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The socioeconomic level of public school students and the conditions for the provision of education in the Brazilian municipalities[1]

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Abstract: The purpose of this article is to analyze the socioeconomic background of elementary school students from public schools in the Brazilian municipalities, through a synthetic measure, the Student Socioeconomic Index of the Municipalities (ISE-M). It also aims to analyze the achievement in educational assessments and the conditions for the provision of education in the municipalities. The ISE-M was generated through factor analysis with the use of data from the contextual questionnaire of *Prova Brasil 2007* (2007 Brazil Test) held with approximately 4.1 million students in 5,553 municipalities. The

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results ratified the association between the socioeconomic level of students and the educational outputs observed in other studies. In addition, they showed that there is a relationship between the socioeconomic status and the educational infrastructure available in the municipalities, because there is evidence that the conditions for the provision of education are lower in places that have a higher proportion of socioeconomically disadvantaged students.
Keywords: basic education; public education; socioeconomic level of students; conditions for the provision of education; educational inequality.

O nível socioeconômico dos alunos das escolas públicas e as condições de oferta de ensino nos municípios brasileiros

Resumo: O objetivo deste artigo é analisar o contexto socioeconômico dos alunos das escolas públicas de educação básica nos municípios brasileiros por meio de uma medida sintética, o Indicador Socioeconômico Estudantil dos Municípios (ISE-M). Igualmente, visa analisar o desempenho dos alunos nas avaliações educacionais e as condições de oferta de ensino dos municípios. O ISE-M foi gerado por meio da análise fatorial com a utilização de dados do questionário contextual da Prova Brasil 2007 de cerca de 4,1 milhões de alunos agregados em 5.553 municípios. Os resultados ratificaram a associação entre o nível socioeconômico e o desempenho educacional dos alunos, verificada em outras pesquisas. Além disso, mostraram que há relação entre o *status* socioeconômico e a infraestrutura educacional disponível nos municípios, pois há evidências de que as condições de oferta de ensino são inferiores nas localidades que possuem maior proporção de alunos menos favorecidos socioeconomicamente.
Palavras-chave: educação básica; educação pública; nível socioeconômico dos alunos; condições de oferta de ensino; desigualdade educacional.

Nivel socioeconómico de los alumnos de las escuelas públicas y condiciones de oferta educativa en los municipios brasileros

Resumen: El objetivo de este trabajo es analizar el contexto socioeconómico de los alumnos de educación básica de escuelas públicas en los municipios brasileros, mediante una medida sintética, el Indicador Socioeconómico Estudiantil de los Municipios (ISE-M). Igualmente, se pretende examinar el desempeño de los alumnos en las evaluaciones educacionales y las condiciones de la oferta educativa de los municipios. El ISE-M fue construido con base en el análisis factorial de los datos del cuestionario contextual de la Prova Brasil 2007, para cerca de 4,1 millones de alumnos, agregados en 5.553 municipios. Se ratificó la asociación entre el nivel socioeconómico de los alumnos y sus resultados educativos, verificada en otras investigaciones. También se mostró que hay relación entre el status socioeconómico y la infraestructura educativa disponible en los municipios, pues hay evidencias de que las condiciones de oferta educativa son inferiores en las localidades con una mayor proporción de alumnos menos favorecidos socioeconómicamente.
Palabras clave: Educación básica; educación pública; nivel socioeconómico; condiciones de oferta educativa; desigualdad educativa.

Introduction

Studies on education and stratification in developing countries have pointed out that historical, cultural and social factors (educational background of the family and the socioeconomic background of the students), macrostructural and political forces (mainly the

actions of the State in providing educational opportunities through investments, regulation and the structure of educational systems), school factors related to the conditions regarding the provision of education (school infrastructure, training and performance of teachers, teaching materials, class hours, number of students per class, etc..) and economic factors (impacts of education in the labor market in the social mobility of individuals) are associated with the educational inequalities and, therefore, with the appropriation of educational outputs between social groups (Barros, Mendonça, Santos, & Quintaes, 2001; Buchmann & Hannum, 2001; White, 1982).

Therefore, this article focuses on aspects related to the socioeconomic background of the students and the State actions regarding the provision of education based on data aggregated at the municipal level, because it assumes that the description of the differences in the socioeconomic background of the student population and the educational infrastructure in these places are an essential process for the formulation of policies within a country such as Brazil, where the municipalities are places for meeting the educational demands of society through collaboration between the three government spheres[2]. Thus, educational policies must be relevant to the history and reality of the municipalities in order to guarantee the right to quality education to all Brazilians, considering the regional and local diversities. Similarly, the State must provide mechanisms to point out the places where, by chance, there are imbalances in the provision or outputs of education to implement corrective actions.

Therefore, the purpose of this article is to analyze the socioeconomic background of elementary school students from public schools in the Brazilian municipalities, through a synthetic measure, the Student Socioeconomic Index of the Municipalities (ISE-M). It also aims to analyze the achievement in educational assessments and the conditions for the provision of education in the municipalities.

Initially, we will present the theoretical background of the study, followed by the methodological procedures that allowed the construction of the ISE-M. The third part analyzes the different groupings of municipalities formed based on the levels of the indicator proposed in contrast to the students' achievement in educational assessments and the characteristics of the conditions regarding the provision of education. In the end, we present the final considerations.

Theoretical Framework

The indicator of the socioeconomic level or the status that individuals occupy in a social hierarchy is an aspect widely studied by social sciences and a tradition of the American and English sociology. The first attempts to measure this construct began in the 1920s with the study of Chapin (1928) and Blishen (1958). However, the study of Duncan (1961) has become a methodological reference and perhaps the most influential study for the contemporary sociological studies. The socioeconomic index proposed by the author was developed through multiple regression, using income and education data from the 1950 U.S. population census, and an external variable on occupational prestige.

Since then, several authors have updated, objected and proposed new measures of socioeconomic status based on a combination of variables that express one or more of the

[2] Since it is not the focus of this article to further analyze issues related to Brazilian education federalism, that is, on aspects of the system of collaboration between the municipal, state and federal governments for the provision of education set forth in the Federal Constitution, an interesting reflection on the subject can be found in Oliveira & Santana (2010).

following aspects: income, education level, occupation, asset ownership and access to items of comfort in the household, marital status or family configuration, home quality, status of the place of residence, social and political behavior etc. (Alves & Soares, 2009; White, 1982).

In this sense, Hollingshead (1975) used four factors (education, gender, occupation and marital status) to calculate an index of social status based on the combination between education levels and occupations, and marital status categories. On the other hand, the study of Stevens and Featherman (1981) proposed an updated study of Duncan due to changes in the demographic, economic and educational characteristics of the workforce in the American society, especially in the occupational prestige resulting from changes in the relationship between the education level and economic attributes of the individuals and the increasing participation of women in the labor market. The authors also sought to overcome the limitations of the data from the 1950's that, according to them, have led Duncan to take arbitrary decisions that overlaid the initial socioeconomic index of certain degree of subjectivity.

Since the lack of relevant data on occupation can be an obstacle to the calculation of the socioeconomic indicators, Osborn (1987) used an alternative methodology to propose an index for the social position of the families using data based on the educational level of the householders, type of household, house tenure[3], number of people per room, car and telephone. For the authors, the selected variables provide greater reliability and sensitivity to measure the socioeconomic status where it is not possible to obtain lots of information about the type of occupation of the individual.

The study of Ganzeboom, De Graaf and Treiman (1992) also aimed to propose a measure of the social status of the individuals, but intended to make comparisons between countries. To this end, the authors calculated the International Socio-Economic Index of Occupational Status (ISEI) based on the International Standard Classification of Occupation (ISCO) through the comparison of education, occupation and income data of 73,901 male workers in 16 countries. Based on this information, 271 occupational categories were created and occupation came to be considered as the intervening variable of income and education level. According to the authors, this allows the inference and comparison of the social status of individuals from different countries only with the occupation data. For this characteristic, which facilitates the description of the socioeconomic aspects in large-scale international assessments, the ISEI has a great application in educational assessments such as the Programme for International Student Assessment (PISA)[4]. The ISEI has been updated and standardized according to the occupational status proposed by ISCO, published in 1988[5] in Ganzeboom and Treiman (1996).

Nakao and Treas (1992) and Cirino et al. (2002) are also other interesting international references on the construction of socioeconomic indexes. In Brazil, we

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[3] It informs the economics of the housing option of the family with regard to the lease, acquisition or ownership of the property. This variable is usually used in social research as an indicator of family income and wealth.

