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Basic Education in Brazil, Performance and Indicators about Resources, Management and Projects

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Abstract**—** *This article proposes an analysis for solving problems in a system of continuous change to improve the results, in a typical Brazilian school. As a result of public policies for basic and high school education in Brazil, public schools are increasingly absorbed by the logic of efficiency. Following this guideline managers must work with goals, build partnerships, identify political alignments, seek data, establish a compensation plan and select performance measures for their units. In this way, educational management must implement successful strategies in the medium and long term. This article intends to suggest a promising approach for public education that compose in a process of continuous improvement.*

Keywords**— Public education; Management; Competitiveness; Strategy; Indicators and targets.**

SCHOOL MANAGEMENT IN BRAZIL

From the standpoint of neoliberalism education, public schools are increasingly absorbed by the logic of efficiency. In this logic, managers should clarify goals, build a network of partners, map political alignments, raise data, establish a bonus / retribution plan, and select performance measures. However, for data to be analyzed at the decision-making level, it takes at least three years (Yoder, Freed, Fetters, & Center on Great Teachers and Leaders at American Institutes for Research, 2014).

In this way, educational management must implement successful strategies in the medium and long term. In this direction, a promising approach to public education is the process of "continuous improvement." This term is used in all sectors to describe a process or approach to problem solving in a continuous change system to improve results (Park, Hironata, Penny & Lee, 2013).

In education, continuous improvement can refer to a region, municipality or school, what matters is that there is a continuous commitment of the organization with the improvement of quality. At the classroom level, continuous improvement can be associated with the use of data to inform how it is possible to improve teacher practice. At school or county level, continuous improvement may refer to ongoing efforts to improve operational practices and processes related to teaching effectiveness and efficacy outcomes (Best, Dunlap &McREL International, 2014).

According to Park et al. (2013), educational organizations that adopted the process of continuous improvement were more effective at achieving performance goals, including reducing student failure rates on exams, increasing university enrollments, and using efficient use of financial resources. Therefore, for the authors cited, such results deserve to be considered by education policy makers and education professionals.

According to Park et al. (2013), the implementation of a continuous improvement plan requires four stages: 1) elaborate the plan: at this stage, the continuous improvement team studies the problem that needs to be solved, collects the database about this problem, develops potential solutions to solve the problem and develops a plan of action; 2) do: at this stage, the team implements the action plan, collects data on its intervention and records the development of the plan; 3) study: it is time for the team to measure the success of the intervention by comparing the baseline of the project and the new data, analyzing the results and documenting the lessons learned; finally, 4) law: the team determines what to do with the results. In this way, depending on the success of the intervention, the team can adopt, adapt or abandon the tested solution.

Because the process of continuous improvement is interactive and cyclical, school management teams can work toward many long-term goals. However, it is necessary to focus on few goals at a time. In this sense, ensuring that goals are clear, measurable, and achievable increases the success of the process (Best et al., 2014).

Best et al., (2014) recommend that such managers: investigate current practices in the education system to determine a new and better way to assess the

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effectiveness of the system; analyze the policies related to the number and type of goals to be achieved, the rate of reach and the flexibility related to the objectives; gather information about the training and time dedicated to continuous improvement in the manager's area of work; compile and evaluate information on data collection, data systems, data use and data sharing within and between schools in the manager's area of activity; make sure that there are training measures and intermediaries to help strengthen ongoing improvement efforts; examining policies related to the evaluation of school programs and determining whether they provide ongoing support for improvement efforts; evaluate the current policy to determine what mechanisms are available to promote stakeholder participation in the process of continuous improvement.

To implement educational reforms, the literature indicates that managers take the position of leaders (Robinson, Lloyd, & Rowe, 2008). Leadership is the process of influencing a group to achieve goals. However, not all leaders necessarily possess the skills or competencies of effective managers and vice versa (Mansoor, 2015).

In this way, Gosnell-Lamb, O'Reilly, & Matt, (2013) stress that it is important that school managers also be leaders so that they can make the evaluation of results meaningful for students and teachers, so as to make them understand the real role they play in the learning process in the education system.

In the academic environment, leaders are required to change paradigms and make it possible to increase student performance. If this role was previously restricted to the teacher, in the last decade there has been an expansion to a much larger network, involving principals, supervisors and family members, leaving the educational manager to create an environment of improvement and strengthening of an atmosphere of support for individual learning. and institutional development (Mansoor, 2015).

