



2014/ED/EFA/MRT/PI/07

Background paper prepared for the
Education for All Global Monitoring Report 2013/4

Teaching and learning: Achieving quality for all

Charting progress in learning outcomes in Peru using national assessments

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2013

This paper was commissioned by the Education for All Global Monitoring Report as background information to assist in drafting the 2013/4 report. It has not been edited by the team. The views and opinions expressed in this paper are those of the author(s) and should not be attributed to the EFA Global Monitoring Report or to UNESCO. The papers can be cited with the following reference: “Paper commissioned for the EFA Global Monitoring Report 2013/4, Teaching and learning: Achieving quality for all” For further information, please contact efareport@unesco.org

Charting progress in learning outcomes in Peru using national assessments

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Abstract

This paper is primarily focused on analysing recent evidence on learning achievement in Peru from three different viewpoints: (i) levels of achievement; (ii) equity gaps in achievement; (iii) the relationship between achievement and teachers' characteristics. The paper is focused on primary education and based upon nationally-produced information.

The paper shows that student achievement levels are low and, at the same time, the important pace of progress recorded between 2007 and 2010 that has slowed down in the most recent period. At the same time, this aggregated progress has gone hand in hand with an overwhelming intensification of disparities in student achievement when results are observed by gender (the equity dimension with the smallest gaps); location (urban/rural); school management (public/private); class organisation (multi-grade/single-grade); mother tongue (Amerindian/Spanish); and socioeconomic status (measured at school level).

Finally, the paper provides some reflections on current and recent educational policies and the need to conduct systematic evaluations of them to properly establish their relationship with changes in student achievement.

Introduction

Peru is a country where education matters greatly to people. This is shown by the rates at which enrolment at all education levels has evolved in recent decades. For example, while in 2001 net enrolment rates for preschool (ages 3 to 5), primary (ages 6 to 11) and secondary (ages 12 to 16) were 53.5, 92.7 and 68.8 per cent respectively; by 2011 these levels had grown to 72.6, 94.0 and 80.0 per cent.⁴ At the same time, public investment in education has also grown more than twice over the past 10 years,⁵ given the impressive growth of the Peruvian Gross Domestic Product (GDP) in this period, and even if it represents a limited share of the national wealth (only 2.8 per cent of the GDP in 2003 and 2.6 per cent in 2011)⁶ in spite of the Peruvian Education Law passed in 2003 (Art 83), which states that public investment in education should amount to at least 6 per cent of the GDP. The Ministry of Economy and Finance has refused to implement such increase for fear that this might spur inflation, which was a severe national problem in the late 80s and early 90s.

While enrolment and completion of studies are advancing rapidly, there are serious concerns about how much children learn while at school. Only in the past 20 years Peru has conducted national and international evaluations of student learning. These studies have consistently shown low

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⁴ Estimates retrieved on 7 May 2013 from the Ministry of Education statistical website: <http://escale.minedu.gob.pe/tendencias>.

⁵ In 2003, the national public budget for education was 1718 million US dollars. This figure was raised to 4600 million US dollars by 2011 (estimates made based on constant soles from 1994, using the average exchange rate for each year; these estimates were made by the authors based on publicly available data (<http://estadisticas.bcrp.gob.pe/index.asp?sFrecuencia=A> (consulted on 1 May 2013)).

⁶ Data taken on 8 May 2013, from <http://datos.bancomundial.org/indicador/SE.XPD.TOTL.GD.ZS>

averages and large differences among groups of students. This is the first issue that is explored in this document. Traditionally, Peruvian policies have not been aimed at reducing inequalities. The current government (which was inaugurated in July 2011) has started some potentially promising programmes and policies, which are briefly presented and discussed below, yet the impact of these still needs to be estimated.

Educational research conducted in Peru and abroad suggests that while the socioeconomic status of children and their families is highly predictive of achievement, teachers are also a key factor. For example, several studies carried out in Peru have shown association between the opportunities to learn provided by teachers (measured through an analysis of notebooks and textbooks) and student achievement in reading and mathematics (Cueto, León, Ramírez, & Guerrero, 2008). However, there is only one study concerning Peru that has linked teachers' abilities in a curricular area and student achievement (Metzler & Woessmann, 2010). This is the second main issue explored in this paper, where we present original data on the association between these variables for reading comprehension and mathematics.

Peru is at a crossroads. With its GDP has grown at annual rates above 5 per cent for the past 10 years (except in 2009, when it was close to 1 per cent), political decisions and higher investments are needed so that economic growth will indeed reach everybody. For the educational field this would mean higher investments and innovative programmes oriented towards those groups hereby identified as facing low and especially the lowest levels of achievement. We trust that the information presented in this document will be relevant in helping define what groups should be prioritised, and explain how teachers knowledge matters in order to increase achievement and reduce inequalities.

Methodology

This paper has been developed in order to provide some answers to the following research questions:

- i. how do learning outcomes compare by socio-economic status, and overlapping disadvantage, by combinations of poverty, gender, and location (rural/urban)?
- ii. how has performance changed for these different groups and sub-groups? What are the reasons for these trends?
- iii. What is the relationship between teacher and student performance? e.g. do high or low teacher scores correspond to high/low scores of pupils from high/low socio-economic background? What factors explain differences?
- iv. What teacher quality characteristics, teaching and learning factors, and school-level factors explain any observed differences in student learning outcomes – how does this compare in different parts of the country?

The existing evidence enabled us to successfully address most of these topics and only partially some of them as will be noted in the body of the text. The main limitations refer to: (i) not having enough information to explain the differences among subpopulations (last part of research question ii); (ii) information on teachers is limited only to cognitive aspects and corresponds to a single moment in time, so trends cannot be identified in this case (last part of research question iii); and (iii) the evidence is not detailed enough (for reasons to be discussed in the paper) to conduct an in-depth analysis of the relationship between student achievement and teaching and learning factors (research question iv).

The paper is based on the following evidence (detailed information is provided in the Methodological Notes at the end):

- National assessments of student achievement in reading comprehension and mathematics for Grade 2 students. Conducted yearly between 2007 and 2012.
- National assessment of student achievement conducted in 2004 which includes information on teachers' characteristics not available in the previously mentioned studies.
- Other research-based evidence detailed in the References.

Information from the 2007-2012 national assessments has been taken from available reports (Perú: Ministerio de Educación, 2012)⁷ regarding the distribution by performance levels (national, by gender, urban/rural area; public/private schools; single-grade/multi-grade classes), or reprocessed by the authors in the case of some distributions (by mother tongue; socio-economic status; extreme groups identified using several criteria concurrently) on the basis of the publicly available datasets.

Information from the 2004 national assessment was reprocessed by the authors to address the research questions leading this paper.

Educational progress in Peru: overall situation, the persistence of significant gaps and the impact of the socio-economic context

The Peruvian educational situation has been a matter of deep concern for students, parents, policy-makers and the national community in general since at least the past 15 years, given that some evidence has systematically shown serious limitations in the levels of student achievement.⁸

This section of the paper presents most of the existent evidence showing the overall situation, pays particular attention to disparities in levels of student achievement that can be observed with said evidence, and identifies some trends.

The current situation

Before discussing the available evidence on student achievement it is important to bear in mind that levels of access and completion of studies are high in Peru. For those born since 1980, the likelihood of having completed primary education is above 90 per cent, and that proportion goes up to 95 per cent for those born since 1989 (see Table 1).

This situation means that most of the policy debates are focused not only on ensuring access and completion to those who are still excluded from educational services, but also and mainly on the levels of student achievement that have been documented over the past 15 years. It also means, that information on student achievement at the primary level can be taken as a proper portrayal of the situation of the Peruvian children as a whole.

As already noted (see footnote 8) information on levels of student achievement is produced regularly by the Ministry of Education. The latest available data (2012) shows that less than one out of three students (between 30.1 and 31.7 per cent)⁹ in the second grade of primary education can read at the level expected by the national authority, and one in eight (between 12.1 and 13.4 per cent)¹⁰ of the same student population perform satisfactorily in Math (see Table 2; Graph 1 and Graph 2).

⁷ Since the 2012 results were released while this paper was being finalized, only those data included in the Ministerial report could be included. It also should be noted that information for 2007 is more limited. See the Methodological Notes for full details.

⁸ From the first Latin American study conducted in 1996 (and the fact that the Peruvian government requested UNESCO not to publish Peruvian data when the data was released in 1998), the second Latin American study (2006), national assessments conducted since that time (in 1996, 1998, 2001, 2004, and annually since 2007) and PISA conducted in 2001, 2009 and 2012.

⁹ That is between 68.3 and 69.9 per cent performed below the satisfactorily level.

¹⁰ That is between 86.6 and 87.9 per cent performed below the satisfactorily level.

Even if these values are low, they are the result of a process of improvement experienced in the recent past. The information for the period 2007-2012 shows that, on average, Peru has almost doubled the percentages of students performing satisfactorily in both reading comprehension and mathematics; however, said improvement was verified in the first part of that period (2007-2010) while the last part (2010-2012) shows stagnation (see Table 2; Graph 1 and Graph 2).

At the same time, the observation of those performing at the lowest level defined by the assessment (below level 1)¹¹ also shows progress in “raising the floor.” In 2007 between 29.6 and 30.0 of the students felt in this level for Reading Comprehension and between 56.3 and 56.7 per cent in the case of Mathematics. These shares have decreased by 2012 to between 19.3 and 20.3 and 48.2 and 49.9 per cent respectively (Table 2).

Identifying gaps and trends

As already mentioned, progress in levels of student achievement could be verified in the recent past. Nevertheless, since national policy objectives include both improving learning levels and equity, in this section we analyse the evolution of gaps in achievement among different echelons of society focusing on the percentage of students who did/did not achieve the satisfactory performance level.

A first equity dimension to be explored pertains to **gender disparities**. As shown in Table 3, in every national assessment run between 2007 until 2012, second grade girls who reached the satisfactory level of performance in Reading Comprehension represented a larger proportion of their subpopulation than in the case of boys. Conversely, in the case of Mathematics, boys outperformed girls in every single year with one exception (2008). At the same time, the length of the disparities has remained stable in Reading Comprehension (see Table 3 and Graph 3) and has oscillated in Mathematics: it disappeared in 2008 and then it has increased since 2009 (see Table 3 and Graph 4).

A second equity dimension to be explored is related to the **urban/rural divide**. As shown in Table 4, in every national assessment run between 2007 until 2012, second grade students living in urban areas who reached the satisfactory level of performance in Reading Comprehension represented a larger proportion of their subpopulation than in the case of those living in rural areas. At the same time, the pattern of improvement observed for the national aggregate (progress between 2007 and 2010, and then a trend towards stagnation) is mimicked by those students living in urban areas; while the situation of students living in rural areas has basically remained stagnated across the whole period of time¹² leading to doubling, over this period of time, the gap between these two areas. This situation also means that the differential probability of achieving a satisfactory performance¹³ in urban areas was 7.0 times higher than in rural areas when it used to be 4.3 times higher (see Table 4 and Graph 5).

In the case of Mathematics, an increasing gap is also observed but at a much lower level of performance. At the same time, the percentage of students in rural areas who achieved the expected level of proficiency decreased between 2009 and 2011 (see Table 4 and Graph 6). Thus the differential probability of performing in a satisfactory manner in 2012 was 3.6 times higher for those in urban schools, when it was 1.9 times higher in 2007.

¹¹ Assessment results are reported in three levels: satisfactory meaning a level of achievement that is expected by the grade (level 2); “in progress” meaning students can only complete very basic tasks (level 1), and “initial” (below level 1).

¹² The strange peak observed in 2009 is explained by a problem with the improper classification of some schools as rural (Perú: Ministerio de Educación, 2012, pág. 46).

¹³ Here and in the following cases, this differential probability will be measured as an odd ratio comparing the limit values that represent the minimum distance between the groups (lower limit of the confidence interval for the group with higher values and upper limit for the other one).

A third equity dimension is organised in relation to **whether schools are public or private**. As shown in Table 5, in every national assessment run between 2007 until 2012, second grade students enrolled in Private schools and who reached the satisfactory level of performance in Reading Comprehension represented a larger proportion of their subpopulation than in the case of those enrolled in Public schools. At the same time, the pattern of improvement observed for the national aggregate (progress between 2007 and 2010, and then a trend towards stagnation) is reproduced by both groups. Thus, the gap between the two has remained stable for the whole period of time (Graph 7) and the differential likelihood of achieving this level has oscillated between being 2.8 and 3.7 times higher for Private schools.

It is important to notice that this situation is verified in a context where enrolment in Private schools has been increasing in a steady way for a number of years.¹⁴

In the case of Mathematics, the gap, which was actually enlarged around 2009, shows a positive trend towards its narrowing; nevertheless, said newer trend is not the result of an improvement in the performance observed in Public schools, but of a decreasing performance by Private schools (see Table 5 and Graph 8). The latter situation might be associated to the already noted increase in enrolment leading to an increased heterogeneity in the Private sector. By 2012 the differential likelihood of having a satisfactory performance in Private schools was 1.3 higher than in Public schools when in 2007 it was 1.7 times higher.

It is also important to look at the achievement results by the type of school in relation to the class organisation as **multi-grade or single grade**.¹⁵ As in previous cases, improvement seems to be concentrated in the first part of the period (before 2010) and it is differentiated, thus the existing gap regarding the proportion of students who achieved a satisfactory level of performance has been widened over the period in both Reading Comprehension and Mathematics (Table 6). In this way the proportion of students who performed satisfactorily in Reading Comprehension has gone from around 19 to around 35 per cent for students in single-grade classes¹⁶ and from around 5 to around 10 per cent for students in multi-grade classes¹⁷ (Graph 9) keeping the differential probability of performing satisfactorily in single-grade classes around 4.5 times higher than in multi-grade classes. In the case of Mathematics, the first group of students improved from around 8 to around 14 per cent¹⁸ while the latter moved from around 4 to around 7 in the first year and then it fell down to the 4 per cent again by the end of the period¹⁹ (Graph 10); thus, the differential probability of scoring satisfactorily in single-grade classes was 3.3 higher than for students in multi-grade classes in 2012 while it was 1.8 times higher in 2007.

¹⁴ While second grade enrolment in Private schools used to represent 11.9 and 12.3 per cent of the total enrolment for said grade in 1993 and 1999 respectively (Guadalupe, y otros, 2002, pág. 68), in the national assessment conducted in 2008 it was already between 18.1 and 20.5 per cent, and for 2012 it reached between 24.5 and 25.7 per cent. Information for 1993 and 1999 corresponds to school census data, information for 2008 and 2012 to the national assessment, so confidence intervals are provided in this case ($\alpha=0.05$).

¹⁵ Multi-grade schools gather students from several grades in a single classroom, while single grade schools have students enrolled in a unique grade in a given classroom. In the Peruvian case, multi-grade schools tend to be located in scattered rural localities with small population (according to the last population census, 2007, 58 per cent of rural localities have 50 inhabitants or less – <http://www.inei.gob.pe>), which are in general poorer and more likely to be indigenous. Given that a pre-defined quota of students per class is not achieved, historically, rural schools tend to be multi-grade. Multi-grade classes are almost always present in the Public sector, while Private schools tend to be schools with single grade classes.

¹⁶ Thus, the share by those below the satisfactory level went from around 81 to around 65 per cent.

¹⁷ Thus, the share by those below the satisfactory level went from around 95 to around 90 per cent.

¹⁸ Thus, the share by those below the satisfactory level went from around 92 to around 86 per cent.

¹⁹ Thus, the share by those below the satisfactory level went from around 96 to around 93 per cent in the first year and then went back to 96 per cent.

A fifth equity dimension refers to the **socio-economic** background of the students. In the case of Reading Comprehension the share of the wealthiest quintile who reaches a satisfactory performance is systematically higher than the corresponding share of the poorest quintile (Graph 11), and the gap between the two groupings has widened over the observed period: in the wealthiest quintile those reaching a satisfactory performance moved from around 26-30 per cent in 2008 to around 39-44 per cent in 2011,²⁰ while in the poorest quintile there was a clear pattern of stagnation around three-five per cent (Table 7). In this way the differential likelihood of having a satisfactory performance in the wealthiest quintile has gone from 6.6 times higher than in the poorest quintile in 2008 to 15.3 times higher in 2011. In the case of Mathematics (Graph 12), a similar pattern is observed but with a smaller share of students performing satisfactorily; moreover, there is a less marked progress in the wealthiest quintile where a clear improvement in the first part of the period has been followed by stagnation that translated in having around one in five students achieving the satisfactory level, while the poorest quintile has remained stuck at around four per cent.