[4] International comparative assessment program organized by the Organisation for Economic Co-operation and Development (OECD) covering three skills: reading, mathematics and sciences. The test is applied to 15 year-old students (age that coincides with the end of the mandatory elementary school period in most countries) of the OECD countries (29 developed countries and Mexico) and others, such as Brazil, who participate as a guest. In the 2009 edition, PISA had 66 participating countries.

[5] The latest version of ISCO was published by the *International Labor Organization*, in 2008.

highlight the studies of Pastore (1979), Scalon (1998), Januzzi (2000), Pastore and Silva (2000) and Santos (2005).

The study of Pastore and Silva (2000), for instance, proposed a Socioeconomic Status Index (ISS) based on total income and years of study data collected by the National Sample Survey of Households (PNAD) in 1996. The ISS of each occupation is the average of the values of the variables used, presented on a scale from 0 to 100. Thus, the occupations with similar general characteristics and ISS with approximate values are grouped and form six strata[6]. According to the authors, through this procedure, it is possible to infer the social status of the individual based on the occupational status to which the individual belongs.

In general, as noted by Sirin (2005), educational level, occupation and income are the most recurrent variables in the proposals for socioeconomic measures, although there is no consensus on the best methodological procedures and variables to describe such a construct. Therefore, as described in the following section, the index proposed in this paper was based on the indirect observation of the level of education and income of students' families.

In any case, the measures that indicate the social status of individuals and families in the societies have become very relevant in social studies and, in particular, in educational assessments (Alves & Soares, 2009), especially since the 1960s, in view of the large number of studies that showed evidences that the socioeconomic factor explains large part of the educational achievement (Bowles & Gintis, 1976; Coleman, 1966; Hanushek, 1979, 1986; Jencks et al., 1972; Lee, 2000; Madaus, Airasian, & Kellaghan, 1980; Mosteller & Moynihan, 1972; Plowden & Britain, 1967; Rutter, Maughan, Mortimore, & Ouston, 1979; Soares, 2004; Soares & Andrade, 2006; White, 1982; Willms, 1992). Although the association between these factors is a reality in several countries, including developed countries (Reardon & Robinson, 2008), in Brazil, despite the advances to extend the access to education since 1970 (Oliveira, 2007), the social traits of the historical trajectory of the Brazilian educational system persist, which is highly selective and exclusive, marked by the severe inequality between the rich minority and the poor majority and the numerous social problems that feed back the educational exclusion cycle of the least privileged (Cury, 2008).

To give evidence of numbers to educational inequalities between individuals of different socioeconomic levels in the Brazilian context, Figure 1, with data on population of working age, between 25 years[7] and 64 years (estimated at 94.7 million people) raised the National Household Survey in 2008 shows educational inequality fostered by social and economic inequality.

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[6] The occupational strata range from low-lower (formed by unskilled rural workers), going through intermediate levels such as low-upper, middle-lower, middle-middle and middle-upper to high (consisting of high level professionals and large landholders).

[7] The international education statistics consider the age of 24 years old as a reference for the completion of graduation in higher education.

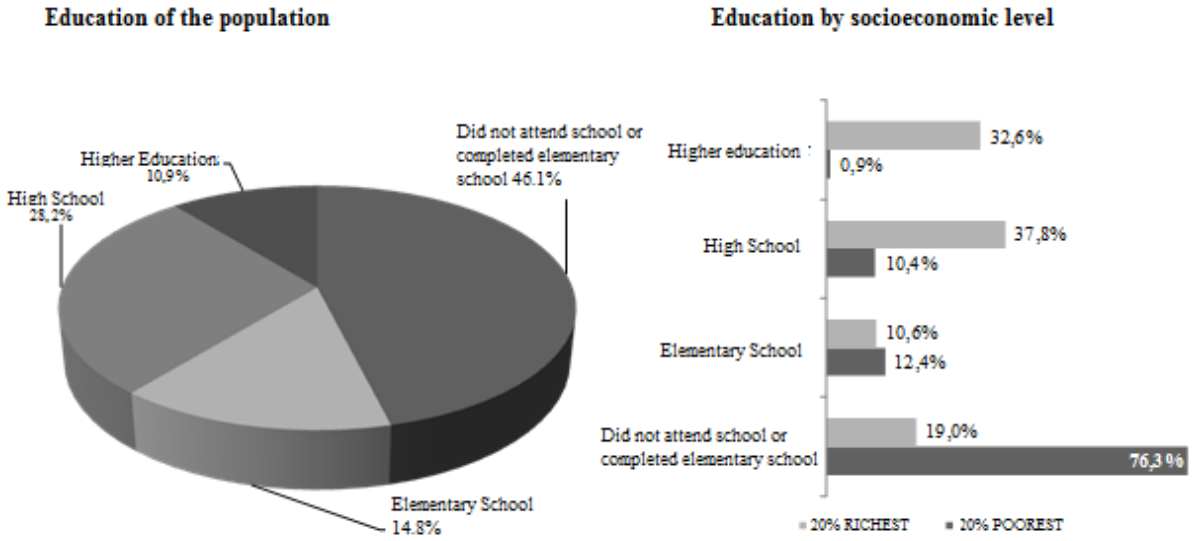

Figure 1. Education and socioeconomic level of the population between 25 and 64 years old Information summarized from the 2008 PNAD microdata

Initially, the area chart on the left in Figure 1 shows how complex is the realization of the right to education in Brazil, by showing that at the end of the first decade of this century, 46.1% of the economically active population has no formal education (according to PNAD 2008, 10.4% of this population did not attend school) or completed elementary school[8] (35.7% completed only the first grades of elementary school). The chart on the left shows that less than one-third (28.2%) completed only high school and only 10.9% completed higher education[9]. In the same figure, the bar chart on the right shows the relationship between the socioeconomic inequality and the educational inequality in the country. Since "it's in the labor market and paid employment that the education works on the distribution of income to mitigate or worsen the economic and social inequalities" (Brooke & Soares, 2008, p.18), the *household income per capita* was taken as a parameter for determining the income of the families. Then, the education level and income of the 20% poorest and 20% richest [10] were compared. By analyzing the level of education of these groups, the chart on the right shows that: (a) 76.3% of the poorest population have not studied or have not completed elementary school, in contrast to only 19% among the

[8] This finding is even more surprising if one considers the fact that elementary school is compulsory for children from 7 to 14 years old since the 1967 Constitution. In 2009, the Constitutional Amendment 59 changed the text of the Constitution in force and extended compulsory education for children aged 4 to 17 years old.

[9] A survey with data from 2007 on the education level of the adult population (between 25 and 64 years old) from 36 countries - with 30 members of the OECD (29 developed countries and Mexico) and six non-member countries (including Brazil) - reveals that, on average, 30% of the population of OECD countries have attended college. With special mention to: Canada (48%), New Zealand (41%), Japan (41%) and USA (40%). Brazil is ranked last in the general list that includes the non-member countries, including Mexico (16%) and Chile (13%) (OECD, 2010).

[10] According to PNAD 2008, the 20% poorest of the population has household income *per capita* of up to R$ 150 per month, while the 20% richest have incomes above R$ 801. Among the 10% richest and the 10% poorest, the income gap is 15 times. These data confirm the condition of Brazil as a member of the group of the most unequal countries in the world (Sen & Kliksberg, 2010).

richest; (b) 10.4% completed high school among the poorest, while nearly 37.8% did so among the richest, and (c) less than 1% completed higher education, while 32.6% among those with the highest household income *per capita* have completed this level of education.

Also, data from PNAD show that, despite the progress, the current Brazilian educational system, to some extent, has some characteristics of the existing system in the late nineteenth century in which, as stated by Cury (2008), education served the small literate and economically dominant elite. This is because, although the group that perceives household income *per capita* greater than R$ 800 per month represents only 25% of the total population under the age group analyzed, 76.3% of people who have completed higher education is part of it. It clearly shows that the chance of a Brazilian, coming from the poorest population, to have access to higher education is significantly lower[11].

Despite the evidences on the existence of a strong relationship between the socioeconomic status and the educational achievement shown by the Brazilian data and the research in several countries, it is important to note that the conclusions are not always used to support the work of the schools and reinforce the importance of education policies to mitigate social inequalities.

Therefore, according to the concept of the school role arising from the findings, the research on this issue can be divided into two groups. The first began with the study of Coleman (1966) and its conclusions had been ratified by Mosteller and Moynihan (1972), Jencks et al.(1972), Bowles and Gintis (1976) and Madaus et al. (1980), among others. These studies, conducted in developed countries, for some time spread the idea that "schools do not make a difference." This concept has gained momentum and is spread by some recent studies in economics of education on productivity or production function of education aimed at measuring the impact of increased educational inputs in school outputs assessed by the scores on large scale tests (Hanushek, 1979; 1986). These studies concluded that the socioeconomic conditions explain almost the entire variation of performance and that the school variables (building and facilities conditions available for education, equipment, level of education and training of teachers, number of students per class, organization of school work, as well as aspects related to management and leadership, etc..) have little ability to influence the educational outputs.

