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Appraisal of a Learning Coaching Strategy in Rural Areas of Peru in a Results-based Budgeting Rationality

Balance de la Estrategia de Acompañamiento Pedagógico en Áreas Rurales de Perú en la Lógica del Presupuesto de Resultados

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This research analyzes a learning coaching strategy called Acompañamiento Pedagógico promoted by the ministry of Education of Peru since 2008 focusing in rural multi-grade (Spanish and bilingual) schools aiming to improve learning outcomes. It focuses on the learning achievements of its students and also seeks providing advice for improving functioning of the current strategy. The first goal was to determine if there is a significant difference in learning achievements in Spanish reading and comprehension and mathematics between coached and non-coached schools and were performed mixed-designed ANOVAs tests. The finding of statistically significant interactions between receiving coaching for 3-years disclosures an effective strategy in order to increase the goal of any educational system, the learning of students. The second goal of the research was analyzing if the present learning coaching strategy meets the standards set by the national results-based budgeting approach. For that purpose, a documentary review of policy design, focalization and expenditure were performed, finding a design inconsistency, some coverage problems and absence of clear standards and organization parameters.

Keywords: Learning coaching, Result-based performance, Mentoring, Rural education.

La presente investigación analiza la estrategia nacional llamada "Acompañamiento pedagógico" promovida por el Ministerio de Educación del Perú desde el año 2008, centrada en escuelas multi-grado rurales con lengua castellana y bilingues. La investigación se centra en los logros de aprendizaje de sus estudiantes así como evaluar y recomendar mejoras en su implementación. El primer objetivo fue determiner si existe diferencia significativa entre escuelas que han recibido acompañamiento pedagógico y aquellas que no han recibido en las pruebas nacionales tomadas a alumnus de segundo grado de primaria en comprensión lectora y matemáticas. Para ello se realizaron diversos tests de análisis de varianzas mixtas. Los hallazgos demuestran que han habido interacciones estadísticamente significativas entre recibir acompañamiento pedagógico por 3 años, lo cual indica que la estrategia es efectiva a fin de mejorar los aprendizajes de los estudiantes. La segunda meta de la investigación fue analizar la estrategia de acuerdo a la lógica subyacente en la política nacional de presupuesto por resultados en la que se enmarca la estrategia. Se realizó una revision y análisis documental, centrándose en el diseño lógico, focalización, organización y gasto público. Se encontraron inconsistencias en el diseño, problema de cobertura y la ausencia de estándares claros de organización.

Descriptores: Coaching, Rendimiento basado en resultados, Asesoría, Educación rural.

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1. Background

Since 2007, the ministry of Education has performed a National Students Evaluation for assessing learning outcomes in Spanish, Mathematics (2nd grade) and Spanish as a second language for students of bilingual schools (4th grade). Results show, for example, that from 2009 to 2013, the national Spanish reading and comprehension mean of students in a proficient level went from 23.1% to 33.0%, growing 9.9%. That improvement could be considered significant but insufficient due to the fact that, still, only approximately one third of children can satisfactorily read and comprehend texts. At the same time there are substantial differences between private and public schools, and between urban and rural schools.

The lower proficiency scores are principally in rural areas. For example, in 2009, only 11.6% of students reached a proficient level, regressing to 10.4% (with a sampling error of 0.4%) by 2013. In the case of multi-grade and single-teacher schools, there has been a slight improvement by 5.5% such that by 2013 14.0% of students were at an acceptable level.

To tackle the low quality of public rural education, the ministry of education of Peru launched a learning coaching strategy called *Acompañamiento Pedagógico* in 2008 as a pilot scheme. The goal was improving the learning outcomes of students in rural public schools in reading and mathematics with a focus in enhancing the teachers´ practice. The program operates at the preschool level and primary level in Spanish and bilingual schools (A school is defined as bilingual when more than 50% of their students speak any of the 47 native official languages of the country).

An important feature of the strategy is the decentralized arrangement where each administrative division of the country, called "regions" obtains its budget and implements all actions. The strategy implementation (see table 1) involved an increase in number of coaches and attended teachers and schools, extending to all regions of the country in 2010.

Table 1. Historical summary of the strategy

Year	2008	2009	2010
Region	13**	18	26
Coach	n.d.	n.d.	1,826
Coach supervis.	0	0	0
Coached teachers	n.d.	n.d.	19,872
Schools	n.d.	n.d.	13,.110
Students in schools	n.d.	n.d.	n.d.
Expend*	5,602,207.10	11,284,177.18	60,398,775.88
Year	2011	2012	2013
Region	26	26	25***
Coach	2,212	2,370	1,640
Coach supervis.	0	0	183
Coached teachers	19,569	20,510	14,576
Schools	14,296	14.132	7,001
Students in schools	417,113	446,244	235,731
Expenditure	99,133,860.42	104,381,914.72	94,101,514.00

Source: Author´s based on different monitoring reports from Ministry of Education (2008-2013)
Note: * in nuevos soles; ** of 26 possible; *** The capital of the country (Lima) was excluded by the policy makers because it is urban .

This learning coaching strategy is considered a school-based training service that aims to transform and improve teaching performance to achieve better students´ learning outcomes. The strategy involves the allocation of a coach to a group of teachers, which work in single-teacher and multi-grade teaching schools in rural areas. In the same manner, since 2013, a coach supervisor is assigned to a group of coaches. There are three different types of activities during every year: visits to classrooms, meetings between coached teachers, and workshops.

1.1. A program in a performance-based budgeting setting

There was a major budgetary reform policy in 2007 in Peru where a results-based budgeting system was established (Ley 28927, 2006; Ley 2841, 2004). In order to accomplish its goals, this system was comprised of four components: 1) budgetary programs, 2) follow-up actions based on performance indicators, 3) evaluations and 4) incentives. This reform was promoted by the Inter-American Development Bank and initially began prioritizing programs related to childhood in the education and health sectors. In 2015, the reform reaches 58% of the national budget.

The ministry of Education designed in that same year a budgetary program which was called *Programa Estratégico Logros de Aprendizaje en el III Ciclo de Educación Básica Regular* (Strategic Program Learning Achievements in Cycle III of Elementary School), which included the afore-mentioned learning coaching strategy. Later in 2013 the program was extended to all grades of basic education and was renamed *Programa Presupuestal Logros de Aprendizaje de Estudiantes de Educación Básica Regular* (Budgetary Program for Learning Achievements for Students in Basic Education). This new program uses an updated learning coaching strategy.

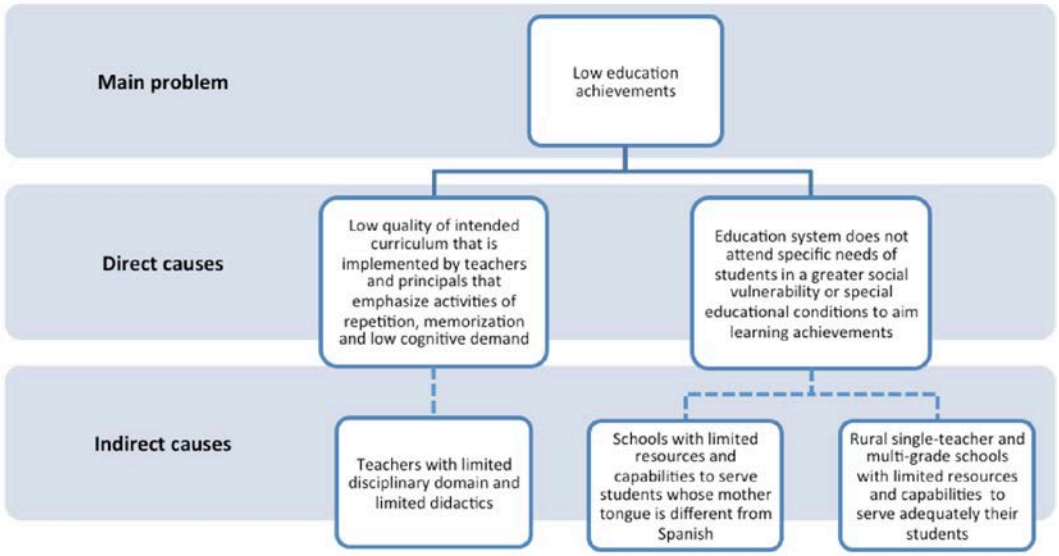

Figure 1. Problem tree analysis of "Learning achievements of students of basic education budgetary program
Source: Ministerio de Educación (2013a).

