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ONE DECADE OF PROVA BRASIL: EVOLUTION OF STUDENT PERFORMANCE AND GRADE PROMOTION[1]

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ABSTRACT

This paper analyzes data from Prova Brasil in order to answer two questions: in the ten-year period, have there been advances in the quality of education in terms of learning and student grade progression in primary and lower secondary education (1st to 9th grades)? Who are the students who have (or have not) improved, considering geographic and social characteristics? We present descriptive statistics on proficiency levels and on student self-declaration regarding grade repetition for students in the 5th and 9th grades from 2007 to 2017. Results show a continuous improvement for both quality indicators for all regions and social groups. However, according to the criteria we used, the differences between social groups and between the country's regions are important to understand the obstacles to overall advancement in learning and to a decrease in grade repetition.

KEYWORDS EDUCATION QUALITY • PROVA BRASIL • LEARNING • STUDENT PERFORMANCE.

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UMA DÉCADA DA PROVA BRASIL: EVOLUÇÃO DO DESEMPENHO E DA APROVAÇÃO

RESUMO

O artigo analisa os dados originados pela aplicação da Prova Brasil, a fim de responder duas perguntas: no período de dez anos, houve avanços na qualidade da educação em termos de aprendizado e aprovação no ensino fundamental 1 e 2? Quem são os alunos que melhoraram (ou não), segundo recortes territoriais e características sociais? São apresentadas estatísticas descritivas dos níveis de proficiência e da autodeclaração sobre a reprovação dos alunos do 5º e 9º anos de 2007 a 2017. Os resultados mostram uma melhora contínua dos dois indicadores de qualidade em todas as regiões e grupos sociais. Porém, pelos critérios adotados, as diferenças entre os grupos sociais e regiões do país são importantes para entender os entraves no avanço global do aprendizado e na redução da reprovação.

PALAVRAS-CHAVE QUALIDADE DA EDUCAÇÃO • PROVA BRASIL • APRENDIZAGEM • RENDIMENTO DO ALUNO.

UNA DÉCADA DE 'PROVA BRASIL': EVOLUCIÓN DEL DESEMPEÑO Y APROBACIÓN

RESUMEN

El artículo analiza los datos producidos por la 'Prova Brasil' a fin de responder a dos preguntas: en el periodo de diez años ¿hubo avances en la calidad de la educación en lo que se refiere a aprendizaje y aprobación en la educación básica 1 y 2? ¿Quiénes son los alumnos que mejoraron (o no), según recortes territoriales y características sociales? Se presentan análisis descriptivos de los niveles de competencia y de autodeclaración sobre la reprobación de los alumnos del 5º y 9º años, del 2007 al 2017. Los resultados muestran una mejora continua de los dos indicadores de calidad en todas las regiones y grupos sociales. Sin embargo, por los criterios adoptados, las diferencias entre los grupos sociales y regiones del país son importantes para entender los obstáculos en el avance global del aprendizaje y en la reducción de la reprobación.

PALABRAS CLAVE CALIDAD DE LA EDUCACIÓN • PROVA BRASIL • APRENDIZAJE • RENDIMIENTO DEL ALUMNO.

INTRODUCTION

Each year, many Brazilian students do not progress from one grade to the next because they fail to achieve the expected performance or because of insufficient attendance, and are failed. Brazil has one of the highest grade repetition rates in the world, even considering the decrease achieved in the last decade (IKEDA; GARCÍA, 2014). According to the Census of Basic Education, in 2017, 9% of basic education students were retained, a rate that reached 17% in 2007 (BRASIL, 2009, 2018a). But the current percentage still represents nearly three million students who will have an uneven educational career and less chances of completing basic education. The national and international literatures show the effect of early grade repetition in the initial years of basic education (FERRÃO, 2015; FERRÃO; COSTA; MATOS, 2017), in the short and medium terms concerning late failure (FERRÃO, 2015; FERRÃO; COSTA; MATOS, 2017), and in the long term regarding student performance in higher education (FERRÃO; ALMEIDA, 2018, 2019) and the transition of the young adult to the job market (EIDE; SHOWALTER, 2001).

To address this problem, in 2007 the federal government created the Index of Development of Basic Education (Ideb) with targets for basic education

improvement by 2021, which were later included in the National Education Plan (PNE) (BRASIL, 2007, 2014). The Ideb is calculated for each stage of basic education through the mean learning measured by the National System of Basic Education Assessment (SAEB) and the mean promotion rate calculated with data from the Census of Basic Education. Ideb includes a "swap rate" because an increase in grade repetition decreases the performance score (FERNANDES, 2007).

To meet the Ideb targets, the education systems need to significantly improve their performance and normalize the student-flow rates, which involves eliminating grade repetition. Since its launch, the Ideb targets have been met for primary education (1st to 5th grade)[2], but not for the subsequent levels. Over the years, the Ideb growth pattern was expected to advance from the first into the next stages, in line with the "wave theory", but this has not been the case (FERNANDES, 2016).

Matos and Rodrigues (2016) identified a differential behavior regarding the probabilities that the Ideb targets will be met for primary and lower secondary education. The variables with greatest impact on primary education, according to the authors – the school's infrastructure and socioeconomic status –, have had a smaller effect on the next stage, or even, in the case of socioeconomic status, an inverse effect. This finding seems paradoxical, because Ideb values are correlated with these variables (SOARES; ALVES, 2013).

Perhaps the answer to this lies in the increase in educational inequality from one stage to the next. In an effort to improve their Ideb, schools may be privileging the best students in order to raise their average performance, while compensating for repetition rates, a strategy that can perversely increase inequalities (SOARES; XAVIER, 2013). The differences between Brazilian students by the end of lower secondary education are huge, especially regarding the poorest students (SOARES; DELGADO, 2016). If the goal is to increase the non-repetition rate and consequently improve student-flow rate, the students who advance may not have the opportunity to recover from the gaps they accumulate, as found in the previous decade in relation to primary education. (ALVES, 2007; FERNANDES NATENZON, 2003)

The goal of this paper is to analyze the evolution of data from the National School Performance Assessment (Anresc), familiarly known as *Prova Brasil*, in

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2 Translator's note: In this article, the authors use the ISCED 2011 classification adopted by UNESCO to classify school stages; according to it, the stage from 1st to 5th grade (age 5/7 – 10/12) is termed primary education or ISCED LEVEL 1, and the stage from 5th to 9th grade (age 10/12 – 14/16) is termed lower secondary education or ISCED LEVEL 2. It is worth noting that, in Brazil, the stage from 5th to 9th grade is considered part of primary education and is designated *ensino fundamental 2*, which can be translated as primary education 2.

order to discuss the advances in the quality and equity of Brazilian education. The questions we intend to answer are: in the ten-year period, have there been advances in the quality of education in terms of learning and student grade progression in primary education and lower secondary education (1st to 9th grade)? Who are the students who have (or have not) improved, considering geographic and social characteristics?

To answer the former question, we will analyze the score distribution patterns in the Prova Brasil editions for primary education, as well as the obstacles found in the next stage, i.e., lower secondary education (6th to 9th grade). The answer to the latter question will allow us to reflect on the problem of educational inequality and to investigate whether social and geographic barriers, a well-known phenomenon in education, have remained constant or not over time.

Regarding previous studies on the evolution of education quality based on public educational data (ALVES et al. 2017; ALVES; SOARES; XAVIER, 2016; KLEIN, 2006; CARNOY et al. 2015; RODRIGUES; RIOS-NETO; PINTO, 2011; SOARES; DELGADO, 2016), we propose an alternative approach. Firstly, because we will describe, for each edition of *Prova Brasil*, the proficiency levels achieved by the students, rather than their average grades, so as to make a substantive interpretation of results (SOARES, 2009). Secondly, because we will use the student's self-declaration on grade repetition. This is an indirect way of recovering students' education trajectory, thus distinguishing those who completed primary and lower secondary education within the expected time from those who took longer.

CONCEPTUAL APPROACH

Conceptualization and measurement are fundamental tasks in scientific activity. In educational research, that is particularly important because this is a field with much controversy about the meaning of concepts and/ or how they are operationalized or measured. One example is education quality. It is a polysemic term that reflects the population's main demands in terms of school education in each period, and currently holds different perspectives (OLIVEIRA; ARAUJO, 2005). Nevertheless, education is one of the areas with greatest amount of data to measure its phenomena, which poses an interpretation challenge. In this section, we clarify some concepts and strategies for measuring phenomena described in the article.

Learning

Since the 1990's, the National Institute for Educational Studies and Research "Anísio Teixeira" (Inep) has implemented the Saeb in order to analyze student learning by administering proficiency tests to students in a sample of public and private schools. From 2005 onwards, the Saeb expanded its scope to include a sample-based part, with public and private schools – i.e., the National Basic Education Assessment (Aneb) – and a nearly census-like part with only public primary and secondary education schools, i.e., the National School Performance Assessment (Anresc), known as *Prova Brasil*.[3]

In Saeb assessments, learning is defined as the skills students demonstrate to have mastered regarding Portuguese (emphasis on reading) and mathematics (problem solving) by the end of each stage of primary and lower secondary education. Obviously, school learning is not restricted to these areas, and many skills developed at school cannot be assessed by external evaluation (VIANNA, 2003). However, for a large-scale analysis, the tests' results – called proficiency – are taken as evidence of this learning in schools, since the focus is not on individual student assessment (FONTANIVE, 2013).