Obviously, these findings may have serious consequences for the operation of the public school systems. First because they undermine the school role given the supposed "almost inevitable determinism" of the socioeconomic factor on the educational future of children and teenagers. Second, they suggest that a greater financial investment in schools has no effect on the quality of education, which applied to developing countries where part of schools have conditions regarding the provision of education (building, teaching materials, equipment, class hours, number of students per class, etc..) that are inadequate and/or insufficient and the teaching profession is unattractive (due to low salaries and lack of working conditions), may contribute to the continuity of the educational problems, which solutions depend on a greater financial input for the sector.

The second group included the research of Rutter et al. (1979) as a starting point in the attempt to challenge the findings of the authors of the first school of thought and show that "schools make a difference." Along with Mortimore, Sammons, Stoll, Lewis, and Ecob (1988), Willms (1992) and Lee (2000) and a number of other studies, these authors agree that

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[11] According to PNAD 2008, only 1.2% of the population aged 25-64 years old who completed higher education in Brazil is part of the group that realizes 20% of the lowest household incomes *per capita.*

the socioeconomic background of the students has a strong influence on the educational achievement, however, they observed that the context in which learning occurs is also relevant. These studies challenge the magnitude of the influence of the socioeconomic factor verified by the studies correlated to Coleman's and make methodological criticisms to that research line, whose main ones are: (a) consider only the cognitive abilities measured by the tests as educational outputs; (b) the assumption of linearity in the relationship between educational *inputs and outputs* rather than seeking to understand the educational process; (c) the variables selected to operationalize the analysis; and (d) the use of correlated independent variables (multicollinearity). On the other hand, as shown by the reviews of Fuller (1987) and Fuller and Clarke (1994), numerous studies conducted in developing countries show that the infrastructure and school-related factors have a significant effect on the student achievement. Thus, these studies began a new thinking based on analysis of the analysis of the percentage change in the proficiency of students, not only in the input-output relationship of the school. Some studies show that for students from privileged socioeconomic conditions, the conditions offered by the school may have a lower influence, but for the least privileged, a school with better educational infrastructure may lead to a significant variation in their cognitive performance, contributing to overcoming the school delay caused by the social background to which they were submitted (Soares, 2004). In summary, these studies conclude that the school work is able to minimize the differences and help correct the social and economic direction of the least privileged through transformative educational opportunities.

Methodological Aspects

Based on the objectives of this study, we performed a quantitative descriptive study that used secondary data from assessments and surveys of the National Institute of Educational Studies and Research Anísio Teixeira (INEP), specifically *Prova Brasil* and the School Census of 2007.

With respect to Prova Brasil, we used data from nearly 4.1 million students in municipal and state schools collected through a contextual questionnaire[12]. These data were aggregated by municipality (territorial unit). Remember that 5,553 municipalities and 48,713 urban public schools participated in the evaluation, which represents almost all the municipalities and 89% of elementary schools in Brazil. The School Census, in turn, provided information on the conditions for the provision of education of public schools with regard to teacher training and a few items of the school infrastructure (whether they have library, computer lab and sports court).

According to the studies presented in the previous section, which used socioeconomic status measures to describe the position of the individuals on the social pyramid based on income, occupation and education, the calculation of the ISE-M based on the assumption that it is possible to reveal the socioeconomic level of the students' families by describing the access or possession of factors that characterize wealth, power and social status. Therefore, the data source used in this study provides a certain limitation, since

[12] The completed questionnaires applied to students from the 5th and 9th grade are identical in the questions used to generate the socioeconomic indicator proposed in this paper and are available at http://www.inep.gov.br/salas/download/prova_brasil/Questionarios_2007/questionarios_4.doc and http://www.inep.gov.br/salas/download/prova_brasil/Questionarios_2007/questionarios_8.doc

the data allow us to do so only indirectly, that is, by the description of the economic and social background of the students' families performed through information held on goods and services to which families have access (such as home appliances, car, computer, internet, housemaid services, etc..) in addition to the educational background of the parents. Thus, 14 questions were initially selected from the contextual questionnaire, which consisted of 15 variables pre-selected to make up the aforementioned index (see Table 1).

Table 1. (Continua)
Questions used from the contextual questionnaire of Prova Brasil and variables generated to build the ISE-M

Question from the contextual questionnaire	Variable generated	
Do you have a color TV at home? [A] Yes, one; [B] Yes, two; [C] Yes, three or more; [D] No	V1	TV
Do you have radio at home? [A] Yes, one; [B] Yes, two; [C] Yes, three or more; [D] No	V2	Radio
Do you have VCR or DVD at home? [A] Yes; [B] No	V3	VCR or DVD
Do you have a refrigerator at home? [A] Yes, one; [B] Two or more; [C] No	V4	Refrigerator
Do you have freezer at home? [A] Yes; [B] No; [C] Do not know	V5	Freezer
Do you have a washing machine at home? - [A] Yes; [B] No	V6	Washing machine
Do you a vacuum cleaner at home? [A] Yes; [B] No	V7	Vacuum cleaner
D you have a car at home? [A] Yes, one; [B] Yes, two; [C] Yes, three or more; [D] No	V8	Car
Does your house have a bathroom? [A] Yes, one; [B] Yes, two; [C] Yes, three; [D] Yes, more than three; [E] No	V9	Bathroom
Is there a housemaid working in your house? [A] Yes, a cleaning woman, once or twice a week; [B] Yes, one, from Monday to Friday; [C] Yes, two or more, from Monday to Friday; [D] No	V10	Housemaid
Do you have a computer at home?	V11	Computer
[A] Yes, with internet; [B] Yes, with no internet; [C] No	V12	Internet
In addition to school books, how many books do you have at home? [A] 10 to 20 books; [B] 21 to 100 books; [C] More than 100 books; [D] No	V13	Books
How far did your mother or stepmother study? [A] Never studied or did not complete the 4th grade; [B] Completed the 4th grade, but did not complete the 8th grade; [C] Completed the 8th grade, but did not complete High school; [D] Completed High school, but did not complete college; [E] completed college; [F] Do not know	V14	Mother's education

Table 1.
Questions used from the contextual questionnaire of Prova Brasil and variables generated to build the ISE-M

Question from the contextual questionnaire	Variable generated
How far did your father or stepfather study? [A] Never studied or did not complete the 4th grade; [B] Completed the 4th grade, but did not complete the 8th grade; [C] Completed the 8th grade, but did not complete High school; [D] Completed High school, but did not complete college; [E] completed college; [F] Do not know	V15 Father's education

Note: The text of the questions selected to comprise the ISE-M was taken from *Prova Brasil* questionnaires applied to students and is available at http://www.inep.gov.br/salas/download/prova_brasil /Questionarios_ 2007/questionarios_4.doc and http://www.inep.gov.br/salas/download/prova_brasil/ Questionarios_2007/ questionarios_8.doc

As the calculation of the municipal index was made through Factor Analysis, the data originally collected per student were aggregated at the municipal level. For this purpose, we initially performed a process of aggregation of data, which consisted the calculation of the absolute frequencies, and then, the relative frequencies of answers on each item of the questions selected from the questionnaire. The next step was to obtain the metric variables. Then, we calculated the weighted average of the answers for each set of students in each municipality in each question or the proportion of students who have access to the items selected. In the case of variables V1, V2, V4, V8, V9, V10, V13 (see Table 1), weights were assigned for the amount of goods that the students' families have to calculate the weighted average. This was a strategy to consider the amount of items, assuming that families who own two TVs or two cars have more economic power than others who only have one of each item. This procedure is similar to that used in *Critério Brasil*[13]. After calculating the weighted average, since the variables presented values in different scales, there was a standardization so that they remained on a scale from zero to one. For questions that described only the existence or absence of items (variables V3, V5, V6, V7, V11 and V12 in Table 1), we used the proportion of students in the municipality who have access to the items. The variables V14 and V15 shown in Table 1 were obtained by a slightly different procedure, because in order to increase the power of discrimination between the municipalities, we considered only the education of mothers or fathers in high school and college. Thus, these variables inform the proportion of mothers or fathers who have completed these levels at school.