All the budgetary programs were designed according to common guidelines established by the Ministry of Economy and Finances of Peru (2014). According to these guidelines, the first step for a program design is making a diagnosis of the central problem of a

determined field, based on strong evidence, and then developing a 'problem tree analysis', the second step is an analysis of possible activities in order to address the identified causes in the prior tree analysis, and the third step is building a logical framework table with three levels (activities, outputs, and outcomes) to be reproduced in the annual national budget.

The low student reading and mathematics achievements were detected as the central problem by the budgetary program. The problem tree analysis identified two immediate and three secondary causes that were directly related to rural public schools which are shown in figure 1.

1.2. Research objectives and questions

The research focuses on a wider understanding of learning coaching strategy and the contribution it makes to the learning achievements of primary education students within the context of the Peruvian education system and also providing advice for policy reform and for improving implementation of the current coaching strategy.

The first goal is to determine if there is a significant difference in learning achievements in Spanish reading and comprehension (for Spanish and bilingual schools) and mathematics between coached and non-coached schools.

The second goal of the research is to analyze if the present learning coaching strategy meets the standards set by the national results-based budgeting approach.

To meet these objectives, the current research addresses the following questions:

- Is there a significant difference in learning achievements in Spanish reading and comprehension and mathematics between coached and non-coached schools after 3-years of strategy?
- Does the learning coaching strategy design, focalization, and implementation follow the official results-based standards?

2. Literature Review

This concise review of the literature was conducted in order to provide an overview of the ideas and concepts relating to effectiveness of learning coaching strategies and their foundations, and performance-budgeting economic policies.

2.1. Schools inputs and outputs

The "Equality of Educational Opportunity" Report by James Coleman (1966) challenged educational world by observing that the impact of outside-school variables (as family and friends) were more significant to learning results than inside-school inputs (as teacher characteristics or school infrastructure). This early investigation`s findings triggered hundreds of studies (Gamoran, 2006) with very different approaches, and results, spurring controversy.

Contrary to Coleman´s research, there is important quantitative research and meta-analysis which reveals that endogenous school inputs and processes are very relevant for inferring student achievements (Hattie, 2009). Furthermore, importance of the teacher is highlighted due "variance in teacher effectiveness is the single largest factor affecting academic growth of populations of students" (Sanders, 2000, p. 334).

Although teachers´ quality is a very relevant driver to student´s learning (Rivkin et al., 2005) and, even its effect is cumulative over time (Sanders and Rivers, 1996), there is an absence of a clear and strong relationship between learning outcomes and teachers "fixed characteristics" as degrees, certification or additional years of experience past the initial years cannot be traced as significant predictors of learning outcomes (Hanushek, 2012). One of the reasons of this phenomena is that many characteristics of a successful teacher are not easily observable and measurable (Duarte et al., 2012).

A conventional educational production-function will not largely explain teachers´ effect on learning outcomes since it reduces importance of process within the classroom and school. This diminution of internal factors´ importance forgets, among others, teaching processes such as lesson planning and asking questions during lessons have been highlighted as un-measured variables with great impact in students' achievements (Aslam and Kingdon, 2007) and also keeping learning higher goals for students (Murillo, 2008).

For this research an outcome-based perspective will be adopted but the emphasis will be in a endogenous process in the school (teachers´ practice), with the understanding that a good teacher is someone who "consistently gets higher achievement from students (after controlling for other determinants of student achievement such as family influences or prior teachers)" (Hanushek and Rivkin, 2012, p. 132).

2.2. Coaching and its effectiveness

Learning coaching has been implemented in schools in many different ways with different underlying theory. For example, Cornett and Knight (2008) did an extensive research on coaching finding four approaches to learning coaching: peer coaching (modeling, practice, and feedback), cognitive coaching (set of strategies and thinking to reshape thinking and problem solving capabilities), literacy coaching (emphasizes the development of students' reading and writing abilities) and instructional coaching (collaborative work, empowerment to incorporate research-based instructional methods into classrooms). Moreover, Vezub and Alliaud (2012) refer to different models of coaching: support to personal relationships (therapeutic relationship); technical service; closure of an initial training process and professional licensing; mutual training and feedback.

On the other hand, Barber and Mourshed (2007) argue that the most important educational systems in the world place coaches in schools to support teachers and to enable teachers' peer-to-peer experiences. These peer-to-peer experiences are beneficial, even though they do not provide clear evidence-base valuations.

Regarding the process of evaluating the effectiveness of coaching strategies there are few studies presenting evidence. Biancarosa et al. (2010) establish significant gains in literacy results beginning at the first year of being coached and increasing results in subsequent years. Sparks and Bruder (1987) in a perception study found that 70% of teachers believed that being coached led to improvements in students' academics. Ross (1992) linked teacher efficacy to coaching concluding that student achievement are higher when teachers interacted more extensively with their coaches. In other instance, it is also possible to find studies as Cornett and Knight (2008) who indicate an absence in research showing that coaching improves teaching practices that increase student achievement.

Regarding the Peruvian strategy, in spite of the rich literature about this theme (Consejo Nacional de Educación, 2007a; Joyce and Showers, 1982; Knight, 2008; Puig and Froelich, 2006; Rhodes and Beneicke, 2006; Swafford, 1998; Veenman, 1995), it is not possible to find solid theoretical foundations of the learning coaching strategy in the official documents of the Ministry of Education. The only mention is the understanding of learning coaching as "a collaborative and critical support from a coach, which is understood as a systematic and ongoing assistance process in order to promote reflection of the teachers of their practice and explore the assumptions behind it" (Ministerio de Educación, 2014a, p. 7).

Associated with this, the implementation of this coaching strategy in Peru has not been studied extensively. Associated with this the implementation of the coaching Peruvian strategy has not been studied extensively Montero (2011) identifies the scarcity of trainers and coaches and the lack of institutionalization of coach function in the educational system as the main problems of the strategy. On other hand, the World Bank reports 7% and 24% positive impact on reading and mathematics respectively in an in-house unpublished impact evaluation of the program using a difference-indifference technique (World Bank, 2013).

2.3. Peruvian budgetary reform

The Peruvian budgetary reform was built following an international trend which since the 50´s has sought to increase efficiency and effectiveness of public budgeting. The underlying intention of this reform seems to be to shift the management culture of all public agencies to attain certain objectives: citizen-oriented policies, greater focus on delivering goods to solve population needs, and accountability of results (Ministerio de Economía y Finanzas, 2008; Osborne, 1993). The main purpose of the reform is to find the best allocation of funds to produce the outcome with the best possible results. The government perspective is that best budget allocation is possible following an evidence-based, logical prescriptive and conceptual action model. The theoretical basis of this approach is to understand causality and results in a chain framework (Robinson, 2011).