There is a vast literature explaining the conception and technical aspects of Saeb (FONTANIVE; KLEIN, 2000; KLEIN, 2003). To date, there is no official interpretation for the Saeb scale, which, according to the PNE, is overdue. One of the plan's strategies provides that by the middle of the decade at least 70% of students will have achieved a "sufficient" learning level, and at least 50% a "desirable" level for each stage of basic education (BRAZIL, 2014).

With no official precept in place, we will use in this paper the interpretation proposed by Soares (2009), which divides the Saeb scale into four levels: below basic, basic, adequate and advanced. The author used a proficiency distribution correspondence technique to create a benchmark distribution for the Saeb scale.[4] According to this proposal, it would be ideally acceptable for only 5% of students to be at the first level (below basic), and at least 25% of students should be at the highest level (advanced). The other two levels were defined considering that percentile 70 of the benchmark distribution separates the

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3 Currently, Saeb has also included the National Literacy Assessment (Ana), which was introduced in 2013 to assess the literacy and numeracy skills of children by the end of the literacy cycle, i.e., 3rd grade of primary education. Information about Saeb are available at: http://portal.inep.gov.br/web/guest/educacao-basica/saeb. Acesso em: 10 dez. 2018.

4 Soares (2009) established a correspondence between the distribution of Brazilian students' proficiency in the Programme for International Student Assessment (Pisa), in which Brazil participates, and the distribution of 9th graders in Prova Brasil, and calculated the gap between both distributions. This gap corresponds to how much students must advance in Prova Brasil to reach the benchmark distribution.

students who have met learning expectations from those who have not. Based on these assumptions, the cut off points were defined and named according to Chart 1.

CHART 1 – Saeb learning levels scale – reading and mathematics, and learning expectations

LEARNING LEVEL	5TH GRADE OF PRIMARY EDUCATION		9TH GRADE OF LOWER SECONDARY EDUCATION		% OF STUDENTS EXPECTED TO BE AT THE LEVEL
	READING	MATHEMATICS	READING	MATHEMATICS	
Below Basic	Until 150	Until 175	Until 200	Until 225	5%
Basic	From over 150 to 200	From over 175 to 200	From over 200 to 275	From over 225 a 300	25%
Adequate	From over 200 to 250	From over 200 to 225	From over 275 to 325	From over 300 to 350	45%
Advanced	Over 250	Over 225	Over 325	Over 350	25%

Source: Soares (2009)

Student Grade Promotion

A student is promoted to the next grade level if her/his academic achievement meets the system's standard requirements; otherwise, she/he has to repeat that grade level . There are also cases where the student ceases to attend school, which characterizes a dropout (RIGOTTI; CERQUEIRA, 2004). In an effective education system, grade repetition is expected to be a rare event, dropout never happens, and children in the same cohort will stay together and complete basic education within the regular time period.

In Brazil, since the 1930's, official statistics have shown high grade repetition rates (GIL, 2018). Although widely used as a pedagogical resource, grade repetition has proved ineffective and has been associated with poor education quality and with exclusion of the poor (RIBEIRO, 1991). The repeat student does not overcome obstacles by doing it all over again; on the contrary, he/she is more likely to fail again (CRAHAY, 2006; FERRÃO; COSTA; MATOS, 2017), to undergo early transfer to Youth and Adult Education (EJA) (PEREIRA; OLIVEIRA, 2018) and to drop out without having completed basic education (SIMÕES, 2016). All empirical studies based on educational assessment data suggest that students who have not been promoted are found to perform worse than those who have never failed a grade (FERRÃO; BELTRÃO; SANTOS, 2002a; KARINO; LAROS, 2017; KLEIN, 2006).

Grade repetition, grade progression, dropout and student flow rates are all determined based on the Census of Basic Education; however, one cannot combine data from the Census and data from Prova Brasil, except within the Inep. Therefore, we use information from the Prova Brasil student

questionnaire, which provides student age (5th graders) or year of birth (9th graders) and birthday month, which allows calculating the age-grade correspondence. There are also items about failure and dropout experiences. In educational research, the age-grade lag variable is most commonly found as a control variable (ANDRADE; SOARES, 2008; BARBOSA; FERNANDES, 2001; SOARES; ALVES; XAVIER, 2016; KASMIRSKI; GUSMÃO; RIBEIRO, 2017; FERRÃO et al. 2001; FERRÃO; BELTRÃO; SANTOS, 2002a, 2002b). However, when the focus is on the grade repetition phenomenon, previous failure experiences are more often used (ALVES; ORTIGÃO; FRANCO, 2007; ORTIGÃO; AGUIAR, 2013; FERRÃO; COSTA; MATOS, 2017).

In the Prova Brasil databases, we found students above the adequate age for a particular grade, but who never failed or left school. Therefore, in this paper, we chose to analyze the student's self-declaration about grade repetition and take this answer as a proxy about their educational trajectory. The dropout phenomenon is not so common in primary and lower secondary education levels and when it does occur, it usually entails repetition of that grade. We therefore assume the variable on failure to captures both phenomena.

Educational inequality

The relationship between school results and social background is one of the most studied phenomena in educational research, a subject that intermingles with the origin of sociology of education (FORQUIN, 1995). Research on school effectiveness and improvement has shown very promising results in mitigating inequalities (KASMIRSKI; GUSMÃO; RIBEIRO, 2017; MORTIMORE; WHITTY, 1997), specifically in identifying the factors of school and/or teacher effectiveness that contribute to mitigate the inequalities that prevent the child or youth from achieving full development. Thus, the large number of studies is justified by the problem's persistence, despite the use of various policies to mitigate the effects of social disadvantage and promote greater equity in education.

An education system or school is considered equitable if its policies and practices can reduce the negative impact of social background (CASASSUS, 2007). In Brazil, research shows that when performance improves, inequalities tend to persist or even increase in relation to socioeconomic status (FRANCO et al., 2007), race/color (ALVES; ORTIGÃO; FRANCO, 2007; SOARES; ALVES, 2003), gender (ALVES; SOARES; XAVIER, 2016; XAVIER; ALVES, 2015) and place of residence (ÉRNICA; BATISTA, 2012; KOSLINSKI; ALVES; LANGE, 2013). Since basic education is a constitutional right, such persistent inequality patterns challenge educational policies.

The problem of quality distribution between groups can be analyzed through the notion of school justice, whereby equity is understood as the situation in which all students have educational outcomes above a certain level, regardless of their social background (RIBEIRO, 2013). Obviously, one does not expect absolute equality, but rather the equivalence of results between social groups. This idea of justice is grounded, for example, in Crahay (2000, 2013), for whom education systems must guarantee basic knowledge for all students, assuming that differences will exist beyond that basis. Likewise, Dubet (2004) argues that the school should promote social justice and guarantee a minimum of resources to the disadvantaged, thus setting limits to the meritocratic system that excludes the weak.

Analyzing external evaluation proficiency by means of levels is a way of operationalizing this notion of school justice. Students who fail to reach a certain learning level are the ones served by an education system that fails to guarantee basic knowledge equity for all social groups (ALVES et al., 2017; KASMIRSKI; GUSMAO; RIBEIRO, 2017; SOARES, 2009; SOARES; DELGADO, 2016; XAVIER; ALVES, 2015).

With regard to grade repetition, the idea of school justice is almost like an antonym of it, since failing the student is associated with increasing inequality from the beginning of his/her school trajectory (CORREA; BONAMINO; SOARES, 2014; LOUZANO, 2013). A school justice framework applied to grade repetition can be found in the PNE. The target for primary education provides that at least 95% of students will complete this stage at the recommended age, which would give an "acceptable" margin of 5% of retained students during the nine years of primary and lower secondary education. This target is still far away because in 2017, 76% of students completed primary education at the recommended age, but with poor students this percentage was only 63% (BRASIL, 2018b).

What do we know about the evolution of quality in education?

The quality of the education provided for the Brazilian population has been a recurring subject in the literature since the beginning of this century (FERRÃO; BELTRÃO; SANTOS, 2002a; SOARES, 2004), when large-scale education assessment data became available to researchers (GATTI, 2004). Given the high percentage of students with an age-grade lag at the turn of the century, Ferrão, Beltrão and Santos (2002a, p. 52-53) affirm that,

> Whatever measure is implemented to correct the age-grade lag, it must preserve the quality of the education provided

> for the population so as to ensure, in particular, that the formal promotion of the student corresponds to an actual promotion and, therefore, that a student who holds a certificate not only have the adequate age, but also master the knowledge and skills necessary for fully exercising citizenship. Otherwise, the public education system itself will impose educational exclusion. As Muñoz-Repizo (1999)[5] says, being excluded from education today is equivalent to exclusion from work and to not count as a citizen or as a person.