As we observed a considerable amount of invalid answers to the questionnaires (blank or incorrectly marked) or the alternative marking "not sure" (which for the purpose of the ISE-M was not considered), there was a reduction in the number of valid answers. To avoid the risk of underestimating or overestimating the values of the index as a result of this reduction, only the municipalities with at least 20 valid answers to each question in the questionnaire obtained the ISE-M.

[13] Critério Brasil is calculated based on the allocation of points to the amount of goods (TV, radio, bathroom, car, housemaid, vacuum cleaner, washing machine, VCR/DVD, refrigerator and freezer*)* that the individuals have, in addition to considering the level of education of the head of the family. For each asset owned there is a score and the seven resulting economic classes are defined by the sum of the scores (Pereira, 2004).

At the end of the selection and preparation of the metric variables by municipality, the index was calculated via factor analysis using the procedures indicated by Fachel (1976). According to the author, the indicators can be obtained by calculating the weighted average between the factor loading and the percent of variance explained in the respective factors. The factors resulting from the analysis were extracted by the *principal component method*[14]. We also used the *varimax*[15] method of factor rotation. For these procedures, each municipality participating in *Prova Brasil* 2007 obtained a value in the stardardized ISE-M on a scale from zero to one.

Based on the indicators of the municipalities, they were classified into five levels. The first includes the localities whose students represent together the 20% most socioeconomically disadvantaged of the country. The other levels evolve into fifths of the sample so that in the last level it groups the 20% of the municipalities whose students are the most socioeconomically advantaged.

Analysis of Results

The calculation of the ISE-M began with a descriptive analysis of the 15 variables presented in Table 1. Due to the temporal limitation of the indicators of the socioeconomic level generated through descriptors of goods and services (because some items initially accessible only to the most advantaged classes, became popular over time, as pointed by Alves and Soares (2009), we calculated the coefficient of variation to verify the variables that best discriminate the student population among the municipalities. It was found that variables such as TV, refrigerator, bathroom and books have coefficient of variation below 20% that is, they are common items to both municipalities with the "poorest or richest" students, and therefore, were removed from the factor analysis. Then, we verified the existence of high correlations between the variables, which is one of the assumptions of factor analysis (see the correlation matrix in Appendix A). The variable "housemaid" was removed from the model that generated the ISE-M for having low correlations.

After these verifications, the factor analysis with the 10 remaining variables was successful and showed satisfactory results, as shown in Appendix B. The ISE-M was presented in a standardized scale with standard values from zero to one for 5,460[16] municipalities. The average value of the index was 0.36, whereas 50% of the municipalities had values up to 0.33. The ISE-M equal to one was assigned to the municipality of Águas de São Pedro-SP, since the set of public school students showed characteristics that defined it as the municipality with the highest socioeconomic level among students from basic

[14] Factor solution model in which the factors identified contain part of the total variance observed in the factorial matrix (Hair, 2005). Once the goal was to synthesize the socioeconomic background of the students in an indicator, this model was adopted because it allows to explain most of the variance of the original data with a smaller number of factors.

[15] Rotation method of the reference axes of the factors that facilitate their interpretation, since it minimizes the number of variables that have high factor loadings on one factor.

[16] 93 municipalities had no *score* in the ISE-M because they presented a small number of questionnaires (<20) with valid answers.

education in the country[17]. Table 1 shows the general characteristics of the municipalities in each level of the ISE-M formed by the 20th, 40th, 60th and 80th percentile of the indicator[18].

Table 2.
Characteristics of the municipalities in the ISE-M levels (standard deviation in parentheses)

	Level of ISE-M[a]				
Variable	Least Privileged	Level 2	Level 3	Level 4	Most privileged
V1-TV	0.37 (0.04)	0.41 (0.04)	0.45 (0.05)	0.49 (0.05)	0.57 (0.06)
V2-Radio	0.35 (0.06)	0.36 (0.06)	0.41 (0.07)	0.47 (0.05)	0.54 (0.06)
V3-VCR or DVD	0.53 (0.11)	0.62 (0.10)	0.67 (0.11)	0.71 0.11)	0.78 (0.10)
V4-Refrigerator	0.40 (0.05)	0.44 0.04)	0.49 0.03)	0.53 (0.02)	0.55 (0.02)
V5-Freezer	0.13 (0.05)	0.17 (0.08)	0.26 (0.14)	0.34 (0.18)	0.46 (0.22)
V6-Washing Machine	0.18 (0.09)	0.30 (0.14)	0.50 (0.19)	0.64 (0.17)	0.81 (0.13)
V7-Vacuum Cleaner	0.03 (0.02)	0.04 (0.02)	0.06 0.03)	0.12 (0.05)	0.26 (0.12)
V8-Car	0.06 (0.02)	0.09 (0.03)	0.14 (0.05)	0.20 (0.04)	0.26 (0.05)
V9-Bathroom	0.28 (0.02)	0.30 (0.02)	0.31 (0.02)	0.33 (0.02)	0.35 (0.03)
V10-Housemaid	0.06 (0.02)	0.07 (0.02)	0.07 (0.02)	0.06 (0.02)	0.07 (0.03)
V11-Computer	0.06 (0.03)	0.11 (0.03)	0.19 (0.05)	0.27 (0.05)	0.41 (0.08)
V12-Internet	0.03 (0.02)	0.06 (0.02)	0.10 (0.04)	0.16 (0.05)	0.27 (0.08)
V13-Books	0.38 (0.04)	0.40 (0.04)	0.39 (0.06)	0.38 (0.05)	0.40 (0.04)
V14-Mother's education	0.19 (0.07)	0.24 (0.07)	0.27 (0.09)	0.28 0.08)	0.31 (0.08)
V15-Father's education	0.13 (0.05)	0.19 (0.06)	0.23 (0.08)	0.27 (0.08)	0.31 (0.09)

Note: (a) The five levels of the ISE-M were defined on a scale from 0 (zero) to 1 as follows: Level 1 (least privileged) <= 0.19; level 2 > 0.19 and <= 0.27; level 3 > 0.27 and <= 0.39; level 4 > 0.39 and <= 0.52; and level 5 (most privileged) > 0.59

[17] The full list of the values of the ISE-M obtained by the 5,460 municipalities may be requested by email to the authors.

[18] The municipalities were grouped into five levels. The five levels were defined as follows: Level 1 <= 0.19; level 2 > 0.19 and <=0.27; level 3 > 0.27 and <=0.39; level 4 > 0.39 and <= 0.52; and level 5 > 0.59.

Initially, in order to avoid mistakes in reading Table 2, it is necessary to consider that the variables V1, V2, V4, V8, V9, V10, V13 are weighted averages of the number of items that students have in their homes and that the variables V3, V5, V6, V7, V11, V12, V14 and V15 represent the proportion of students who have access to goods, services or levels of education in each municipality. The table confirms that the five variables taken from the factor analysis (TV, refrigerator, bathroom, maid and books) have values very close in the five levels of the indicator. In any case, there are more popular items in all social strata, such as radio and VCR/DVD and others whose public school students have more limited access, such as freezer, washing machine, vacuum cleaner, car, computer and internet[19].

Another aspect worth noting is the low level of education of the students' parents: only 13% of fathers and 19% of mothers (on average) of the municipalities of level 1 and 31% of both in level 5 completed high school or college. These data are just as worrisome as those presented in Figure 1 on the education of the adult population in Brazil portrayed by PNAD 2008, and in a way, they show the same phenomenon: the low level of education of the adult population in Brazil. The biggest problem in this aspect refers to the intergenerational transmission of the educational condition of the families noted in studies such as Barros et al. (2001) and Silva and Hasenbalg (2000). This indicates that if the education policies are not directed to change this situation in the municipalities in which parents, to a greater extent, did not succeed in school, these locations will tend to remain in a cycle of low education between generations. These figures reinforce the relevance of the policies to strengthen the education of the adult population, which in Brazil have always assumed a secondary character.In order to contextualize the results of the ISE-M, it was found that there is a strong association between the ISE-M and the Gross Domestic Product (GDP) *per capita* of the municipalities. See Table 3.

Table 3.
Percentage of municipalities in the ranges of GDP per capita and levels of ISE-M

		Level of ISE-M[a]				
GDP *per capita* level of municipalities (in R$)	N	Least Privileged	Level 2	Level 3	Level 4	Most privileged
up to 3,368	1,103	**61.5**	33.4	5.1	0.1	-
greater than 3,368 up to 5,488	1,093	31.3	**40.9**	22.4	4.9	0.5
greater than 5,488 up to 8,563	1,093	5.0	18.0	**36.6**	29.6	10.8
greater than 8,563 up to 12,318	1,089	1.1	4.3	23.4	**36.4**	34.8
greater than 12,318	1,082	0.6	3.0	12.6	29.4	**54.5**

Note: (a) The five levels of the ISE-M were defined on a scale from 0 (zero) to 1 as follows: Level 1 (least privileged) <= 0.19; level 2 > 0.19 and <= 0.27; level 3 > 0.27 and <= 0.39; level 4 > 0.39 and <= 0.52; and level 5 (most privileged) > 0.59

[19] The descriptive F test indicated that the variables that most differentiated the five levels of the ISE-M were, respectively: computer, internet, car, washing machine, vacuum cleaner, radio, father's education, freezer, VCR/DVD and mother's education.