In terms of education, there is an extensive discussion on the topic of greater versus better money allocation. Hanushek supports the idea that "there is no strong or systematic relationship between school expenditures and student performance" (1989, p. 47; see also Hanushek, 1979; 1981; 1986). Analyzing basically the same set of studies, but using other techniques for integrating results, Hedges et al. (1994) concluded the opposite: there is a strong relationship between budgetary funding and educational results in students.

There is a consensus that a paradigm shift is focusing more on endogenous processes (inside the school) as very relevant tools for explaining understanding student achievements. Those processes do not necessarily mean budgetary increments but better allocation of the budget instead (Rivkin et al., 2005), although such argument seems evident or trivial, this current research sought to corroborate it.

3. Methodology

This research used mixed methods to address the various intended research questions. Data collection, framework for analysis, and limitations will be explained in the current chapter. The software package used in all statistical tests was SPSS v. 19.

3.1. Learning achievements

The main object of this research is to understand if the learning coaching strategy influences students´ learning achievements. Following Kudó and Bazan (2009), results will be analyzed at the school-level being it more reliable for the investigation. Between-school variation is relatively larger compared against within-school variation.

Five different databases were used, which are summarized:

- The school mean measurements data was retrieved from the National Students Assessment (ECE). The tests are performed by 2nd (reading and mathematics) and 4th grade students (Spanish as second language). The test is performed by all schools with five or more students in the tested grade;
- The learning coaching strategy data was retrieved from the official monitoring system (SIGMA);
- The official school database (ESCALE) was used to retrieve schools characteristics;
- The official national poverty map index from 2007;

There are two different types of dependent variables. The first set is the mean scores of each test by school. The second set is the percentage of proficient students in each school. Psychometric tests were built following a RASCH model with high confidence levels.

For Spanish reading and comprehension and for mathematics, the studied universe was all Spanish Public schools and was assessed as not being recorded at the National Bilingual school register (table 2).

Table 2. Universe of valid cases of Spanish-speakers

	NO	YES	TOTAL
Spanish schools	19006	386	19392

Source: Author´s based on UMC and SIGMA.

All districts in the country are divided in five groups according to their Human Development Index, being the quintile 1 the poorest. For testing differences, only schools in poverty quintiles 1, 2 and 3 were considered. The reason for excluding cases from poverty quintile 4 and 5 are theoretical (the strategy is focused in poverty areas) and methodological (coached schools make up a very small proportion of schools -less than .01).

In order to assess the difference between coached and non-coached schools learning outcomes, there were performed four mixed-designed ANOVAs tests for (1) Spanish reading and comprehension, and (2) mathematics. The tests always included post hoc tests to determine differences between groups. Sphericity was assumed because there was only one degree of freedom.

There were some difficulties during the research. Some databases were not easily accessible and cases were not coded in a standardized way. There was also neither information nor evidence to conduct deeper analysis associating the learning process (absenteeism, use of students' materials, use of time in class, etc.) to the strategy or to learning outcomes.

In case of the quantitative analysis, there were also some limitations. The dependent variables did not always have a normal distribution. Because the mixed-design ANOVA is robust to deviations from normality and also because schools were not sampled (because the data comes from all schools in a national exam), the tests were performed.

In some cases the homogeneity of variances of some 2013 dependent variables assessed by Levene's Test of Equality of Error Variances was rejected. The same violation occurred with the homogeneity of covariances tests. For these cases it was used the Hartley's F_{max} test in order to hold the assumption of homogeneity of variances.

Some cases (outliers) were removed because did not appear genuine data. It were cases of schools with very few students and results seems related to mistakes in the test process examination. Removing those outliers did not modify in any sense statistical results.

3.1.1. Spanish reading and comprehension mean scores

A mixed-designed ANOVA test had as dependent variables the (1) 2010 Spanish reading and comprehension mean scores per school; and (2) 2013 Spanish reading and comprehension mean scores per school. The between-subject factor was a dummy variable, which controls for whether or not the school had a 3-year coaching strategy (from 2011 to 2013). All cases with results under 200 were removed because did not appear to be genuine data.

Kolmogorov-Smirnov´s test (table 3) was performed indicating that all schools´ groups ($p. < .05$) were abnormally distributed except for coached schools in 2013 ($p. > .05$) which was normally distributed.

Table 3. Test of normality of Reading mean score

	COACHED FROM 2011 TO 2013	**KOLMOGOROV-SMIRNOV**		
		Statistic	df	Sig.
2010	No	.016	9573	.000
	Yes	.052	303	.043
2013	No	.016	9573	.000
	Yes	.038	303	.200*

Source: Author´s analysis based on UMC and SIGMA.

There was homogeneity of variances, as assessed by Hartley's F_{max} test ($p = 1.04$) and also there was homogeneity of covariances, as assessed by Box's test of equality of covariance ($p. = .037$).

3.1.2. Spanish reading and comprehension percentage of proficient students

A second test had as dependent variables the (1) 2010 percentage of proficient students in Spanish reading and comprehension; and (2) 2013 percentage of proficient students in Spanish reading and comprehension with the same between-subject factor used above. Outliers were treated in the same way as in the first test.

Kolmogorov-Smirnov´s test (table 4) was performed, finding that no groups showed normal distribution ($p. < .05$).

There was homogeneity of variances, as assessed by Hartley's F_{max} test ($p = 1.04$). There was heterogeneity of covariances as assessed by Box's test of equality of covariance ($p. <.001$). Therefore, it was not possible to interpret an interaction term.

Table 4. Test of normality of Reading percentage of proficient students

	COACHED FROM 2011 TO 2013	KOLMOGOROV-SMIRNOV		
		Statistic	df	Sig.
2010	No	.234	9573	.000
	Yes	.297	303	.000
2013	No	.214	9573	.000
	Yes	.194	303	.000

Source: Author´s analysis based on UMC and SIGMA.

3.1.3. Mathematics mean scores

A third mixed-designed ANOVA test having dependent variables (1) 2010 Mathematics mean scores per school; and (2) 2013 Mathematics mean scores per school was performed with the same between-subject factor used above. All cases with results under 220 and above 900 were removed because they did not appear to be genuine data.

Kolmogorov-Smirnov´s test (table 5) was performed, finding that no groups (p. < .05) were normally distributed.

Table 5. Test of normality of Mathematics mean score

	COACHED FROM 2011 TO 2013	KOLMOGOROV-SMIRNOV		
		Statistic	df	Sig.
2010	No	.057	11766	.000
	Yes	.089	484	.000
2013	No	.039	11766	.000
	Yes	.045	484	.023

Source: Author´s analysis based on UMC and SIGMA.

There was homogeneity of variances, as assessed by Hartley's F_{max} test (p = 1.13). There was heterogeneity of covariances as assessed by Box's test of equality of covariance (p. <.001). Therefore, it is not possible to interpret an interaction term.

3.1.4. Mathematics percentage of proficient students

Another test was performed, having as dependent variables the (1) 2010 percentage of proficient students in mathematics; and (2) 2013 percentage of proficient students in mathematics. The same between-subject factor was used. Outliers were treated in the same way as the first test.

Kolmogorov-Smirnov´s test (table 6) was performed finding that no groups showed normal distribution (p. < .05).

Table 6. Test of normality of Mathematics percentage of proficient students

	COACHED FROM 2011 TO 2013	KOLMOGOROV-SMIRNOV		
		Statistic	df	Sig.
2010	No	.301	11766	.000
	Yes	.372	484	.000
2013	No	.280	11766	.000
	Yes	.270	484	.000

Source: Author´s analysis based on UMC and SIGMA.

There was homogeneity of variances, as assessed by Hartley's F_{max} test (p = 1.05). There was heterogeneity of covariances as assessed by Box's test of equality of covariance (p. <.001). Therefore, it is not possible to interpret an interaction term.

