%	22.6%	10.7%	2.9%	5.7%	2.9%	21.4%	5.4%	12.8%	24.6%	17.8%
Private Urban Schools	48.4%	58.6%	62.0%	77.9%	38.0%	100.0%	60.1%	38.8%	26.5%	9.8%	18.3%	21.5%	70.7%	25.5%	36.1%	22.9%	47.4%
Public Urban Schools	21.0%	35.9%	22.3%	58.2%	1.9%	5.2%	33.5%	21.2%	22.5%	0.9%	10.5%	0.0%	56.4%	5.8%	24.1%	38.7%	10.2%
Public Rural Schools	5.2%	9.3%	7.6%	28.5%	0.0%	5.2%	19.3%	16.7%	5.6%	2.1%	0.0%	0.0%	6.9%	1.9%	1.3%	17.7%	9.1%
Computer lab																	
<i>Country's Total</i>	44.9%	49.0%	61.8%	70.7%	30.6%	94.8%	90.1%	42.2%	23.0%	11.9%	35.6%	14.0%	30.8%	14.9%	31.6%	26.7%	42.4%
Private Urban Schools	83.5%	100.0%	86.5%	85.1%	100.0%	100.0%	97.5%	87.5%	77.7%	74.6%	72.4%	56.9%	100.0%	69.4%	79.3%	50.9%	87.9%
Public Urban Schools	58.3%	45.3%	67.4%	90.6%	57.5%	99.0%	100.0%	48.9%	55.0%	17.0%	46.6%	24.0%	60.4%	11.8%	56.8%	36.2%	28.3%
Public Rural Schools	19.4%	20.3%	20.1%	43.3%	13.3%	90.5%	73.6%	20.8%	6.9%	2.1%	21.1%	4.5%	13.9%	6.3%	7.2%	8.5%	43.6%
Arts or Music Hall																	
<i>Country's Total</i>	12.4%	34.4%	14.8%	14.9%	14.0%	7.9%	25.4%	15.7%	4.1%	4.3%	8.5%	4.6%	3.2%	7.9%	7.2%	5.3%	25.7%
Private Urban Schools	39.6%	61.1%	49.1%	39.7%	62.0%	100.0%	34.4%	35.8%	12.1%	22.5%	27.3%	21.3%	21.4%	24.5%	32.2%	10.3%	72.4%
Public Urban Schools	12.3%	43.5%	5.9%	6.9%	18.0%	13.6%	25.3%	11.4%	10.8%	0.9%	13.5%	3.2%	3.9%	9.8%	6.7%	9.9%	14.3%
Public Rural Schools	2.4%	3.8%	0.0%	6.6%	7.2%	2.1%	15.3%	9.5%	1.3%	2.1%	1.5%	1.8%	0.0%	4.6%	0.0%	0.0%	9.1%
School Library																	
<i>Country's Total</i>	71.8%	87.2%	81.4%	78.5%	35.0%	87.9%	85.1%	39.1%	73.9%	83.6%	70.3%	39.8%	51.6%	39.0%	56.4%	58.2%	90.1%
Private Urban Schools	86.9%	90.2%	93.3%	100.0%	83.1%	100.0%	93.3%	76.3%	83.9%	64.9%	91.1%	73.3%	76.1%	66.3%	60.5%	81.4%	96.2%
Public Urban Schools	77.9%	93.7%	85.5%	78.6%	60.9%	96.9%	84.5%	31.4%	91.1%	76.5%	69.2%	61.1%	74.2%	47.9%	76.6%	61.0%	89.7%
Public Rural Schools	61.1%	76.0%	58.0%	64.8%	20.5%	78.9%	76.4%	27.8%	68.4%	87.3%	68.1%	30.3%	43.5%	32.2%	46.9%	44.4%	81.9%
Nurse's Office																	
<i>Country's Total</i>	10.5%	5.5%	9.1%	22.1%	7.6%	15.0%	39.3%	14.7%	3.8%	4.0%	10.5%	3.1%	6.4%	4.2%	7.4%	13.3%	4.6%
Private Urban Schools	27.8%	13.4%	16.1%	66.6%	46.9%	100.0%	49.6%	42.6%	18.3%	12.1%	33.4%	16.0%	32.0%	8.1%	28.7%	20.7%	6.4%
Public Urban Schools	11.2%	3.1%	9.6%	8.3%	9.4%	25.8%	38.2%	11.6%	4.2%	2.6%	13.5%	1.6%	17.8%	4.0%	10.1%	19.0%	4.0%
Public Rural Schools	3.7%	3.6%	0.0%	6.6%	2.6%	4.2%	28.7%	4.9%	1.3%	2.9%	4.7%	1.0%	0.0%	3.6%	0.0%	6.3%	5.5%
Psycho-pedagogical Services																	
<i>Country's Total</i>	30.4%	36.7%	60.6%	37.8%	16.7%	39.6%	48.8%	22.6%	6.2%	5.3%	16.0%	11.9%	9.4%	8.0%	16.1%	39.4%	23.6%
Private Urban Schools	65.6%	62.3%	82.2%	83.1%	87.8%	100.0%	55.4%	54.1%	28.4%	27.0%	33.8%	42.4%	51.3%	33.7%	75.6%	78.9%	73.1%
Public Urban Schools	39.2%	45.5%	59.8%	35.4%	22.1%	51.7%	63.7%	25.0%	11.9%	5.4%	24.7%	23.3%	10.8%	7.9%	12.2%	45.6%	11.6%
Public Rural Schools	10.0%	7.3%	38.6%	11.3%	6.9%	27.3%	29.1%	8.7%	1.3%	2.1%	6.3%	4.5%	2.0%	3.6%	0.0%	15.1%	5.5%