Table 3 shows that most municipalities of level 1 of the ISE-M (61.5%) has GDP *per capita* of up to R$ 3,368[20] and that the proportion of municipalities in the GDP and ISE-M levels increases in an associated manner to the extent that 54.5% of the municipalities with the highest socioeconomic level are located on the highest level of GDP *per capita*. This association is evidenced by the *modified coefficient of contingency*[21] equal to 0.742.

On the other hand, when we analyzed the association between the socioeconomic status of students and the size of the municipalities, we observed a modified coefficient of contingency of 0.335, which indicates a moderate association between the variables. Table 4 shows that among the municipalities with up to 50,000 inhabitants, which represent almost 90% of the Brazilian municipalities, there is a slight homogeneous distribution between the five levels formed by the ISE-M. However, it is clear that the larger municipalities focus on higher levels and move away from the lowest levels of the index.

Table 4.
Percentage of municipalities of each size (based on the population size) in the levels of ISE-M

		Level of ISE-M[a]				
Population	N	Least Privileged	Level 2	Level 3	Level 4	Most privileged
up to 5,000	1239	17.2	16.4	24.1	25.6	16.8
5,001 - 10,000	1260	24.1	18.7	21.3	19.8	16.2
10,001 - 20,000	1401	25.8	22.7	18.1	19.6	13.8
20,001 - 50,000	993	19.4	25.5	17.6	16.2	21.2
50,001 - 100,000	314	6.4	21.7	17.5	16.6	37.9
above 100,000	253	0.8	5.5	16.6	15.0	62.1

Note: (a) The five levels of the ISE-M were defined on a scale from 0 (zero) to 1 as follows: Level 1 (least privileged) <= 0.19; level 2 > 0.19 and <= 0.27; level 3 > 0.27 and <= 0.39; level 4 > 0.39 and <= 0.52; and level 5 (most privileged) > 0.59

Socioeconomic status and achievement in educational assessments

The results of the ISE-M were analyzed in contrast with the achievement of the municipalities in the Basic Education Development Index (IDEB)[22] in 2007, in the 5th and

[20] It is worth it to remember that the average of the GDP *per capita* of Brazilian municipalities in 2007 was R$ 9,236.

[21] According to Barbetta (2007), the modified coefficient of contingency (C *) is an alternative way to measure the association between two categorical variables usually measured by the *coefficient of contingency (C),* as the value expressed by C is difficult to interpret because it depends on the size of the contingency table. C*, in turn, is always presented between a range from 0 (zero) to 1 (one), where 1 indicates perfect association and 0 independence between the variables. The coefficient is calculated by $C^* = \frac{\sqrt{k.X^2}}{(k-1).(n+X^2)}$, where: k is the lowest between the number of rows and columns of the contingency table; X^2 is the chi-square value; and n is the number of observations.

[22] The calculation of the IDEB score considers student achievement in Prova Brasil and the rate of approval calculated based on the School Census data. The calculation methodology of the IDEB is available at http://www.inep.gov.br/download/Ideb/Nota_Tecnica_n1_concepcaoIDEB.pdf.

9th grade of elementary school in municipal and state schools. Through linear regression, it was possible to verify that there is no significant association between the test achievement and the socioeconomic level of the students in the municipalities. The coefficient of explanation *(*R^2) of the regression also indicated that 47.5% of the total variation of IDEB score of the 5th grade of municipal schools is explained by the socioeconomic factor. Similarly, 34.8% of the IDEB variation of the 5th grade in state schools, 39.3% of the 9th grade in municipal schools and 31.3% of the 9th grade in state schools are explained by the ISE-M (Figure 2).

This association shows that in many municipalities, the appropriation of educational outputs (at least in the dimensions expressed by the index used) is stratified according to the social status of the individuals, because in general, the poorer the student population, the worse is the educational performance of the municipality. Other studies may verify the reflexes of this table of social and economic indicators of the locations, since it tends to intensify the regional differences in the country (favoring the co-existence of developed centers and socioeconomically degraded areas), making it even more complex to guarantee the right to quality education to all children and teenagers and Brazilian federative relations, and therefore, an obstacle to the development of the country as a whole.

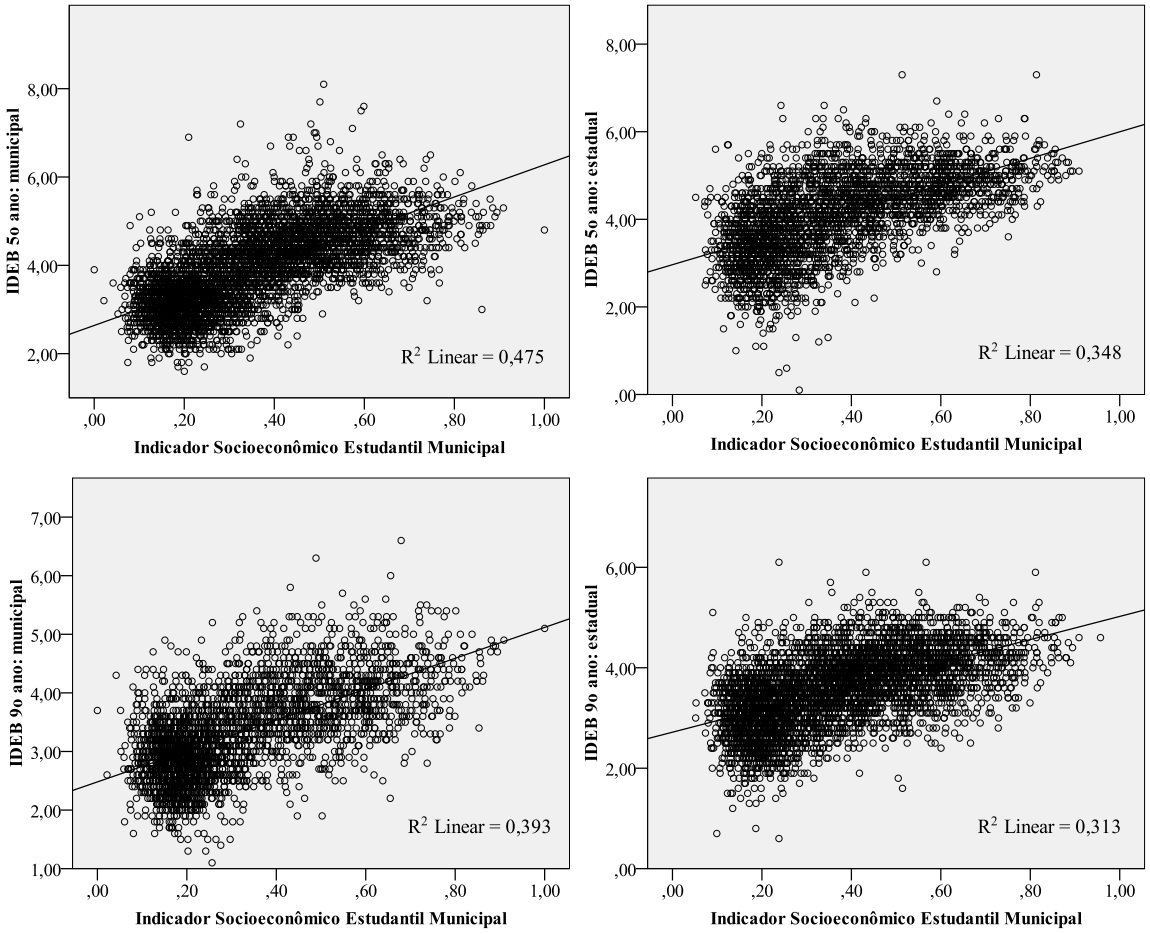

Figure 2. Dispersion analysis between IDEB and ISE-M

It is worth it to point out that the differences in the magnitude of the association between the variables shown in Figure 2 among municipal and state schools can be partly

explained by the difference in the conditions to provide education of these schools. This is because, as some studies show, among them Alves and Passador (2011), the municipal school, in general, is the one with the worst conditions, which enhances the relationship between the variables analyzed in schools where most students have disadvantaged socioeconomic background and provide them with fewer resources, compared to the others.