A final equity dimension that it is possible to explore with the available evidence refers to **student's mother tongue** (indigenous versus Spanish). As shown in Table 8 and Graph 13, the proportion of students who achieved a satisfactory performance in Reading Comprehension has been systematically higher for those with Spanish as their mother tongue. Moreover, this group of students has made progress over the years while performance for those speakers of an indigenous language has initially improved slightly and then declined. Thus the gap between these two groupings has widened. The differential likelihood of having a satisfactory performance among those with Spanish as their mother tongue was 7.1 times higher than in the case of those with an indigenous mother tongue (2011) when it used to be 4.0 times higher at the beginning of the period (2008). In Mathematics (see Table 8 and Graph 14), the former group improved its performance at the beginning of the period (2008) and then remained stagnated (until 2011), while the latter has experienced stagnation and some signs of decline; thus, the performance gap in this case has also been widened even if at a lower level of performance. In this case, the differential likelihood of having a satisfactory performance among those with Spanish as their mother tongue was 4.8 times higher than in the case of those with an indigenous mother tongue when it was 1.6 times higher at the beginning of the period.

Given sample sizes, it was also feasible to combine some of these criteria to identify the joint effect on equity of several criteria and the largest gaps in student achievement. Thus, Table 9 presents information on the percentage of students who perform below the satisfactory level in both Reading Comprehension and Mathematics by the following groupings:

- Females with Amerindian mother tongue.
- Females in the poorest quintile of SES
- Students with Amerindian mother tongue in the poorest quintile of SES
- Females in the poorest quintile of SES with Amerindian mother tongue
- Females with Amerindian mother tongue in multi-grade classes
- Females with Amerindian mother tongue in single-grade classes
- Students in the poorest quintile of SES with Amerindian mother tongue in multi-grade classes
- Students in the poorest quintile of SES with Amerindian mother tongue in single-grade classes
- Females in the poorest quintile of SES in multi-grade classes
- Females in the poorest quintile of SES in single-grade classes

²⁰ Thus, the share by those below the satisfactory level went from around 70-84 to around 56-61 per cent.

Additionally, the same table includes previously presented figures for the national aggregate, female students, those with Amerindian mother tongue and those in the poorest quintile of SES for easy reference.

As shown in the table, all of these groupings present particularly challenging levels of performance. In some cases (highlighted in the table using a boldfaced font), the confidence intervals for the estimates include the value 100 per cent, meaning that in these cases, the evidence does not allow stating that there is at least a minimum number of students performing at satisfactory level. This is the situation in the following cases:

- For Reading Comprehension:
 - Females in the poorest quintile of SES with Amerindian mother tongue in 2011
 - Students in the poorest quintile of SES with Amerindian mother tongue in multi-grade classes in 2011
 - Students in the poorest quintile of SES with Amerindian mother tongue in single-grade classes in every year (2008/2011)
- For Mathematics:
 - Females in the poorest quintile of SES with Amerindian mother tongue in 2010 and 2011
 - Students in the poorest quintile of SES with Amerindian mother tongue in multi-grade classes in 2011
 - Students in the poorest quintile of SES with Amerindian mother tongue in single-grade classes in every year (2008/2011)
 - Females in the poorest quintile of SES in single-grade classes in 2008 and 2011

One of these situations (Reading Comprehension among students in the poorest quintile of SES with Amerindian mother tongue in single-grade classes vis-à-vis the national aggregate) is presented in Graph 15 to illustrate these disparities.

Additionally, in order to identify the largest gaps, two additional groupings were observed: (i) Students living in rural areas, having an indigenous mother tongue, and attending a Public school in a multi-grade class; and (ii) Students living in urban areas, having Spanish as their mother tongue, and attending a Private school in a single-grade class.²¹

The information for these two extreme groups is presented in Table 10, Graph 16 (Reading), and Graph 17 (Mathematics). As shown, the percentage of students performing at level 2 (satisfactory) in Reading Comprehension in the better-off group moved upwards from about 44-51 per cent in 2008 to about 58-63 per cent in 2011 while in the disadvantaged group this proportion decreased from 1-7 per cent to less than one per cent over the same period of time.²² Thus, the gap between both groups was widened (going from about 37 to about 57 percentage points) and the differential likelihood of performing satisfactorily changed from being 10.1 times higher for the better-off group in 2008 to being 150.8 times higher in 2011. A similar pattern is shown in Mathematics where the share of students from the first group increased from around 17-23 per cent to around 23-30 per cent from 2008 to 2011 while the second group deteriorated moving from an already low 2-9 per cent to less than two per cent over the same period of time.²³ Thus, the gap between both groups was widened (going from about 8 to about 21 percentage points) and the differential likelihood of

²¹ We have not included the gender variable in the identification of these groupings because it is the one showing narrower gaps that are not consistent across areas. It should be bear in mind that the inclusion of each additional variable in the composition of these groupings translates into having less observations and, therefore, losing sampling power.

²² Actually, the value is so low that is not statistically different from zero.

²³ Actually, the value is so low that is not statistically different from zero.

performing satisfactorily changed from being 2.1 times higher for the better-off group in 2008 to being 16.2 times higher in 2011.

The information presented in the previous pages and in the appended tables can be summarised in the following manner:

Grouping	Area	Achievement: satisfactory	Achievement: below level 1 ²⁴	Trend
National	Reading	From 15 to 30%	From 30 to 20%	Progress in the first years, then stagnation
	Mathematics	From 7 to 12%	From 56 to 49%	
Gender	Reading	Girls better-off	Girls worse-off	Sustained gaps
	Mathematics	Boys better-off	No differences	
Urban/Rural	Reading	Urban better-off	Rural worse-off	Widened gaps
	Mathematics			
Public/Private	Reading	Private better-off	Public worse-off	Widened gap
	Mathematics			First widening, then narrowing gap
Single-grade / Multi-grade	Reading	Single-grade better-off	Multi-grade worse-off	Widened gaps
	Mathematics			
Wealth	Reading	Highest quintile better-off	Lowest quintile worse-off	Widened gaps
	Mathematics			
Mother tongue	Reading	Spanish better-off	Indigenous worse-off	Widened gaps
	Mathematics			
Extreme groups	Reading	High extreme better-off	Low extreme worse-off	Widened gaps
	Mathematics			

Even if there has been some progress in the initial part of the observed period, the Peruvian situation could be described as a combination of low levels of performance (satisfactory is equivalent to at least the **minimum** prescribed by the national authorities) with increasing levels of inequity.

The previous statement can be partially qualified if the proportion of individuals in each group is considered: Peru is an increasingly urban country (around 78 per cent of the 2012 second-grade students),²⁵ multi-grade schools represent a limited share of the total enrolment (around 18 per cent of the 2012 second grade students),²⁶ and Spanish is the predominantly mother tongue (89.2 per cent of those who were eight in 2012 and increasing).²⁷ Nevertheless, Public schools still represent, even if decreasing, a large proportion of the enrolment and, the right to education is not something that can be considered contingent upon magnitudes.

Finally, it should be noted that (as described in the methodological note) the information coming from the national assessments excludes schools with less than five students in second grade. Also, it should be noted that for schools running a bilingual educational programme, a special test is conducted in grade four and in two languages (Spanish and the corresponding Amerindian language).²⁸

²⁴ Even if this particular category is not discussed in the paper (except when talking about national aggregates in p. 4); it is presented here (and in the tables including as appendix) as referential information concerning the situation regarding those at the very bottom of the distribution. Footnote 11 explains how the national assessment results are organised in categories.

²⁵ Weighted participation in the 2012 national assessment sample.

²⁶ Weighted participation in the 2012 national assessment sample.

²⁷ For those who were three in the last population census (2007), which is the age-group, with information on mother tongue, closest to the one enrolled in grade two in 2012. For those who were seven in 2007, this proportion was 86.9 per cent. Information retrieved on 01 May 2013 from <http://inei.inei.gob.pe/inei/RedatamCpv2007.asp?id=ResultadosCensales?ori=C>.

²⁸ Given some issues described in the methodological note, in this section we will only refer to information from the 2012 assessment.

As shown in Table 11, students in bilingual education programmes (sampled only in four Amerindian language groupings) tend to have a rather low level of achievement in both languages (Spanish and the corresponding Amerindian language). In no case, the proportion of students in the satisfactory level reaches one in five. At the same time, performance in Spanish seems to be²⁹ better than in the Amerindian languages for the Andean languages (Quechua³⁰ and Aimara) when the opposite situation is observed in the case of the Amazonian languages (Awajun and Shipibo) even though at a much lower level of performance. Reading at a satisfactory level in an Amerindian language seems to be a reality only for one in ten Quechua students and for less than one in 20 students with another Amerindian mother tongue. Reading at a satisfactory level in Spanish is something achieved by less than one in five students with an Andean mother tongue, and by less than one in 30 students with an Amazonian mother tongue.³¹

Taking into consideration that, according to the purpose of the bilingual education programmes, by grade four these students should be competent in both the spoken and written form of both languages, these results suggest that, pending a formal evaluation of the program, the implementation of these education programmes and the social support they receive should be carefully appraised.

Educational progress and socio-economic conditions.

One crucial element that should be factored in the analysis of educational progress in Peru pertains to the overall changes in socio-economic conditions that have characterised the recent past. It is well documented in the literature that the socio-economic background of students explains a significant share of the variability in performance. By the same token, it can be expected, that changes in socio-economic conditions across time, can have an effect in changes in student achievement levels.

These considerations are particularly important in the case of Peru given the changes it has experienced in its recent past. In fact, the Peruvian economy has experienced a sustained process of growth over the past 15 years. This process is even more important because it follows a long period of stagnation and crisis that started around the mid-seventies and had its worst moment at the beginning of the nineties. Moreover, the economic crisis led to significant levels of poverty, and was accompanied by huge levels of political violence (especially between 1980 and the early nineties) and an overall decay in the institutional life. Against this backdrop, the sustained economic growth of the new Century, together with its institutional continuity (last coup-d'état took place in 1992), changes in the distribution of State authority (a decentralisation process), and socio-economic changes (a significant increase in the importance of intermediate urban settings reducing significantly the proportion of people living in rural areas) have transformed Peruvians' lives.

Guadalupe & Villanueva (2013) have estimated that half of the progress shown by Peru in PISA, regarding reading mean scores, can be explained directly by these overall changes that were translated into an improved socio-economic background of the students tested in 2001 and 2009.³² Other indirect effects still need to be explored.

²⁹ Since no standard errors are provided, this information cannot be quoted as conclusive.

³⁰ Only one of the languages (Quechua Cusco-Collao) grouped under the Quechuan family.

³¹ In the case of satisfactory performance in Spanish by students with an Amazonian mother tongue, the (not provided) confidence intervals of these estimations most likely include zero, meaning they are not distinguishable from zero. Since these figures are not necessarily comparable with the ones coming from the national assessment or with the information from previous years, there is no much more to add to this section.

³² Students tested in 2001 were born around 1986, that is, they spent their early childhood in the worst period in terms of economic crisis and political violence. Those tested in 2009 were born around 1994 when the economy started to show signs of stabilisation and political violence was reduced to minimal levels.

Using the data from the second grade national assessments (2008-2011) we conducted an exercise to estimate the amount of variance that is explained by socio-economic factors (using the same measure of socio-economic status computed at school level). The results (Table 17) show an increase over time in the limited amount of variance that is explained by the socio-economic conditions: it doubles in the case of reading comprehension (goes from around three to around six per cent), and remains constant in the case of mathematics (at around 11 per cent).

Economic growth has also translated in an increasing amount of resources available for public policies. The budget of the Education sector has more than doubled in real terms over the past ten years, allowing the different governments to implement and sustained different policies that are discussed later in this paper. The long-term impact of these policies also needs to be explored in order to prevent a simplistic and untenable association between long-term changes and short-term interventions and vice versa.

The fact that national assessments have been conducted only since 2007 might be veiling the fact that changes could have started long before. Thus, recent stagnation could in turn suggest a limit has been reached in terms of what can be explained by the overall national context. Today, when poverty levels have been reduced, the sole reduction of poverty cannot have a major impact on student performance as seen through national aggregates: these are times when the very effectiveness of educational policies is needed if we want to experience noticeable progress.

Teachers and learning outcomes: what the evidence shows

Teachers content knowledge and student performance

As previously mentioned, the 2004 national assessment conducted by the Ministry of Education included a “validation” exercise whereby teachers were asked to answer one test on mathematics and one on reading comprehension. Since a large proportion of teachers (94 per cent) accepted to voluntarily participate in this exercise (Perú: Ministerio de Educación, 2005, pág. 105), the results are a good indication of some key elements of teacher content knowledge.³³

Sixth grade teachers’ answered a test on mathematics and one on reading comprehension items designed to match the requirement for sixth grade students. Therefore, it was expected that sixth grade school teachers should answer most or all of them correctly. Thus, the first striking result is that teachers answered these questions following a normal distribution pattern as shown in Graph 18 and Graph 19 (these Graphs were composed using raw scores converted into a Rasch scale; mean set at 300 and the standard deviation at 50 for both cases).

In Graph 21, a sample mathematics item is shown; this one requested schoolteachers to read and interpret a table in order to answer a set of questions that involved the use of mathematical concepts or connecting different mathematical concepts to solve a problem. In the case of reading comprehension, a sample item, reproduced as Graph 20, asks schoolteachers to read a text and answer a set of questions about it. Answering could entail just retrieving information from the text or reflect using the information provided by the text.

The results shown in Graph 18 and Graph 19 also reveal large disparities in performance. For the purpose of this paper, we analyse the distribution of scores considering different possible breakdowns:

- (i) by school management (public/private);
- (ii) class organisation (multi-grade/single grade);

³³ A previous paper (Metzler & Woessmann, 2010) develops an analysis that is close to the one presented in this section and also with similar findings. However, the authors proceeded by combining into one dataset the information generated by both tests (mathematics and reading comprehension), and this procedure poses a significant methodological issue since the scales are not commensurate even after normalising the data because the latent traits being measured are not commensurate.

- (iii) language of instruction (bilingual/non-bilingual school); and
- (iv) area where the school is located (rural/urban).

As shown in Table 12 table 1, teacher's achievement gaps are larger between teachers from private and public schools (one standard deviation or more), favouring the former. They are also statistically significant according to location (urban and rural), and class organisation (multi-grade or not). In the case of bilingual and monolingual schools, differences are only statistically significant in the case of reading comprehension. In general terms however, **the pattern of differences resembles the ones found for student achievement.**

Given these results, we explored the association between teachers' achievement in mathematics and reading comprehension with students' achievement in the same areas. The results are shown in Table 13 and Table 14. For students' achievement in mathematics, the association is statistically significant even after controlling for several student, school and teacher variables. For reading comprehension, we did not find association once children's, teacher's and school's characteristics are controlled for.

Nevertheless, this does not necessarily mean that there is a cause-effect relation between teachers' skills (measured through the tests) and students' achievement. One limitation that prevents establishing causal effects is that there is no information on whether the tested teacher had had the students for more than one year (although this is common practice in Peru, especially in public schools). Also, the statistical analysis does not exclude self-selection as a potential explanation; in other words, it is possible that the students who perform better are assigned to the more skilled teachers which, in turn, might represent another potential policy issue affecting equity.

Teachers' content knowledge of mathematics and reading are important variables, as they are prerequisites for good teaching and learning. Thus we explored what teacher and school characteristics were associated with these. Table 15 and Table 16 show the results yielded by a multivariate linear regression analysis performed. At the individual level, the stronger variables (i.e. statistically significant in both models) are age (favouring the younger, especially in mathematics), gender (favouring women in reading and men in mathematics), regular teacher training (which may mean more interest in being trained and/or that teacher's benefit from participating in training courses). At the school level, the only variable significantly associated with teachers' content knowledge was working for a wealthy school.

Shulman (1986) proposed that teacher knowledge had been an important omission in theory and research in education. He proposed that what matter was not only teacher knowledge of subject matter, but also how he applied this knowledge in interacting with students (what he called Pedagogical Content Knowledge) and this area has been the subject of research since then.³⁴ In studies within this field however, it seems that a command of subject matter knowledge is assumed, or at least not tested. This is likely due to the fact that most studies on teacher knowledge have been conducted in industrialised countries. However, the data shown above suggests that many teachers have important deficits in their content knowledge. While we have not measured pedagogical content knowledge here, it is obvious that, given the found deficits, teaching and learning in these classrooms are impaired by teachers' skills (or lack thereof). Furthermore, in three of the four models computed to explain student achievement, teachers' scores were significant predictors. Again, causality does not follow from this automatically, but the results suggest the need to pay attention to in-depth training in pre- and in-service teacher training programmes as well as to overall staffing policies including recruitment and permanence in service. The findings also suggest the need to survey the extent to which curriculum is covered in classrooms; it may be the case that teachers only cover, or cover in more detail, those areas where they feel more comfortable. Finally, it suggests the need to place a heavy emphasis on subject matter knowledge

³⁴ For instance Hill, Loewenberg Ball & Schilling (2008).

in teacher evaluations. Currently teacher evaluations are under revision in Peru but, when developed, they have traditionally focused on knowledge of pedagogical theories, Peruvian regulations, attitudes towards students and education and general knowledge.