3.2. A results-based framework

A second question is whether the learning coaching strategy answers to a result-based framework, as officially stated. For that purpose, an analysis was done of four relevant aspects that are considered important: (1) design consistency; (2) focalization; (3) intervention; and (4) program expenditure. The parameter for assessing the design consistency and focalization is the official guidelines from the Ministry of Economy. This document was compared to the official learning strategy documents and literature review. Data was collected through a financial, legal document review and literature review. The intervention was analyzed through a critical reading and literature review. Finally, the expenditure was analyzed by comparing individual costs.

While it is possible for the design consistency (as a logic causal relationship) and focalization to be objectively examined, it was not possible to define clear measurements for assessing the intervention, and, therefore, two instruments were used instead: the protocol of intervention, and the perception from teachers, as collected from the National Educational Survey of 2012. Finally, it was not feasible to conduct a cost-benefit or cost-feasibility of the program because there were no statistical measured differences between learning achievements of coached and non-coached schools at a regional level. To address this issue, the budget analysis was done by comparing teacher per coach, students per coach and coaches per staff ratios.

4. Results

4.1. Students´ learning outcomes

4.1.1. Spanish reading and comprehension mean scores

Descriptive statistics for Spanish reading scores in 2010 and 2013, divided by coached and non-coached schools are presented in table 7.

Table 7. Descriptive statistics of Reading scores

	COACHED FROM 2011 TO 2013	MEAN	STD. DEVIATION	N
2010	No	494.058036	64.7428249	9573
	Yes	491.711450	62.2278580	303
	Total	493.986041	64.6653457	9876
2013	No	508.750210	62.9433574	9573
	Yes	528.582513	68.8550272	303
	Total	509.358674	63.2217635	9876

Source: Author´s analysis based on UMC and SIGMA.

It was found a statistically significant interaction between being coached for three years and time on Spanish reading and comprehension scores, $F(1.9874) = 32.471$, $p. < .0005$, partial $\eta^2 = 003$, as shown in table 8.

There was no statistically significant difference in reading scores between coached and non-coached schools in 2010, $F(1.9874) = .387$, $p. = .534$, partial $\eta 2 < .001$. After 3 years, there was a statistically significant difference between coached and non-coached schools, $F(1.9874) = 28.984$, $p. < .001$, partial $\eta 2 = .003$.

Table 8. Tests of within-subjects effects

SOURCE	TYPE III SUM OF SQUARES	DF	MEAN SQUARE	F	SIG.	PARTIAL ETA SQUARED
TIME	390445.089	1	390445.089	175.507	.000	.017
TIME * coached3years	72236.911	1	72236.911	32.471	.000	.003
Error(TIME)	21966408.737	9874	2224.672			

Source: Author´s analysis based on UMC and SIGMA. Note: Sphericity assumed.

Finally, it was found that there was a statistically significant effect in reading scores in coached schools after a 3-year strategy, $F(1.302) = 82.408$, p. < .001, partial $\eta 2 = .214$; the effect in non-coached was significant but smaller, $F(1.9572) = 466.250$, p. < .001, partial $\eta 2 = .046$ (table 9).

Table 9. Effect of time in schools (test of within-subjects effects)

SOURCE	BETWEEN-SUBJECT	TYPE III SUM OF SQUARES	DF	MEAN SQUARE	F	SIG	PARTIAL ETA SQUAR.
TIME	Coached	205960.505	1	205960.505	82.408	.000	.214
Error(TIME)		754781.653	302	2499.277			
TIM	Non-coached	1033213.847	1	1033213.847	466.25	.000	.046
Error(TIME)		21211627.08	9572	2216.008			

Source: Author´s analysis based on UMC and SIGMA. Note: Sphericity assumed.

4.1.2. Spanish reading and comprehension percentage of proficient students

There was statistically significant difference in percentage of proficient students between coached and non-coached schools in 2010, $F(1.9874) = 4.021$, p. = .045, partial $\eta 2 < .001$. There was also statistically significant difference between coached and non-coached schools in 2013, $F(1.9874) = 28.714$, p. < .001, partial $\eta 2 = .003$.

Finally, there was a statistically significant effect in reading percentage of proficient students in coached schools after a 3-year strategy, $F(1.302) = 50.245$, p. < .001, partial $\eta 2 = .143$; while the significant effect in non-coached schools was smaller, $F(1.9572) = 125.969$, p. < .001, partial $\eta 2 = .013$ (table 10).

Table 10. Effect of time in schools

SOURCE	BETWEEN -SUBJECT	TYPE III SUM OF SQUARES	DF	MEAN SQUARE	F	SIG	PARTIAL ETA SQUAR.
TIME	Coached	2.446	1	2.446	50.245	.000	.143
Error(TIME)		14.703	302	.049			
TIM	Non-coached	4.275	1	4.275	125.96	.000	.013
Error(TIME)		324.850	9572	.034			

Source: Author´s analysis based on UMC and SIGMA.

4.1.3. Mathematics mean scores

Descriptive statistics for mathematic means scores in 2010 and 2013 divided by coached and non-coached schools are presented in table 11.

A non-statistically significant difference was found in mathematic scores between coached and non-coached schools in 2010, $F(1.12248) = 2.218$, p. = .136, partial $\eta 2 <$

.001. On other hand, there were statistically significantly different scores between coached and non-coached schools in 2013, $F(1.12248) = 58.962$, p. < .001, partial $\eta 2 = .005$.

Table 11. Descriptive statistics of Mathematics scores

	COACHED FROM 2011 TO 2013	MEAN	STD. DEVIATION	N
2010	No	492.280059	85.2323179	11780
	Yes	499.092821	87.5387004	485
	Total	492.549459	85.3313804	12265
2013	No	498.821007	79.3068874	11780
	Yes	527.451664	85.5703325	485
	Total	499.953161	79.7556280	12265

Source: Author´s analysis based on UMC and SIGMA.

Finally, there was a statistically significant effect in mathematics scores in coached - schools after a 3-year strategy, $F(1.483) = 34.768$, p. < .001, partial $\eta 2 = .2067$; while the significant effect in non-coached schools was smaller, $F(1.11765) = 55.400$, p. < .001, partial $\eta 2 = .005$ (table 12).

Table 12. Effect of time in schools

SOURCE	BETWEEN -SUBJECT	TYPE III SUM OF SQUARES	DF	MEAN SQUARE	F	SIG	PARTIAL ETA SQUAR.
TIME	Coached	203476.72	1	203476.727	34.768	.00	.067
Error(TIME)		2826751.15	483	5852.487			
TIM	Non-coached	252941.94	1	252941.946	55.400	.00	.005
Error(TIME)		53716165.07	11765	4565.760			

Source: Author´s analysis based on UMC and SIGMA. Note: Sphericity assumed.

4.1.4. Mathematics percentage of proficient students

Descriptive statistics for percentage of proficient students in 2010 and 2013 divided by coached and non-coached schools are presented in table 13.

There was not statistically significant difference in percentage of mathematics proficient students between coached and non-coached schools in 2010, $F(1.12248) = .704$. p. = .402, partial $\eta 2 < .001$. On the other hand, there was statistically significant difference between coached and non-coached schools in 2013, $F(1.12248) = 29.149$, p. < .001, partial $\eta 2 = .002$.

Table 13. Descriptive statistics of Mathematics percentage of proficient students

	COACHED FROM 2011 TO 2013	MEAN	STD. DEVIATION	N
2010	No	.104676	.2010022	11766
	Yes	.112524	.2183738	484
	Total	.104986	.2017132	12250
2013	No	.113523	.1945127	11766
	Yes	.162912	.2548057	484
	Total	.115474	.1974663	12250

Source: Author´s analysis based on UMC and SIGMA.