Table 5
Percentage distribution of municipalities between the IDEB and ISE-M levels

		Level of ISE-M[b]				
IDEB (year/school system)	Achievement[a]	Least Privileged	Level 2	Level 3	Level 4	Most privileged
IDEB 5th grade: municipal	Lowest	**46.8**	36.9	14.0	2.3	0.1
	Level 2	34.3	**35.7**	21.6	5.7	2.7
	Level 3	12.4	16.5	**28.9**	27.1	15.1
	Level 4	2.2	7.2	23.5	**36.6**	30.5
	Highest	0.7	3.1	14.9	31.2	**50.0**
IDEB 5th grade: state	Lowest	**38.3**	**36.3**	20.9	4.0	0.5
	Level 2	27.4	**33.2**	23.5	11.8	4.1
	Level 3	13.4	23.8	**26.9**	21.1	14.8
	Level 4	8.3	11.7	20.1	**26.7**	**33.3**
	Highest	2.0	6.0	18.2	22.4	**51.3**
IDEB 9th grade: municipal	Lowest	**49.9**	36.2	10.3	2.4	1.1
	Level 2	**42.8**	34.6	14.8	4.3	3.5
	Level 3	**29.4**	**25.1**	19.1	14.8	11.6
	Level 4	10.7	13.4	**23.6**	**23.8**	28.5
	Highest	4.2	5.0	17.1	25.7	**48.1**
IDEB 9th grade: state	Lowest	**35.2**	**37.1**	17.7	6.7	3.3
	Level 2	22.1	**26.7**	24.3	15.5	11.5
	Level 3	14.4	16.3	**26.9**	**25.4**	17.0
	Level 4	4.2	9.8	20.8	**33.1**	**32.0**
	Highest	2.2	4.1	16.0	29.5	**48.2**

Note: (a) The levels of average achievement of the municipalities in IDEB, on a scale from 0 to 10, are: Level 1 (lowest achievement) <= 3.2; Level 2 > 3.2 and <= 3.8; Level 3 > 3.8 and <= 4.3; Level 4 > 4.3 and <= 4.8; and level 5 (highest achievement) > 4.8.
(b) The five levels of the ISE-M were defined on a scale from 0 (zero) to 1 as follows: Level 1 (least privileged) <= 0.19; level 2 > 0.19 and <= 0.27; level 3 > 0.27 and <= 0.39; level 4 > 0.39 and <= 0.52; and level 5 (most privileged) > 0.59

Therefore, since no significant differences were noted in the profile of students from state and municipal schools during the data analysis, it is believed that the difference in magnitude of the association indicated in Figure 2 can not be explained, largely due to the difference in the student profile of these schools, since, in general, in Brazil, a more privileged socioeconomic profile is perceived, considering the general profile of the schools, the students of the federal school system (where there is an admission process - the

"admission exams") and the private system (due to the charging of tuition). In any case, since the comparison between the socioeconomic level of students among the school networks goes beyond the scope of this article, it is an aspect that should be further studied in a specific analysis.

Similarly, Table 5 shows how the municipalities evaluated are distributed between the levels formed by the 20th, 40th, 60th and 80th percentile of the index and the IDEB of each year, school system. This analysis also makes it evident that the municipalities with the most privileged student population, in its majority, achieve the highest levels of achievement on educational assessments, as indicated by the modified coefficient of contingency equal to 0.67, 0.60, 0.62 and 0.57, respectively, between the ISE-M and IDEB of the 5th grade of municipal schools, 5th grade of state schools, 9th grade of municipal schools and 9th grade of state schools. The evidences of this association with data aggregated at the municipal level are corroborated by research conducted at the student level, such as Coleman (1966), Mosteller and Moynihan (1972), Jencks et al. (1972), Bowles and Gintis (1976), Madaus et al. (1980), Rutter et al. (1979), Mortimore et al. (1988), Willms (1992), Lee (2000), Hanushek (1979; 1986), Alves and Soares (2009), Soares (2004), Soares and Andrade (2006), among others.

The ISE-M and the educational infrastructure of the municipalities

After verifying the association between the socioeconomic level and the academic achievement in Brazilian municipalities, at this point, we intend to investigate the socioeconomic background of the students in contrast with the educational infrastructure of the municipalities. For that, we used items that describe, in part, the conditions to provide education such as the existence of a library, computer labs, internet access and the teachers' degree in public schools of each municipality. Thus, the focus of discussion at this point is the equality of educational opportunities offered by the municipalities and the expectation is to provide insights on the underlying question: Do municipalities have the same conditions to provide education regardless of the socioeconomic level of the student population? Table 6 shows the average proportion of the presence of the items highlighted in the municipalities classified in the five levels of the ISE-M.

With regard to computer labs, the table shows that on average, less than one-third (29.6%) of the elementary schools of the Brazilian municipalities has this school facility that allows access to information technology resources. It also shows that this level of access is not homogeneous across all municipalities, since it may fall to 18.5% for municipalities that have the poorest students and increase to 41.2% in municipalities whose students have better socioeconomic conditions.

Also, the differences are perceived in the other items. With respect to libraries, almost one at every two schools has libraries in the cities (on average). However, only 32.3% of schools in the poorest municipalities and more than 60% in the richest have libraries. It is also almost two times greater the possibility of finding sport courts in schools of the richest municipalities (48.9%) than in the poorest municipalities (20.7%). The average proportion of the country in this item is 36.1%. Likewise, it was found that 62.1% of teachers in each municipality have college degree and 57.3% have teaching degree. However, there is a great variability in this ratio. Therefore, the table shows that 43.2% of teachers have college degree and 39% graduated with a teaching degree in the municipalities whose students are the poorest and nearly 76.9% and 72.1% have the respective levels of education in the municipalities whose student population has a higher socioeconomic status. The correlation

index of 0.54 also shows the association between the level of teacher education and the socioeconomic level of the municipality, which indicates how the low school achievement and inadequate educational facilities can be harmful for the training of professionals who should act in the labor market in each location, beginning with the one whose job is to educate others.

Table 6.
Average proportion of public schools in the municipalities classified by socioeconomic level with analyzed items indicating the conditions to provide education (standard deviation in parentheses)

	Level of ISE-M[a]					
Conditions provided	Least Privileged	Level 2	Level 3	Level 4	Most privileged	Sample
Computer Lab	18.5	21.5	29.0	37.9	41.2	29.6
	(18.6)	(18.6)	(21.1)	(22.6)	(21.3)	(22.3)
Library	32.3	40.3	51.7	56.9	60.3	48.3
	(24.0)	(25.8)	(23.6)	(23.2)	(22.1)	(26.0)
Sports court	20.7	25.3	37.7	48.0	48.9	36.1
	(20.0)	(20.8)	(23.6)	(23.1)	(20.7)	(24.5)
Teachers w/ higher education	43.2	48.8	65.2	76.6	76.9	62.1
	(21.9)	(23.6)	(20.4)	(13.8)	(13.2)	(23.6)
Teachers w/ higher education and teaching degree	39.0	44.5	59.7	71.3	72.1	57.3
	(20.8)	(22.5)	(20.0)	(14.3)	(13.1)	(23.0)

Note: (a) The five levels of the ISE-M were defined on a scale from 0 (zero) to 1 as follows: Level 1 (least privileged) <= 0.19; level 2 > 0.19 and <= 0.27; level 3 > 0.27 and <= 0.39; level 4 > 0.39 and <= 0.52; and level 5 (most privileged) > 0.59

Table 7 is formed by contingency tables developed through the 20th, 40th, 60th and 80th percentile of the ISE-M and the proportion of schools in each municipality that has the conditions to provide education analyzed in the previous table. Its purpose is to verify whether there is a relationship between the educational infrastructure and the socioeconomic status of students and, if so, to what extent.

We observed a moderate and significant association for the five variables[23]. Therefore, it is possible to notice in Table 7 that in 68.3% of the municipalities, where at most 10% of schools have computer labs, were ranked among the poorest (levels 1 and 2 of the ISE-M), while 63.7% of municipalities in which more than 50% of schools have computer labs are among the richest (levels 4 and 5 of the ISE-M). The association is also evident when it comes to libraries, since the municipalities in which at most one in four schools (25%) have this important facility to stimulate reading, 73.3% are the poorest, and among those where the library is available in more than 67% of schools (at least in almost three out of four schools), 61.2% of the municipalities are among the richest. With regard to sports facilities, this important facility for recreation, physical education and development of

[23] The modified coefficients of contingency between computer lab, library, sports court and teachers with college degree and teachers with teaching degree and the socioeconomic level of the student population were, respectively, 0.43, 0.45, 0.51, 0.58 and 0.57.

social skills, in the municipalities where this item is available in up to 14% of schools, 74.2% of them are the poorest and where it is available in more than 56% of schools, 66.2% of the municipalities are the richest.