Finally, we would like to stress that the gaps shown in teachers' achievement (e.g. rural-urban, and private-public) resemble the gaps shown in student achievement. In other words the educational system in Peru is equipping with better teachers those students who come from more advantageous socioeconomic environments, and probably as a result of a combination of these factors, these students show higher levels of achievement. These phenomena are deeply rooted inequalities in the Peruvian education system, that should be measured regularly and would need programmes aimed at simultaneously increase achievement and diminish gaps in student achievement. Some initiatives in this area are discussed in the following section of this paper.

Educational policies and progress: a preliminary review

In 2006 the main political players and stakeholders in Peru agreed on establishing a National Educational Plan, which sets a vision and strategic objectives to be achieved by 2021 (Perú: Consejo Nacional de Educación, 2006). This Plan states that the main challenge is to increase students' achievement while reducing inequalities. As noted above, there has not been much progress in the reduction of inequalities (except perhaps for gender, which has mixed results and smaller gaps). Thus, two critical questions remain to be posed: what policies have been implemented by the government to increase achievement and to reduce inequality? and what has been their impact?

Educational policies in Peru have followed a template that could be described as heavily concentrated in inputs. Some of the main investments in public education in Peru are explained by infrastructure, provision of textbooks and other materials to all students, as well as the provision of computers to both students and schools. Unfortunately, there is very little empirical information regarding the implementation or impact of these types of initiatives. One exception is the evaluation of the One Laptop per Child programme. The Peruvian government is the one which has purchased the largest number of laptops in this programme (around 860,000 since 2009 according to the information available at <http://one.laptop.org/map> -retrieved 1 May 2013). This programme has had interesting features in terms of equality; for example, the first distribution of laptops was focused on students in rural, impoverished areas. However, a recent evaluation shows that while students have increased their knowledge and skills regarding the use of laptops, and even increased marginally their cognitive skills, their achievement in mathematics and reading did not increase after fifteen months of implementation of the programme (Cristia, Ibarrarán, Cueto, & Severín, 2012). The explanation seems to lie in the absence of a pedagogical model for the incorporation of laptops into class sessions; technology by itself does not seem to be the answer.

Another important area of educational reform in Peru has been the reforming of the rules and regulations pertaining to the teaching career in the civil service. The old career (approved by Congress in the late eighties) did not promote teacher evaluations, and the differences in salaries among teachers in the lowest and highest categories were relatively small. In 2012 a new Law of Teacher Career Reform was passed.³⁵ This law distinguishes eight levels for teachers, with important differences in salaries among them and evaluations as one of the requirements to be recruited and promoted. This Law, however, is still at its initial stages of implementation. While it may be possible that better teachers are attracted and retained through this Law, there are almost no provisions in it regarding inequality. For example, there are few incentives to teach in rural areas. Thus it is likely that the current trend will continue, whereby younger inexperienced teachers are assigned to rural areas, and more experienced teachers manage to be assigned to urban settings. Another problem in rural areas is the education of indigenous students; data from the past few years for fourth graders suggest that their results in reading in their mother tongue or

³⁵ Called *Ley de Reforma Magisterial*; see <http://www.reformamagisterial.pe/> for details.

Spanish are even lower than those presented for second graders above. A few studies have also found that teachers tend to teach in Spanish even in indigenous schools targeted by bilingual education initiatives (Cueto & Secada, 2003).

In regards to how to improve student achievement, it would seem sensible to explore what happens inside the classrooms and not only what sort of inputs school agents receive. There are few studies showing that teachers cover less topics of the national curriculum and do fewer exercises with poorer students. This evidence comes from an analysis of notebooks in language/communication (Cueto, Ramírez, León, & Azañedo, 2006) and mathematics (Cueto, Guerrero, León, Zapata, & Freire, 2013). Furthermore, the types of exercises students are commonly asked to solve are mostly routine, where students are asked to identify and mechanically apply procedures instead of using more complex cognitive processes. An example of this sort regarding language is given by situations where students are asked to identify when to use “s”, “c” or “z” in writing.³⁶ The situation regarding mathematics can be illustrated in cases where teachers ask students to write the word RECTANGLE dozens of times as a way to learn geometry. Changing this type of pedagogical practice would require, among other things, reforms in pre- and in-service teacher training and a revision of the current textbooks, in order to align them with the national curriculum and the emphasis on more complex cognitive skills, such as inferring meaning from different types of texts and solving mathematics problems that are increasingly identify as needed and present in both national and international assessments.

Finally, after centuries of having a rather centralised form of government, Peru embarked in a decentralisation process over the last decade. The results of this initiative in education seem to be poor (Perú: Consejo Nacional de Educación, 2013). For example, while regional governments pay their teachers, there are quite a few local initiatives on improving achievement and reducing inequality and none links teachers’ remunerations in any way to substantive objectives. At the school level, principals in State-run schools are not allowed to make decisions such as what textbooks to use or what teachers to hire or let go. The budget available for schools to decide on is quite limited, and allotted uniquely (and forcefully) to investments in infrastructure. It is expected that over the next few years, increasingly educational attributions and responsibilities, as well as resources, will be assigned at lower levels, including regional and local governments, as well as schools.

While there are several standardised evaluations of achievement in Peru, there is very little empirical research on the effectiveness of interventions, monitoring of programmes, or impact evaluations. This is also likely to change, as the Ministry of Economy and Finance has started an initiative called “Budget by Results”, whereby the assignment of funding will be increasingly decided based upon programmes’ impact. There is also a National System for the Accreditation of Educational Institutions at different levels and for the certification of professional skills (called *Sistema Nacional de Evaluación, Acreditación y Certificación de la Calidad Educativa* -SINEACE). However, there is almost no governmental support to educational research. In spite of this situation, a private national association for educational research was established in 2009.³⁷

Final remarks

This document has documented recent changes in levels of student achievement in Peru. In so doing, it shows how low those levels are and, at the same time, the important pace of progress recorded between 2007 and 2010 that, sadly, has slowed down in the most recent period. National assessments show this important improvement consisting in: (i) doubling the proportion of second grade students that perform satisfactorily in reading comprehension and in mathematics; and (ii)

³⁶ In Latin American Spanish these letters are usually pronounced in the same fashion (as /s/) except in words where “c” is used as /k/.

³⁷ The Peruvian Society of Educational Research (<http://ww.siep.org.pe>).

reducing the proportion of students performing below the lowest achievement level in the national assessments.

At the same time, this aggregated progress has gone hand in hand with an overwhelming intensification of disparities in student achievement when results are observed by gender (the equity dimension with the smallest gaps); location (urban/rural); school management (public/private); class organisation (multi-grade/single-grade); mother tongue (Amerindian/Spanish); and socioeconomic status (measured at school level). When two extreme groups are identified the dramatic magnitude of the gaps is significantly magnified.

The most recent years present a challenging situation when aggregate levels of achievement are stagnated and so are the equity gaps.

These stagnation and equity gaps are increasingly important concerns for many agents in Peru. Diverse initiatives are being deployed by both governmental and private agents but their levels of success are still to be established. In a recent study (Beltrán & Seinfeld, 2012) two concurrent analysis are performed in order to measure equity gaps: firstly, they measure the differential impact on achievement of attending a pre-school programme by mother tongue; location; and poverty; secondly, they analyse the possible determinants of students' achievement gaps also by mother tongue; location and poverty. Their findings stress the importance of the disparities also explored in this document and, also highlight the importance of the interaction among diverse factors that explain student achievement. This interaction is of crucial importance to deploy interventions that are, from the very onset, designed as combining different factors as to promote the positive nature of their concurrence.

One important element to factor in the analysis pertains to the overall Peruvian context and its impact on students' achievement levels. The overall conditions of the country have favoured progress and the deployment of a complex set of policies and programmes. Nevertheless, there is no reason to assume that these positive impacts on education will continue to have the same intensity in the years to come: having effective policies is extremely urgent, and build a substantive body of knowledge about the effectiveness of the interventions can make a substantive contribution in that direction.

This document has also explored evidence on teachers' content knowledge and showed the significant importance it has on students' achievement. While this seems to be a goes-without-saying kind of finding, it is important not only because evidence on that relationship is scarce, but also because it helps in positioning teacher-related issues at centre of the debates on what sort of effective policies are needed. Teacher-related policies need to be informed by a main consideration: the right to education means that children are entitled to have effective teachers whose professional ability is commensurate to the learning needs of the students.

Methodological notes

These notes are intended to document the sources and procedures used in the paper as to clearly set its limits and potential.

The first source of data corresponds to the national assessments conducted between 2007 and 2012. These assessments are conducted among the second grade of primary student population excluding only those in schools with less than five students in said grade. While the assessment is conducted using a census-based approach, the Ministry of Education also conducts a sampled-based measurement. The "control sample" as the Ministry defines it, is intended to yield reliable results at national level and according to several breakdowns (gender; public/private; urban/rural; multi-grade/single-grade classes; regions) This sample-based study prevents issues that might affect the aggregation of census-based results related to coverage (potential selection bias) and administration issues.

In this paper we have used this source of data in two different ways: (i) directly using the information reported by the Ministry (Perú: Ministerio de Educación, 2012), and (ii) processing the “control sample” data for additional breakdowns (wealth; mother tongue; extreme groupings). In the latter case, we have been able to access only the data for 2008-2011 (data for 2007 is not in the public domain, and data for 2012 was released when this paper was almost completed).

While data on mother tongue was available in the datasets, data on wealth required an additional step. The information of the “control sample” was matched, at school level, with information on schools coming from the national school census conducted by the Ministry of Education every year (available at <http://escale.minedu.gob.pe>). The information used and the procedures followed are as follows:

- i) Access to basic services (electricity, sewage and piped water)
- ii) School facilities (library, computer lab, sports field and teacher’s room)

These variables were processed using Latent Trait Analysis techniques (based on a Rasch model) in order to create a single composite score of the latent dimension (socio-economic status -SES). Once a SES score was estimated for each school, we identified quintiles that were used to categorize each school and student in the “control sample”

In these national assessments, the scores are standardised using a scale where 500 is the mean and 100 the standard deviation. It should be noted that each scale (mathematics and reading) is independent from the other, so there is no equivalence between one scale and the other since they are not commensurate.

The national assessments also include (as a parallel study) a test of students in grade fourth in schools following a bilingual education programme. Since administrative records of these schools are not fully consolidated, it is difficult to have a reliable sampling frame and this situation translates into some instability in the records across time. Therefore, the identification of trends is not advisable. This paper has used only the information presented by the Ministry of Education as results from this study for 2012 (Perú: Ministerio de Educación, 2013). It should be noted, that this study is conducted in Quechua-Cusco/Collao, Aimara, Awajun and Shipibo out of the more than 60 Amerindian languages being spoken in Peru: Quechua (a family of several languages; including the Cusco/Collao variant included in the study; is the second largest in importance mother tongue in Peru), followed by Aimara, and then the Amazonian languages that together explained less than two per cent of the population.

We used the **sampled-based national assessment conducted by the Ministry of Education in 2004**. This assessment covered grades fourth, sixth, eighth and eleventh (sixth and eleventh final grades in each educational level) but we focused the analysis only in grade sixth. When conducting this assessment, teachers were invited to answer the same tests as their students voluntarily. Since a very large proportion of teachers were willing to participate (more than 94 per cent)³⁸ it is a reliable source of information about teacher’s content knowledge. Nevertheless, it should be noted that since it was not designed as a sample of teachers, results should be understood in relation to the proportion of students teachers’ serve. Given the nested structure of the data (students nested within schools), a random effects model was used. This type of regression model allow us to control for non-observable factors at student and school level as well as obtain better estimates of the standard errors for the teacher or school level variables. Therefore, we formulate two models (one for mathematics and another for reading comprehension) that estimated the association of teacher’s content knowledge and student achievement holding constant students’ demographic and academic characteristics and teachers and school characteristics.

³⁸ See Perú: Ministerio de Educación (2005, pág. 105).

Finally, the **identification of gaps** has been done using the confidence intervals of the estimations (.05); thus, in every case, the gaps refer to the distance between the upper limit of the confidence interval for the category with lower values, and the lower limit of the confidence interval for the category with higher values. Thus, the gaps refer to the *minimum gap* we can confidently identify in each case.

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Table 1: Peru 2011. Percentage of individuals who have completed primary education by year of birth.

Year of birth	Household survey year							
	2011	2010	2009	2008	2007	2006	2005	2004
1934 or before	37.8	38.1	38.2	35.7	40.6	42.0	39.1	40.1
1935 - 1939	44.0	44.2	42.6	41.6	43.1	46.2	48.1	47.7
1940 - 1944	48.3	47.6	48.2	50.3	50.6	53.2	49.1	48.3
1945 - 1949	58.5	58.3	58.0	60.4	59.0	60.1	57.1	58.1
1950 - 1954	68.5	66.4	68.4	69.6	70.0	68.4	66.5	67.2
1955 - 1959	75.3	74.7	74.6	76.4	76.9	75.8	76.1	76.9
1960 - 1964	79.5	80.7	78.5	79.2	79.5	77.6	79.3	79.1
1965 - 1969	80.5	82.0	81.8	82.3	81.9	81.7	81.2	82.1
1970 - 1974	83.4	84.2	84.0	83.6	84.6	85.8	85.2	85.4
1975 - 1979	86.0	87.2	87.5	88.1	88.8	88.1	88.3	89.4
1980	89.0	87.8	91.2	88.8	88.4	90.4	91.7	90.1
1981	90.4	89.6	91.7	90.3	90.0	91.6	90.3	90.6
1982	90.2	92.3	91.4	91.6	91.0	92.2	92.2	91.8
1983	91.0	91.2	92.2	91.8	91.7	93.0	92.5	94.0
1984	92.8	93.3	92.3	91.6	91.7	93.9	92.5	92.8
1985	93.0	94.7	94.3	93.2	92.2	94.6	92.2	93.3
1986	94.0	93.9	95.5	94.7	94.0	93.6	93.8	92.5
1987	94.7	95.3	95.5	95.4	95.2	95.2	94.0	93.9
1988	94.6	94.7	93.8	94.3	95.3	94.2	94.1	93.0
1989	95.7	96.0	94.1	94.1	94.3	95.6	93.5	91.4
1990	96.0	95.8	95.6	95.3	95.0	93.9	90.7	85.4
1991	96.4	96.2	95.3	95.7	94.1	91.1	87.5	77.2
1992	95.6	95.9	95.6	94.1	92.7	89.1	78.5	57.4
1993	96.0	96.1	94.5	93.4	89.2	79.6	61.8	18.8
1994	96.9	95.8	93.2	90.3	82.7	60.5	19.5	
1995	95.5	93.6	89.5	81.0	62.3	20.2		
1996	95.0	91.4	82.6	63.3	19.8			
1997	91.0	85.7	66.5	21.5				
1998	84.6	65.6	21.4					
1999	69.7	20.6						
2000	21.2							

Note: Information from the 2004-2011 National Household Surveys (ENAHO) processed by the authors. Shaded cells show the values for those at the official completion age. Boldfaced cells show the point around which the maximum value is achieved. That is, timely completion (including those graduating earlier than the official age) has been improving from around 57 per cent to around 70 per cent; and total levels of completion are achieved five years later than the official graduation age. Early completion seems to be stabilised around 20 per cent. Standard errors not shown since the concurrent use of several observations for the same population cohorts helps in identifying stable patterns.

Table 2: Peru 2007-2012. Percentage of second grade students by performance level in Reading Comprehension and Mathematics.

	Below Level 1			Level 1			Level 2			Below Level 2		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit
Reading Comprehension												
2007	29.6	29.8	30.0	54.1	54.3	54.5	15.7	15.9	16.0	84.0	84.1	84.3
2008	28.9	30.0	31.1	52.2	53.1	54.0	16.0	16.9	17.9	82.1	83.1	84.0
2009	22.4	23.3	24.3	52.7	53.6	54.5	22.1	23.1	24.1	75.9	76.9	77.9
2010	22.9	23.7	24.5	46.9	47.6	48.3	27.7	28.7	29.8	70.2	71.3	72.3
2011	22.3	23.1	23.9	46.3	47.1	47.8	28.7	29.8	30.9	69.1	70.2	71.3
2012	19.3	19.8	20.3	48.7	49.3	49.9	30.1	30.9	31.7	68.3	69.1	69.9
Mathematics												
2007	56.3	56.5	56.7	36.1	36.3	36.5	7.0	7.2	7.4	92.6	92.8	93.0
2008	53.3	54.7	56.1	34.9	35.9	36.9	8.6	9.4	10.2	89.8	90.6	91.4
2009	48.0	49.2	50.4	36.5	37.3	38.1	12.7	13.5	14.3	85.7	86.5	87.3
2010	52.1	53.3	54.5	32.3	32.9	33.5	13.0	13.8	14.6	85.4	86.2	87.0
2011	49.7	50.9	52.1	35.3	35.9	36.5	12.4	13.2	14.0	86.0	86.8	87.6
2012	48.2	49.0	49.9	37.7	38.2	38.7	12.1	12.8	13.4	86.6	87.2	87.9

Note: Confidence intervals at $\alpha = .05$. The category "below level 2" has been added just to facilitate the reference.