Sixth Grade Schools Profile | Presence of Utilities (in percentages) | Disaggregated by Management and Area

Table

	Latin America	Argentina	Brazil	Colombia	Costa Rica	Cuba	Chile	Ecuador	El Salvador	Guatemala	Mexico	Nicaragua	Panama	Paraguay	Peru	Dominican Republic	Uruguay
Drinking Water																	
<i>Country's Total</i>	80.9%	82.7%	91.1%	79.9%	86.4%	94.2%	93.0%	61.1%	67.7%	82.4%	81.2%	60.0%	61.9%	65.1%	67.4%	65.8%	98.1%
Private Urban Schools	98.9%	100.0%	100.0%	91.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	93.4%	100.0%	100.0%	100.0%	92.1%	100.0%
Public Urban Schools	92.0%	93.8%	89.6%	89.9%	92.8%	99.0%	100.0%	81.5%	98.7%	94.4%	94.8%	93.8%	100.0%	86.2%	91.0%	72.6%	100.0%
Public Rural Schools	64.8%	55.6%	84.8%	63.6%	82.5%	89.4%	79.3%	35.8%	55.5%	78.3%	67.4%	48.5%	48.8%	54.3%	48.1%	48.1%	83.6%
Drainage system																	
<i>Country's Total</i>	66.2%	55.0%	78.2%	83.3%	74.3%	72.1%	82.6%	60.6%	52.4%	45.0%	69.5%	32.7%	47.0%	30.6%	47.4%	61.0%	96.5%
Private Urban Schools	91.0%	78.8%	86.5%	95.6%	100.0%	100.0%	97.7%	87.6%	91.7%	100.0%	100.0%	89.8%	100.0%	79.6%	92.3%	97.6%	96.2%
Public Urban Schools	83.3%	76.4%	81.1%	89.3%	82.4%	95.9%	93.7%	81.3%	88.3%	93.5%	85.7%	64.0%	89.7%	34.9%	85.4%	67.7%	97.3%
Public Rural Schools	42.6%	9.3%	61.4%	69.9%	68.5%	48.1%	56.5%	40.0%	38.1%	30.8%	51.7%	17.2%	30.5%	21.2%	18.5%	37.9%	92.7%
Enough Restrooms																	
<i>Country's Total</i>	68.5%	75.1%	83.3%	65.0%	59.1%	90.8%	89.8%	54.9%	66.5%	49.7%	66.0%	34.9%	49.8%	60.0%	51.8%	73.4%	81.4%
Private Urban Schools	97.9%	99.2%	100.0%	95.6%	100.0%	100.0%	100.0%	87.5%	95.9%	98.1%	100.0%	80.8%	89.6%	100.0%	95.9%	97.6%	96.2%
Public Urban Schools	75.4%	75.0%	81.4%	64.6%	68.6%	89.8%	90.2%	54.6%	75.7%	56.2%	74.2%	56.3%	84.6%	62.7%	68.0%	59.3%	76.1%
Public Rural Schools	51.9%	59.1%	69.7%	45.8%	51.2%	91.7%	77.8%	41.9%	59.7%	41.8%	54.1%	23.1%	36.9%	52.5%	32.0%	68.4%	85.5%
Electricity																	
<i>Country's Total</i>	91.5%	95.8%	100.0%	94.4%	96.4%	99.5%	99.4%	97.4%	94.4%	74.6%	96.7%	59.1%	66.7%	89.3%	59.0%	86.0%	99.6%
Private Urban Schools	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	96.4%	100.0%	100.0%	100.0%	100.0%	100.0%
Public Urban Schools	98.8%	100.0%	100.0%	98.0%	98.3%	100.0%	100.0%	100.0%	100.0%	96.3%	98.1%	95.0%	100.0%	96.1%	96.4%	89.7%	100.0%
Public Rural Schools	82.2%	87.2%	100.0%	87.5%	95.3%	98.9%	98.4%	95.1%	92.3%	68.1%	95.0%	46.6%	55.2%	86.0%	31.5%	76.5%	96.3%
Telephone																	
<i>Country's Total</i>	53.3%	72.5%	79.1%	70.6%	75.4%	35.7%	85.1%	45.4%	48.0%	18.3%	41.0%	28.4%	34.0%	23.8%	30.0%	44.9%	98.6%
Private Urban Schools	97.5%	100.0%	100.0%	95.6%	100.0%	100.0%	100.0%	95.9%	100.0%	88.4%	100.0%	89.8%	95.0%	86.7%	92.0%	89.1%	100.0%
Public Urban Schools	75.7%	95.3%	87.5%	80.1%	89.4%	65.0%	100.0%	51.2%	97.3%	48.7%	65.4%	59.2%	88.6%	49.1%	45.0%	61.3%	99.5%
Public Rural Schools	18.1%	22.1%	34.5%	46.2%	67.7%	6.0%	56.2%	22.3%	28.6%	4.2%	12.1%	12.2%	14.1%	7.3%	5.3%	12.4%	90.9%