Table 7.
Percentage distribution of municipalities between the levels of the conditions to provide education and the ISE-M

		Level of ISE-M[b]				
Conditions provided	Ratio[a]	Least Privileged	Level 2	Level 3	Level 4	Most privileged
Computer Lab	<= 10	**38.8**	29.5	16.8	9.5	5.4
	> 10 <= 22	24.6	**27.7**	23.4	13.5	10.7
	> 22 <= 33	17.4	19.0	21.1	**21.3**	**21.3**
	> 33 <= 50	11.9	15.3	20.7	24.4	**27.8**
	> 50	8.6	9.5	18.3	30.3	**33.4**
Library	<= 25	**42.2**	31.1	12.9	8.5	5.2
	> 25 <= 40	**23.0**	22.9	22.2	17.8	14.1
	> 40 <= 50	16.2	17.8	**23.2**	22.2	20.6
	> 50 <= 67	9.7	14.4	22.8	25.2	**27.9**
	> 67	6.6	12.6	19.6	27.5	**33.7**
Sports court	<= 14	**41.8**	32.4	15.2	6.1	4.5
	> 14 <= 29	27.0	**28.9**	22.0	12.7	9.3
	> 29 <= 40	17.5	19.9	**23.8**	19.5	19.3
	> 40 <= 56	8.9	11.1	18.0	29.0	**32.9**
	> 56	4.9	7.9	21.0	32.6	**33.6**
Teachers w/ higher education	<= 41	**45.4**	36.0	14.5	2.1	2.0
	> 41 <= 61	**29.8**	27.8	21.4	11.3	9.7
	> 61 <= 74	16.3	21.7	**22.1**	18.5	21.5
	> 74 <= 83	5.9	9.1	23.6	**32.4**	29.1
	> 83	2.6	5.2	18.4	36.0	**37.9**
Teachers w/ higher education and teaching degree	<= 36	**45.7**	35.7	14.9	2.2	1.5
	> 36 <= 56	**30.1**	27.0	21.7	11.3	9.8
	> 56 <= 68	15.1	21.7	**22.2**	20.5	20.4
	> 68 <= 78	6.1	9.6	22.7	30.0	**31.6**
	> 78	2.7	5.7	18.4	36.2	**37.0**

Note: (a) The levels of the conditions to provide education were defined by the 20th, 40th, 60th and 80th percentile of each variable.
(b) The five levels of the ISE-M were defined on a scale from 0 (zero) to 1 as follows: Level 1 (least privileged) <= 0.19; level 2 > 0.19 and <= 0.27; level 3 > 0.27 and <= 0.39; level 4 > 0.39 and <= 0.52; and level 5 (most privileged) > 0.59

However, the greatest magnitude of association was found between the variables that describe the proportion of graduate teachers in each municipality and the ISE-M. In this analysis, 81.4% of the municipalities that have up to 41% of teachers with higher education

belong to the first and second level of the ISE-M, while 73.9% of the municipalities in which more than 83% of teachers have higher education belong to the last two levels of the ISE-M. Also, 81.4% of the municipalities in which up to 36% of teachers have teaching degrees are ranked among the poorest and 73.2% of those in which more than 78% of teachers have teaching degree, the student population belongs to the most privileged strata.

Finally, we used the cluster analysis to identify the municipalities that have similar educational backgrounds. For that, we used the variables of the socioeconomic level (ISE-M), educational achievement in the school assessments (IDEB[24]) and the conditions to provide education. As a result, 5,460 municipalities were classified into three groups. See the characteristics of the clusters by the average and standard deviation of the variables in Table 8.

Table 8
Profile of the educational background of the municipalities (standard deviation in parentheses)

Profile of municipalities	Educational Background			
	Higher	Intermediate	Lower	Sample
Number of municipalities	1.534	2.003	1.923	5.460
Percentage of municipalities	28,1	36,7	35,2	100,0
GDP per capita (in R$)	14,137 (13,275)	10,000 (9,532)	4,469 (6,700)	9,214 (10,658)
ISE-M	0.53 (0.14)	0.38 (0.13)	0.20 (0.07)	0.36 (0.17)
IDEB	4.77 (0.67)	4.18 (0.65)	3.10 (0.50)	3.97 (0.91)
Computer Lab[a]	50.8 (21.6)	25.6 (15.8)	17.0 (15.8)	29.6 (22.3)
Library[a]	69.0 (21.1)	50.9 (20.6)	29.1 (20.0)	48.3 (26.0)
Sports court[a]	59.4 (20.4)	35.2 (18.6)	18.5 (16.6)	36.1 (24.5)
Teachers with higher education[a]	78.8 (13.1)	71.9 (12.9)	38.6 (20.1)	62.1 (23.6)
Teachers with higher education and teaching degree[a]	73.5 (13.4)	66.5 (13.4)	34.8 (19.0)	57.3 (23.0)

Note: (a) percentage values

The first group gathered 1,534 municipalities (28% of the sample) that have a higher education background, considering the reality of the other Brazilian municipalities. These

[24] We preferably used the municipal IDEB calculated based on the achievement of students in the 5th grade from municipal schools, since this indicator was available for 91.3% of the schools. We used the IDEB of the 5th grade of state schools in the municipalities that did not obtain the index for the municipal school system.

municipalities have a more dynamic economy and therefore the average GDP *per capita* reaches R$ 14,137. Their students have higher socioeconomic level (average ISE-M = 0.53) and achieved the best rates on educational assessments (average IDEB = 4.77). They also have educational infrastructure considerably superior than other groups of municipalities. The second group is the largest and brings together 2,003 municipalities (37% of the municipalities surveyed). As shown in Table 8, this group presents intermediate characteristics that clearly distinguish them from the others. However, when analyzing the characteristics of the third group, it was found that one in three municipalities (35%) live in a concerning educational scenario (although the others are not in ideal conditions).