Table 3: Peru 2007-2012. Percentage of second grade students by gender who performed at the satisfactory level and below. Reading Comprehension and Mathematics.

	Girls			Boys		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit
Satisfactory level (Level 2)						
Reading Comprehension						
2007	16.7	16.9	17.1	14.7	14.9	15.1
2008	17.2	18.7	20.1	14.3	15.2	16.1
2009	23.7	25.2	26.7	19.9	21.0	22.0
2010	28.4	29.9	31.4	25.0	26.2	27.5
2011	31.1	32.4	33.7	25.9	27.2	28.5
2012	32.0	32.8	33.7	28.2	29.0	29.9
Mathematics						
2007	6.8	6.9	7.1	7.4	7.5	7.7
2008	7.9	8.9	9.8	9.1	9.9	10.7
2009	11.4	12.5	13.5	13.7	14.5	15.4
2010	11.0	12.0	12.9	13.2	14.2	15.2
2011	11.0	11.9	12.8	13.4	14.5	15.6
2012	10.8	11.4	12.0	13.3	14.1	14.9
Below level 1						
Reading Comprehension						
2007	30.4	30.6	30.9	28.7	29.0	29.2
2008	30.0	31.2	32.3	27.5	28.8	30.1
2009	23.3	24.3	25.3	21.3	22.4	23.5
2010	23.8	24.7	25.5	21.8	22.7	23.6
2011	23.5	24.4	25.3	21.0	21.9	22.7
2012	20.2	20.8	21.3	18.2	18.8	19.4
Mathematics						
2007	56.3	56.5	56.8	56.2	56.4	56.7
2008	52.6	54.0	55.3	53.9	55.5	57.1
2009	47.1	48.4	49.6	48.5	50.0	51.6
2010	51.6	52.8	54.1	52.5	53.8	55.1
2011	49.2	50.6	51.9	50.1	51.3	52.6
2012	47.6	48.5	49.4	48.6	49.6	50.5
Below satisfactory (Level 2)						
Reading Comprehension						
2007	82.9	83.1	83.3	84.9	85.1	85.3
2008	79.9	81.3	82.8	83.9	84.8	85.7
2009	73.3	74.8	76.3	78.0	79.0	80.1
2010	68.6	70.1	71.6	72.5	73.8	75.0
2011	66.3	67.6	68.9	71.5	72.8	74.1
2012	66.3	67.2	68.0	70.1	71.0	71.8
Mathematics						
2007	92.9	93.1	93.2	92.3	92.5	92.6
2008	90.2	91.1	92.1	89.3	90.1	90.9
2009	86.5	87.5	88.6	84.6	85.5	86.3
2010	87.1	88.0	89.0	84.8	85.8	86.8
2011	87.2	88.1	89.0	84.4	85.5	86.6
2012	88.0	88.6	89.2	85.1	85.9	86.7

Note: Confidence intervals at $\alpha = .05$. Boldfaced figures show values that are significantly larger for either girls or boys.

Table 4: Peru 2007-2012. Percentage of second grade students by residence area who performed at the satisfactory level and below. Reading Comprehension and Mathematics.

		Urban			Rural		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit	
Satisfactory level (Level 2)							
Reading Comprehension							
2007	20.7	20.9	20.9	5.4	5.6	5.7	
2008	21.3	22.6	22.6	4.7	5.4	6.2	
2009	27.5	28.9	28.9	10.5	11.6	12.7	
2010	34.3	35.5	36.7	7.0	7.6	8.2	
2011	35.1	36.3	37.5	5.1	5.9	6.7	
2012	36.6	37.5	38.4	6.4	7.0	7.6	
Mathematics							
2007	8.4	8.6	8.7	4.4	4.6	4.7	
2008	10.1	11.0	11.9	5.3	6.2	7.1	
2009	16.0	16.8	17.5	6.3	7.1	7.9	
2010	15.8	16.4	17.0	5.2	5.8	6.3	
2011	15.3	15.8	16.3	3.2	3.7	4.2	
2012	14.7	15.2	15.6	3.6	4.1	4.6	
Below level 1							
Reading Comprehension							
2007	18.4	18.6	18.8	52.3	52.7	53.0	
2008	17.6	18.8	20.0	50.9	52.7	54.5	
2009	14.0	15.0	15.9	38.0	39.9	41.8	
2010	13.5	14.3	15.0	51.7	53.1	54.5	
2011	13.3	13.9	14.5	55.3	57.0	58.8	
2012	11.3	11.7	12.1	47.9	49.2	50.5	
Mathematics							
2007	51.5	51.8	52.0	65.8	66.1	66.4	
2008	46.7	48.3	49.9	66.1	67.8	69.5	
2009	40.0	41.5	43.1	62.5	64.4	66.3	
2010	45.7	47.0	48.4	71.6	72.9	74.2	
2011	42.7	44.0	45.4	75.0	76.5	78.0	
2012	41.5	42.4	43.4	71.9	73.1	74.3	
Below satisfactory (Level 2)							
Reading Comprehension							
2007	79.1	79.1	79.3	94.3	94.4	94.6	
2008	77.4	77.4	78.7	93.8	94.6	95.3	
2009	71.1	71.1	72.5	87.3	88.4	89.5	
2010	63.3	64.5	65.7	91.8	92.4	93.0	
2011	62.5	63.7	64.9	93.3	94.1	94.9	
2012	61.6	62.5	63.4	92.4	93.0	93.6	
Mathematics							
2007	91.3	91.4	91.6	95.3	95.4	95.6	
2008	88.1	89.0	89.9	92.9	93.8	94.7	
2009	82.5	83.2	84.0	92.1	92.9	93.7	
2010	83.0	83.6	84.2	93.7	94.2	94.8	
2011	83.7	84.2	84.7	95.8	96.3	96.8	
2012	84.4	84.8	85.3	95.4	95.9	96.4	

Note: Confidence intervals at $\alpha = .05$. Boldfaced figures show values that are significantly larger for either of the groupings.

Table 5: Peru 2007-2012. Percentage of second grade students by school management who performed at the satisfactory level and below. Reading Comprehension and Mathematics.

		Public			Private		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit	
Satisfactory level (Level 2)							
Reading Comprehension							
2007	11.7	11.9	12.0	32.6	33.0	33.4	
2008	11.0	11.9	12.9	35.6	37.7	39.9	
2009	16.8	17.8	18.8	40.9	43.0	45.1	
2010	21.7	22.8	23.9	46.5	48.6	50.6	
2011	21.8	23.0	24.1	48.3	50.3	52.3	
2012	23.3	24.0	24.8	49.7	51.4	53.2	
Mathematics							
2007	6.2	6.3	6.5	10.8	11.1	11.3	
2008	7.2	8.0	8.7	13.7	15.3	16.9	
2009	10.2	10.9	11.7	21.3	23.2	25.1	
2010	10.9	11.7	12.4	19.2	20.9	22.5	
2011	10.4	11.3	12.2	17.0	18.9	20.9	
2012	10.9	11.5	12.2	14.9	16.5	18.0	
Below level 1							
Reading Comprehension							
2007	34.4	34.6	34.8	8.9	9.2	9.5	
2008	33.5	35.1	36.8	7.5	8.5	9.4	
2009	26.2	27.6	29.0	6.5	7.3	8.2	
2010	29.1	30.6	32.1	5.6	6.3	7.0	
2011	27.4	28.8	30.3	5.3	5.9	6.6	
2012	24.2	24.8	25.4	4.3	4.8	5.3	
Mathematics							
2007	59.7	59.9	60.1	41.3	41.8	42.2	
2008	56.5	58.2	59.9	37.9	40.2	42.4	
2009	52.1	53.8	55.5	29.6	31.8	33.9	
2010	57.2	59.0	60.7	37.2	39.5	41.7	
2011	54.4	56.1	57.7	33.1	35.4	37.6	
2012	51.8	52.7	53.7	36.1	37.9	39.7	
Below satisfactory (Level 2)							
Reading Comprehension							
2007	88.0	88.1	88.3	66.6	67.0	67.4	
2008	87.1	88.1	89.0	60.1	62.3	64.4	
2009	81.2	82.2	83.2	54.9	57.0	59.1	
2010	76.1	77.2	78.3	49.4	51.4	53.5	
2011	75.9	77.0	78.2	47.7	49.7	51.7	
2012	75.2	76.0	76.7	46.8	48.6	50.3	
Mathematics							
2007	93.5	93.7	93.8	88.7	88.9	89.2	
2008	91.3	92.0	92.8	83.1	84.7	86.3	
2009	88.3	89.1	89.8	74.9	76.8	78.7	
2010	87.6	88.3	89.1	77.5	79.1	80.8	
2011	87.8	88.7	89.6	79.1	81.1	83.0	
2012	87.8	88.5	89.1	82.0	83.5	85.1	

Note: Confidence intervals at $\alpha = .05$. Boldfaced figures show values that are significantly larger for either of the groupings.

Table 6: Peru 2007-2012. Percentage of second grade students by class type (multi-grade or not) who performed at the satisfactory level and below. Reading Comprehension and Mathematics.

	Single grade			Multi-grade		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit
Satisfactory level (Level 2)						
Reading Comprehension						
2007	19.4	19.6	19.8	4.9	5.1	5.2
2008	19.5	20.7	21.9	6.6	7.8	8.9
2009	25.8	27.0	28.3	8.5	9.5	10.5
2010	32.7	33.9	35.1	8.50	9.3	10.0
2011	33.7	34.9	36.1	6.6	7.6	8.54
2012	34.7	35.5	36.4	8.51	9.4	10.4
Mathematics						
2007	8.0	8.2	8.3	4.4	4.6	4.7
2008	9.6	10.5	11.3	5.9	6.8	7.8
2009	14.7	15.6	16.6	5.5	6.3	7.2
2010	15.0	15.8	16.7	5.6	6.2	6.8
2011	14.4	15.4	16.4	3.3	3.8	4.4
2012	13.9	14.6	15.4	3.6	4.2	4.7
Below level 1						
Reading Comprehension						
2007	20.7	20.9	21.1	55.2	55.6	55.9
2008	20.0	21.6	23.1	48.2	50.4	52.6
2009	15.8	17.0	18.1	43.4	45.5	47.7
2010	15.7	16.8	17.9	50.7	52.4	54.2
2011	14.7	15.6	16.5	53.7	55.9	58.0
2012	13.3	13.7	14.2	46.2	47.8	49.4
Mathematics						
2007	52.8	53.0	53.2	66.3	66.6	67.0
2008	48.5	50.4	52.2	63.3	65.3	67.3
2009	42.2	43.9	45.7	65.4	67.4	69.5
2010	47.4	49.1	50.8	70.8	72.3	73.9
2011	43.7	45.2	46.7	73.9	75.6	77.3
2012	43.1	44.0	44.9	70.7	72.2	73.7
Below satisfactory (Level 2)						
Reading Comprehension						
2007	80.2	80.4	80.6	94.8	94.9	95.1
2008	78.1	79.3	80.5	91.1	92.2	93.4
2009	71.7	73.0	74.2	89.5	90.5	91.5
2010	64.9	66.1	67.3	90.0	90.7	91.5
2011	63.9	65.1	66.3	91.5	92.4	93.4
2012	63.6	64.5	65.3	89.6	90.6	91.5
Mathematics						
2007	91.7	91.8	92.0	95.3	95.4	95.6
2008	88.7	89.5	90.4	92.2	93.2	94.1
2009	83.4	84.4	85.3	92.8	93.7	94.5
2010	83.3	84.2	85.0	93.2	93.8	94.4
2011	83.6	84.6	85.6	95.6	96.2	96.7
2012	84.6	85.4	86.1	95.3	95.8	96.4

Note: Confidence intervals at $\alpha = .05$. Boldfaced figures show values that are significantly larger for either of the groupings.

Table 7: Peru 2007-2012. Percentage of second grade students in the lowest and highest socio-economic status quintile who performed at the satisfactory level and below. Reading Comprehension and Mathematics.

	First quintile (lowest)			Fifth quintile (highest)		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit
Satisfactory level (Level 2)						
Reading Comprehension						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	3.0	4.0	5.0	25.7	28.3	31.0
2009	4.9	6.3	7.6	29.5	31.6	33.8
2010	3.6	4.5	5.4	36.3	39.1	41.8
2011	2.5	3.3	4.1	39.5	41.7	44.0
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mathematics						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	4.3	5.7	7.2	11.8	13.6	15.4
2009	3.3	4.3	5.4	17.0	18.6	20.2
2010	3.2	4.1	5.0	17.0	19.1	21.2
2011	2.1	3.0	3.9	18.0	19.9	21.7
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Below level 1						
Reading Comprehension						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	55.5	58.2	60.9	12.6	15.0	17.5
2009	49.1	52.0	54.9	11.0	12.4	13.9
2010	60.6	62.9	65.3	10.7	12.4	14.0
2011	64.6	67.8	71.0	9.9	11.0	12.2
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mathematics						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	66.7	69.3	71.9	40.3	43.4	46.6
2009	70.9	73.5	76.2	35.5	38.0	40.4
2010	76.5	78.7	80.9	40.4	43.5	46.6
2011	79.9	82.5	85.1	35.5	37.8	40.1
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Below satisfactory (Level 2)						
Reading Comprehension						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	95.0	96.0	97.0	69.0	71.7	74.3
2009	92.4	93.7	95.1	66.2	68.4	70.5
2010	94.6	95.5	96.4	58.2	60.9	63.7
2011	95.9	96.7	97.5	56.0	58.3	60.5
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mathematics						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	92.8	94.3	95.7	84.6	86.4	88.2
2009	94.6	95.7	96.7	79.8	81.4	83.0
2010	95.0	95.9	96.8	78.8	80.9	83.0
2011	96.1	97.0	97.9	78.3	80.1	82.0
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: Confidence intervals at $\alpha = .05$. Boldfaced figures show values that are significantly larger for larger for either of the groupings. See the methodological note on how the socio-economic status has been measured in this paper. "n.a." = not available.

Table 8: Peru 2007-2012. Percentage of second grade students by students' mother tongue who performed at the satisfactory level and below. Reading Comprehension and Mathematics.

	Indigenous			Spanish		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit
Satisfactory level (Level 2)						
Reading Comprehension						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	2.1	3.5	4.9	17.0	18.0	19.1
2009	5.0	6.9	8.8	23.1	24.3	25.5
2010	2.1	3.5	4.9	28.5	29.8	31.1
2011	2.2	4.0	5.8	30.3	31.6	32.8
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mathematics						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	2.6	4.3	6.0	9.1	9.8	10.6
2009	3.2	4.6	6.0	13.3	14.2	15.1
2010	2.6	4.3	6.0	12.9	13.9	14.8
2011	1.3	2.2	3.0	13.0	14.0	14.9
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Below level 1						
Reading Comprehension						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	56.7	60.8	64.9	26.2	27.4	28.7
2009	45.0	49.2	53.4	20.4	21.4	22.5
2010	59.6	62.7	65.7	20.9	21.9	22.9
2011	61.8	65.4	69.1	19.3	20.2	21.1
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mathematics						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	70.7	74.4	78.2	51.6	53.0	54.5
2009	67.4	71.2	75.0	46.1	47.6	49.1
2010	77.6	80.0	82.5	50.9	52.4	53.9
2011	80.3	82.9	85.6	47.3	48.7	50.1
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Below satisfactory (Level 2)						
Reading Comprehension						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	95.1	96.5	97.9	80.9	82.0	83.0
2009	91.2	93.1	95.0	74.5	75.7	76.9
2010	95.1	96.5	97.9	68.9	70.2	71.5
2011	94.2	96.0	97.8	67.2	68.4	69.7
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mathematics						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	94.0	95.7	97.4	89.4	90.2	90.9
2009	94.0	95.4	96.8	84.9	85.8	86.7
2010	94.0	95.7	97.4	85.2	86.1	87.1
2011	97.0	97.8	98.7	85.1	86.0	87.0
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: Confidence intervals at $\alpha = .05$. Boldfaced figures show values that are significantly larger for larger for either of the groupings. "n.a." = not available.

Table 9: Peru 2008-2011. Percentage of second grade students who performed below the satisfactory level by different groupings. Reading Comprehension and Mathematics.