Several authors have researched subjects related to either education quality or the correction of school flow. To our knowledge, there are no studies addressing both dimensions of the system's performance since the Ideb was implemented in 2007. For example, Carnoy et al. (2015) analyzed the ranking of Brazilian students in the Programme for International Student Assessment (Pisa) from 2000 to 2012, and in the Saeb from 1995 to 2013 in order to assess the "effectiveness of Brazilian primary and lower secondary education (grades 1-8/9)" (CARNOY et al., 2015, p. 450). Such factors were also mentioned by Soares and Delgado (2016, p. 773), who considered the student population in the 5th and 9th grades in their chronological analysis from 2005 to 2013, in which they found that "there have been improvements in both reading and mathematics", although the improvement rate varied between groups defined by socioeconomic status, race/color and gender. This analysis was complemented by Alves, Soares and Xavier (2016, p. 49), who quantified the learning inequalities between the groups above to conclude that "where there has been quality improvement, there has been no decrease in inequalities".

In analyzing the performance of eight-year-old students in Saeb from 1995 to 2003, Alves (2007, p. 537) noted "a slight decline in the quality of performance" and considered it

> [...] very likely that the efforts of authorities to meet the demands imposed by the targets will have effects at different times. Probably, in the coming years, the

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5 MUÑOZ-REPIZO, M. I. Calidad divino tesoro. *Crítica*, Madri, n. 866, p. 22-25, jun. 1999.

> first results of the policies implemented to regulate the school flow will begin to appear. Only after a while, with the school flow almost regularized (or stable at low levels), will the results on school performance be noticed. Thus, in the near future, we will possibly see once more a sharp drop in non-promotion rates, with no change in school performance improvement. (ALVES, 2007, p. 539)

However, according to the National Household Sample Survey (INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA – IBGE, 2008), in 2008, the schooling rate for the school age population (6 to 14 years old) was 97.5%, and for the age group from 15 to 17 years old, it was 84%. School flow statistics also showed considerable improvement. Comparing the scenarios before and after the passing and implementation of the Education Guidelines and Framework Law (LDB/96, Law No. 9394/96) (BRASIL, 1996) allows observing some changes. Specifically, the LDB/96 encouraged the development and implementation of school flow correction proposals, such as learning acceleration classes, the cycle system, automatic promotion, among others. The effect of measures arising from LDB/96 is partially visible through the statistics reported by Klein (2006), which allowed a comparison between 1992 and 2003. In 1992, the average grade repetition rate was 35% for the 1st to 4th grades of primary education and 30% for the 5th to 8th grades of primary education; the highest completion rate achieved by an age cohort was 77% for the 4th grade and 42% for the 8th grade, while in 2003 the average repetition rate was 19.8% for the 1st to 4th grades and 18.5% for the 5th to 8th grades; the highest completion rate observed for a cohort was 89% for the 4th grade and 65% for the 8th grade.

From our knowledge to date, studies on Brazilian education quality evolution focus either on students' performance in standardized tests or on aspects related to school flow correction. Therefore, in the context of progressive decrease in grade repetition rates, this article aims to find evidence that unmistakably demonstrates that, in the last few years, grade repetition has been decreasing without worsening school education quality, and to achieve this goal by answering the two research questions previously stated.

DATA, VARIABLES AND PROCEDURES

We use data from Prova Brasil, a national assessment carried out every two years since 2005, consisting of standardized tests of Portuguese (hereinafter "reading") and mathematics. Prova Brasil is administered to all students in the 5th and 9th grades at all public schools with 20 or more students in the assessed grades. In addition to the Prova Brasil tests, context questionnaires are administered to students, teachers, principals, as well as a questionnaire about the school to the person administering the test. Data refer to municipal and state schools. We excluded federal public schools as they represent an insignificant part of all enrollments and have very different characteristics from other public schools. Results for 2007 to 2017 for reading and mathematics proficiencies, as well as students' self-declaration on grade repetition experiences, are summarized in Table 1.

TABLE 1 – Number of students per million (unit: 10^6): total with proficiency and pass/fail self-declaration by stage and year

STAGE	INFORMATION	PROVA BRASIL YEAR					
		2007	2009	2011	2013	2015	2017
5th grade	**Total**	**2.8**	**3.1**	**2.6**	**2.5**	**2.5**	**2.6**
	Proficiencies	2.3	2.5	2.3	2.0	2.0	2.2
	No information	0.5	0.6	0.4	0.4	0.4	0.4
	Pass/Fail	2.1	2.4	2.2	1.9	1.9	2.0
	No information	0.8	0.7	0.5	0.6	0.5	0.6
9th grade	**Total**	**2.5**	**2.8**	**2.6**	**2.7**	**2.4**	**2.3**
	Proficiencies	1.8	2.0	2.0	2.0	1.8	1.8
	No information	0.7	0.8	0.6	0.7	0.6	0.5
	Pass/Fail	1.7	1.9	2.0	1.9	1.8	1.7
	No information	0.7	0.9	0.6	0.7	0.6	0.6

Source: Data from *Prova Brasil* 2007, 2009, 2011, 2013, 2015, 2017 – municipal and state schools (Prepared by the authors).

It is worth highlighting the amount of data. Every two years, about 5 million 5th and 9th grade students are eligible for Prova Brasil. Therefore, one can say that data from Prova Brasil are the most complete about primary education.[6] However, a large number of students provide no information on either variable, especially for the 9th grade and for the fail variable. For this paper, we will assume that missing data have a completely random distribution and that valid information is robust for analyzing the evolution

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6 The Census of Basic Education certainly produces complete data both on schools and all enrolled students, but educational assessments include information about learning and performance factors that are not the focus of the Census.

of primary and lower secondary education quality. However, in analyzes not included in this article, we found the percentage of missing data to vary significantly between states, which indicates the need for further studies to test for patterns that can bias results.

Learning outcomes and self-declaration on grade repetition will be analyzed according to discriminating variables school location and student social background. Table A1 in the Appendix presents the descriptive statistics for these variables. It is worth noting that 2007 had no representation of rural schools (less than 0.05% of students), which began to participate significantly the following year. Thus, period comparisons should always take this into account.

Also in the Appendix, Table A2 shows the distribution of the social background variables: gender, race/color, and socioeconomic status (SES). Regarding the distribution by gender, we found a gender ratio inversion in the transition from primary education (boys are the majority) to lower secondary education (girls become the majority). This is related to the fact that boys' greater birth figures compared to girls (a well-known demographic phenomenon) finds in education its first selective filter, i.e., early grade repetition, which is much higher among boys, as we shall see below.

In the race/color distribution, we highlight the reduction in the percentage of students who declared themselves white and the increase in the number of students who declared themselves brown, particularly in the 9th grade, in which the percentage of self-declared blacks has also increased. This change is consistent with demographic surveys that found an increase in the population who is self-declared black or brown in Brazil (SOARES, 2008). The change in the variable's distribution due to social behavior may influence statistical trends over time. However, examining this variable's consistency is beyond the scope of this paper.

With regard to socioeconomic status (SES),[7] which measures the status of students' families in a social hierarchy (0 to 10-point scale), the average has increased from 2007 to 2013. In 2015, the SES remained the same as in the previous year for students in primary education and decreased for those in lower secondary education. In 2017, the mean values decreased for both levels.

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7 Socioeconomic status (SES) was estimated using an Item Response Theory (IRT) model that measures this latent feature according to the methodology described by Alves, Soares and Xavier (2014).

RESULTS

Learning Tendencies

Table 2 shows the distribution of students at state and municipal schools who took the Prova Brasil from 2007 and 2017 over four learning levels. Considering the 2007 baseline year, the change in the percentage of students who reached at least the "adequate" learning level reflects a consistent increase (a minimum growth of 13% in mathematics for the 9th grade from 2007 to 2009; a maximum increase of 104% in reading for the 5th grade from 2007 to 2015), which was greater in reading than in mathematics.

TABLE 2 – Student Percentage Distribution by Proficiency Level according to Stage and Year

STAGE	LEARNING		PROVA BRASIL YEAR					
			2007	2009	2011	2013	2015	2017
5th grade	Reading	Below Basic	30.2	26.1	22.7	22.7	13.9	12.4
		Basic	44.4	42.4	40.2	35.8	34.4	30.6
		Adequate	21.3	24.0	27.0	27.9	34.0	34.9
		Advanced	4.0	7.6	10.0	13.5	17.6	22.0
	Mathematics	Below Basic	38.7	31.0	28.3	28.4	20.1	19.1
		Basic	39.9	38.8	38.4	35.5	39.9	36.0
		Adequate	17.8	23.2	24.4	25.3	28.6	32.1
		Advanced	3.6	6.9	8.9	10.8	11.5	12.8
9th grade	Reading	Below Basic	27.4	22.1	21.3	23.3	17.9	15.7
		Basic	57.0	55.5	55.7	52.0	52.4	49.7
		Adequate	14.2	19.7	20.0	21.1	25.1	28.4
		Advanced	1.4	2.7	3.1	3.6	4.7	6.1
	Mathematics	Below Basic	37.9	39.0	33.9	35.7	31.1	30.2
		Basic	52.8	50.5	53.8	52.5	55.1	53.8
		Adequate	8.4	9.4	11.0	10.6	12.2	13.9
		Advanced	0.9	1.1	1.3	1.3	1.7	2.1

Source: Data from *Prova Brasil* 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

It is worth noting that since 2015, the percentage of 5th graders who were below basic dropped to less than half what it was in 2007. At the other extreme, the percentage of students at the advanced level in 2017 increased fivefold compared to ten years earlier. In 2017, the combined percentages of adequate and advanced levels (57%) brought the 5th grade reading result closer to the target of 70% of students at levels adequate and above (see Table 1). In mathematics, 5th graders' performance was also found to increase, though far from what would be adequate as 55% of students still had not reached the learning expectation by the end of the period.