Finally, there was a statistically significant effect in mathematics percentage of proficient students in coached schools after a 3-year strategy, $F(1.483) = 12.069$, p. < .001, partial $\eta 2 = .024$; while the significant effect in non-coached was smaller, $F(1.11765) = 14.447$, p. < .001, partial $\eta 2 = .001$ (table 14).

Table 14. Effect of time in coached schools (test of within-subjects effects)

SOURCE	BETWEEN -SUBJECT	TYPE III SUM OF SQUARES	DF	MEAN SQUARE	F	SIG	PARTIAL ETA SQUAR.
TIME	Coached	.614	1	.614	12.069	.001	.024
Error(TIME)		24.591	483	.051			
TIM	Non-coached	.460	1	.460	14.447	.000	.001
Error(TIME)		374.974	11765	.032			

Source: Author´s analysis based on UMC and SIGMA. Note: Sphericity assumed.

4.2. Results-based methodology

4.2.1. Design consistency

The logical framework of the Program Logros de Aprendizaje de Estudiantes de Educación Básica Regular and the learning coaching strategy as a component of it has the following result chain (figure 2). An important features of the current framework differentiates Spanish and bilingual schools, which face additional challenges for adequately assessing their students' achievements in Peru.

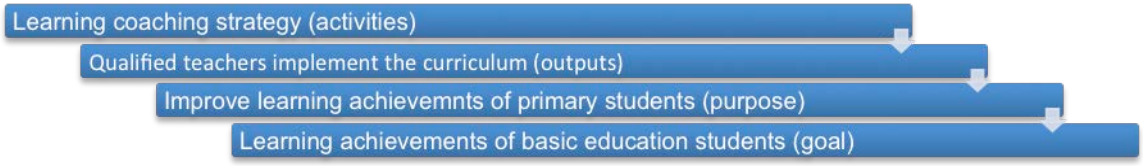

Figure 2. Result chain of budgeting program
Source: Ministerio de Educación (2013a).

4.2.2. Focalization

A new focalization process was performed for 2013-2016 as explained in the Protocol (Ministerio de Educación, 2014a). The criteria for including schools are: multi-grade schools in rural areas belonging to poverty quintile 1 and 2 districts with low achievements results. There is an explicit exception that allows full-grade schools of rural and urban areas into the strategy.

Table 15. Focalization criteria of learning coaching schools

	% SCHOOLS	% TEACHERS	% STUDENTS
Assumption of all criteria (rural, multi-grade, poverty quintile 1 and 2)	80.93%	70.76%	69.15%
Assumption of rural and poverty quintile	1.91%	6.11%	6.60%
Assumption of poverty quintile	8.47%	10.67%	10.17%
Rural schools in quintile 3, 4 and 5	5.10%	4.39%	3.26%
Urban schools in quintile 3, 4, and 5	3.59%	8.07%	10.82%

Source: Author´s base on SIGMA.

The analysis of the correct focalization distinguishes the main criteria from the exceptions. Results are presented in table 15. Only 70.76% of teachers and 69.15% of

students meet the established criteria, while students and teachers in quintiles 3 to 5 make up 12.46% and 14.0%.

4.2.3. Intervention

Assessing the teachers´ view about the components in the intervention (table 16), it is possible to see that just 37.2% teachers find the coach´s class visits very useful, despite that this was considered the most important element of the strategy. At the same time, it is not a surprise that workshops are highly rated. Possible complementary explanations are that they are the traditional training scheme and also that they are a space for learning theory (contents or didactics).

Another interesting feature is the fact that 96% of the teachers found internships useful or very useful, although that component was removed from the strategy in 2013. That acceptance rate should lead to a deeper analysis of internship value. It would be valuable to rethink its inclusion in the future.

Table 16. Perception of usefulness of different components of learning coaching

	VERY USEFUL	USEFUL	SOME USEFUL	NOTHING USEFUL
Visit to class	37.2%	48.4%	12.3%	2.2%
Meetings between teachers	39.1%	52.8%	7.7%	.4%
Workshops	45.5%	46.6%	7.6%	.3%
Interships	46.3%	49.7%	3.3%	.7%

Source: ENEDU 2012 (1st grade teachers receiving the coaching strategy).

Focusing on class visits (figure 3) show that experienced and inexperienced teachers have similar positive experiences after being coached which discloses the possibility of experienced teachers (which usually are considered as lost cases) may change their teaching practices, and also revealing the strategy does not impact in novel ones, as other international experiences exhibit (see Vezub et al., 2012).

In order to have a correct understanding of program expenditure of all regions, some ratios (number of teachers per coach; number of students per coach; number of staff per coach) were calculated, which are summarized in table 17. The region of Callao was excluded because is a high density urban area which does not follow the focalization criteria. Unlike the student per coach ratio, the teacher per coach ratio has a very uniform distribution.

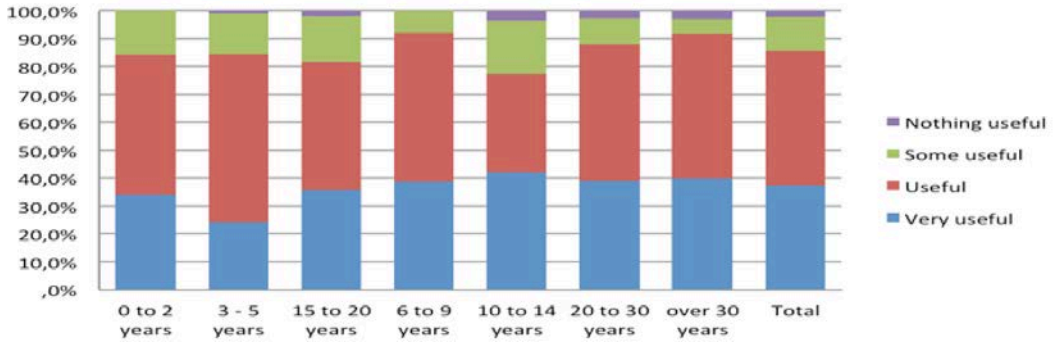

Figure 3. Perception of usefulness of visits to class by teaching experience (1st grade teachers)

Source: ENEDU 2012 (1st grade teachers receiving the coaching strategy).

Table 17. Ratios of strategy in 2013

	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
Teacher per coach	24	6.00	9.71	7.83	1.12
Students per coach	24	69.01	197.04	123.76	36.50
Coaches per staff	23	4.00	50.33	15.28	12.08
Valid N (listwise) 23					

Source: Author´s based on Ministerio de Educación (2014b), SIGMA and ESCALE.

5. Discussion

5.1. Learning outcomes

In summary, after performing five between-factor within-factor analysis of ariances, assumptions held for valid results in two cases. The most important discovery was the statistically significant interaction between being coached for 3-years (2011 to 2013) and reading scores improvement in the same period of time, $F(1.9874) = 32.471$, $p. < .0005$, partial $\eta 2 = 003$. Considering there was no statistically significant difference between 2010 means, the mean score of coached schools increased 36.87 points (491.711 to 528.35) while non-coached schools had a 14.7 increment (494.05 to 508.75) (see figure 4).