	2008			2009		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit
Reading Comprehension						
National	82.1	83.1	84.0	75.9	76.9	77.9
Indigenous mother tongue	95.1	96.5	97.9	91.2	93.1	95.0
Poorest quintile	95.0	96.0	97.0	92.4	93.7	95.1
Female	79.9	81.3	82.8	73.3	74.8	76.3
Female +						
Indigenous mother tongue	95.3	96.7	98.2	90.6	92.7	94.7
Poorest quintile	94.8	96.0	97.2	92.2	93.7	95.3
Indigenous mother tongue +						
Poorest quintile	92.7	95.7	98.8	94.1	96.1	98.2
Female + Poorest + Indigenous	93.9	96.6	99.3	92.8	95.7	98.6
Female + Indigenous + Multigrade	94.2	96.3	98.4	88.0	91.5	94.9
Female + Indigenous + Single grade	95.7	97.3	99.0	91.7	93.9	96.1
Poorest + Indigenous + Multigrade	92.9	96.0	99.1	93.1	95.7	98.2
Poorest + Indigenous + Single grade	82.6	93.5	100.0	94.7	97.4	100.0
Female+ Poorest + Multigrade	94.8	96.0	97.2	92.3	94.0	95.6
Female+ Poorest + Single grade	91.9	95.8	99.7	88.5	92.8	97.1
Mathematics						
National	89.8	90.6	91.4	85.7	86.5	87.3
Indigenous mother tongue	94.0	95.7	97.4	94.0	95.4	96.8
Poorest quintile	92.8	94.3	95.7	94.6	95.7	96.7
Female	90.2	91.1	92.1	86.5	87.5	88.6
Female +						
Indigenous mother tongue	94.2	96.0	97.8	93.5	95.1	96.7
Poorest quintile	92.8	94.4	96.0	95.0	96.2	97.4
Indigenous mother tongue +						
Poorest quintile	90.2	94.0	97.9	93.3	95.8	98.3
Female + Poorest + Indigenous	90.1	94.1	98.2	92.5	95.5	98.6
Female + Indigenous + Multigrade	93.1	95.6	98.1	92.5	94.8	97.2
Female + Indigenous + Single grade	94.1	96.6	99.0	93.1	95.3	97.5
Poorest + Indigenous + Multigrade	91.0	94.6	98.2	91.5	94.8	98.0
Poorest + Indigenous + Single grade	72.8	89.9	100.0	97.6	99.0	100.0
Female+ Poorest + Multigrade	92.9	94.4	96.0	94.6	96.0	97.5
Female+ Poorest + Single grade	88.2	94.3	100.0	94.3	96.8	99.3

	2010			2011		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit
Reading Comprehension						
National	70.2	71.3	72.3	69.1	70.2	71.3
Indigenous mother tongue	95.1	96.5	97.9	94.2	96.0	97.8
Poorest quintile	94.6	95.5	96.4	95.9	96.7	97.5
Female	68.6	70.1	71.6	66.3	67.6	68.9
Female +						
Indigenous mother tongue	94.5	95.7	96.8	94.0	95.9	97.8
Poorest quintile	94.6	95.6	96.6	95.5	96.4	97.4
Indigenous mother tongue +						
Poorest quintile	95.7	97.6	99.4	99.1	99.6	100.0
Female + Poorest + Indigenous	95.8	97.7	99.6	98.8	99.5	100.0
Female + Indigenous + Multigrade	95.1	96.5	97.8	98.1	98.7	99.4
Female + Indigenous + Single grade	92.5	94.5	96.6	87.6	91.8	96.1
Poorest + Indigenous + Multigrade	96.0	97.8	99.7	99.1	99.6	100.0
Poorest + Indigenous + Single grade	85.9	94.6	100.0	99.0	99.7	100.0
Female+ Poorest + Multigrade	94.7	95.7	96.8	95.7	96.7	97.7
Female+ Poorest + Single grade	91.6	94.7	97.8	92.0	94.8	97.7
Mathematics						
National	85.4	86.2	87.0	86.0	86.8	87.6
Indigenous mother tongue	94.0	95.7	97.4	97.0	97.8	98.7
Poorest quintile	95.0	95.9	96.8	96.1	97.0	97.9
Female	87.1	88.0	89.0	87.2	88.1	89.0
Female +						
Indigenous mother tongue	96.2	97.2	98.3	97.2	97.9	98.7
Poorest quintile	95.3	96.4	97.4	95.7	96.9	98.1
Indigenous mother tongue +						
Poorest quintile	95.4	97.4	99.4	98.3	99.2	100.0
Female + Poorest + Indigenous	95.0	97.5	100.0	97.8	99.0	100.0
Female + Indigenous + Multigrade	95.1	96.7	98.4	97.8	98.6	99.4
Female + Indigenous + Single grade	96.8	97.9	99.0	95.6	97.0	98.3
Poorest + Indigenous + Multigrade	95.1	97.2	99.4	98.2	99.1	100.0
Poorest + Indigenous + Single grade	96.4	98.6	100.0	98.9	99.6	100.0
Female+ Poorest + Multigrade	95.0	96.1	97.3	96.0	97.1	98.2
Female+ Poorest + Single grade	96.2	97.8	99.4	90.6	95.6	100.0

Note: Confidence intervals at $\alpha = .05$. Boldfaced cells include instances where the confidence interval includes the value 100 per cent, that is, where it is not possible to say there are students who perform satisfactorily at all.

Table 10: Peru 2007-2012. Percentage of second grade students by performance level and area. Reading Comprehension and Mathematics. Low and high extreme groups.

	Low extreme			High extreme		
	Lower Limit	Estimate	Upper Limit	Lower Limit	Estimate	Upper Limit
Satisfactory level (Level 2)						
Reading Comprehension						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	0.8	4.0	7.2	44.0	47.6	51.1
2009	1.8	4.4	7.1	45.7	48.7	51.7
2010	0.3	2.2	4.1	54.5	58.4	62.3
2011	0.0	0.4	0.9	57.8	60.5	63.3
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mathematics						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	1.8	5.5	9.2	17.4	20.3	23.2
2009	2.0	5.3	8.6	24.3	27.3	30.2
2010	0.6	2.8	5.0	23.1	26.6	30.2
2011	0.0	0.9	1.8	22.9	26.6	30.2
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Below level 1						
Reading Comprehension						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	58.6	66.0	73.4	4.3	5.2	6.2
2009	52.2	60.8	69.4	4.6	5.2	6.3
2010	69.6	75.1	80.6	2.3	3.2	4.1
2011	77.7	83.5	89.3	2.4	2.8	3.3
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mathematics						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	65.2	72.3	79.5	29.8	33.2	36.7
2009	70.6	77.7	84.9	24.1	26.7	29.3
2010	79.3	84.2	89.2	26.7	30.4	34.1
2011	86.5	90.6	94.6	22.0	24.8	27.6
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Below satisfactory (Level 2)						
Reading Comprehension						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	92.8	96.0	99.2	48.9	52.4	56.0
2009	92.9	95.6	98.2	48.3	51.3	54.3
2010	95.9	97.8	99.7	37.7	41.6	45.5
2011	99.1	99.6	100.0	36.7	39.5	42.2
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mathematics						
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	90.8	94.5	98.2	76.8	79.7	82.6
2009	91.4	94.7	98.0	69.8	72.7	75.7
2010	95.0	97.2	99.4	69.8	73.4	76.9
2011	98.2	99.1	100.0	69.8	73.4	77.1
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: Confidence intervals at $\alpha = .05$. Boldfaced figures show values that are significantly better for larger for either of the groupings. Low extreme: Students living in rural areas, having an indigenous mother tongue, and attending a State-run school in a multi-grade class; and High extreme: Students living in urban areas, having a non-indigenous mother tongue, and attending a non-State-run school in a single-grade class. "n.a." = not available.

Table 11: Peru 2012. Percentage of fourth grade students by performance level in their mother tongue (Amerindian) and Spanish.

	Quechua (Cusco-Collao)		Aimara		Awajun		Shipibo		Total
	Amerin- dian	Spanish	Amerin- dian	Spanish	Amerin- dian	Spanish	Amerin- dian	Spanish	Spanish
Level 2	11.0	17.9	4.0	19.6	5.1	1.5	3.6	2.9	13.6
Level 1	44.1	33.9	40.3	27.6	21.1	7.6	10.7	11.4	23.0
Below level 1	44.8	48.2	55.7	52.8	73.8	90.9	85.7	85.7	63.4
Below level 2	89.0	82.1	96.0	80.4	94.9	98.5	96.4	97.1	86.4

Note: Taken from Perú: Ministerio de Educación (2013, pág. 40). No standard errors provided in the original source.

Table 12: Peru 2004. Sixth grade teacher's achievement gaps in Mathematics and Reading Comprehension.

Breakdown		Reading		Mathematics	
		Estimate	Standard error	Estimate	Standard error
School management	Public	290.1	2.8	288.2	3.0
	Private	338.6	5.3	359.3	7.0
	Difference	48.5	***	71.0	***
Location	Rural	278.5	4.7	275.4	5.2
	Urban	307.8	2.9	312.3	3.4
	Difference	29.3	***	36.9	***
Language	Bilingual	284.0	8.4	306.1	
	Spanish	300.1	2.7	300.1	
	Difference	16.2	*	-6.0	
Class organisation	Multi-grade	276.6	4.5	281.0	5.1
	Single grade	308.8	3.0	310.2	3.5
	Difference	32.2	***	29.2	***

Note: ***p<0.001, **p<0.01, *p<0.05

Table 13: Peru 2004. Determinants of mathematics achievement of sixth grade students.

	Model 1		Model 2		Model 3		Model 4	
<i>Individual variables</i>								
Indigenous	-14.67	(2.29) ***	-10.09	(2.18) ***	-10.28	(2.17) ***	-10.32	(2.17) ***
Female	-9.96	(1.02) ***	-10.37	(1.01) ***	-10.36	(1.01) ***	-10.35	(1.01) ***
Age (years)	-4.32	(0.63) ***	-3.77	(0.62) ***	-3.77	(0.62) ***	-3.76	(0.62) ***
Number of siblings	-0.51	(0.25) *	-0.10	(0.25)	-0.09	(0.25)	-0.08	(0.25)
Nuclear family	-1.53	(1.18)	-0.91	(1.17)	-0.91	(1.17)	-0.93	(1.17)
Number of days per week that work	-1.23	(0.27) ***	-0.65	(0.27) *	-0.66	(0.27) *	-0.70	(0.27) **
Number of times who repeated a grade	-7.78	(0.94) ***	-7.46	(0.93) ***	-7.46	(0.93) ***	-7.41	(0.93) ***
Educational Materials at home	0.16	(0.57)	0.09	(0.56)	0.15	(0.56)	0.16	(0.56)
More than 50 books at home	11.08	(1.52) ***	10.65	(1.51) ***	10.66	(1.51) ***	10.67	(1.51) ***
Socioeconomic index	0.32	(0.06) ***	-0.13	(0.06) *	-0.13	(0.06) *	-0.13	(0.06) *
Father's education (Secondary or higher)	7.66	(1.32) ***	6.23	(1.31) ***	6.25	(1.31) ***	6.27	(1.31) ***
Mother's education (Secondary or higher)	5.76	(1.41) ***	4.71	(1.40) **	4.64	(1.40) **	4.65	(1.39) **
<i>School variables</i>								
Public			-14.98	(5.09) **	-13.52	(5.06) **	-13.18	(5.03) **
Full teacher			-0.62	(4.05)	-1.04	(4.02)	0.82	(3.99)
Urban			-0.43	(4.26)	-0.12	(4.22)	-0.02	(4.17)
Number of students enrolled			0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Infrastructure index			0.08	(0.02) ***	0.07	(0.02) ***	0.06	(0.02) **
Socioeconomic status (aggregated)			1.83	(0.19) ***	1.78	(0.19) ***	1.72	(0.18) ***
Bilingual school			-18.98	(3.45) ***	-19.00	(3.42) ***	-20.58	(3.40) ***
<i>Teacher variables (aggregated at school level)</i>								
Teacher's score in math					0.05	(0.01) **	0.04	(0.01) **
Teacher experience (years)							0.37	(0.17) *
Teacher's commitment with the student							-0.02	(0.02)
Teacher's perception on classroom organisation							0.03	(0.01) *
Teacher pedagogical practices							0.01	(0.02)
Relationship with his/her colleagues							-0.01	(0.01)
Teacher's satisfaction							0.05	(0.01) **
Constant	309.60	(9.51) ***	165.96	(19.19) ***	156.94	(19.25) ***	145.04	(20.15) ***
Percentage of variance within schools	62.03		77.47		77.88		78.82	
Percentage of variance between schools	37.97		22.53		22.12		21.18	
Variance explained at level 1	3.72		4.48		4.46		4.43	
Variance explained at level 2	50.0		76.4		77.0		78.2	
<i>Observations</i>								
Students	10034		10034		10034		10034	
Schools	590		590		590		590	

***p<0.001, **p<0.01, *p<0.05, +p<0.10

Note: Standard errors in brackets

Table 14: Peru 2004. Determinants of reading comprehension achievement of sixth grade students.

	Model 1		Model 2		Model 3		Model 4	
<i>Individual variables</i>								
Indigenous	-19.24	(2.51) ***	-13.16	(2.33) ***	-13.02	(2.33) ***	-13.58	(2.32) ***
Female	3.43	(1.17) **	3.10	(1.15) **	3.10	(1.15) **	3.13	(1.15) **
Age (years)	-3.12	(0.71) ***	-2.49	(0.70) ***	-2.50	(0.70) ***	-2.42	(0.70) ***
Number of siblings	-1.18	(0.29) ***	-0.62	(0.29) *	-0.62	(0.29) *	-0.59	(0.28) *
Nuclear family	-2.71	(1.36) *	-1.67	(1.34)	-1.67	(1.34)	-1.69	(1.34)
Number of days per week that work	-1.70	(0.31) ***	-0.93	(0.30) **	-0.92	(0.30) **	-0.95	(0.30) **
Number of times who repeated a grade	-7.66	(1.06) ***	-7.16	(1.04) ***	-7.13	(1.04) ***	-7.24	(1.04) ***
Educational Materials at home	-1.44	(0.64) *	-1.64	(0.62) **	-1.60	(0.63) *	-1.63	(0.62) **
More than 50 books at home	9.28	(1.76) ***	8.70	(1.74) ***	8.66	(1.74) ***	8.68	(1.74) ***
Socioeconomic index	0.66	(0.07) ***	-0.02	(0.07)	-0.02	(0.07)	-0.02	(0.07)
Father's education (Secondary or higher)	8.37	(1.50) ***	6.08	(1.48) ***	6.11	(1.48) ***	6.10	(1.48) ***
Mother's education (Secondary or higher)	5.57	(1.61) **	4.25	(1.59) **	4.21	(1.59) **	4.24	(1.58) **
<i>School variables</i>								
Public			-5.79	(4.41)	-5.75	(4.40)	-4.12	(4.39)
Full teacher			0.40	(3.54)	0.02	(3.54)	2.33	(3.50)
Urban			7.60	(3.68) *	7.83	(3.67) *	6.10	(3.62) +
Number of students enrolled			0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Infrastructure index			0.04	(0.02) *	0.04	(0.02) *	0.03	(0.02) +
Socioeconomic status (aggregated)			2.07	(0.17) ***	2.03	(0.17) ***	2.06	(0.17) ***
Bilingual school			-15.47	(3.08) ***	-15.34	(3.07) ***	-14.99	(3.04) ***
<i>Teacher variables (aggregated at school level)</i>								
Teacher's score in reading					0.02	(0.01)	0.01	(0.01)
Teacher experience (years)							0.47	(0.15) **
Teacher's commitment with the student							0.00	(0.01)
Teacher's perception on classroom organisation							0.00	(0.01)
Teacher pedagogical practices							0.00	(0.02)
Relationship with his/her colleagues							-0.01	(0.01)
Teacher's satisfaction							0.05	(0.01) **
Constant	265.73	(10.76) ***	114.40	(17.71) ***	111.50	(17.76) ***	96.97	(18.72) ***
Percentage of variance within school	74.47		87.48		87.59		88.22	
Percentage of variance between schools	25.53		12.52		12.41		11.78	
Variance explained at level 1	0.50		2.18		2.16		2.15	
Variance explained at level 2	64.6		85.5		85.6		86.4	
<i>Observations</i>								
Students	9553		9553		9553		9553	
Schools	587		587		587		587	

***p<0.001, **p<0.01, *p<0.05,+p<0.10

Note: Standard errors in brackets.

Table 15: Peru 2004. Determinants of mathematics achievement of sixth grade teachers.

	Model 1			Model 2			Model 3		
<i>Teacher variables</i>									
Age (years)	-2.97	(0.74)	***	-2.77	(0.73)	***	-2.30	(0.71)	***
Female	-10.60	(6.64)		-10.80	(6.63)		-17.61	(6.40)	*
Years of experience	3.36	(0.80)	***	3.08	(0.80)	***	1.92	(0.77)	*
Regular teacher training	36.45	(7.32)	***	35.50	(7.06)	***	17.61	(7.17)	*
Studied at Pedagogical Institute	-6.92	(8.28)		-6.46	(8.05)		1.59	(7.51)	
Teacher's commitment with the student				-0.04	(0.05)		-0.02	(0.05)	
Teacher's perception on classroom organization				0.06	(0.04)		0.03	(0.04)	
Teacher pedagogical practices				-0.06	(0.05)		-0.03	(0.05)	
Relationship with his/her colleagues				-0.01	(0.03)		-0.02	(0.03)	
Teacher's satisfaction				0.11	(0.04)	*	0.08	(0.04)	+
<i>School variables</i>									
Public							14.23	(13.41)	
Full teacher							7.24	(9.84)	
Urban							-0.15	(9.47)	
Number of students enrolled							-0.02	(0.01)	
Infrastructure index							0.07	(0.05)	
Socioeconomic status (aggregated)							1.26	(0.48)	*
Bilingual school							2.88	(13.49)	
Constant	357.23	(26.06)	***	338.12	(28.34)	***	196.07	(43.80)	***
R-squared	0.07			0.09			0.16		
Observations									
Teachers	697			697			697		
Schools	531			531			531		

***p<0.001, **p<0.01, *p<0.05,+p<0.10

Note: Standard errors in brackets. The mean VIF value for the model is 1.8 and indicates the absence of collinearity (lower than 5) among the variables.