With regard to 9th grade reading proficiency, students at the adequate and advanced levels increased threefold during the 2007-2017 period, but 65.5% did not reach the adequate level in 2017. In mathematics, the percentage of students who reached at least the adequate level grew by little more than 50% during the analyzed period, but in 2017 there were still 84% of students who did not reach adequate.

Table 3 shows the results by location and country region. For the sake of simplicity, results will henceforth be described as the percentage of students who have reached at least the adequate level. With regard to the whole of Brazil, there is clear improvement for all locations and regions, though important differences were found that confirm the known patterns of regional inequalities (CERQUEIRA; SAWYER; 2007; SOARES et al., 2012; FERRÃO et al., 2001). In rural schools in the North and Northeast, there are systematically fewer students who achieved adequate proficiency than in urban schools in the South and Southeast. Results for the Central-West are in an intermediate range.

TABLE 3 – Percentage of students who reached at least the adequate level in reading and mathematics by stage, location, region and grade

STAGE	SCHOOL LOCATION	READING						MATHEMATICS					
		2007	2009	2011	2013	2015	2017	2007	2009	2011	2013	2015	2017
5th grade	Rural	(*)	15.4	20.4	22.6	32.0	38.3	(*)	14.3	17.3	19.1	22.7	27.8
	Urban	(*)	33.3	38.8	43.5	53.8	59.7	(*)	31.8	35.0	38.0	41.9	47.5
	North	15.4	20.9	25.1	27.8	37.7	42.8	10.8	16.6	18.6	21.0	24.4	29.5
	Northeast	13.2	16.3	21.6	24.8	35.9	42.3	9.9	13.3	16.5	19.4	23.8	29.1
	Southeast	31.3	41.0	45.9	51.9	62.2	67.4	27.1	41.3	43.6	47.3	51.8	56.8
	South	31.7	37.9	46.4	54.2	62.3	68.0	28.2	37.8	44.0	49.6	51.8	57.2
	Central-West	26.5	35.2	42.6	47.1	55.2	61.2	21.4	31.5	36.6	40.0	39.7	46.5
9th grade	Rural	(*)	11.8	11.8	13.7	18.2	21.9	(*)	5.2	6.7	6.4	8.1	9.7
	Urban	(*)	23.3	24.0	25.6	30.8	36.2	(*)	10.9	12.8	12.3	14.4	16.8
	North	10.8	17.0	16.4	18.3	22.1	26.2	4.9	6.0	7.5	6.8	7.9	9.5
	Northeast	8.5	13.1	13.4	15.8	21.3	26.0	4.0	4.8	6.5	6.3	8.4	10.6
	Southeast	18.8	27.4	28.4	29.5	34.4	39.5	11.5	13.5	15.5	15.2	17.1	19.3
	South	18.8	27.2	27.4	28.6	35.9	43.2	12.8	14.5	16.1	14.4	18.4	22.1
	Central-West	14.9	22.6	23.5	26.8	33.1	39.0	8.8	9.8	12.0	12.6	15.2	18.2

Source: Data from *Prova Brasil* 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

(*) In 2007, rural schools were not represented.

For the 5th grade, the best reading results are in the South and Southeast regions, where respectively 68% and 67.4% of students reached the adequate level in 2017. For the 9th grade, despite some improvement, all percentages are low, especially for students in rural schools in the Northeast and North. In mathematics, few students have reached the adequate level. In rural areas and

in the North and Northeast, about 90% of students did not reach the learning target for the 9th grade.

Tables displaying percentages of students by state are in tables A3 (reading) and A4 (mathematics) in the Appendix. There are some noteworthy exceptions in the North and Northeast, where, as seen earlier, fewer students reached the adequate level. In the North, the state of Acre has the best results since 2009 for the 5th grade, and in 2011 for the 9th grade, closely followed by the state of Rondônia. In the Northeast, results for the state of Ceará stand out both in regional and in national terms.

We then analyze the percentage of students who reached the adequate learning level according to social group, i.e., by gender, color/race and SES. Table 4 shows that female students perform better in reading than male students, and the opposite occurs in mathematics, a well-known pattern in the educational literature (EURYDICE, 2011; ALVES; SOARES; XAVIER, 2016; XAVIER; ALVES, 2015; MARTÍNEZ; SERNA, 2018). During the analyzed period, the percentage of girls who reached the adequate level in the 5th grade increased by 34%. Boys advanced slightly less (31%). We also found growth, albeit more modest, in mathematics, i.e., around 24% for both groups; thus, the initial difference practically remained in 2017. That year, the difference between boys and girls at the adequate level in mathematics was only 1.3%; in reading, there were 11% more girls at this level.

For the 9th grade, inequality patterns remained as in the first stage of primary education. However, boys' advantage in mathematics increased slightly over the period (7% higher for boys at the adequate level in 2017). The tendency towards equity in the previous stage did not remain; on the contrary, girls' disadvantage in mathematics increased.

With regard to the race/color variable, the learning patterns for the 5th and 9th grades in reading and mathematics are similar. The percentage of students who reached the adequate level increased for all groups, but the initial differences remained. Growth was higher for white students, except for reading for the 5th grade, where brown students had the same increment pattern. As to black students, although the percentage who reached the adequate level also increased, the increase was smaller and their difference from whites increased in 2017. Students who declared themselves yellow showed a better performance than brown ones, while indigenous students had similar results to those for blacks.

TABLE 4 – Percentage of students who reached the adequate level by stage, gender, race/color and socioeconomic status

STAGE	VARIABLES	READING						MATHEMATICS					
		2007	2009	2011	2013	2015	2017	2007	2009	2011	2013	2015	2017
5th grade	Male	22.1	28.4	32.6	38.1	48.0	53.1	23.0	32.1	35.8	38.9	42.4	47.0
	Female	30.3	37.2	44.1	48.8	58.3	64.3	20.9	30.2	32.7	36.7	39.9	45.7
	White	30.7	37.4	44.9	50.5	58.7	64.7	26.5	36.5	41.7	45.3	47.7	53.7
	Black	15.5	21.2	26.8	31.4	40.5	39.9	12.2	19.5	22.9	26.0	28.8	28.7
	Brown	25.7	32.4	37.4	44.0	54.1	59.9	21.3	30.7	33.2	38.3	41.7	46.7
	Yellow	20.8	27.4	35.9	40.2	51.9	49.4	18.2	26.3	32.6	35.2	40.6	38.8
	Indigenous	26.7	31.3	40.1	46.0	57.8	58.0	20.3	27.5	32.9	37.2	42.3	43.4
	SES--	15.8	17.7	23.0	24.6	33.8	39.2	12.8	15.9	18.5	19.6	22.4	26.9
	SES-	21.4	26.2	31.2	35.4	46.4	52.4	17.3	24.3	26.6	29.4	33.2	38.7
	SES+-	25.1	31.8	37.9	44.0	54.7	60.0	20.8	30.4	33.7	37.8	41.8	46.8
	SES+	29.6	38.2	44.4	51.3	61.2	66.3	25.3	37.1	40.8	45.8	49.5	54.6
	SES++	35.6	44.5	49.8	54.9	63.9	69.0	31.5	43.9	47.9	50.8	54.6	59.7
9th grade	Male	12.7	18.5	18.8	19.9	25.5	31.0	11.7	13.0	14.6	13.6	16.8	19.9
	Female	18.5	26.0	27.2	29.7	34.4	39.1	7.4	8.4	10.6	10.6	11.5	12.9
	White	20.8	28.9	30.5	32.2	38.3	44.0	13.5	15.2	17.5	16.9	19.8	22.7
	Black	10.9	16.3	17.2	18.3	23.2	26.6	5.5	6.7	8.3	7.7	9.3	10.3
	Brown	13.2	19.8	20.7	23.1	28.2	33.3	7.3	8.5	10.5	10.6	12.6	14.7
	Yellow	16.0	23.9	25.2	26.7	32.5	35.4	9.3	10.8	13.1	12.1	14.0	15.0
	Indigenous	12.0	17.6	18.1	20.3	27.3	30.2	6.0	6.8	8.7	8.1	10.9	11.9
	SES--	8.1	12.4	12.1	14.3	18.8	22.2	4.0	4.5	5.8	5.6	6.9	8.1
	SES-	11.8	18.2	18.3	21.2	25.7	29.7	6.3	7.1	8.9	8.9	10.4	11.5
	SES+-	14.8	22.1	23.5	26.0	31.1	35.6	8.3	9.6	11.9	11.9	13.7	15.4
	SES+	18.7	26.9	28.4	29.8	35.2	41.2	11.4	12.9	15.3	14.8	17.1	20.1
	SES++	24.8	32.6	33.0	32.6	38.4	45.0	16.7	18.3	19.9	18.4	21.5	25.4

Source: Data from *Prova Brasil* 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

In order to analyze the tendencies by family Socioeconomic Status (SES), the original continuous scale (0 to 10 points) was divided into quintiles for each year so as to maintain comparability. We found that the association between SES and the percentage of students who reached the adequate level is unmistakable. The highest percentage of students with adequate learning in all results presented so far appears in the highest SES quintile for reading for the 5th grade (69%, in 2017). At the other extreme, the lowest percentages in all years are those of students in the lowest SES quintile, for the 9th grade, for mathematics.