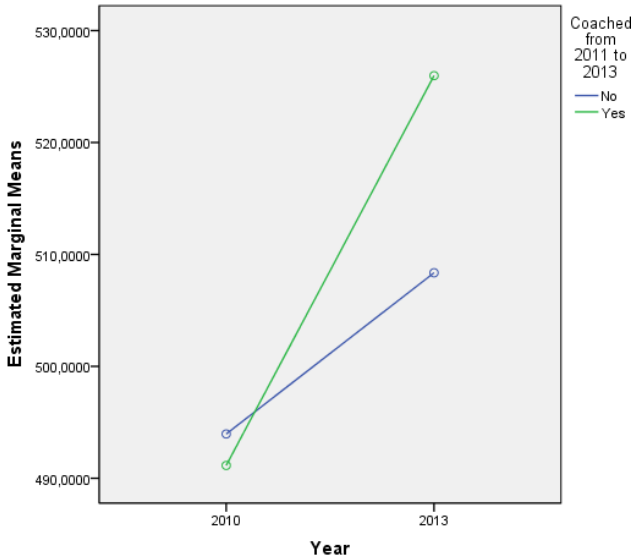

Figure 4. Reading mean scores (2010 and 2013) of coached and non-coached schools
Source: Author's elaboration.

The positive interaction occurs in the set of schools which are behind national mean (which is also low), and, therefore, represents an emergency strategy to impact schools with very low results. In order to measure the effect size, and because of the unbalanced design, Glass`s delta was calculated at 0.34. This value is considered at the border of small to medium. While Hattie (2012) considers relevant an intervention with a $\Delta > .4$, the school context and historical stagnation of results in rural and multi-grade schools makes the effect size very appreciable.

Another important finding is the large effect on mean time spent in coached schools (partial $\eta 2 = .214$, $\Delta = .59$). This defers from that of non-coached schools which also grew but in a smaller scale compared to the coached schools (partial $\eta 2 = .046$, $\Delta = .22$).

Finally, is important to recall the large effect size of time on percentage of proficient students in coached schools (partial η2 = .143; Δ=.62) which means an increment from 12.7% to 25.5% of students at a proficient level.

Although it was not possible to assess interaction, both tests performed in mathematics (means and percentage of proficient students) show a statistically significant effect of time on coached schools (mean scores: partial η2 = .207, Δ=.32; percentage of proficient students: partial η2 = .024, Δ=.23) (figure 5), which was greater than for non-coached schools (means: partial η2 = .005; percentage of proficient students: partial η2 = .001). Mean scores and percentage of proficient students for math are always lower than for Spanish, because in 2nd grade, when the test is taken, a proficient reading and comprehension competency is a prerequisite to understand mathematical problems. Therefore, math results should not be used alone to analyze tests scores.

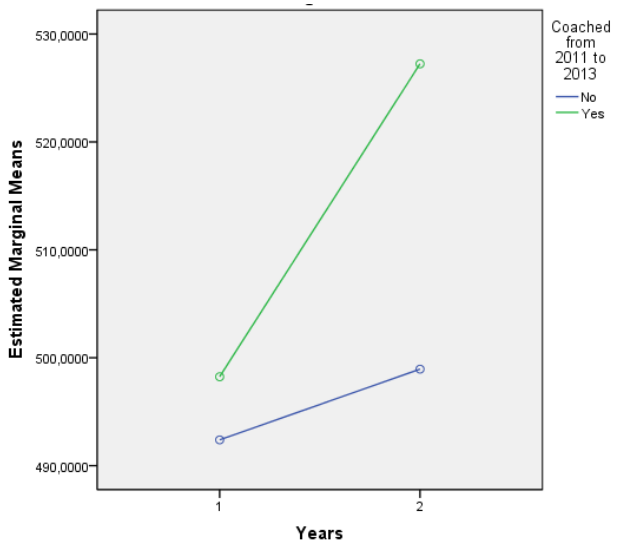

Figure 5. Mathematics mean scores (2010 and 2013) of coached and non-coached schools

Source: Author's elaboration.

5.2. Assessment of the results-based methodology

5.2.1. Design consistency

It is possible to find a vertical inconsistency because the impact and the purpose in the assessed framework are very similar, with the only difference being in the targeted population (primary students versus basic education students). Considering that there is a correct formulation of the program impact (as stated in official planning national documents), the program purpose could be centered on the school.

The logical framework stated in a recent document (Soltau et al., 2013) on the learning coaching strategy has the following structure (table 18).

It is accepted that the connection between purpose and goal is always uncertain because of many other factors which may or may not cause the expected final results. Considering that premise, a consistent cause-effect analysis reveals a wide gap between the goal and purpose in the present framework as assessed by different studies. For

example, Murillo (2011) identifies the school as the subject of change and the teacher as an important component inside the school. Therefore, the stated purpose should be placed at the output level and rephrased to focus on the improvement of class teaching, and the coaching strategy should be considered as an activity, as stated in the national program framework.

Table 18. Result-chain of learning coaching strategy framework

Final result (Goal):
Contribute to learning achievements of students
Purpose:
Coached teachers improve their pedagogical performance in class
Output:
Teachers of multi-grade schools receive coaching
Teachers of bilingual multi-grade schools receive coaching
Activities:
Support materials for coaches
Training and certification of coaches
"Package" for coached teachers: visit to classes, workshops, etc.
Training for management of rural schools

Source: Soultau et al. (2013).

If the learning coaching strategy was understood in a wider scope, the established outputs should be understood as activities. Therefore, other outputs could be expected, which could be centered on successful school and class management, teacher development, and active community participation (considering that strategy focuses on small schools in rural areas). Finally, the declared activities should be considered as inputs because they are resources used in order to complete activities.

The current differentiation of Spanish and bilingual schools is considered a positive feature which highlights the specific needs of bilingual schools. However, at the same time, strong difficuties as the existences of bilingual teachers are not being considered, which could be addressed by a specific intervention.

5.2.2. Focalization

The new focalization has at least two major bias. The first is an urban bias allowing urban schools in the program which distort the purpose of the program at the same time will not perceive the benefit of a strictly rural strategy. The second one is the attendance of schools that are not in poor areas of the country (students and teachers in quintiles 3 to 5 make up 12.46% and 14.0%), which could be considered as an important focalization error.

5.2.3. Intervention

The execution of the strategy is done by the sub-national governments which follow a protocol of intervention (Ministerio de Educación, 2014a), which constitutes the most important document of the learning strategy. Recently officially published, it is a significant effort to institutionalize the strategy and has many positive features as well as provides a very practical handbook which will standardize actions. It was produced through a participatory method with different coaches in an experience-based process. Another positive aspect is a specific distinction of strategy for intercultural and bilingual schools, although the difference in the protocol is reduced almost only to the linguistic diagnostic of the school (Alvarado, 2013; Defensoría del Pueblo, 2011). Finally, the

competency approach of the protocol allows for the description of estimated effects of teachers, principal, coaches and trainers. This could be useful for assessing progress, although it could be enhanced if indicators are used for monitoring and evaluation.

The lack of a critical mass of qualified coaches (Consejo Nacional de Educación, 2007; Montero, 2011) is still a problem in order to have a greater impact on teachers and students. Table 19 shows very positive perceptions of 1st grade teachers regarding coaches' management of contents and pedagogical resources. A positive aspect is the creation in 2012 of the position of coach supervisor and equally welcomed was the national government order to start a postgraduate training for all coaches and coach supervisors in 2013.

Table 19. Teachers´ perception about coaches´ proper management of contents

TEACHERS EXPERIENCE	ALWAYS	MANY TIMES	SOMETIMES	NEVER
0 to 2 years	63.8%	27.7%	8.5%	.0%
3 - 5 years	54.9%	20.9%	21.4%	2.7%
6 to 9 years	59.0%	20.5%	16.9%	3.6%
10 to 14 years	65.9%	17.5%	14.2%	2.4%
15 to 20 years	73.6%	14.7%	9.7%	2.0%
20 to 30 years	75.0%	14.7%	9.6%	.7%
over 30 years	67.7%	17.9%	12.4%	2.0%
Total	63.8%	27.7%	8.5%	.0%

Source: ENEDU 2012 (1st grade teachers receiving the coaching strategy).