The presence of leaders in the educational system is important in terms of providing the leaders with a fairer and more egalitarian environment, and also to establish the basis for democratic ideals (Okçu, 2014). By acting in the manner shown, the manager can redesign the school organization to build a culture of collaboration with parents and the community (Steinberg, Regional Educational Laboratory Mid-Atlantic (ED) & ICF International, 2013).

Robinson et al. (2008) concluded that, in the medium term, assuming the leadership position, managers can improve students' performance by 3 to 4 times the average, and this improves the effect of the involvement of teachers in the establishment of curriculum planning, coordination, teaching and assessment.

One of the great challenges to the educational manager, in the role of leader, is raised by Okçu (2014) when he recalls that the effectiveness of educational management requires the manager to be aware of and respect for diversity among employees (gender,) and consider this diversity as wealth. For Okçu (2014) diversity management is one of the approaches necessary to achieve organizational objectives, such as performance, profitability, productivity and efficiency.

On the other hand, Sifakakis, Tsatsaroni, Sarakinioti& Kourou (2016) emphasize that educational managers should seek resources in areas such as economics, market and politics to redefine and systematize pedagogical purposes. For these authors, the global and European discourse of efficient management of education, coming through the changes that were incorporated when adopting NGP and models of educational leadership, is relayed to the point of becoming a "truth regime" for policies public education.

Closing the context of leadership, Matheri, Cheloti, & Mulwa (2015), attest that even with the availability of all the relevant resources required for students to perform well on exams, lack of leadership to motivate teachers and learners would lead to performance. For these authors, no matter how elegant the physical design, since the real innovations go mainly by the support to the employees and other members of the academic community. Thus, to make real improvements, educational managers must develop policies and plans that meet these needs. In parallel, Okçu (2014) recalls that only leaders are able to apply management styles appropriate to environmental conditions.

Brazilian context for municipal public education

In Brazil, educational policy focused on basic education underwent major changes after the 1988 Federal Constitution. Through the constitutional reform, the process of decentralization of responsibilities was encouraged, transferring to the municipalities the basic education network.

In this direction, starting in the 1990s, the Brazilian central government implemented a series of measures to make municipalities more operational in terms of school management, while the central government would assume the role of financier and, at the same time, regulator of quality, implementation of the National Education Plan (PNE) and the IDEB(DaSilva, 2016).

Therefore, knowing its current system of transfers and applications of public funds in education in

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Brazil, becomes a relevant issue for the purposes of this thesis. This is the purpose of this section.

The Brazilian model of performance evaluation of schools

To accompany the results of the decentralization of public education management, in 2005, the central government instituted ProvaBrasil and IDEB, programs designed to provide a detailed diagnosis of Brazilian public education, since it data collection by schools and municipalities from the application of Portuguese Language and Mathematics tests, applied every two years to 5th and 9th grade students (MEC, 2011).

The IDEB adds to the pedagogical focus of the results of the evaluations the possibility of synthetic results on a scale of 0 to 10, calculated based on the methodology of Sanders (2000) and Sanders & Horn (1994), also used by PISA.

The IDEB is, officially, the external quality indicator of Brazilian education at the elementary and secondary levels (basic education). In addition to measuring the quality of each school and each school network in the biennial assessments, it allows the design of educational quality goals for education systems. These targets for each local government are already known by the year 2024, when the proposed national average is 6.0, the average obtained by developed OECD countries(DaSilva, 2016).

The legislation applied to Brazilian municipal public education

Brazil is a country with a large territorial dimension, marked by regional socioeconomic inequalities (Barros, 2011; Souza-Junior & Gasparini, 2006). These disparities make the central government face the challenge of transferring part of its tax revenues to the other federated entities (states and municipalities) in order to reduce possible imbalances between the local collection capacity and the demand for public goods and services (Souza- Junior & Gasparini, 2006).

In this context, the CF of 1988 increased the participation of the state and municipal levels in the use of transfers made mainly through the State Participation Fund (FPE) and the Municipal Participation Fund (FPM) (Souza-Junior & Gasparini, 2006). The FPM is a redistributive transfer, paid by the Union to all municipalities in the country. It is obligatory and its use is unconditional and unparalleled. In small municipalities, FPM accounts for 57.3% of total revenues (Franca & Gonçalves, 2013).

It should also be mentioned that, with the increase of the responsibility assumed by the municipalities in the production of goods and services, in the last decades, the central question of the State reform brought significant changes in the management of resources, previously assigned to the central government (Brunozi, Ferreira, Abrantes &Arantes, 2010).