Tendencies about Student Promotion

Considering students who have never experienced grade repetition, i.e., the status of education success, Table 5 shows that the percentage of students in this situation increased from 2007 to 2017. However, in 2017 there are still 22% of students in the 5th grade who declared that they had been previously retained, although this is a stage in which grade repetition is not recommended. This rate is 30% for 9th graders.

TABLE 5 - Percentage of students who self-declared "to never have been retained" for Brazil, location, region and year

STAGE	SCHOOL LOCATION	PROVA BRASIL YEAR					
		2007	2009	2011	2013	2015	2017
5th grade	Brazil	69.5	68.5	69.4	71	75.3	77.9
	Rural	(*)	54.3	55.7	59.1	64.8	69.8
	Urban	(*)	70.0	70.8	72.3	76.5	79.1
	North	61.8	59.9	58.9	62.4	67.0	71.2
	Northeast	57.1	56.0	57.7	60.4	66.2	69.9
	Southeast	77.1	77.0	77.7	77.5	82.7	84.4
	South	71.9	71.9	72.3	77.5	77.8	80.4
	Central-West	67.8	69.3	72.3	74.5	77.1	80.1
9th grade	Brazil	66.4	65.1	66.1	68.2	69.6	70.1
	Rural	(*)	56.0	55.8	57.9	60.8	63.4
	Urban	(*)	65.9	66.9	69.1	70.4	71.0
	North	59.6	59.1	59.2	61.1	62.8	64.8
	Northeast	54.5	55.3	55.6	57.9	60.7	63.0
	Southeast	73.6	72.2	73.7	75.5	76.4	75.1
	South	66.5	65.7	66.4	69.6	69.0	73.6
	Central-West	62.2	64.8	64.0	67.4	71.5	74.1

Source: Data from *Prova Brasil* 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

(*) In 2007, rural schools were not represented.

The Southeast had the best result and closest to the target: in 2017, 84.4% of 5th grade students had never been retained. The Central-West was the region that advanced the most during the analyzed period and surpassed the South in education success statistics for the 9th grade. It is worth noting that the differences have decreased between urban and rural schools and between Southeast (greatest promotion figures) and Northeast (smallest promotion figures).

Among the states (Table A5, Appendix), Acre stands out in the North for its learning level. Rondônia, which also stood out for its learning, did not succeed as much in promoting students; on the contrary, there were almost 30% of students in the 5th grade and 40% in the 9th grade who said they had been retained once or more. In the Northeast, Ceará has the largest percentage of students who have always been promoted, far above the other states in the region, thus confirming the success of its educational policies to ensure student learning and decrease grade repetition. In the Southeast, São Paulo and Minas Gerais have the greatest number of students who have always been promoted. In the South, Santa Catarina is the positive case and Rio Grande do Sul, the negative one. In Mato Grosso, the increase in the percentage of students with education success from 2007 to 2015 is almost twice that of other states in the region.

The percentage of students who declared no repetition by gender, color/race and SES are shown in Table 6. We highlight three results: improvement for all groups during the period; the reduction of inequalities

between self-declared white and black, white and brown, yellow and indigenous students, as well as between those of higher and lower SES; and the pattern of inequality that is practically unchanged between male and female students, the latter being much more successful in their school trajectory.

TABLE 6 – Percentage of students who declared "to never have been retained" by gender, color, SES, and year

STAGE	VARIABLES	PROVA BRASIL YEAR					
		2007	2009	2011	2013	2015	2017
5th grade	Male	65.5	64.7	65.3	67.1	71.3	74.0
	Female	74.5	73.7	75.0	76.8	80.9	83.3
	White	74.6	73.9	75.7	77.0	79.8	82.0
	Black	59.5	59.9	60.5	62.3	67.0	67.2
	Brown	69.2	68.2	69.3	72.1	76.6	79.8
	Yellow	64.5	64.3	66.3	68.1	73.1	73.3
	Indigenous	68.2	66.2	68.0	70.4	75.4	75.8
	SES--	56.3	53.4	55.7	58.7	63.8	67.5
	SES-	65.7	64.0	65.0	67.1	72.2	75.4
	SES+-	70.7	69.9	70.9	72.9	77.4	79.6
	SES+	75.2	75.4	76.0	77.2	81.1	82.9
	SES++	79.6	79.5	79.5	79.1	82.3	84.2
9th grade	Male	60.9	59.7	60.4	63.0	64.4	64.8
	Female	71.4	70.1	71.5	73.5	74.8	75.9
	White	71.9	70.8	72.3	74.2	75.0	75.4
	Black	57.5	56.7	57.7	60.7	62.6	62.2
	Brown	65.0	63.9	65.2	67.8	69.5	70.6
	Yellow	63.5	62.9	64.1	66.6	68.8	69.5
	Indigenous	62.7	60.7	61.1	63.2	66.5	67.2
	SES--	54.2	53.0	53.5	55.6	58.5	59.8
	SES-	63.0	61.8	62.6	65.4	66.9	67.1
	SES+-	67.7	66.4	68.1	71.1	72.0	71.6
	SES+	71.9	70.8	72.4	74.2	75.0	75.5
	SES++	75.0	73.7	74.0	74.9	75.7	76.9

Source: Data from *Prova Brasil* 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

Multiplied Inequalities

We have so far described inequalities both in learning and in education success (non-repetition) according to group characteristics, one at a time. But inequalities are complex, and when groups are defined by multiple criteria, differences become even sharper, as shown by Alves, Soares and Xavier (2016) and Soares and Delgado (2016) based on data from Prova Brasil until 2013.

In line with previous research, we will show the learning gap between groups defined by multiple social criteria (gender, color/race and SES), while adding student history ('never retained' or 'has been retained') and considering the percentage of those who reached the adequate learning level. For this

analysis, SES was divided by the median, and 24 groups[8] were created. For the sake of simplicity, we present only the descriptive analyzes for 5th graders in reading, who have the best performance. Table 7 shows these results, in which the percentages are in decreasing order considering the 2017 result.

TABLE 7 - Percentage of 5th graders who reached the adequate and advanced levels in reading by multiple groups and year

MULTIPLE GROUPS	2007	2009	2011	2013	2015	2017
Female, White, SES+, no repetition	49.2	57.5	66.0	72.1	77.5	82.8
Female, Brown, SES+, no repetition	42.3	51.8	58.8	66.1	73.6	78.4
Male, White, SES+, no repetition	39.7	48.5	55.6	63.6	70.6	75.8
Male, Brown, SES+, no repetition	33.5	42.8	47.8	57.5	66.2	71.2
Female, White, SES-, no repetition	32.1	37.8	47.7	52.4	60.2	67.4
Female, Brown, SES-, no repetition	31.0	37.8	45.1	50.7	59.2	65.5
Female, Black, SES+, no repetition	29.0	38.3	48.4	54.8	62.8	65.2
Male, White, SES-no repetition	24.6	29.1	36.6	41.8	51.0	57.2
Male, Brown, SES-, no repetition	24.1	29.7	34.2	40.6	50.1	56.3
Male, Black, SES+, no repetition	21.7	30.5	36.3	44.8	52.3	54.2
Female, Black, SES-, no repetition	20.9	27.4	36.6	40.3	49.4	50.5
Female, White, SES+, repetition	15.8	24.1	29.0	33.1	41.0	46.8
Female, Brown, SES+, repetition	15.5	23.8	27.2	31.6	41.2	46.0
Male, White, SES+, repetition	12.4	19.4	22.9	27.8	37.2	41.4
Male, Brown, SES+, repetition	12.3	18.7	20.5	25.8	35.3	39.4
Male, Black, SES-, no repetition	15.8	21.0	26.0	31.1	39.7	39.0
Female, Brown, SES-, repetition	13.1	18.2	20.8	23.7	31.3	35.4
Female, White, SES-, repetition	11.5	15.7	19.7	22.2	29.9	33.5
Female, Black, SES+, repetition	10.9	16.3	22.4	26.1	33.8	31.9
Male, Brown, SES-, repetition	10.0	13.4	14.5	17.4	25.4	28.3
Male, White, SES-, repetition	9.0	12.4	14.4	17.2	24.2	27.9
Male, Black, SES+, repetition	8.6	13.7	16.6	21.2	27.7	26.6
Female, Black, SES-, repetition	9.8	13.5	17.2	18.7	27.0	25.4
Male, Black, SES-, repetition	7.4	10.5	12.5	14.2	21.8	20.6

Source: Data from Prova Brasil 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

The group of white girls with higher SES and no repetition has the best results for all years. In 2017, 82.8% of students in this group were at least at the adequate level. Since 2013, they have reached the 70% target, and by 2009 most had already shown adequate learning. In addition to this group, brown girls and white boys with higher SES and no repetition have also reached the over 70% mark since 2015. In 2017, the group of brown boys with higher SES and no repetition also reached this target.

In 2017, all groups of "no repetition" students exceeded the 50% mark

[8] Table A6 in the Appendix shows the percentages of 5th graders per group. Note that due to missing data in the four variables, the number of cases without information multiplies in the created variable and exceeds 30%.

at the adequate level, except one, i.e., black boys with lower SES (39%). The lowest values in the table are found for groups with some grade repetition experience, the lowest percentage being for black students with lower SES, i.e., just above 20%.