Annex 2: Omission Rates for Indicators According to Management/Area and Quintile of ISEC of the School

Third Grade Sample Schools

Indexes	Total	Urban	Urban	Rural	Quintile 1	Quintile 5
		Private	Public	Public		
Sports Fields	4,4%	3,8%	3,9%	4,9%	4,4%	3,4%
Common Use Areas	6,7%	9,8%	8,1%	5,0%	4,0%	10,7%
Offices	5,4%	3,7%	2,9%	7,4%	5,4%	4,2%
Academic Areas	7,1%	8,7%	9,0%	5,4%	4,6%	9,3%
Health Areas	7,0%	5,9%	11,3%	4,7%	4,4%	6,9%
Water and Sanitation	4,3%	2,0%	3,8%	5,2%	4,6%	3,0%
Utilities	3,9%	1,5%	2,3%	5,6%	4,4%	2,0%

Sixth Grade Sample Schools

Indexes	Total	Urban	Urban	Rural	Quintile 1	Quintile 5
		Private	Public	Public		
Sports Fields	4,0%	2,8%	3,8%	4,8%	3,9%	2,9%
Common Use Areas	7,1%	6,9%	8,7%	5,8%	3,2%	6,7%
Offices	4,5%	3,2%	3,7%	5,9%	3,1%	3,1%
Academic Areas	7,1%	8,3%	8,7%	5,3%	3,4%	7,7%
Health Areas	6,2%	5,9%	7,5%	5,2%	3,6%	4,5%
Water and Sanitation	5,2%	1,9%	4,7%	7,2%	5,8%	2,9%
Utilities	4,9%	1,9%	2,9%	7,9%	5,7%	2,5%

Annex 3: Relationship between School Infrastructure and Learning in Reading and Mathematics for Third Grade in Latin America According to the SERCE Study Using the Sample Without Imputation