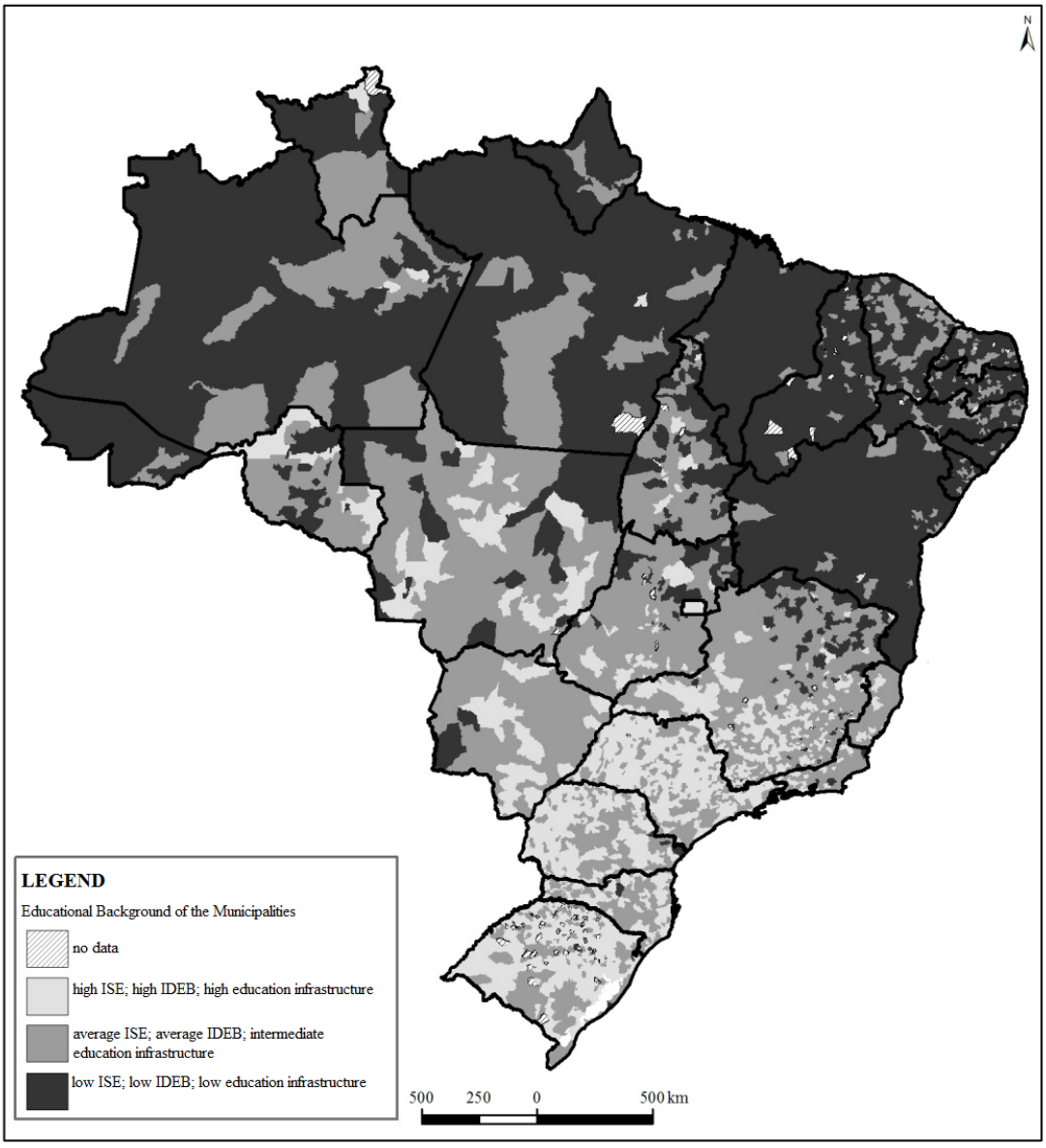

Figure 3. Geographic location and classification of the educational background of the Brazilian municipalities

The populations of these 1,923 localities report a GDP *per capita* of only R$ 4,469, which is very distant from the national average GDP *per capita* of R$ 9,214 municipalities. In addition, they have a higher proportion of students from disadvantaged socioeconomic background (average ISE-M of 0.20, where 86% are in levels one and two of the ISE-M); they have the worst results in IDEB (average score of 3.10) and poor educational conditions, since, on average, only 17% of the schools in these municipalities have computer labs, 29% have libraries, 19% have sports court, 39% of teachers have higher education degree and 35% have teaching degree. The results of the cluster analysis shown on the map in Figure 3 indicate the geographical location of the different educational realities in Brazil.

The map also shows that the different realities are associated with the major political and administrative regions in Brazil, since 92.1% of the municipalities with the worst educational background are located in the North and Northeast region, and 92.2% of the group that has the best educational background consists of municipalities located in the South and Southeast regions. The intermediate group consists of 7.2% of the municipalities in the North, 12.9% in the Northeast, 15.9% in the Midwest, 42.9% in the Southeast and 21% in the South. Analyzing each region in particular, it is possible to verify that there is a prevailing background in each one of them: 61.9% of the municipalities in the North and 84.6% in the Northeast have lower background; 69.2% of the municipalities in the Midwest are intermediate; 52% of the municipalities in the Southeast are intermediate and 43% are higher; and 62.2% of the municipalities in the South have higher educational context.

Final Considerations

This article analyzed the conditions regarding the provision of education, the achievement on educational assessments and the socioeconomic background of students in the Brazilian municipalities. It is believed that the analysis of the issues addressed at the municipal level is relevant because of the role this federal entity assumed in the provision of public education based on the promulgation of the Constitution of 1988 and the strategies of decentralization of social public policies that took place in the 1990s , a process that occurred in several business areas of the State (Arretche, 2000; Souza, 2005).

Based on data from the IBGE, which show that the profound differences in the education level achieved by the Brazilians in working age belonging to different socioeconomic levels (Figure 1) and the evidence found in various surveys that the educational achievement is strongly associated with the socioeconomic background of the students, we proposed a socioeconomic measure for the student population aggregated by municipality (ISE-M) in order to provide an indicator to indicate where are the students who are the most socioeconomically vulnerable, and therefore, are more likely to not achieve the expected educational outputs, thus maintaining the cycle of low education and, consequently, low economic, political and social development.

The results showed that the indicator is strongly correlated to the GDP *per capita* of the municipalities and that the students in the municipalities with the largest population contingent (above 50,000 inhabitants) indicate a higher socioeconomic level. In addition, the result of the regression analysis showed that the performance of the municipalities in IDEB and the socioeconomic level of the students are significantly associated (the origin of the students explains almost 50% of the total variation of the IDEB score of the 5th grade in municipal schools).

The analysis also showed evidence that there is an association between the socioeconomic level and the educational infrastructure of the municipalities. This suggests

that, depending on the municipality in which a Brazilian child or teenager is enrolled there is a higher or lower probability to find basic educational inputs for a quality education, such as a library and teaching laboratories or teachers with college degrees. The evidences of association between IDEB and ISE-M (Figure 2 and Table 5) and between ISE-M and the conditions regarding the provision of education (Tables 6, 7 and 8 and Figure 3) are in the direction of what concluded Soares (2004) by describing the cognitive performance of the students in the SAEB. The author found that there are large disparities in achievement among students from different socioeconomic levels and geographic regions and that the Brazilian educational system does nothing to balance the educational inequalities because it offers the worst schools (that is, with the lowest educational conditions) to students with the lowest achievement, largely, the poorest. The aggregated data by municipalities presented here allow the same conclusions: locations whose students are poorer have worse performance on educational assessments and this situation is maintained or enhanced because they perceive lower education/learning conditions.

Finally, it was found that 28% of the 5,460 Brazilian municipalities investigated have an educational background higher than the others (though not ideal) when jointly analyzing the achievement on educational assessments, the socioeconomic level of the students and the conditions for the provision of education of public schools. However, 35% of them have characteristics associated with the reality of countries that are "far behind" Brazil, especially from the economic standpoint, in the "race" for economic and social development. The deficient scenario of conditions for the provision of education presented by this group of localities does not point to a situation in which education can make a difference and reduce the gaps between the economic and social strata through transformative educational opportunities.

Thus, it is expected that indicators such as the ISE-M contribute to indicate the different Brazilian educational realities in the complex federative context of a country with large territorial dimension, distinct regional and historical trajectories and deep social differences, so that actions can be implemented to reduce the great difference between the right to education of the rich and poor and thus the country can truly move towards the development of a fair society.

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Appendix A

Table A1. Correlation matrix

Variable	V2	V3	V5	V6	V7	V8	V10	V11	V12	V14	V15
V2-Radio	**1.00**	.41	.54	.63	.68	.78	-.08	.73	.66	.12	.30
V3-VCR / DVD	.41	**1.00**	.05	.34	.49	.41	-.01	.62	.62	.39	.60
V5-Freezer	.54	.05	**1.00**	.75	.52	.67	.11	.53	.44	.17	.18
V6-Washing Machine	.63	.34	.75	**1.00**	.66	.76	.10	.76	.70	.32	.42
V7-Vacuum Cleaner	.68	.49	.52	.66	**1.00**	.73	-.02	.79	.76	.22	.41
V8-Car	.78	.41	.67	.76	.73	**1.00**	.01	.84	.75	.27	.40
V10-Housemaid	-.08	-.01	.11	.10	-.02	.01	**1.00**	.08	.09	.32	.19
V11-Computer	.73	.62	.53	.76	.79	.84	.08	**1.00**	.95	.43	.60
V12-Internet	.66	.62	.44	.70	.76	.75	.09	.95	**1.00**	.44	.62
V14-Mother's education	.12	.39	.17	.32	.22	.27	.32	.43	.44	**1.00**	.77
V15-Father's education	.30	.60	.18	.42	.41	.40	.19	.60	.62	.77	**1.00**

Appendix B

Results of the factor analysis

- KMO[a]: 0.875
- Total Variance Explained[b:] 76.61%
- Factor 1 = V2, V5, V6, V7, V8, V11, V12 (explained variance = 47.17%)
- Factor 2 = V3, V14, V15 (explained variance = 29.44%)

Notes:
(a) Kaiser-Meyer-Olkin, measure that compares the total correlations between pairs of variables with the residual correlations between the pairs.
(b) Sum of explained variances by all factors.

Table B1. Factor analysis statistics

Variable	MSA[a]	Commonality[b]
V2-Radio	.937	.723
V3-VCR /DVD	.904	.616
V5-Freezer	.814	.673
V6-Washing Machine	.910	.763
V7-Vacuum Cleaner	.971	.725
V8-Car	.915	.854
V11-Computer	.843	.917
V12-Internet	.865	.852
V14-Mother's education	.720	.693
V15-Father's education	.806	.852

Notes: (a) *Measures of Sampling Adequacy,* equivalent to individual measures of sampling adequacy for each variable.
(b) Measure related to the sum of the squares of factor loadings for each variable that represents the percentage of the variance of each variable captured by the factors together.

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