DISCUSSION OF RESULTS

Based on our analysis of Prova Brasil data from 2007 to 2017, we have shown throughout this paper that the quality of primary and lower secondary education has improved, learning has evolved and grade repetition has decreased. Regarding school education quality, we found that for both 5th and 9th grades, the highest percentage of students reached at least the adequate learning level. In other words, in 2007, 25% of 5th graders reached this level in reading and 21% in mathematics; for 9th graders, these values were, respectively, 16% and 9%. In 2017, 57% of 5th graders reached the adequate level in reading and 45% in mathematics, whereas for 9th graders the percentages are respectively 35% and 16%. By comparing these results with the benchmark learning expectation (SOARES, 2009), i.e., 70%, we found that the progress above is still insufficient, particularly for lower secondary education in mathematics.

We found that the percentage of students with no self-declared repetition rose from 66% to 70% for 9th graders and from 70% to 78% for 5th graders during the 2007- 2017 period. In other words, grade repetition experiences were found to decrease for both stages.

Thus, the first research question is answered, i.e., if there were education quality advances in terms of learning and student grade progression for primary and lower secondary; additionally, we showed that improvements were greater in reading than in mathematics for the 5th grade.

Results did not confirm the hypothesis of Alves (2007, p. 539) who, based on his analysis of Saeb until 2003, expected that "in the near future, we will possibly see once more a sharp drop in non-promotion rates, with no change in school performance improvement". On the other hand, our evidence seems to contradict the assumption of Carnoy et al. (2015, p. 482) that "Saeb suggests that Brazilian students are having major gains in mathematics after 2005 and small gains in reading (Portuguese) only after 2011". However, due to methodological aspects, we cannot directly compare findings, particularly because of the difference in the sample population (the study of Carnoy *et al.* analyzes data for 9th graders in the Saeb test, which includes private schools)

and in the scales used to measure school education quality.

Given the evidence of a slight improvement in lower secondary education, we present two non-excluding hypotheses, which need to be researched in future studies. The first concerns the change in the student sample composition due to grade repetition, which is much more frequent in lower secondary education. Thus, the cohort that advances with no grade repetition becomes classmates of students who were retained in some grade (KLEIN, 2006; SIMÕES, 2016). Students who have been retained do not learn more because they repeat the grade, and those who have been retained by the 5th grade are more likely to repeat the experience (FERRÃO; COSTA; MATOS, 2017). The second hypothesis is the quality of education provided in lower secondary education. Research indicates that there are obstacles to improving that education level related to educational policies, school infrastructure, specific features of education organization, teachers and students (ALVES et al., 2017; ALVES; XAVIER, 2018; PADILHA et al., 2012; VIDAL; VIEIRA, 2011).

With regard to geographic differences, advances in school education quality for 5th graders in reading range from 13% in the state of Maranhão to 42% in the state of Ceará. This means that, in all Brazilian states, there has been an increase in the percentage of 5th graders who reached at least the adequate level. As to mathematics, these percentages range from 4%, also in Maranhão, to 31%, also in Ceará. For 9th graders, the minimum advance in reading was 5% in the state of Amapá and the maximum, 25% in the state of Santa Catarina. In mathematics, the minimum was 0% in the state of Roraima and the maximum, 12% in Santa Catarina.

With regard to social characteristics, we considered gender, race/color and socioeconomic status. We showed that school education quality fluctuates over the period by gender, i.e., the gender gap narrowed for 5th graders and remained for 9th graders, with girls ahead in reading and boys in mathematics. In addition, grade repetition rates are much lower for girls. Evidence suggests that boys who overcome the filters of social selectivity and grade repetition in primary education, in the more selective environment of lower secondary education they widen their small advantage in mathematics and slightly attenuate the difference in reading. The literature shows that a more feminine context can promote individuals' learning of mathematics, especially if they are boys (VAN HEK; KRAAYKAMP; PELZER, 2018; XAVIER; ALVES, 2015).

Regarding the self-declared race/color groups, education level advances were also found. However, progress is smaller for the self-declared black group compared to the other groups. Advances by socioeconomic status

were observed for all groups, though in a less pronounced way in the lower quintile of the socioeconomic status distribution. With regard to student grade progression, we found, overall, that the students who are worse off at the start (male, black, lower quintile of SES) have a greater progress, yet still insufficient to be considered at the same level as the other groups.

Based on the analysis of groups defined by multiple criteria generalizing the student's situation in relation to grade repetition, results show that all subgroups advance with different variations. It is worth noting that in 2017, for all "no repetition" subgroups, the percentage of students who reached at least the adequate level exceeds 50%, except for the subgroup of black students with lower SES. For these, the regular (no repetition) school trajectory does not seem sufficient to compensate for the disadvantages associated with poverty and racial prejudice. The subgroup formed by black students with lower SES and previous repetition had the lowest advance (14%) and, in 2017, it had the lowest percentage of students at the adequate level (21%), i.e., this subgroup is increasing its distance from the others in terms of the learning achieved until the 5th grade. Despite being a small group (as it represents approximately 1% of valid cases), these results seem to give empirical support to the "internalization of exclusion" argument (FREITAS, 2002).

Thus, with regard to the second research question, we have shown that all subgroups of 5th graders have improved their performance by reaching the adequate level by a higher percentage; however, there are still subgroups where improvement is slower, thus suggesting that the combination of SES and race /color continues to be a determining factor in reaching the adequate or advanced level, and grade repetition appears to be a barrier for all subgroups.

Regarding socioeconomic status, our results tend to agree with of what was recently analyzed by Ferrão et al. (2018), who demonstrated that student socioeconomic status, mother literacy and student working status have an effect on the student's mathematics and Portuguese scores in *Prova Brasil* 2015 (9th grade). However, the comparison between contextualized outcome models and added value models also shows that when those relationships are controlled by the student's prior knowledge measured by *Prova Brasil* 2011 (5th grade), those effects lose magnitude. Such comparison highlights the full potential of the Brazilian public school in the initial years of primary education as a space particularly conducive to reducing educational inequalities. Indeed, the evidence we have presented here that quality improvement was greater for the first stage of primary education (5th grade) than for the second stage (9th grade) is promising about the repercussion of these improvements

on students' school career. Additionally, our results are also in line with the literature (MORTIMORE; WHITTY, 1997) in suggesting that the educational process of extremely disadvantaged groups may be much more demanding in terms of public investment, and it calls for positive discrimination policies aimed at the schools that educate these groups. It naturally follows that, in the future, it will be necessary to quantify the relative differences between these groups in terms of learning and time required to achieve certain learning goals.

Finally, the variability of results obtained for the states suggests that geographic analyzes conducted by region tend to omit educational quality and equity achievements accomplished by certain education systems.

With regard to the limitations of this study, we emphasize that in order to analyze quality tendency it would be ideal to follow a cohort to find whether, over time, inequalities are mitigated between generations. Another limitation is the difference between the target population – i.e., students eligible for *Prova Brasil* – and the population studied here, which consists of students whose data were actually collected. Describing this difference would be a major contribution in terms of research.

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APPENDIX

TABLE A1 – Percentage of students by location, region, state, and education system (municipal or state), according to grade and year