However, when asking about one of the most important coaching procedures, which is feed-backing (see table 20), we have found that around a third of the teachers think that the feedback is poor. This results reveals that there are still room for improvement in coaches´ performance, especially in novel teachers, which results should be expected to be higher than experienced teachers.

There are also important weaknesses in the strategy that should be addressed. First, there is an absence of a theoretical foundation for the learning coaching strategy. The strategy is briefly explained in the protocol in very general terms as a collaborative and critical support form and with some expected outcomes such as increasing learning achievements, strengthening school autonomy, principal leadership, and changing teaching performance. However there is no much said besides this in government documents, there is no further references to consult, which suggest the lack of this *corpus* to organize and guide the strategy (also see Soltau et al., 2013).

Table 20. Coaches` feedback about teachers´ practice

TEACHERS EXPERIENCE	ALWAYS	MANY TIMES	SOMETIMES	NEVER
0 to 2 years	45.7%	17.0%	28.7%	8.5%
3 - 5 years	49.5%	20.3%	22.5%	7.7%
6 to 9 years	49.1%	14.1%	29.4%	7.4%
10 to 14 years	39.4%	19.7%	28.9%	12.0%
15 to 20 years	54.1%	16.9%	18.1%	10.9%
20 to 30 years	54.1%	19.7%	19.1%	7.1%
over 30 years	55.9%	16.2%	24.3%	3.7%
Total	51.0%	18.4%	22.2%	8.3%

Source: ENEDU 2012 (1st grade teachers receiving the coaching strategy).

Considering that the strategy is officially focused on multi-grade rural schooling, it seems short sighted that there is no defined theoretical framework and that no didactic

resources are enabled to address the specific concerns of rural school, which is significantly different from urban schools. A protocol review shows that there are no references available to consult and address issues such as how to set up the students´ collaborative work in a classroom or references to differentiated teaching notions. Table 26 shows an important decline of the higher valuation after a 2-years of teaching, which can be explained in two ways. First, it is because new and inexperienced teachers do not receive training in initial teachers´ preparation, and second, because generally perception questions have more positive results than other type of questions (see, for example, table 21). Although perception is positive, there are still more than 60% of teachers that conceive a better approach to the matter. The drop of the positive perception could show that tools and approaches are considered as insufficient by teachers with more experience.

Table 21. Coaches´ teachings are adequate to multi-grade teaching

TEACHERS´ EXPERIENCE	VERY USEFUL	USEFUL	SOME USEFUL
0 to 2 years	87.5%	12.5%	.0%
3 - 5 years	51.3%	38.5%	10.3%
6 to 9 years	54.2%	45.8%	.0%
10 to 14 years	38.9%	44.4%	16.7%
15 to 20 years	48.5%	33.3%	18.2%
20 to 30 years	51.7%	44.8%	3.4%
over 30 years	50.0%	50.0%	.0%
Total	51.7%	40.8%	7.6%

Source: ENEDU 2012 (1st grade teachers receiving the coaching strategy).

5.2.4. Program expenditure

Considering that coaches' contracts represent 69.3% of the strategy budget in 2013, relative comparisons between regions are possible to be done. The widespread standard deviation found in the students per coach ratio (36.50) makes difficult using this ratio as possible comparison criteria.

Different cost per unit (teacher, student and coach) were calculated (table 22), and important differences were found across regions, which could be considered as an indicator of efficiency or inefficiency.

Table 22. Strategy ratio costs in 2013

	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
Cost per teacher	24	3007,28	7431,05	4602,8724	974,77862
Cost per student	24	155,76	503,06	310,5804	100,37241
Cost per coach	24	20529,13	48790,11	35648,0026	6710,39482

Source: Author´s based on SIAF and SIGMA.

There is a decision to not use the cost per student ratio because the strategy explicitly focuses in rural small schools and it is found a widespread standard deviation. There are some outliers as the region of Cajamarca that has a cost per teacher of 7431.05 nuevos soles (the highest in the country, over 3 SD than mean) and a cost per coach of 45101,34 (second highest). This is considerably higher than other regions, however it does not have a lower ratio of teacher to coaches of other regions. The region of Pasco, for example, has a very high cost per coach (48790.11 nuevos soles) and also a high cost per teacher (5635.33 nuevos soles) but the teacher per coach ratio does not explain the expensiveness due to the fact that it is one of the higher of the country (8.66 teachers

per coach). The region of Madre de Dios, which is a very isolated region in the Amazon basin, shows a very low student per school ratio (22.08) and also a very low cost per teacher (3897.88 nuevos soles). It should therefore present a high relation of teacher per coach, but presents only a ratio of 7.09. While the student per school ratio is low because of geographic conditions, it is hard to understand how the cost per teacher is low, considering that access to the region and cost of transport between schools is very high. All these differences reveal an unbalanced budgeting (see figure 6) process that could be explained by differences in coaches and staff salaries, an inadequate costing of transportation, workshops, and less probably because of the ratio of coach per teacher.

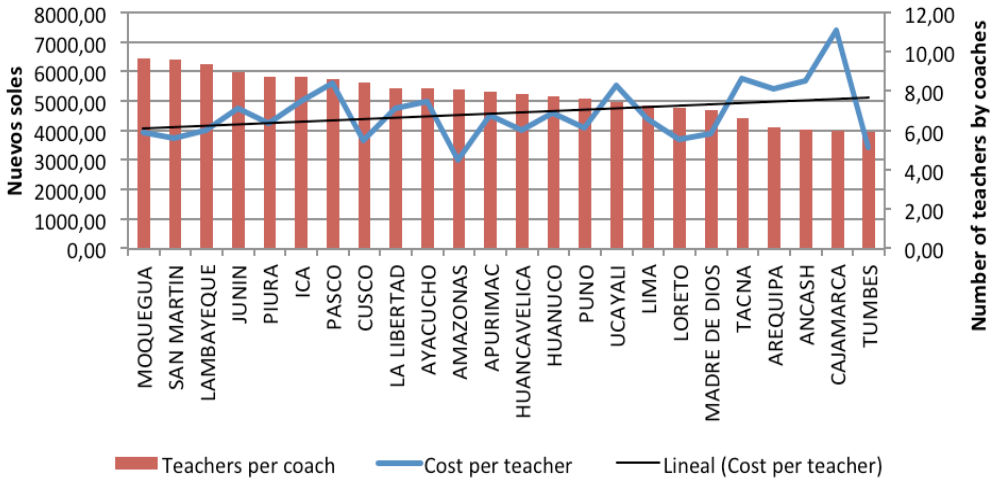

Figure 6. Cost per teacher and teachers per coach in 2013
Source: SIAF, SIGMA. Author´s elaboration.

Finally, the strategy organization also matters in terms of efficiency and affects budget expenditure. It is possible to find a very wide range of regional organization. For example, the Regional Direction of Education of La Libertad manages (75 coaches) the entire strategy with the Regional Direction and does not have any staff, while the Region of Lima manages 77 coaches, almost the same as La Libertad, but employs staff of 13 (see figure 7). At least one region does not have one of the positions, and the variance between the staff quantity is very significant, as shown in table 23. This fact goes against the instructions of Ministerio de Educación (2013c) and reveals the need of a greater institutionalization of the strategy in order to obtain a better management and efficiency (tabla 23).