With this, it falls on the municipality the obligation to manage the resources received better and to give society the best result in terms of the quality of public educational services. Accordingly, Law No. 9,394 / 96, in its article 11, establishes:

Article 11. The Municipalities will be responsible for:

I - organize, maintain and develop the official bodies and institutions of their education systems, integrating them into the educational policies and plans of the Union and of the States;

II - to exercise redistributive action in relation to their schools;

III - to introduce complementary norms for its education system;

IV - to authorize, accredit and supervise the establishments of its educational system;

V - to offer kindergarten and pre-school education and, with priority, elementary education, allowed to work at other levels of education only when the needs of their area of competence are fully met and with resources above the minimum percentage linked by the Federal Constitution for the maintenance and development of education.

VI - assume the school transport of the students of the municipal network

Constitutional Amendments No. 14/1996 and No. 53/2007 created the Fund for Maintenance and Development of Basic Education and Appreciation of Education Professionals (FUNDEB) to materialize the systemic vision of education, since it finances all stages of the basic education (grades 1 to 9) and establish criteria for allocating resources across the country. Therefore, it considers the social and economic development of the regions in relation to the number of students enrolled (MEC, 2011).

Even using autonomy, local managers must follow parameters for the application of public resources in municipal education. These parameters are described in article 70 of Law 9,394 / 96:

Art. 70. The costs incurred in pursuit of the basic objectives of educational institutions at all levels, including those

I - remuneration and improvement of teaching staff and other education professionals;

II - acquisition, maintenance, construction and maintenance of facilities and equipment necessary for teaching;

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III - use and maintenance of goods and services linked to education;

IV - statistical surveys, studies and research aimed at improving the quality and expansion of education;

V - completion of activities-means necessary for the functioning of education systems;

VI - granting scholarships to students from public and private schools;

VII - amortization and costing of credit operations to comply with the provisions of this article;

VIII - acquisition of school-didactic material and maintenance of school transportation programs

For CF the FUNDEB is a special fund, of accounting nature, formed with resources of the Union, states and municipalities as follows:

Article 212 - The Union shall apply annually, never less than eighteen, and the States, the Federal District and the Municipalities shall be responsible for at least twenty-five percent of tax revenue, including transfers, in maintenance and development of teaching.

In order to fulfill the objective of valuing teachers, the Law ensures that at least 60% of FUNDEB's resources are earmarked for the remuneration of basic education professionals, a category that includes teachers and specialists who offer pedagogical support to teaching (art. 22nd, Sole Paragraph, II, of the FUNDEB Law)

In this way, within the municipality it is possible to establish the remuneration of teachers, to create programs of remuneration for performance, to define the administrative structure, among other management actions. Thus, it is underpinned that the policy of the Brazilian central government is to transfer resources to decentralized maintenance of basic education at the level of municipal managers, but not before establishing the IDEB as a performance evaluation model, containing the goals to be pursued by each municipality.

Brazilian public spending in public schools

Official data from the Brazilian government and the International Monetary Fund (IMF) indicate that in the decade 2000-2010, Brazil achieved an average economic growth of 4% per year as measured by GDP, taking the sixth position among the world's largest economies (IPEA - Instituto of Applied Economic Research, Anisio Teixeira, 2010).

However, economic growth indicators do not seem to leverage the social development of Brazilians. For example, in 2010, 14.03% of children up to 14 years of age lived in extreme poverty, with less than US $ 1 a day (IPEA - Anisio Teixeira Institute of Applied Economic Research, 2010).

From this imposed dichotomy, the Brazilian government's Ministry of Finance identified some bottlenecks to sustained growth, such as the lack of skilled labor and the low educational indicators of children and young people (IPEA, 2010). Barros (2011) affirms that the inefficiency of the education of children and young people presents itself as a major economic and social problem in the country's future.

Although the surveys indicate some improvement in the quality of this sector, as can be seen in Bourguignon, Ferreira & Menendez (2007) and Reis & Ramos (2011), such improvements are timid. For example, in PISA, in the comparison between 2003 and 2012, the average performance of Brazilian students jumped from 356 points to 391, an increase of 35 points, making the country continue to occupy position number 58 of 64 countries evaluated (OECD - Organization for Economic Co-operation and Development, 2012).

The OECD (2012, 2002) considers that public expenditure on education in Brazil is small. According to the Organization, to ensure a quality basic education, Brazil should double its spending on primary education (OECD, 2012).