SCHOOL UNIT VARIABLES		5TH GRADE						9TH GRADE					
		2007	2009	2011	2013	2015	2017	2007	2009	2011	2013	2015	2017
Location	Rural	(*)	10.1	10.0	10.5	10.1	13.6	(*)	7.9	7.8	7.9	8.4	11.6
	Urban	100.0	89.9	90.0	89.5	89.9	86.4	100.0	92.1	92.2	92.1	91.6	88.4
Region	North	9.6	10.3	10.6	12.0	12.0	12.0	7.6	8.5	8.7	9.2	9.7	10.7
	Northeast	25.0	27.8	27.7	28.7	27.8	28.6	25.5	27.9	26.5	26.0	27.0	29.0
	Southeast	43.6	40.6	42.2	36.7	38.0	37.6	45.3	42.2	42.6	42.3	43.6	37.5
	South	14.2	14.4	12.2	14.3	14.1	14.0	13.8	14.1	14.4	14.9	12.2	14.5
	Central-West	7.6	7.1	7.3	8.3	8.2	7.8	7.8	7.2	7.8	7.5	7.5	8.3
State	Rondônia	0.9	1.0	0.9	1.1	1.1	1.1	0.8	1.0	0.9	0.9	0.8	1.0
	Acre	0.4	0.5	0.4	0.6	0.6	0.6	0.3	0.4	0.4	0.5	0.5	0.6
	Amazonas	2.5	2.3	2.5	2.8	2.7	2.7	2.0	2.2	2.3	2.4	2.4	2.7
	Roraima	0.3	0.3	0.3	0.3	0.3	0.4	0.2	0.2	0.3	0.3	0.3	0.3
	Pará	4.1	4.8	5.0	5.7	5.7	5.7	3.1	3.5	3.4	3.8	4.2	4.6
	Amapá	0.5	0.5	0.5	0.5	0.6	0.6	0.4	0.4	0.4	0.4	0.5	0.5
	Tocantins	0.9	0.9	0.9	1.0	1.0	1.0	0.8	0.9	1.0	0.9	0.9	1.0
	Maranhão	3.2	4.2	4.1	4.1	4.1	4.4	2.9	3.5	3.5	3.8	4.0	4.4
	Piauí	1.4	1.5	1.5	1.7	1.6	1.8	1.3	1.3	1.4	1.4	1.5	1.7
	Ceará	3.9	4.2	4.4	4.6	4.1	4.3	4.7	4.7	4.4	4.0	4.3	4.8
	Rio Grande do Norte	1.6	1.6	1.7	1.9	1.8	1.7	1.4	1.5	1.3	1.3	1.4	1.6
	Paraíba	1.9	1.6	1.6	1.8	1.8	1.9	2.0	2.0	1.8	1.7	1.7	2.0
	Pernambuco	3.9	4.2	4.1	4.2	4.2	4.3	4.7	4.7	4.7	4.6	4.5	4.5
	Alagoas	1.8	2.2	2.1	2.1	2.0	1.9	1.8	1.9	1.9	1.8	1.7	1.7
	Sergipe	0.9	1.1	1.1	1.0	1.1	1.2	0.8	0.9	0.9	1.0	1.0	1.0
	Bahia	6.3	7.2	7.1	7.3	7.0	7.0	5.8	7.2	6.7	6.6	7.0	7.4
	Minas Gerais	10.9	9.3	11.2	10.9	9.3	9.8	12.5	10.8	10.1	9.5	12.0	11.3
	Espírito Santo	1.8	1.6	1.8	1.8	2.0	2.0	1.8	1.5	1.7	1.6	1.7	1.7
	Rio de Janeiro	7.5	6.6	6.8	6.9	6.3	6.1	6.4	6.7	6.0	5.9	6.2	6.1
	São Paulo	23.4	23.1	22.3	17.0	20.3	19.8	24.6	23.2	24.9	25.3	23.7	18.5
	Paraná	5.7	5.7	4.8	5.8	5.3	5.4	5.9	6.2	6.4	6.2	5.6	6.0
	Santa Catarina	3.1	3.6	3.5	3.3	3.4	3.4	3.0	3.2	3.4	4.3	3.1	3.5
	Rio Grande do Sul	5.3	5.1	3.9	5.3	5.4	5.2	4.9	4.7	4.5	4.5	3.5	5.0
	Mato Grosso do Sul	1.5	1.5	1.4	1.7	1.6	1.5	1.2	1.2	1.4	1.4	1.3	1.6
	Mato Grosso	1.7	1.6	1.6	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.8	1.9
	Goiás	3.2	2.7	2.9	3.5	3.4	3.3	3.7	3.3	3.3	3.0	3.1	3.5
	Distrito Federal	1.2	1.2	1.4	1.4	1.4	1.3	1.1	1.0	1.2	1.3	1.3	1.3
Education System	Estate	33.0	28.6	26.5	22.1	21.1	19.0	67.7	63.0	63.4	61.5	59.3	55.6
	Municipal	67.0	71.4	73.5	77.9	78.9	81.0	32.3	37.0	36.6	38.5	40.7	44.4

Source: Data from Prova Brasil 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

(*) Less than 0.05% of schools.

TABLE A2 - Statistics of student description variables by stage and year

STUDENT DESCRIPTION VARIABLES		5TH GRADE						9TH GRADE					
		2007	2009	2011	2013	2015	2017	2007	2009	2011	2013	2015	2017
Sex (%)	Male	37.1	39.6	42.0	39.0	40.4	40.1	33.2	32.0	35.8	34.9	35.8	36.2
	Female	36.5	37.9	40.1	37.5	38.9	38.8	38.5	37.3	40.5	38.0	38.2	37.9
	No information	26.4	22.5	17.9	23.5	20.7	21.0	28.3	30.6	23.7	27.2	26.0	25.9
Color (%)	White	25.5	26.3	24.8	22.5	21.9	23.1	25.7	23.4	25.1	22.8	20.5	21.5
	Black	8.6	9.4	8.0	7.5	7.6	8.3	7.8	7.7	7.9	7.8	8.9	8.9
	Brown	34.0	34.6	37.2	32.5	35.6	34.8	32.8	33.1	34.6	33.2	35.6	34.6
	Yellow	2.3	1.9	1.6	1.8	1.9	2.1	2.7	2.5	2.4	2.5	2.9	2.7
	Indigenous	2.9	2.8	2.0	2.1	2.0	2.1	2.5	2.2	1.7	1.6	1.6	1.8
	No information*	26.7	25.0	17.8	24.1	20.2	29.6	28.6	31.3	23.5	27.6	25.6	30.8
SES	Mean	4.9	4.8	5.1	5.2	5.2	5.1	4.8	4.9	5.1	5.3	5.2	5.1
	Standard deviation	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.3	1.1	1.2	1.2	1.2
	(%) No information	19.6	19.3	14.9	19.6	18.1	17.8	27.2	29.8	22.7	25.8	24.6	23.9

Source: Data from Prova Brasil 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

(*) No information. Variable "color" includes the option "I don't want to declare".

TABLE A3 - Percentage of students who reached adequate or advanced reading level by state, stage and year

STATE	5TH GRADE						9TH GRADE					
	2007	2009	2011	2013	2015	2017	2007	2009	2011	2013	2015	2017
RO	19.4	24.9	31.5	40.5	50.1	57.4	11.9	18.7	20.2	22.2	30.5	37.6
AC	21.4	30.2	33.1	44.5	52.1	60.9	11.0	19.8	18.4	24.3	25.8	33.0
AM	16.5	24.3	28.1	35.0	45.1	48.8	12.0	20.3	17.0	20.9	26.8	31.6
RR	19.9	20.7	27.1	32.4	40.7	49.3	11.4	15.2	15.1	15.2	19.3	24.1
PA	12.5	17.2	20.7	19.0	30.5	34.7	9.4	14.1	13.8	15.1	17.8	19.0
AP	12.9	16.9	17.6	18.2	28.1	32.4	8.9	13.8	13.1	13.4	14.1	17.6
TO	18.0	25.1	33.6	36.0	40.5	48.5	11.9	19.6	19.8	20.8	23.9	32.1
MA	12.7	12.9	15.9	16.3	25.9	29.3	8.6	12.1	11.3	11.7	15.4	16.9
PI	14.9	21.4	24.5	24.0	36.0	42.9	9.6	15.3	15.1	17.3	21.7	26.7
CE	14.3	22.5	33.0	39.7	56.4	63.1	9.0	16.0	17.5	23.3	32.5	40.0
RN	9.3	14.8	20.8	23.4	32.6	36.3	9.4	14.3	13.5	17.0	21.0	23.7
PB	14.4	18.4	23.2	25.3	34.1	39.7	8.6	13.0	13.0	14.4	19.0	23.5
PE	12.5	15.0	19.3	25.5	37.2	42.4	7.0	12.3	12.4	15.8	21.7	26.7
AL	9.7	10.2	13.5	18.4	29.7	39.8	5.9	9.5	8.4	10.0	15.4	24.1
SE	13.1	14.6	17.3	19.0	28.0	32.6	8.8	13.2	12.9	13.9	19.8	22.3
BA	14.4	15.9	20.6	21.7	33.4	40.3	9.5	12.2	12.9	14.4	19.4	22.0
MG	31.6	47.3	52.2	55.8	63.7	68.2	20.9	31.0	33.6	34.8	37.9	40.0
ES	28.3	35.8	40.8	45.9	56.8	61.3	15.9	25.9	26.2	27.7	33.3	39.1
RJ	26.9	35.2	41.6	44.6	53.6	57.3	16.1	24.9	25.9	26.9	30.2	35.3
SP	32.6	40.5	44.5	52.9	64.7	70.6	18.7	26.4	26.9	28.2	33.9	40.6
PR	33.7	40.9	45.6	55.9	65.0	71.6	18.2	26.5	26.2	27.8	31.8	42.2
SC	31.1	35.4	50.9	56.9	66.3	70.6	18.0	26.7	28.1	27.8	42.7	45.7
RS	30.0	36.0	43.2	50.4	56.6	61.7	20.1	28.3	28.7	30.6	36.0	42.6
MS	26.9	32.9	44.3	45.2	56.2	60.6	18.1	28.7	27.4	29.5	39.4	40.1
MT	23.0	29.9	33.0	38.4	49.5	54.1	13.3	21.5	19.7	20.0	24.7	30.9
GO	21.9	33.8	42.4	49.1	55.6	63.0	12.8	19.6	22.7	29.4	35.1	43.3
DF	40.7	48.1	52.2	55.0	60.4	67.2	20.1	26.4	26.7	27.0	33.6	36.9

Source: Data from Prova Brasil 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

TABLE A4 – Percentage of students who reached the adequate or advanced level in mathematics by state, stage, and year