Table 16: Peru 2004. Determinants of reading comprehension achievement of sixth grade teachers.

	Model 1			Model 2			Model 3	
<i>Teacher variables</i>								
Age (years)	-1.14	(0.62)	+	-1.18	(0.61)	+	-1.02	(0.62)
Female	17.86	(6.27)	*	17.53	(6.25)	*	8.99	(6.37)
Years of experience	0.85	(0.66)		0.79	(0.65)		0.18	(0.66)
Regular teacher training	37.18	(6.36)	***	34.25	(6.43)	***	23.70	(6.71) ***
Studied at Pedagogical Institute	-12.28	(6.93)	+	-11.02	(6.89)		-5.74	(6.73)
Teacher's commitment with the student				-0.12	(0.04)	***	-0.10	(0.04) ***
Teacher's perception on classroom organization				0.06	(0.04)		0.05	(0.04)
Teacher pedagogical practices				0.04	(0.04)		0.03	(0.04)
Relationship with his/her colleagues				-0.05	(0.03)		-0.05	(0.03)
Teacher's satisfaction				0.05	(0.03)		0.05	(0.03)
<i>School variables</i>								
Public							11.56	(11.33)
Full teacher							16.55	(8.33) +
Urban							2.87	(8.85)
Number of students enrolled							-0.01	(0.01)
Infrastructure index							-0.02	(0.04)
Socioeconomic status (aggregated)							0.81	(0.43) +
Bilingual school							-14.76	(11.33)
Constant	308.41	(21.27)	***	323.28	(24.68)	***	236.90	(36.43) ***
R-squared	0.09			0.11			0.16	
Observations								
Teachers	705			705			705	
Schools	536			536			536	

***p<0.001, **p<0.01, *p<0.05,+p<0.10

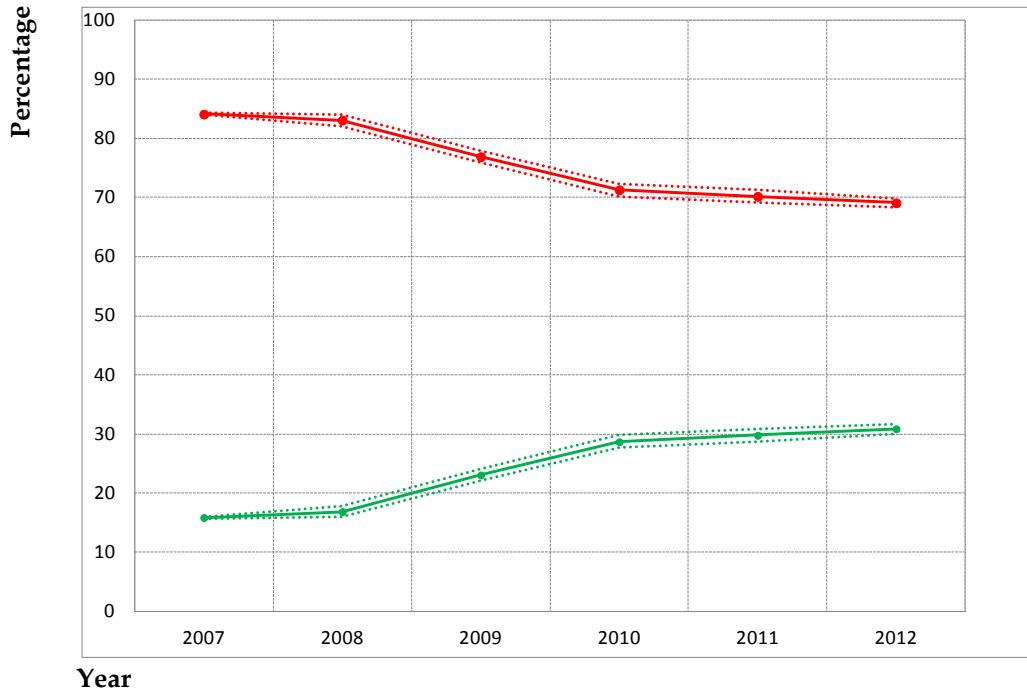
Note: Standard errors in brackets. The mean VIF value for the model is 1.8 and indicates the absence of collinearity (lower than 5) among the variables.

Table 17: Peru 2008-11. Variance explained at school level using a random effects model

Year	Mathematics			Reading		
	Null	SES (School)	Diff (Δ)	Null	SES (School)	Diff (Δ)
2008	41.9	38.5	3.4	50.2	39.6	10.6
2009	41.9	35.7	6.2	45.1	36.3	8.8
2010	41.6	36.2	5.3	49.6	37.6	11.9
2011	39.8	33.4	6.4	47.6	36.4	11.2

Note; Computed by the authors.

Graph 1: Percentage of Grade 2 students with/less than satisfactory performance in Reading Comprehension. Peru 2007-2012



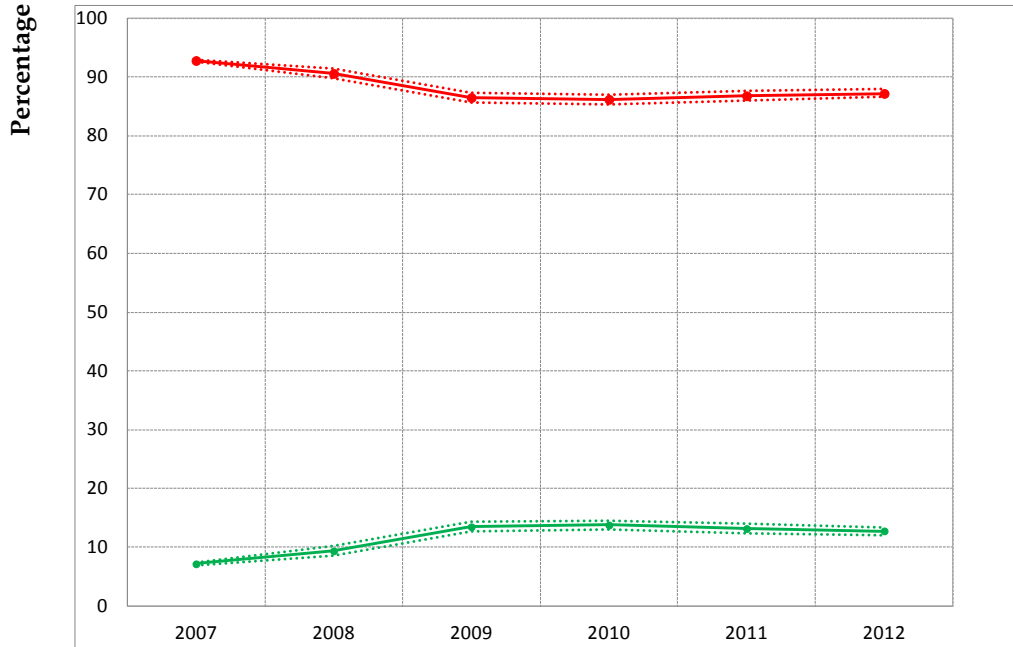
Year

Green line = satisfactory; Red line = less than satisfactory.

Dotted lines show the confidence interval limits.

Note: Confidence intervals at $\alpha = .05$.

Graph 2: Percentage of Grade 2 students with/less than satisfactory performance in Mathematics. Peru 2007-2012



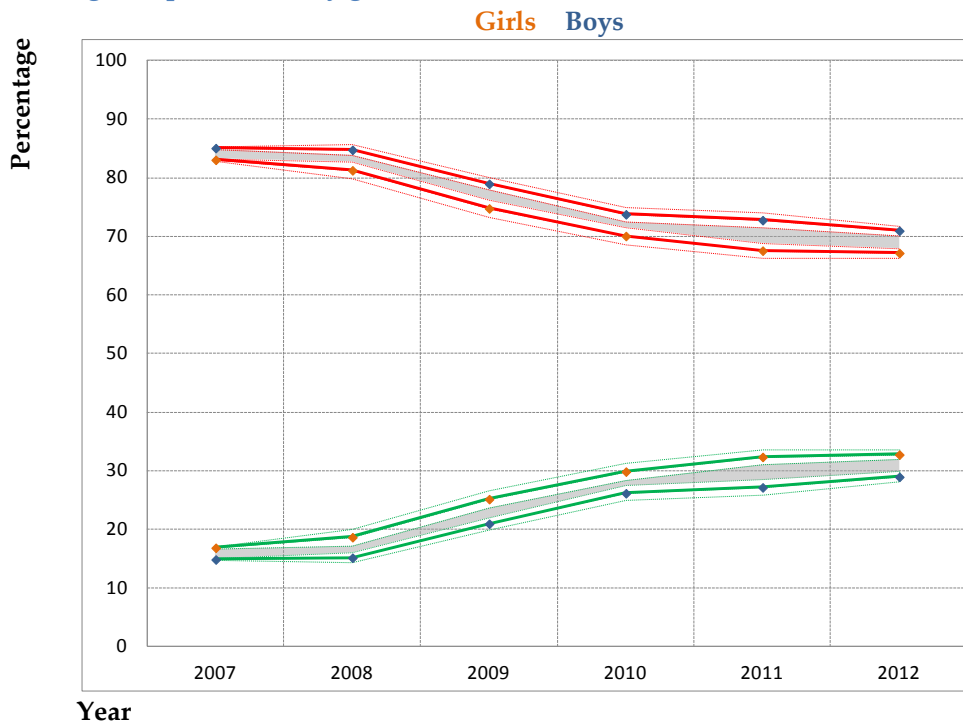
Year

Green line = satisfactory; Red line = less than satisfactory.

Dotted lines show the confidence interval limits.

Note: Confidence intervals at $\alpha = .05$.

Graph 3: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Reading Comprehension by gender. Peru 2007-2012

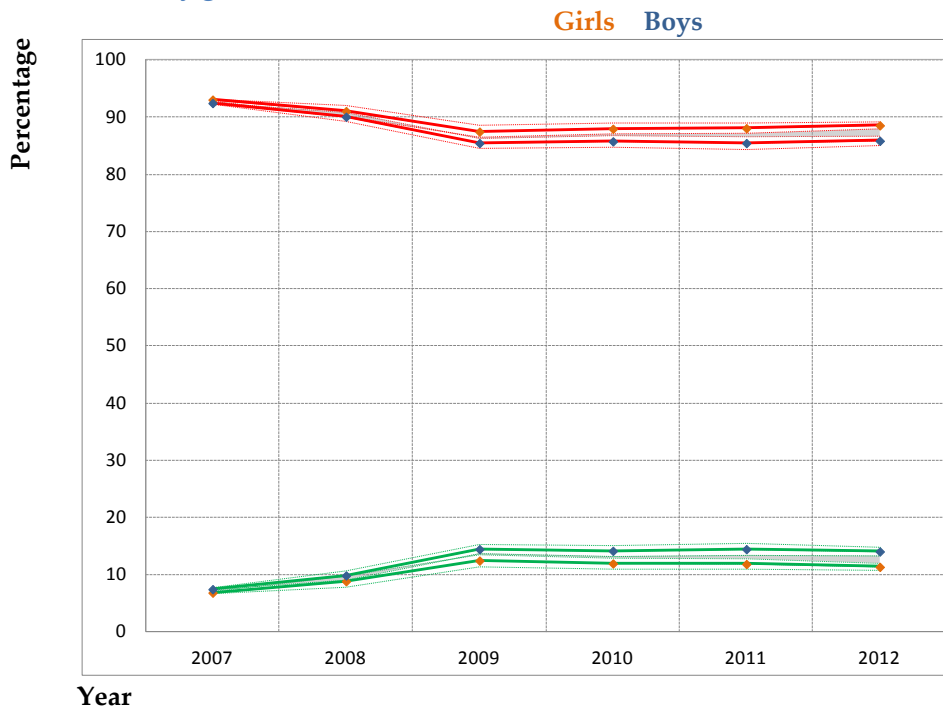


Green line = satisfactory; Red line = less than satisfactory.

Dotted lines show the confidence interval limits.

Note: Confidence intervals at $\alpha = .05$. The shaded area represents the distance between the closest limits (smallest confident gap).

Graph 4: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Mathematics by gender. Peru 2007-2012

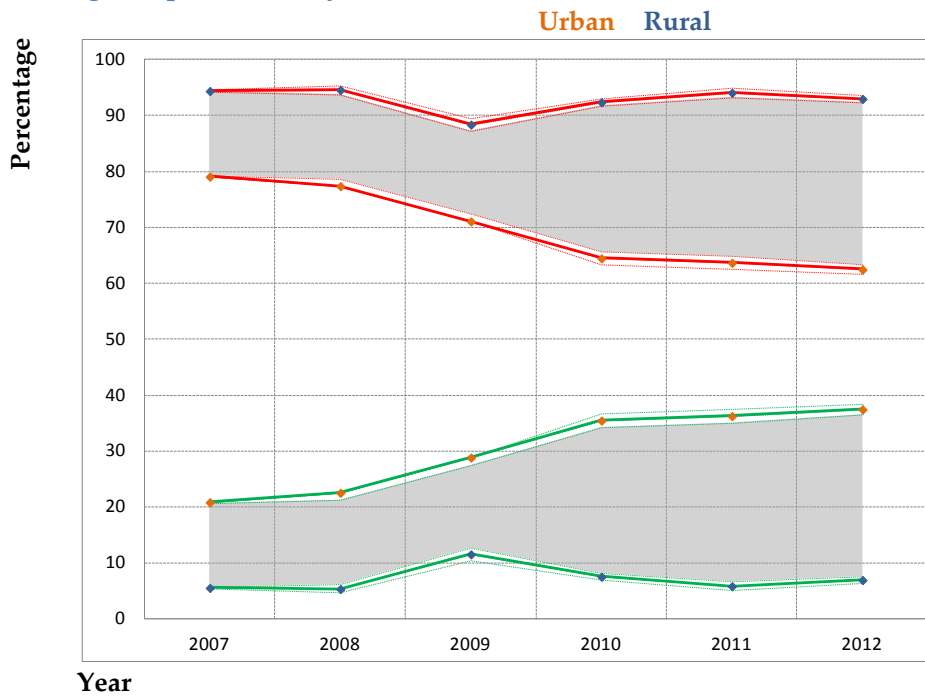


Green line = satisfactory; Red line = less than satisfactory.

Dotted lines show the confidence interval limits.

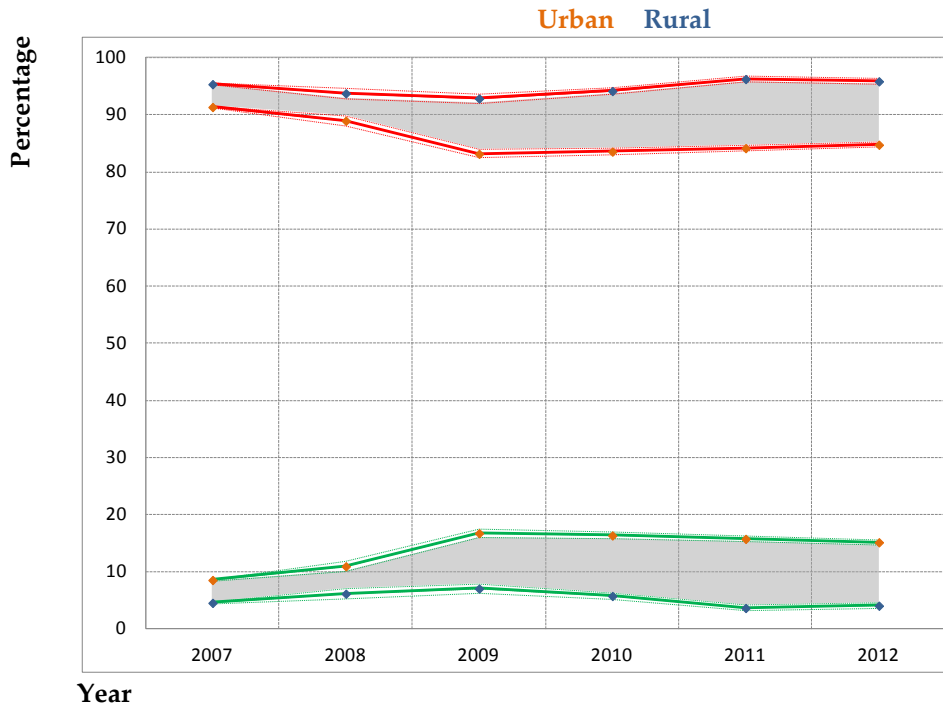
Note: Confidence intervals at $.05$. The shaded area represents the distance between the closest limits (smallest confident gap).