	Third Grade							
	Reading				Mathematics			
	Rural Schools		Urban Schools		Rural Schools		Urban Schools	
	Without Isec	With Isec	Without Isec	With Isec	Without Isec	With Isec	Without Isec	With Isec
b/p		b/p		b/p		b/p		
Sports Fields Sub-Index	2.07	1.52	-2.69*	0.39	4.87**	4.71**	-3.07**	-0.41
	.29	.43	.05	.74	.02	.03	.04	.77
Common Use Areas Sub-Index	2.32	2.46	4.72***	2.91***	0.16	0.2	4.37***	2.79**
	.43	.39	.00	.01	.96	.95	.00	.02
Offices Sub-Index	-4.26	-4.63	4.38**	0.14	-6.04*	-6.19*	-0.25	-3.79*
	.17	.13	.04	.94	.08	.07	.91	.08
Academic/Pedagogic Areas Sub-Index	6.65**	5.80*	13.75***	6.42***	4.63	4.31	13.62***	7.26***
	.03	.06	.00	.00	.18	.22	.00	.00
Health Areas Sub-Index	0.19	0.57	7.10***	3.08***	0.37	0.49	6.89***	3.50***
	.96	.87	.00	.01	.93	.90	.00	.01
Water and Sanitation Index	3.28	1.00	7.42***	-0.47	-1.05	-1.82	4.40*	-2.18
	.13	.64	.00	.82	.66	.45	.09	.37
Utilities Index	7.59***	1.61	7.64***	-2.71	3.02	1.03	4.25	-4.24*
	.00	.53	.00	.20	.24	.72	.10	.08
ISEC		15.59***		42.21***		5.24*		34.44***
		.00		.00		.09		.00
Public School				-19.04***				-18.46***
				.00				.00
Constant	478.50***	480.92***	493.95***	495.23***	483.75***	484.59***	493.17***	496.73***
	.00	.00	.00	.00	.00	.00	.00	.00
N	979		1179		1001		1176	

Levels of Significance: * .10 ** .05 *** .01

Annex 4: Relationship between School Infrastructure and Learning in Reading and Mathematics for Sixth Grade in Latin America According to the SERCE Study Using the Sample Without Imputation

	Sixth Grade							
	Reading				Mathematics			
	Rural Schools		Urban Schools		Rural Schools		Urban Schools	
	Without Isec	With Isec	Without Isec	With Isec	Without Isec	With Isec	Without Isec	With Isec
b/p		b/p		b/p		b/p		
Sports Fields Sub-Index	3.82*	3.28*	-4.24***	-1.16	3.21	2.79	-0.72	1.8
	.06	.09	.00	.34	.17	.22	.67	.25
Common Use Areas Sub-Index	-3.90	-3.6	4.05***	2.08**	-6.62**	-6.53**	4.72***	3.12**
	.17	.19	.00	.04	.04	.04	.00	.02
Offices Sub-Index	-5.42	-5.52*	5.54**	0.29	-8.51**	-8.75**	1.99	-2.42
	.10	.09	.01	.88	.03	.02	.45	.32
Academic/Pedagogic Areas Sub-Index	6.18**	4.96*	13.82***	6.19***	5.39	4.58	15.43***	8.93***
	.05	.10	.00	.00	.13	.19	.00	.00
Health Areas Sub-Index	5.59	5.85*	6.94***	2.13*	9.92**	10.23***	6.37***	2.48*
	.10	.08	.00	.06	.01	.01	.00	.09
Water and Sanitation Index	6.68***	3.32	7.70***	-1.63	2.47	0.01	6.90**	-0.99
	.00	.14	.00	.44	.35	1.00	.02	.72
Utilities Index	10.75***	2.27	6.63**	-4.25*	9.25***	2.68	3.94	-5.15*
	.00	.40	.01	.06	.00	.40	.20	.08
ISEC		22.20***		46.30***		17.11***		38.91***
		.00		.00		.00		.00
Public School				-19.42***				-16.36***
				.00				.00
Constant	473.16***	480.00***	487.89***	498.18***	478.09***	483.28***	484.48***	493.25***
	.00	.00	.00	.00	.00	.00	.00	.00
N	802		1119		801		1112	

Levels of Significance: * .10 ** .05 *** .01