Based on the recommendations of the OECD and the pressures of trade unions and associations concerned, the central government passed Law 13,005 / 2014 approving the PNE and increasing the amount of public spending on education in order to reach at least 7 (seven percent) of Brazil's GDP in the fifth year of its term and at least the equivalent of ten percent (10%) of GDP at the end of ten years.

Following the trend of increases in public spending on education, Law No 13,005, Foreque&Patu (2014) point out that spending on education should go from the current R $ 360 billion in 2013 to R $ 550 billion per year in 10 years, resulting in an increase of R $ 190 billion. As a counterpart to the contribution of this resource, the government set the goal of matching the quality indices of Brazilian education to the average of the OECD countries. However, the aforementioned authors warn that, in proportion to the GDP, Brazil is already investing more than the average value of the OECD countries, estimated at 5.6% of GDP in 2011.

As in Brazil, in the last decade, other developing countries are in the process of increasing spending in public education, looking for an improvement in indicators of educational efficiency, as is the case of China, verified by Hu et al. (2009) and India, as stated by Gourishankar&Lokachari (2012). In this way, it is possible to infer that this seems to be a common decision to the governments of the emerging countries.

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However, international and Brazilian researchers have diverse and conflicting opinions about the effect of the increase in public spending and its relation with the quality of education. In this way, the effectiveness of the increase of public expenditure, in face of the decentralized management of the 5,565 local governments, the interest of the three levels of government and the socioeconomic factors peculiar to each municipality is questioned.

Effect of public expenditure on school performance

At the World Education Forum in Dakar in 2000, the international community committed itself to substantially reducing poverty levels in the developing world through a set of international development goals proposed by the United Nations, Millennium Development Goals (MDGs) for education, more specifically for primary education. In order to achieve the objectives of the proposal, the participants in the forum pointed out, in particular, the need to increase spending on basic education in developing countries (UNESCO - United Nations Educational,).

In this framework, this section aims to compare the positions on the effect of financial resources in public schools. In particular, it addresses the relationship between public expenditure and performance in these schools.

Positions on the effect of expenditure on school quality

Taking into account the context of NGP, which provides for management based on efficiency and effectiveness, governments should only increase expenditures, such as teacher and pedagogical salaries, administrative consumption, educational facilities and research, among others, if the increase the intellectual capital of students. Under this bias, the expected minimum is a positive cost-benefit relationship for society. However, there is great controversy in the literature about the relationship of public expenditure on education and its effects on improving educational performance.

This controversy began with the report on equal educational opportunities of Coleman et al. (1966), which reports that, in the United States, the educational consumption of schools had little or no effect on student performance. From this report, a series of studies begins on the importance of money to improve the quality of public education.

In this direction, the following two subsections demonstrate conflicting opinions about the importance of money to the efficiency of public school education.

Positions contrary to the importance of money in determining the quality of public education.

Hanushek (1986) investigated spending on primary and secondary education in the United States from 1960 to 1983 when enrollment in public schools declined by 10 percent, teacher enrollment increased by 7 percent, and student expenditures of 135 %.

In this new scenario, it was expected an improvement in indicators of educational quality. However, students 'performance as measured by the Scholastic Aptitude Test (SAT) showed that during the study period there was a sharp drop in students' performance in English language and mathematics.

Hanushek (1986) also found that teachers sought to raise their qualifications with master's and doctorate degrees to improve their salaries. In this way, it was observed that the average salaries of teachers increased significantly during the 1960s and remained fairly constant in the following years.

The results of Hanushek's (1986) research show that there is no strong correlation between the quality of education and teacher-student ratios; or with the teacher's training or, also, with the time of the teacher's experience.

Thus, Hanushek (1986) goes to meet Coleman et al. (1966), indicating that there seems to be no strong or systematic relationship between school expenses and student performance. Thus, Hanushek (1986) concludes that educational success can be derived from the individual experiences of students and teachers, the student's family environment, and the policies adopted by decision-makers in education.

In the same vein, in New Jersey, USA, Coate&VanderHoff (1999) investigated the effect of expenditures on the performance of students in basic education, under the legal organization of financing public education, based on the constitutional decision to allocate more public resources to districts in an attempt to make them more efficient.