5TH GRADE						9TH GRADE					
2007	2009	2011	2013	2015	2017	2007	2009	2011	2013	2015	2017
14.7	22.1	26.4	35.7	36.9	44.7	6.8	7.9	10.8	10.0	13.1	17.2
13.4	22.4	25.2	34.8	39.2	50.0	4.2	6.7	8.4	8.6	10.2	13.8
11.8	20.0	22.3	26.1	30.3	35.1	5.9	7.5	7.8	8.4	10.2	11.0
13.8	15.6	19.2	28.7	30.2	40.8	5.8	5.9	6.7	5.7	6.0	8.6
8.6	12.7	13.8	12.9	17.5	20.6	3.7	4.4	5.4	4.4	5.3	5.3
7.8	12.3	9.7	11.6	14.9	17.5	2.5	3.3	3.7	2.7	3.1	4.0
13.3	21.6	28.3	30.0	27.8	37.0	5.5	7.6	10.9	10.3	11.2	16.3
10.1	10.1	10.3	10.9	13.6	16.6	3.6	3.9	4.6	3.6	4.4	5.0
11.0	17.7	18.5	18.4	23.5	30.5	5.9	6.7	9.0	7.3	9.2	12.8
10.2	17.6	26.6	30.6	41.2	48.4	4.2	6.0	9.3	10.9	15.6	19.7
7.6	12.2	15.0	17.9	20.3	22.3	5.3	5.9	6.8	7.0	8.2	9.1
11.8	15.8	17.8	20.0	21.7	27.3	3.9	4.5	5.7	5.1	6.6	8.1
9.4	13.3	15.6	21.3	26.4	29.6	3.2	4.7	6.0	6.6	9.4	11.2
7.5	8.5	10.5	15.1	20.5	29.3	2.8	3.5	3.9	3.4	6.0	10.5
9.9	12.5	13.2	16.2	19.0	21.3	4.3	5.1	7.1	5.5	6.7	7.9
10.3	12.8	15.7	17.1	21.2	26.2	4.0	4.3	5.8	5.0	6.6	7.5
29.0	49.1	50.4	51.5	52.5	57.1	15.5	18.5	22.5	21.0	20.4	20.9
23.3	33.2	36.2	39.6	42.6	48.5	10.8	12.9	16.2	15.5	16.6	20.6
21.3	31.5	38.9	37.9	39.5	42.7	7.8	10.5	13.8	12.6	13.6	14.9
28.3	41.3	42.2	49.1	56.0	61.6	10.5	12.0	12.9	13.5	16.3	19.7
31.5	43.2	45.6	52.4	56.0	63.0	13.1	13.0	14.4	14.0	15.6	21.5
27.1	34.3	47.5	51.4	55.1	59.0	12.7	15.0	17.2	14.2	24.4	24.9
25.2	33.9	38.5	44.9	45.1	49.0	12.6	16.0	17.7	15.3	17.4	20.7
22.3	29.1	39.2	38.1	40.8	45.5	11.8	13.2	15.3	13.5	18.9	18.9
18.4	25.7	27.1	32.4	35.9	40.4	8.2	9.3	9.3	8.3	10.6	13.6
16.5	29.0	35.2	41.5	39.0	47.2	6.8	7.6	11.0	14.6	16.6	20.9
34.6	47.6	47.2	47.6	44.7	54.6	12.5	13.4	15.2	12.5	14.6	16.6

Source: Data from Prova Brasil 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

TABLE A5 - Percentage of students who have always passed, by state, stage, and year

STATE	5TH GRADE						9TH GRADE					
	2007	2009	2011	2013	2015	2017	2007	2009	2011	2013	2015	2017
RO	66.5	64.2	63.3	68.0	72.1	76.5	62.0	58.2	56.9	58.5	60.1	66.3
AC	67.2	67.0	65.9	72.2	75.3	78.4	65.6	64.6	72.0	71.8	71.6	74.8
AM	64.0	64.4	62.6	66.3	69.8	74.3	55.6	59.7	57.4	61.3	65.1	68.7
RR	72.3	70.8	70.6	72.9	74.5	79.1	65.6	64.1	61.6	62.0	64.0	68.5
PA	55.6	53.3	52.3	55.1	61.9	65.7	57.6	56.3	56.7	58.1	59.6	59.7
AP	62.5	65.6	58.9	60.8	69.3	70.1	65.7	66.3	64.2	65.2	63.6	62.5
TO	69.2	67.9	71.3	74.4	72.8	79.7	65.1	62.5	64.8	66.9	67.9	69.0
MA	62.3	60.6	61.3	64.3	69.6	72.4	60.4	60.2	61.4	62.3	63.1	64.0
PI	53.7	54.5	56.6	56.6	62.1	65.3	54.8	56.6	56.9	59.0	60.1	60.0
CE	63.7	61.8	64.3	67.2	73.7	79.6	60.4	61.1	61.6	64.6	70.3	73.2
RN	50.0	51.0	58.6	60.5	65.4	68.1	51.6	48.8	46.9	49.9	58.8	60.9
PB	55.0	54.8	57.1	60.2	63.4	67.4	51.8	53.7	54.3	55.4	59.7	61.5
PE	59.8	61.2	57.4	61.5	66.8	68.7	51.6	57.6	57.0	58.8	60.8	64.7
AL	56.2	51.7	57.3	61.6	66.4	69.8	47.2	48.8	50.2	50.1	56.2	62.1
SE	51.0	50.0	48.1	50.2	57.9	61.5	46.9	44.3	43.5	47.0	46.0	45.9
BA	52.3	50.5	52.7	55.0	62.7	66.2	53.3	51.4	51.5	55.3	56.8	57.2
MG	72.0	73.2	77.0	79.3	84.0	88.5	65.1	65.8	67.9	71.0	77.0	78.1
ES	71.8	70.2	71.4	72.5	76.7	76.3	68.4	68.5	68.3	66.5	66.8	66.2
RJ	65.6	66.8	65.1	65.3	66.4	68.2	61.9	62.2	63.7	64.5	65.1	65.2

STATE	5TH GRADE						9TH GRADE					
	2007	2009	2011	2013	2015	2017	2007	2009	2011	2013	2015	2017
SP	82.3	81.8	82.2	81.4	87.6	87.9	80.2	78.0	78.8	80.3	79.8	77.3
PR	73.7	72.8	73.3	79.0	77.5	81.3	65.8	66.0	66.7	69.1	65.0	73.1
SC	73.9	74.2	77.1	81.1	83.6	84.1	72.9	69.9	70.3	74.1	83.2	77.1
RS	68.7	69.2	66.3	73.1	74.0	76.4	62.9	62.3	63.0	65.6	61.6	71.4
MS	59.3	60.2	67.6	63.3	67.6	69.6	61.3	57.7	54.7	58.3	64.6	62.7
MT	71.9	71.8	75.6	83.2	87.7	87.8	61.5	65.8	68.8	73.5	79.2	85.2
GO	71.2	72.3	72.7	76.4	77.3	82.3	65.4	66.6	65.7	69.6	72.7	76.0
DF	66.0	70.6	72.5	72.3	74.4	76.1	54.7	66.4	62.8	63.0	64.5	64.8

Source: Data from Prova Brasil 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).

TABLE A6 - Percentage of 5th graders by multiple groups, according to year

MULTIPLE GROUPS – 5TH GRADE	PROVA BRASIL EDITION					
	2007	2009	2011	2013	2015	2017
Female, white, SES+, no repetition	5.7	6.0	6.0	5.4	5.4	5.9
Male, white, SES+, no repetition	5.5	5.9	5.8	5.2	5.3	5.6
Female, brown, SES+, no repetition	5.6	5.8	6.4	5.8	6.9	6.8
Male, brown, SES+, no retention	5.2	5.5	6.1	5.4	6.4	5.9
Female, black, SES+, no repetition	0.9	1.0	0.9	0.9	1.0	1.0
Male, black, SES+, no repetition	1.2	1.3	1.2	1.0	1.1	1.1
Female, white, SES-, no repetition	3.5	3.4	3.3	3.0	3.1	3.3
Male, white, SES-, no repetition	2.7	2.8	2.7	2.4	2.7	2.9
Female, brown, SES-, no repetition	6.0	5.9	6.7	5.8	7.0	7.5
Male, brown, SES-, no repetition	4.4	4.6	5.1	4.4	5.5	5.5
Female, black, SES-,no repetition	1.2	1.3	1.1	1.1	1.3	1.4
Male, black, SES-,no repetition	1.2	1.3	1.2	1.1	1.3	1.4
Female, white, SES+, repetition	1.0	1.0	0.9	0.8	0.7	0.6
Male, white, SES+, repetition	1.7	1.8	1.6	1.4	1.2	1.1
Female, brown, SES+, repetition	1.3	1.4	1.4	1.2	1.0	0.9
Male, brown, SES+, repetition	2.1	2.1	2.3	1.9	1.8	1.4
Female, black, SES+, repetition	0.4	0.4	0.3	0.3	0.3	0.3
Male, black, SES+, repetition	0.7	0.7	0.7	0.6	0.5	0.5
Female, white, SES-, repetition	1.4	1.5	1.3	1.0	0.9	0.8
Male, white, SES-, repetition	1.7	1.9	1.7	1.4	1.3	1.2
Female, brown, SES-, repetition	2.7	2.9	3.0	2.2	2.0	1.8
Male, brown, SES-, repetition	3.2	3.6	3.8	2.8	2.8	2.3
Female, black, SES-, repetition	0.8	0.9	0.7	0.6	0.6	0.6
Male, black, SES-, repetition	1.1	1.3	1.1	0.9	0.9	0.9
No information	38.7	35.7	34.5	43.3	39.2	39.3

Source: Data from Prova Brasil 2007, 2009, 2011, 2013, 2015, 2017 – state and municipal schools (Prepared by the authors).