Graph 5: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Reading Comprehension by residence (Urban/Rural). Peru 2007-2012



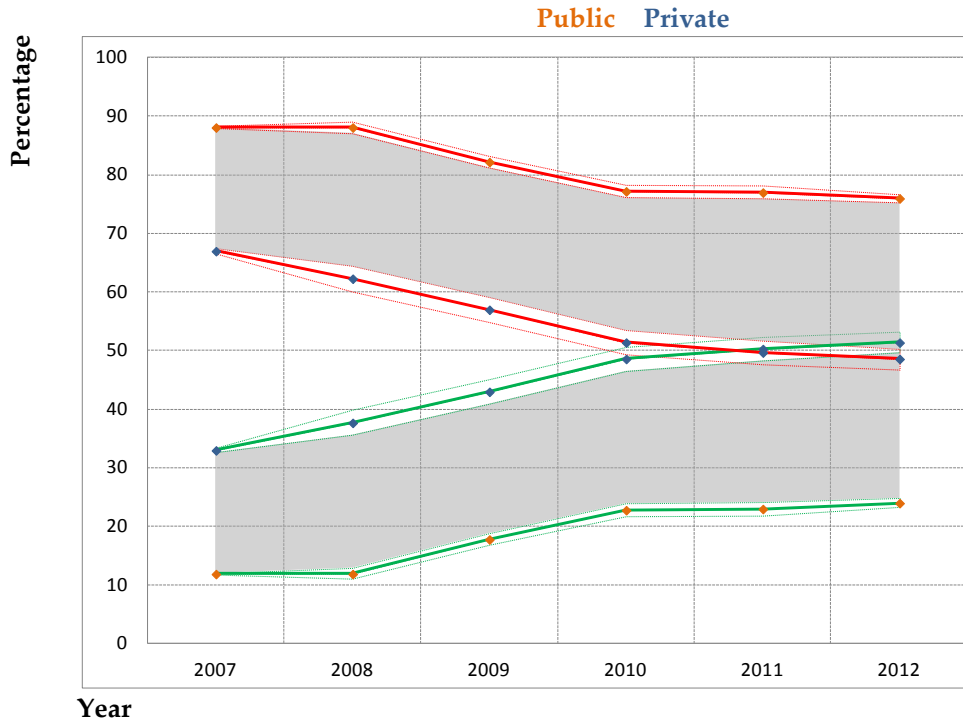
Note: Confidence intervals at .05. The shaded area represents the distance between the closest limits (smallest confident gap). The 2009 results were affected by problems in the classification of schools as located in rural or urban areas.

Graph 6: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Mathematics by residence (Urban/Rural). Peru 2007-2012



Note: Confidence intervals at .05. The shaded area represents the distance between the closest limits (smallest confident gap).

Graph 7: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Reading Comprehension by school management (Public/Private). Peru 2007-2012



Green line = satisfactory; Red line = less than satisfactory.

Dotted lines show the confidence interval limits.

Note: Confidence intervals at .05. The shaded area represents the distance between the closest limits (smallest confident gap).

Graph 8: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Mathematics by school management (Public/Private). Peru 2007-2012

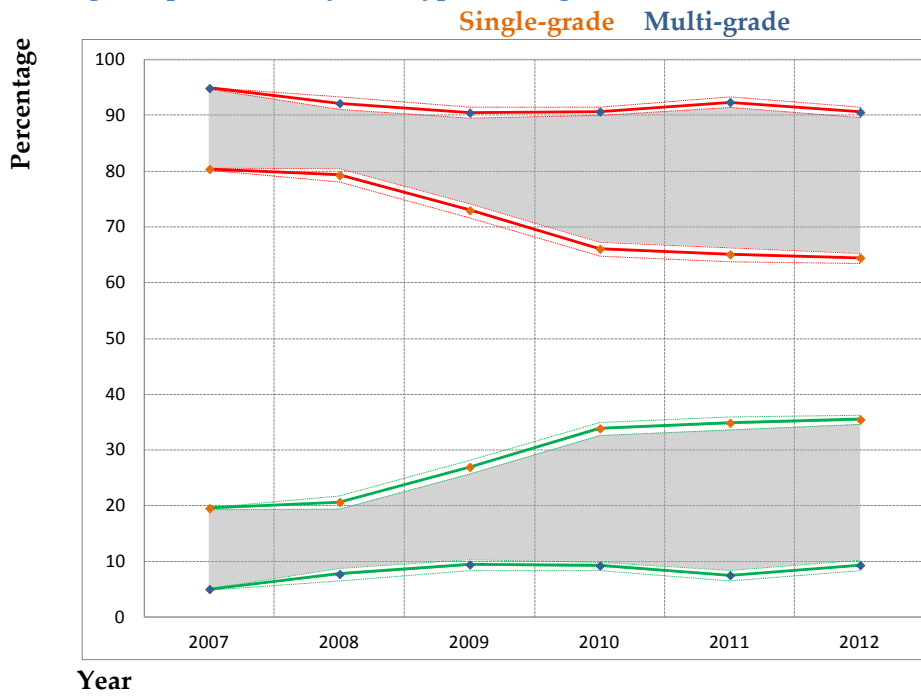


Green line = satisfactory; Red line = less than satisfactory.

Dotted lines show the confidence interval limits.

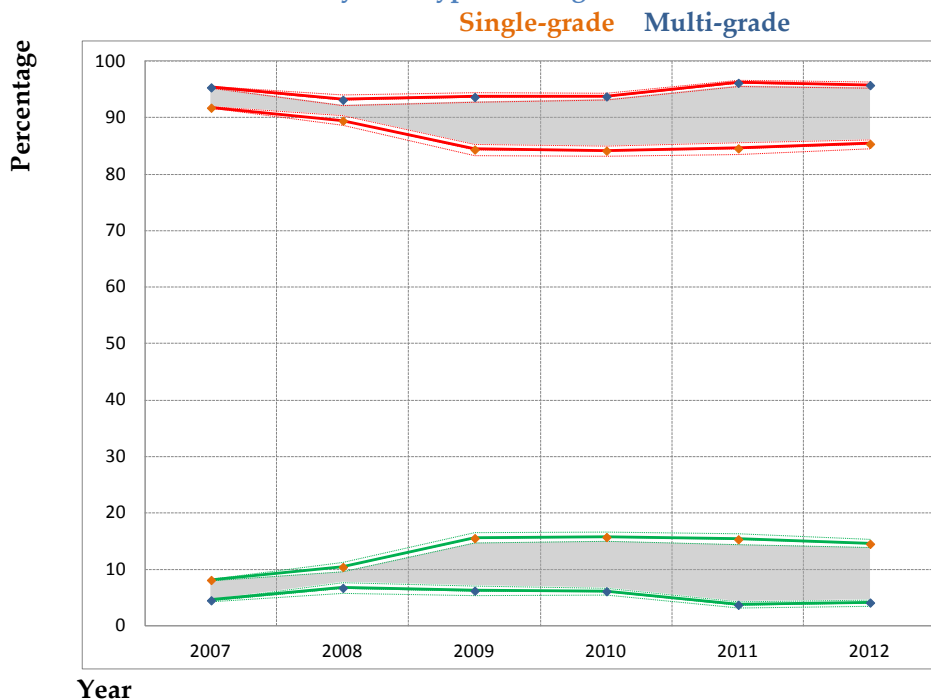
Note: Confidence intervals at .05. The shaded area represents the distance between the closest limits (smallest confident gap).

Graph 9: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Reading Comprehension by class type (multi-grade or not). Peru 2007-2012



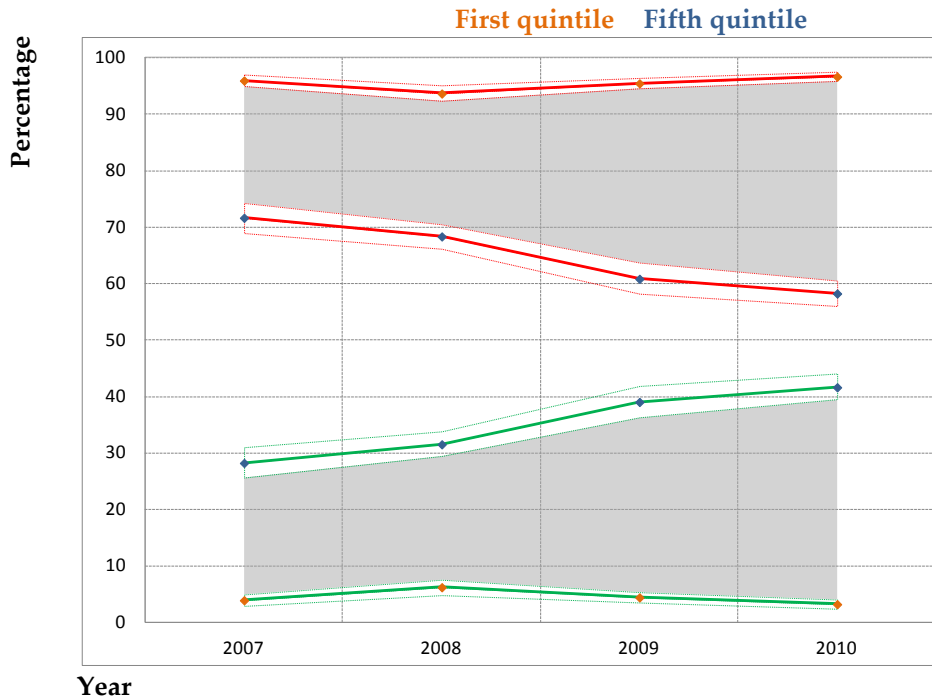
Note: Confidence intervals at .05. The shaded area represents the distance between the the closest limits (smallest confident gap).

Graph 10: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Mathematics by class type (multi-grade or not). Peru 2007-2012



Note: Confidence intervals at .05. The shaded area represents the distance between the the closest limits (smallest confident gap).

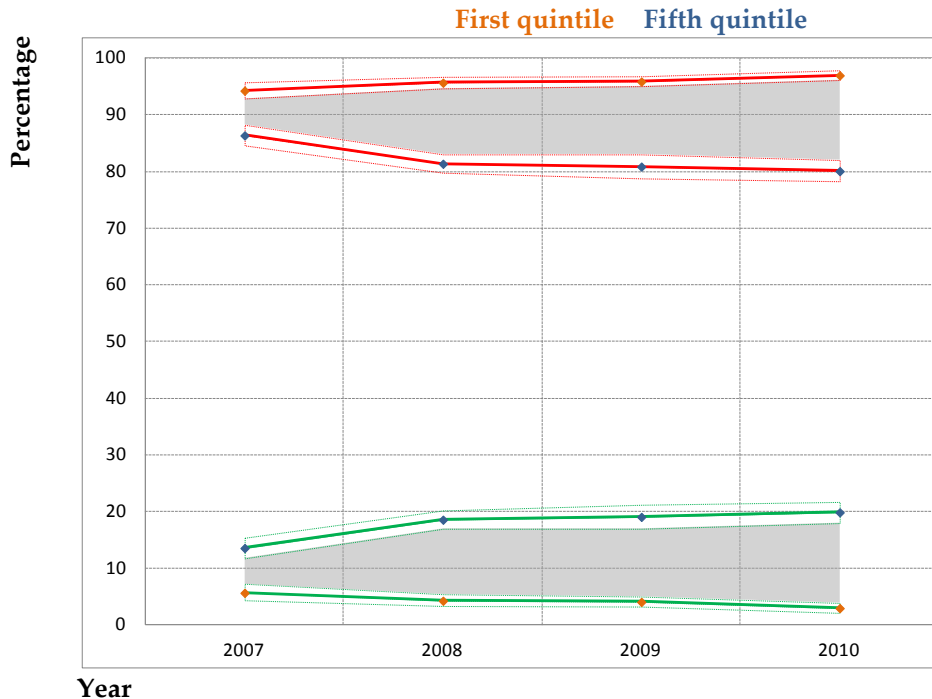
Graph 11: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Reading Comprehension by socio-economic status (first and fifth quintiles). Peru 2008-2011



Green line = satisfactory; Red line = less than satisfactory.
Dotted lines show the confidence interval limits.

Note: Confidence intervals at .05. The shaded area represents the distance between the the closest limits (smallest confident gap).

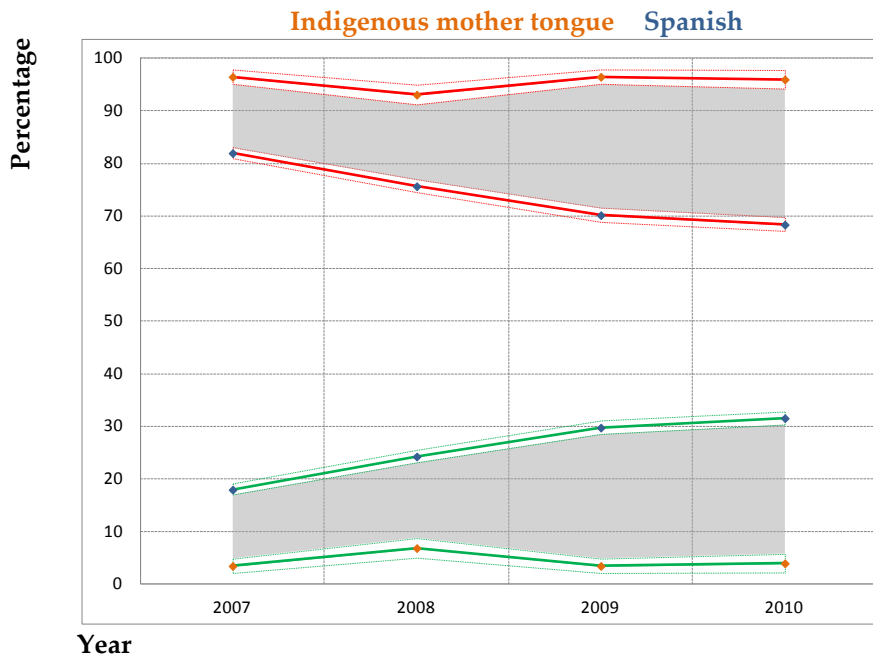
Graph 12: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Mathematics by socio-economic status (first and fifth quintiles). Peru 2008-2011



Green line = satisfactory; Red line = less than satisfactory.
Dotted lines show the confidence interval limits.

Note: Confidence intervals at .05. The shaded area represents the distance between the the closest limits (smallest confident gap).

Graph 13: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Reading Comprehension by mother tongue (indigenous or Spanish). Peru 2008-2011



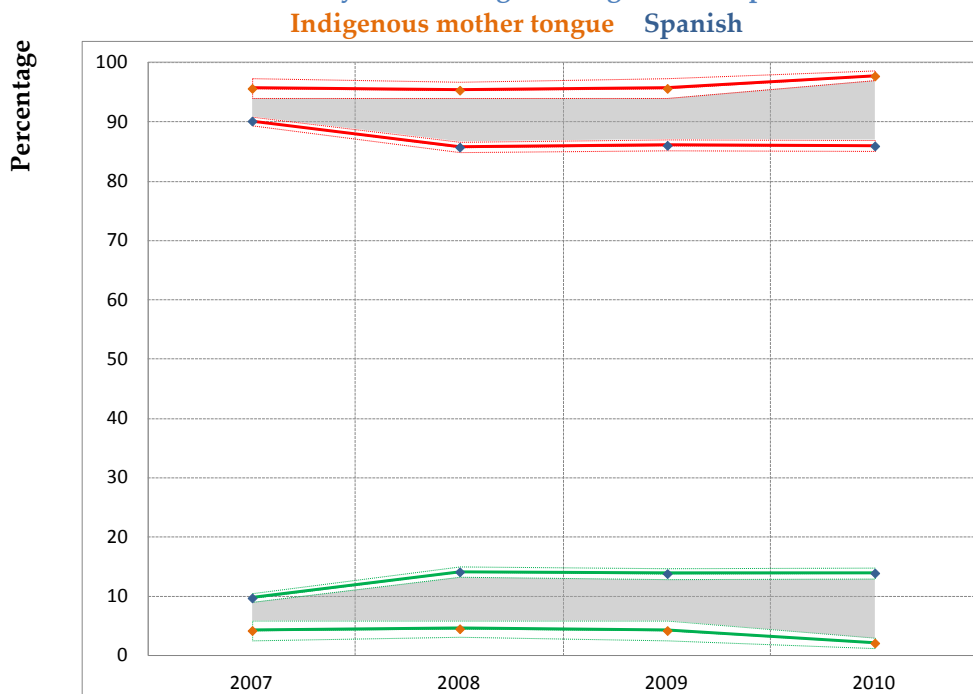
Year

Green line = satisfactory; Red line = less than satisfactory.

Dotted lines show the confidence interval limits.

Note: Confidence intervals at .05. The shaded area represents the distance between the closest limits (smallest confident gap).