The purpose of this research was to analyze the effects of legal protocols on increasing educational expenditures. The data used were collected from the New Jersey Department of Education from 1988 to 1995 and compared with municipal finance numbers and student expenditures. As a result, Coate&VanderHoff (1999) argue that the legal provision that allocated more resources to schools in poor regions did not have any effect, as they found no evidence of the positive effect of student spending and performance.

In the period between 1980 and 1994, Rapp (2000) observed that, in the United States, nominal expenditure on education increased by 283%, while student proficiency fell by 3%. For Rapp (2000) this has caused disquiet among parents and education authorities, forcing the US government to create mechanisms of

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competition between school districts and between public and private schools. The competition came mainly because the US government created a voucher mechanism that allowed public school students to study in private schools.

Rapp (2000), based on agency theory, says that competition has led parents to transfer their children to better-rated schools, including other local governments or school districts. Thus, in 1995, 11.1% of American parents chose to pay private schools to educate their children. As a synthesis of the conclusions, Rapp (2000) affirms that only the laws or policies of public spending determined by the public power are not sufficientfor the improvement of the educational quality. Therefore, it is necessary the involvement of parents and the local community to know and interfere in school actions.

In order to assess whether the differences in resources allocated to education can explain the performance among the countries mentioned in the Dakar 2000 Forum, Al-Samarrai (2006) carried out a study with the following research question: would the increase in resources available for education in developing countries makes them closer to achieving quality indicators in education? To address this issue, Al-Samarrai (2006) used repetition and dropout rates in primary schools and made a combination of these two indicators. In conclusion, the cross-country regression analysis described in the study showed that the ratio of public expenditure on primary education to school outcomes, as measured by a number of indicators, is weak. Al-Samarrai (2006) points out that the absence of a strong relationship between public expenditure and school performance makes it unlikely that decisions on public spending on education will be made on the basis of this useless and insignificant relationship. However, this author emphasizes that this does not imply that resources are unnecessary, but that increasing resources alone is unlikely to be sufficient.

Positions favoring the importance of money in determining the quality of public education.

Challenged by the issues described in the previous section, Hedges, Laine & Greenwald (1994) investigated the production function of education to try to model the relationship between resource inflows and school outcomes.

The proposal of the work of Hedges et al. (1994) was to reanalyze Hanushek's (1979; 1986) data into a meta-analysis that shows the relationship between resource inflows and school outcomes. Statistical analysis used combined tests of significance and estimation methods for variables: a) teachers' experience; b) teacher training; c) salary of teachers; d) teacher-student relationship; e) administrative consumption and; f) installations.

Once the analyzes have been reported, Hedges et al. (1994) argue that, unlike Hanushek's (1979, 1986) conclusions, overall resource inflows, student expenditures, and teacher experience have a substantially positive influence on student performance. The research also points out that only the teacher-student relationship did not present consistency in the results. In view of the conclusion presented, Hedges et al. (1994) recommend that educational managers observe local circumstances to determine the levels of resource inputs so that they obtain the best results for students.

In the same perspective, Krueger (2003) examined the effect of class size on student performance, considering that the decrease in the teacher-student ratio causes an increase in overall expenses. The results of the research suggest that the size of the class, when reduced from 22 to 15 students, causes an increase in the internal rate of student performance of about 6%. Therefore, the view put forward by Krueger (2003) is that increased spending improves the educational quality of students.

Parcel &Dufur's (2001) research is based on the management of public resources earmarked for the maintenance of basic education in Pakistan in order to discover the relationship between the use of school resources and the academic performance of students. Parcel &Dufur (2001) conclude that the cause of the poor quality of education is fundamentally the insufficiency of resources allocated to schools, combined with maldistribution. For the authors, the political implication of the study is that if resources were properly allocated and used at the ideal level, student performance could be improved to more effective levels. Therefore, the problem encountered is resource management and not just lack of money.

In the same vein, Heyneman& Loxley (1983) used data from 29 countries to estimate individualized regression models. To do so, they used school and non-school variables in order to explain the educational quality of the students. These authors observed that, when comparing the results among countries, the proportion of explained variance with school expenses is higher in countries with lower per capita wealth than in countries with higher per capita income.

In sum, Heyneman& Loxley (1983) conclude that in countries with lower income per capita, eg Uganda, Egypt, Paraguay, and Colombia, the predominant influence on student learning falls on school consumption and teachers. Therefore, in poor countries public spending is determinant for school quality. On the other hand, in countries with higher income per capita, for

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example: Germany, North America and Japan, these authors conclude that the students' results are more related to non-school variables.