Table 23. Strategy staff in regions

	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
Regional officer	0	1	,84	,374
Monitoring officer	0	5	1,72	1,208
Local officer	0	10	1,72	2,354
Local monitor	0	9	,76	2,047
Total staff	0	13	5,04	3,335

Source: SIGMA.

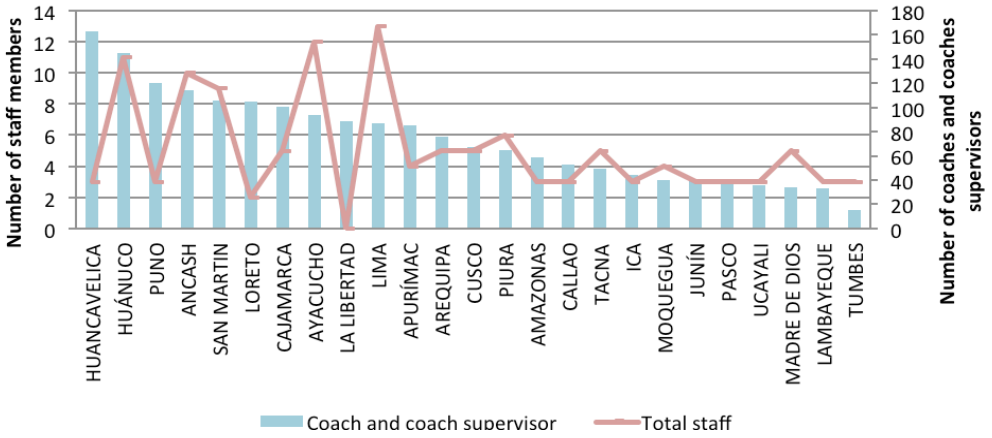

Figure 7. Staff and coaches in 2013
Source: SIGMA

6. Conclusion

The finding of statistically significant interactions between receiving coaching for 3-years (2011 to 2013) and increasing reading scores from 2010 to 2013 (with a small to medium effect size), and also the finding of statistical significance between scores and percentage of proficient students with large effect sizes in all assessed disciplines (Spanish, math and Spanish as second language) exposes an effective strategy in order to increase the goal of any educational system, the learning of students. It is not possible yet to predict the impact of the scheme in the long term.

Although the specificity of the strategy is highly related to the geographical area (rural areas) and the needs of teachers and students (very low and low learning outcomes), this configuration strengths the importance of addressing specific needs with contextualized actions in order to have better educational outcomes in the national system as a whole.

Therefore, it is recommended that the learning coaching should be comprehended among others activities to specifically address the difficulties of rural multi-grade schools and not as an independent strategy. Consequently, a policy review with a program redesign could help to better allocate resources and budget in order to reverse low learning results, focusing on one hand in rural Spanish schools, and on other hand in bilingual schools.

In assessing the current strategy design, the logical framework reveals an inconsistency due a loose gap between the goal and purpose, and in the same way, between purpose, outputs and activities. It is considered that isolating coaching from other strategies reduces the potential of the strategy and ignores other important aspects of rural schools management: networks, appropriate initial training for teachers, specific students´ collaborative educational materials for multi-grade schools, etc. A possible alternative suggested is to assume coaching as a part of a larger intervention focusing on the different school levels (school management, classroom, students). A specific strategy design for rural areas and multi-grade schools will also enhance focalization and could reduce the misguided criteria for choosing coached schools. As a contribution, table 24 presents a draft of a program proposal for Spanish rural multi-grade schools. It has been designed following Murillo (2008, 2011) and Consejo Nacional de Educación (2007a; 2007b).

Table 24. Draft of logical framework for Spanish multi-grade rural schools program

Goal:
Contribute to learning achievements of students
Purpose:
Students of multi-grade rural schools accomplish satisfactorily their primary education
Output:
Teachers improve their pedagogical performance in class
Schools improve management efficiency
Community actively engages in students' performance
Activities:
1.a. Teachers of multi-grade schools receive coaching
1.b. Teachers trained in the utilization of appropriate curriculum resources
1.c. Teachers assist students with learning problems
1.d. Students use appropriate basic learning materials
2.a. Schools networks functioning
2.b. Adequate infrastructure
2.c. Incentives to teachers
2.d. Analysis of viability of merging single-teacher schools
3.a. Accountability of teachers to parents
3.b. Schools participate in community life

Source: Author`s elaboration.

A key limitation to implementation is the absence of a defined and available theoretical framework of the strategy because it constraints a greater diffusion of the strategy, impoverishes coaches´ training and makes more difficult the development of pedagogical resources. Also there is a lack of resources available for coaches and managers to prepare and disseminate well-defined educational ideas of the main aspects of rural multi-grade school system, such as know-how of collaborative learning, or dealing with relationship issues amongst students, how to promote school networking and engagement with the larger communities in rural settings, etc. Another restriction for universalizing coaching of teachers and other in-service training in rural areas recently is producing a critical mass of qualified coaches. A budgetary and organizational overview shows that there are not clear standards and organization parameters. For instance, there is a very large regional variance in costs per teachers and per coaches. Such variance reveals an unbalanced budgeting process with too large differences in salaries and other costs.

Focusing on the current coaching strategy, there are some actions that may improve the present policy. First, it is necessary to set-up the theoretical and pedagogical foundations through research for rural multi-grade schooling and coaching. At least there will be three positive consequences: (1) Strengthening of initial teacher training with specific theories, practices and materials for rural multi-grade schooling; (2) Strengthening of critical mass of current rural teachers; (3) Production of evidence-based benchmark criteria in order to select and maintain the best coaches.

Second, it is important examining if some activities such as internship (because of very positive perception) and coaches´ training can be integrated to the strategy. Third, it would be adequate to complement the strategy with proper learning materials for multi-grade schools (for example, those developed by Fundación Escuelas Nueva (2015).

Four, given the geographical, economic and cultural differences between regions it may not be possible to set a national standard, but certainly it is possible to set regional standards (i.e. for the Amazon basin or for highlands) which will also help to assess efficiency and an efficient expenditure at regional level.

Finally, in order to better estimate the impact of the strategy on learning outcomes, intra school and intra class processes research should be encouraged. At least seven new specific questions appear of importance during this investigation, and which could be addressed in the future:

- Is it possible to differentiate in the coaching policy a strategy for new-inexperienced teachers and for experienced teachers?
- Which teachers´ learning characteristics are improved through coaching?
- Should coaching be considered a permanent activity or only a temporary strategy to address the issue of schools with lower learning outcomes?
- Should a learning strategy that includes coaching in bilingual schools be different from the learning coaching strategy of monolingual schools?
- How could coaching activities become part of a larger comprehensive learning strategy for multi-grade and single-teacher schools?
- Is multi-grade teaching currently the best approach for education in rural areas in Peru?

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Annex

- ESCALE, National educational statistical database
- ENEDU, National educational survey
- INEI, Institute of Statistics of Peru
- MINEDU, Ministry of Education of Peru
- MEF, Ministry of Economy and Finances of Peru
- PELA, Programa Logros de Aprendizaje de Estudiantes de Educación Básica Regular
- SIAF, Sistema Integrado de Administración Financiera

- SIGMA, Sistema de Gestión para la Mejora de los Aprendizajes
- UNESCO, United Nations Educational, Scientific and Cultural Organization
- UMC, Unidad de Medición de la Calidad

Table. Exchange rate

YEAR	NUEVOS SOLES	US DOLLARS
2008	S./ 2.926	$ 1.00
2009	S./ 3.012	$ 1.00
2010	S./ 2.826	$ 1.00
2011	S./ 2.755	$ 1.00
2012	S./ 2.638	$ 1.00
2013	S./ 2.703	$ 1.00

Source: Banco Central de Reserva del Perú.