Graph 14: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Mathematics by mother tongue (indigenous or Spanish). Peru 2008-2011



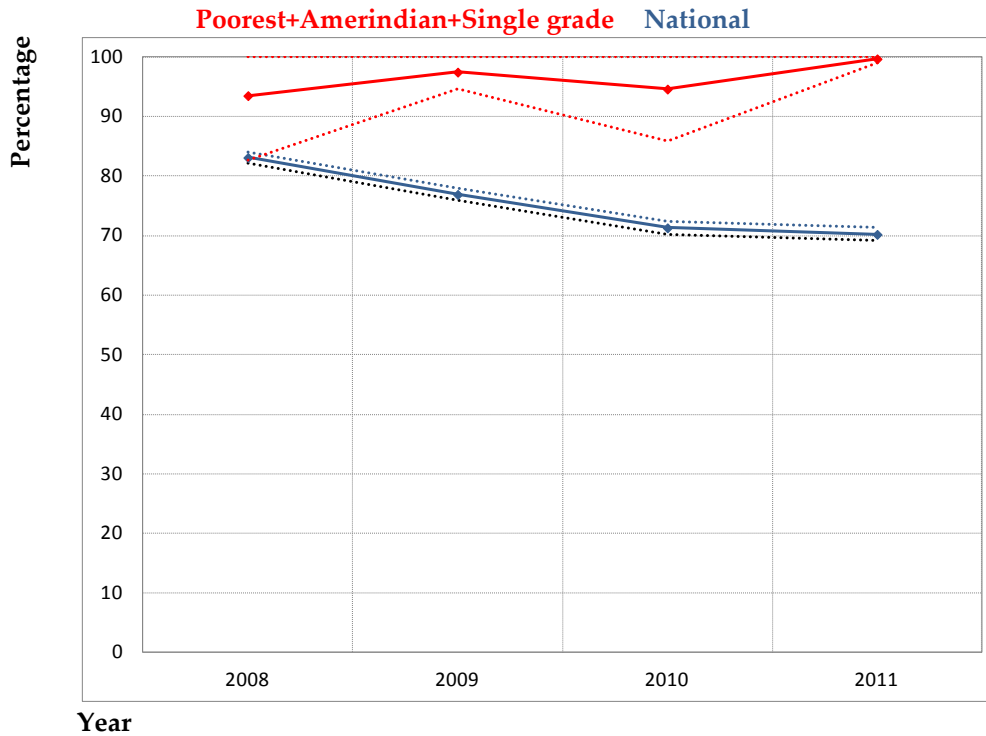
Year

Green line = satisfactory; Red line = less than satisfactory.

Dotted lines show the confidence interval limits.

Note: Confidence intervals at .05. The shaded area represents the distance between the closest limits (smallest confident gap).

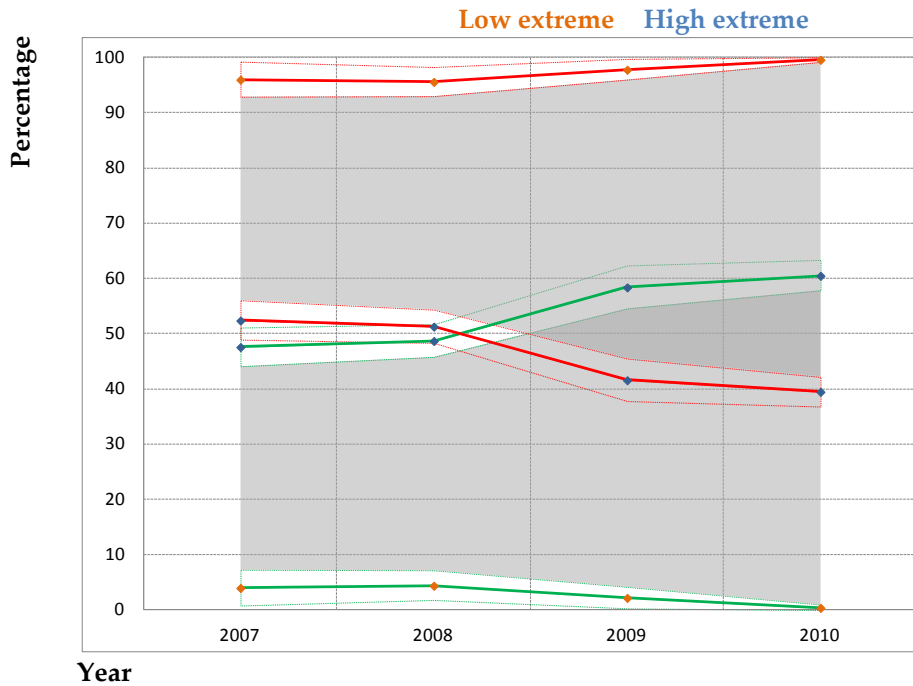
Graph 15: Percentage of Grade 2 students with less than satisfactory performance in Reading Comprehension. National and students in the poorest SES quintile with Amerindian mother tongue and attending single grade classes. Peru 2008-2011



Dotted lines show the confidence interval limits.

Note: Confidence intervals at .05.

Graph 16: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Reading Comprehension. Extreme groupings. Peru 2008-2011

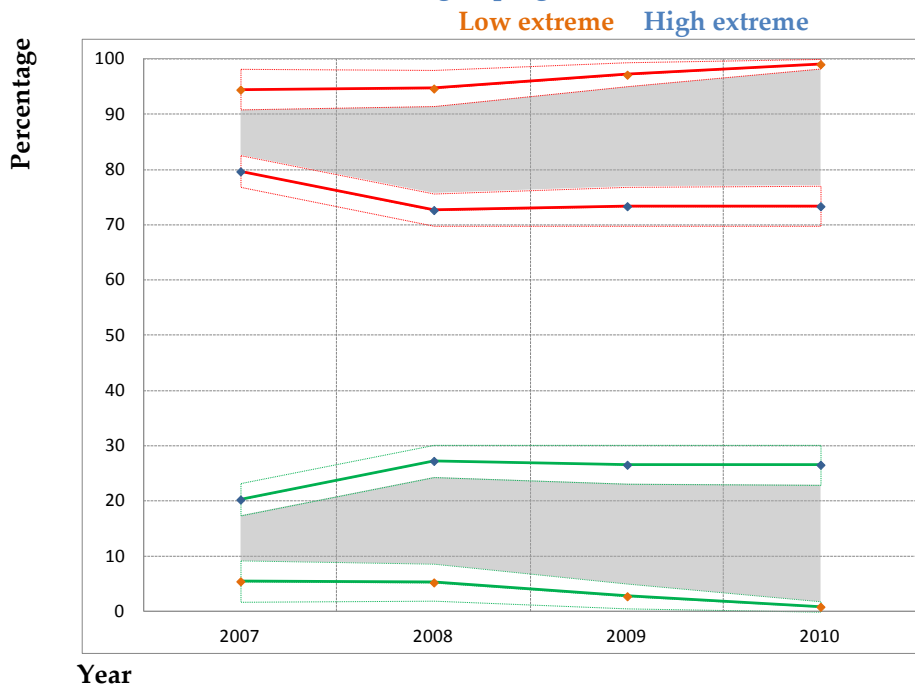


Green line = satisfactory; Red line = less than satisfactory.
Dotted lines show the confidence interval limits.

Note: Confidence intervals at .05. The shaded area represents the distance between the closest limits (smallest confident gap). Low extreme group = living in rural areas, having an indigenous mother tongue, and

attending a Public school in a multi-grade class; High extreme group = living in urban areas, having Spanish as their mother tongue, and attending a Private school in a single-grade class.

Graph 17: Percentage of Grade 2 students with satisfactory and less than satisfactory performance in Mathematics. Extreme groupings. Peru 2008-2011



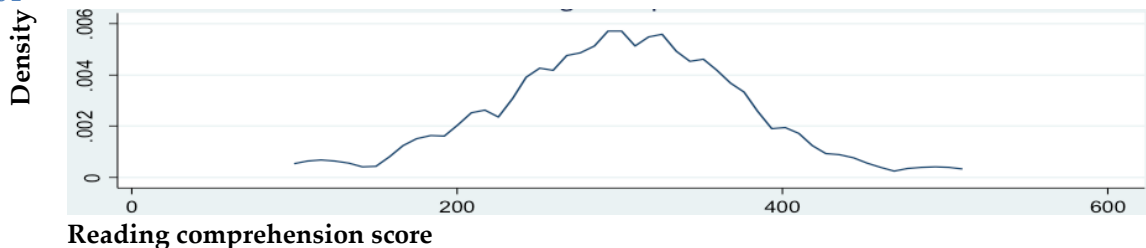
Year

Green line = satisfactory; Red line = less than satisfactory.

Dotted lines show the confidence interval limits.

Note: Confidence intervals at .05. The shaded area represents the distance between the closest limits (smallest confident gap). Low extreme group = living in rural areas, having an indigenous mother tongue, and attending a Public school in a multi-grade class; High extreme group = living in urban areas, having Spanish as their mother tongue, and attending a Private school in a single-grade class.

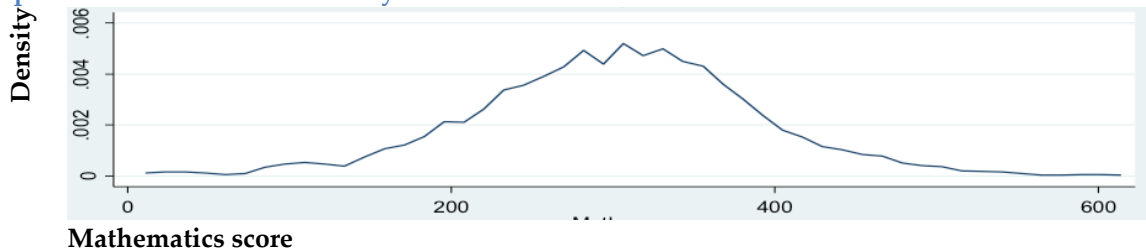
Graph 18: Distribution of scores by teachers in the reading comprehension validation test. Peru 2004



Reading comprehension score

Note: kernel=epanechnikov; bandwidth = 18.4843.

Graph 19: Distribution of scores by teachers in the mathematics validation test. Peru 2004



Mathematics score

Note: kernel=epanechnikov; bandwidth = 17.8783

Graph 20: Sample item, reading comprehension validation test. Peru 2004

<p>Frecuentemente se les dice a muchos estudiantes que la música roba atención al estudio y que, por consiguiente, es perjudicial para el mismo. ¿Qué hay de cierto en esto?</p> <p>Evidentemente, la música vocal actúa como distractor externo al concentrar sobre ella la atención del estudiante, que sigue la letra o se fija en ella hasta terminar aprendiéndola. En la música instrumental puede actuar este factor, si el tema es pegajoso, o inhibirse si es monótono.</p> <p>La música es un tipo de energía que, por medio de sus ritmos, influye en los órganos de los seres vivos y condiciona un tipo de respuesta. Desde hace mucho tiempo se conocen y utilizan los efectos de la música sobre el ánimo humano, pues mente y cuerpo no son independientes, sino que se interrelacionan e influyen mutuamente. Así, el ritmo de las marchas militares se utiliza para encender el ánimo guerrero y la canción de cuna para relajar y dormir al pequeño.</p> <p>Pero, si sabemos que la mente solo se concentra en una actividad, ¿acaso no es un contrasentido escuchar música y estudiar al mismo tiempo? Si el ambiente ideal para estudiar es el de la concentración y esto se ve favorecida por la relajación, todas aquellas técnicas que aminoren los ritmos mente-cuerpo y conduzcan a esa situación de concentración y relajación estarían proporcionando el ambiente ideal de estudio.</p> <p>Existe un tipo de música lenta que contribuye a crear en el alumno un clima de concentración relajada, estado psicofísico en el que debe situarse el estudiante para lograr el óptimo rendimiento intelectual. Pero el volumen de audición ha de ser bajo, inferior incluso al de la música ambiental, ya que, de otro modo, se correía el riesgo de que la música se constituyese en el principal foco de atención, y entonces sí disminuiría la concentración del estudiante que terminaría atendiendo a ella y no al estudio.</p> <p>No se trata pues de escuchar música y estudiar al mismo tiempo; la mente no se concentra en los temas musicales, el objetivo de esta música de fondo no es atraer la atención sobre ella, sino influir sobre la mente y el cuerpo del estudiante aminorando sus ritmos y colocándole física y mentalmente en la situación ideal para estudiar.</p>	<p>En base al texto anterior, responda las siguientes preguntas:</p> <p>4. Según el texto, ¿en qué caso la música puede ser perjudicial para el estudio? Utilice sus propias palabras.</p> <p>_____</p> <p>_____</p> <p>5. Según el texto, ¿en qué caso la música puede ser beneficiosa para el estudio? Utilice sus propias palabras.</p> <p>_____</p> <p>_____</p> <p>6. Explique con sus propias palabras la idea principal del texto anterior.</p> <p>_____</p> <p>_____</p> <p>7. ¿Cuál cree que es un título apropiado para este texto?</p> <p>_____</p>
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Translation by the authors:

<p>Students are usually told that listening to music prevents them from concentrating in their study, so it is detrimental to his/her concentrating. Is this true?</p> <p>It is evident that vocal music acts as an external distractor since it attracts student's attention, so he/she follows the lyrics or focus on them until learning them. Instrumental music can work in the same way if the rhythm is attractive, or not if it is monotonous.</p> <p>Music is a sort of energy that, throughout its rhythm, impacts on living organisms and triggers a response. The effects of music on human mood is well known since a long time ago, since mind and body are not independent from each other, but they interact and influence one another. Thus, the rhythm of a military march is mobilised to inflame a martial spirit while a lullaby to calm and induce a baby to sleep.</p> <p>If we know that our mind focuses on one thing at a time, would it be reasonable to study and to listen to music at the same time? If the best conditions to study are those where the individual is relaxed and focused, any technique aimed at slowing down the body-mind rhythm, leading towards relaxation and concentration would be favouring and ideal study environment.</p> <p>There is a type of rhythm (slow) that contributes to relaxation and concentration in the student., conditions that are required for an optimal intellectual performance. At the same time, the intensity (volume) should be limited even below the usual levels for ambiance music, since otherwise, there will be a risk of the music to become the focus of the student attention which, in turn, would affect concentration making the student pay more attention to it than to his/her study duties.</p> <p>Thus, it is not a matter of studying and listening to music at the same time; it is not desirable that the students mind focuses on the music. The purpose is not to have music that attract student's attention but to impact on the student's mind and body as to slow down his/her rhythm and put him/her in an ideal mental and physical condition to study.</p>	<p>Given the text provided in the column at the left, please, answer the following questions:</p> <p>4. According to the text, under which circumstances music can be detrimental to studying. Please, use your own words.</p> <p>5. According to the text, under which circumstances music can be beneficial to studying. Please, use your own words.</p> <p>6. Explain, using your own words, the main idea presented in the text.</p> <p>7. Which do you think is an adequate title for this text?</p>
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Source: Retrieved on 1 May 2013 from the actual test forms which are available at the Ministry of Education website (<http://umc.minedu.gob.pe/?p=211>)

Graph 21: Sample item, mathematics validation test. Peru 2004

7) Las tarifas postales en una ciudad se han establecido en función del peso de los paquetes (aproximando al gramo más cercano) tal como se muestra en el cuadro.

Peso (g)	Tarifa (nuevos soles)
Hasta 20	0,40
21 – 50	0,70
51 – 100	1,00
101 – 200	1,75
201 – 350	2,30
351 – 500	2,45
501 – 1 000	3,20
1 001 – 2 000	4,30
2 001 – 3 000	5,00

- a) ¿Cuánto costaría enviar un paquete de 10,5 g? _____
- b) ¿Cuánto costaría enviar un paquete de 350,3 g? _____
- c) Juan quiere enviar a un amigo dos artículos que pesan 40 gramos y 80 gramos, respectivamente. En base a las tarifas postales mostradas, decida si resultará más barato enviar los dos artículos en un solo paquete, o enviar los artículos en dos paquetes. Señale los cálculos de los costos en cada caso.

Translation by the authors:

7) Postal rates in a city were fixed according to the weight of each parcel (approximated to the closest gram) as shown in the following table:

Weight (g)	Rate (Peruvian Nuevo Sol)
Up to 20	0.40
21 to 50	0.70
51 to 100	1.00
101 to 200	1.75
201 to 350	2.30
351 to 500	2.45
501 to 1000	3.20
1000 to 2000	4.30
2000 to 3000	5.00

a) How much you would spend in sending a 10.5 g parcel?

b) How much you would spend in sending a 350.e g parcel?

c) Juan would like to send a friend two items that weight 40 and 80 grams respectively. Given the rates shown, you have to decide whether it would be cheaper to send both items in a single parcel, or send two parcels. Show the computation of costs in each case.

Source: Retrieved on 1 May 2013 form the actual test forms which are available at the Ministry of Education website (<http://umc.minedu.gob.pe/?p=211>)

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