Along the same lines, Harris (2007) investigated educational expenditures and the effect on the quality of student performance from data from 32 countries. This author empirically addresses the variable (decreasing) marginal return to spending on education in relation to student performance. Harris (2007) concludes that, although the effects of education spending are positively related to quality, this correlation is small.

However, Harris (2007) observes that this result is consistent with evidences observed in developed nations, especially in the USA, where he found evidence that the variation of student performance is mainly explained by the family (non-school variables) in school expenses.

Like Heyneman& Loxley (1983), when it comes to developed nations, the conclusions of Harris (2007) are in accordance with the investigations of Coleman et al. (1966) and Hanushek (1979, 1986). However, in developing countries, school expenditures are highly correlated with improving educational quality. For the author, this is possibly because students enter schools with little or no prospect, but in it they achieve a high rate of added value.

With the advancement of research, Hanushek, Link &Woessmann (2013) moderate their arguments and suggest that educational policy lessons in developed countries do not directly translate into advice for developing countries.

The results of the studies that examine whether policies that put more money up the quality of teaching and student performance are at best ambiguous (De Witte, Geys& Solondz, 2014).

As just exposed, there is a clear dichotomy about the effect of public money on improving educational quality. In this way, the following section explores this issue better and advances to identify other variables that potentially affect school performance.

Recent studies on determinants of school performance

This section aims to record what is currently being produced in the field under study of this thesis through an analysis of recent studies.

The set of recent studies that follows is composed of 30 investigations, namely: 15 at the international level, in the databases made available to the University of Aveiro, under the criteria of search of determinants of performance in basic and basic level public schools , in the period 2010-2014, among the most relevant.

With the same specifications, the other 15 investigations are of Brazilian researchers, mainly published in the Scientific Periodicals Electronic Library (SPELL) database, which concentrates Brazilian scientific production in the areas of Administration, Accounting, Economics and Tourism.

DESCRIPTION OF RECENT STUDIES

In this first subsection, the empirical investigations are listed under the order of year of publication, specifying the purpose, the method and, in short, the conclusions.

Chakrabort (2010) analyzed the effectiveness of public education with the value parameter added to the public school quality indexes in the Kansas district from 2003-2005. With a sample of 304 schools, the author applied a Tobit regression model, to eliminate negative added values, and then submitted to the DEA. The empirical application indicates an average inefficiency of 5.9%. This amounts to a misallocation of $ 802 million in schools that were supposed to operate at the efficiency frontier in 2003-2005. The study found that in Kansas, the majority of school consumption has low or no influence on student achievement. However, socioeconomic factors of the students had a significant influence on their income.

Crabtree & France (2010) investigated the management effectiveness of primary schools in the rural Waikato-New Zealand region and thus verify if the trends identified in national surveys confirm that schools are underfunded in 2008. To do so, they interviewed school principals to capture financial and non-financial data, such as indicators of the socioeconomic status of the local community. The data were submitted to Pearson's statistical correlation. The findings of the study suggest that schools should seek more government resources to improve educational efficiency, but recognizes that improvements in management can increase the effectiveness of these institutions.

Mihaiu (2010) in a multivariate analysis based on Ordinary Least Squares (OLS), Stochastic Frontier Analysis (SFA) and Data Analisys Envelopment (DEA), evaluated the efficiency of public expenditure for education in Romania compared to European Union in 2010. The author made a comparative analysis of standardized indicators. The conclusion of the study indicates that the resources were not used properly enough to produce the expected results. For the author, it would be reckless to suggest an increase in resources for education, when the analysis carried out shows that the volume of funding is not the problem, but rather the management.

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Agasist (2011) compared the efficiency of spending on education in 20 European countries during the period 2006-2009, using variable return returns to scale (VRS). The results of the school sample indicate that the average score of the efficiency indicator is quite high, however the volume of resources applied is too high or should raise the average score of the quality indicator by 20%. In addition, the model indicates that schools are not efficient from a purely managerial point of view.

Almeida & Gasparini (2011) analyzed public spending on basic education in 179 municipalities in the State of Paraíba, using the DEA-VRS with data from 2007. The results indicate that the smaller municipalities are those with the lowest efficiency indexes educational services and that the large centers appear to positively influence the performance of neighbors.

Cadaval& Monteiro (2011) identified the determinants of the quality of education in Brazil, using micro data from the National System for the Evaluation of Basic Education (SAEB), from a sample of 237 schools in a panel for the years 2001, 2003 and 2005. Based on the data analysis, it was possible to conclude that the factor that most strongly influences students 'performance is their parents' schooling, although the other characteristics have also been significant in part of the analysis.

Dahar and Dahar (2011) investigated the effects of public spending on quality of education in Pakistani schools in the years 2006 and 2008. The sample consisted of 288 schools, 2880 teachers and 5760 secondary school students in 36 municipalities in the district of Punjab. The authors applied questionnaires and submitted them to Pearson's correlation. It has been found that school resource inflows are poorly distributed and managed inefficiently, leading to considerable waste of money. For the authors, if resource inflows were properly allocated, they would be sufficient for effective education outcomes.

Di Gropello& Marshall (2011) analyzed the effectiveness of the Honduran community education program, from a sample of 120 rural schools in 15 states. Based on multiple linear regression, the research indicates the need to implement in school management concepts based on business literature to identify mechanisms for local community involvement, given its importance in improving educational outcomes.

In Brazil, Diniz&Corrar (2011) evaluated the efficiency in allocating public expenditures in elementary education, as a function of the budget structure of 183 municipalities in Paraíba, with data submitted to the DEA in two stages: the first with controllable consumption by the manager and the second including local socioeconomic variables. The research results showed that efficient municipalities have, on average, higher operating budgets, as well as a positive relationship between administrative operating expenses and student performance. It was also verified that the expenses with the teaching profession are not significant for the students' performance. According to the authors, these results have important implications in Brazilian educational management, specifically in the financing of education, school politics and taxation.

Lewis &Pattinasarany (2011) investigated the utility of increasing public spending to improve the quality of primary schools in 408 Indonesian districts, with data collected for the year 2005. The authors used a multiple regression OLS translog. The analysis of the results shows that money really matters for the achievement of primary education goals in the country, but it is not a sine qua non for improving this performance. For the authors, empirical evidence suggests that better management in schools is sufficient to achieve significant improvements while simultaneously reducing overall government spending.

Perelman and Santin (2011), in order to present an empirical application of a model to measure educational efficiency, used Spanish PISA data implemented by the OECD for 2440 students in 185 schools in the year 2000. The authors applied a translog elasticity function with SFA. The results identify the different aspects of the technology underlying the educational quality and suggest that when controlled the endogeneity of school consumption, no other factor differentiates public and private schools. Therefore, research indicates that a model with educational variables is sufficient to measure educational efficiency.

Raposo, Soares, Maia & Menezes (2011) proposed a methodology based on DEA and Tobit to evaluate the efficiency of 862 4th grade public schools in the Northeast Region of Brazil, with data from 2006 and 2007. The results showed that after controlling for students 'socioeconomic variables and teacher effects on learning, the estimated efficiency has become much more homogeneous across schools, which means that school performance seems to depend on the social conditions of the students and the teachers' ability.

Zoghbi, Mattos, Rocha &Arvate (2011) aimed to create indicators of efficiency in education and reinforce the need for accountability in basic education in 15 municipalities in the State of São Paulo in 2005. Using the DEA, the authors analyzed the results in function of the IDEB and concluded that Barretos is the most efficient municipality, and Presidente Prudente, the second most efficient. On the other hand, Ribeirão Preto was the most inefficient. The analysis of quartiles based on GDP per capita shows that the second quartile was the

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most efficient in the IDEB and the fourth quartile (of richer municipalities) was the least efficient.

Batare (2012) investigated the indicators that determine the efficiency of public spending on education and identified the problems related to the evaluation of such efficiency by comparing education funding in the European Union (EU) countries. The author characterized public spending on education in Latvia from the analysis of correlation and multiple regressions. It was concluded that there are a number of indicators that determine the efficiency of education. Therefore, there is no unified approach to its assessment and it should be borne in mind that efficiency indicators are continuously influenced by environmental factors. The author also emphasizes that the value of the financing per student allows to evaluate the efficiency of the public expenses.

Kirjavainen (2012) used panel data models to estimate the stochastic frontier function in the education output of Finnish secondary schools. The results indicate that the data models in panel of random effects and fixed have very divergent results. In this case, the number of years of study by the students was shown to negatively affect the students' performance.

Macedo, Starosky_Filho&Rodrigues_Junior (2012) analyzed the efficiency of public resources directed to education in 285 municipalities in the State of Santa Catarina, from 2005 to 2009. From the DEA-VRS, results indicated that 12% of municipalities in Santa Catarina are efficient in their spending on education and that those of smaller populations tend to be the most efficient.

Sarrico et al. (2012), complementing previous parametric research, conducted semi-structured interviews with influential people in school management to, using the NVivo program, explore the understanding of school self-assessment. As a contribution, research shows that the incorporation of measures of performance in school management is incipient in Portuguese secondary schools. Most interviewees recognize the difficulty of measuring results and few can demonstrate that improvement actions are consequences of self-evaluation. For the authors, there seems to be a consensus that the external evaluation of schools leads to self-evaluation.

Franca & Gonçalves (2013) analyzed the factors that affect the efficiency of educational management in 4350 Brazilian municipalities in the year 2005. Using the DEA-RSV, the authors concluded that the demographic, political and resource impacts on the educational management among the different groups of Brazilian municipalities. For the authors, the increase of public resources, in general, increases the efficiency of municipal school management.

Hanushek et al. (2013) analyzed issues involving the effect of school management autonomy in 42 countries evaluated by PISA in the period 2000-2009. Using panel data with fixed effects, the results suggest that management decentralization negatively affects student performance in countries with low socioeconomic performance. However, it positively affects such performance when it comes to developed countries.

Macedo, Scarpin, Starosky_Filho&Rodrigues_Junior (2013) analyzed the efficiency of public resources directed to education in the years 2005-2009, with a sample of 485 municipalities of the State of Rio Grande do Sul, from the DEA Fixed Returns to Scale (FRA) and RSV. The results indicate that 24.95% of the analyzed cities were efficient in their spending of resources with education. According to the authors, it is noticed that the management of these resources has proved more efficient in the smaller municipalities, with up to 30 thousand inhabitants. Among these, Pelotas occupies the first position.

Poker, Nunes & Nunes (2013) evaluated the quality of spending on education in 5,504 Brazilian municipalities, in order to provide subsidies to guide public policy both in terms of total allocation and the distribution of spending in the Federation. Data submitted to multiple regression indicate that the variation of the Human Development Index (HDI), education dimension, between 2000 and 2010 can be explained by public expenditure on education.

Rodrigues_Júnior, Felipe, Bezerra, Mendonça& Mol (2013) analyzed educational development in the metropolitan region of Natal through the IDEB, with panel data fixed and random effects for 9 municipalities in the years 2005, 2007 and 2009. The authors concluded that spending on education is related to the IDEB, that greater investment in education presupposes an improvement in the quality of the services offered, which can result in better results in the learning process of students attending public schools, with positive repercussions for society.

Savian&Bezerra (2013) analyzed the efficiency of public spending on basic education for 381 municipalities in the State of Paraná, in 2005 and 2009, using DEA-VRS. The results suggest that, in most of the municipalities of Paraná, public spending on education has proved to be inefficient, which demonstrates the need for a review by the public administration of the means of resource allocation.

Silva, Benedicto, Carvalho & Santos (2013) investigated the efficiency of 853 municipalities in the allocation of public resources for the provision of basic education in the year 2010. From the DEA-VRS, the

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results present an average of the technical efficiencies of 61% and reveals that 84% of municipalities can be considered as having a strong or moderate degree of inefficiency and less than 2% are efficient. For the authors, it is evident the need for improvements in the management of resources destined to education.

Wilbert &D'Abreu (2013) evaluated the efficiency of public expenditures with basic education in 94 municipalities in Alagoas to identify the most and least efficient in the period 2007-2011. From the DEA, research indicates that efficient municipalities were those with the worst starting conditions, in terms of average wealth and educational level, and that spent little per enrolled student. On the other hand, the least efficient municipalities were those with the best starting condition in terms of GDP per capita and that had high expenditures per student, but which reached the worst performance in the 2011 IDEB.

Almeida & Almeida (2014) analyzed the relative efficiency of government spending on the provision of basic education services to 157 municipalities in the state of Pernambuco in 2009-2011. From the DEA-VRS, the results indicate that many municipalities performed below the potential they had, given the magnitude of the inputs used. Therefore, they provide the population with an unsatisfactory educational service both in terms of the students' level of learning and the level of expenses incurred.

Blackburn, Brennan & Ruggiero (2014) estimated the efficiency of 1,650 primary schools and 400 secondary schools in the State of New South Wales (NSW), Australia. With DEA-VRS, the results suggest that Australian schools increase efficiency when socioeconomic conditions are more favorable. In addition, efficiency is higher in schools with more students.

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