LUMEN ET VIRTUS

Which model of teacher organization has the best student performance in the fifth year of elementary school?

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ABSTRACT

Debates about the problems of Brazilian basic education have intensified in recent years, seeking ways to improve the quality of education. From the international perspective of evaluations, discussions on how to improve education constantly permeate teacher training. Thus, a point to highlight is the teaching organization to work in the initial grades. Specifically in classes of the 5th year of elementary school, it is known that in the State of Rondônia there are different models of organization, such as a varied number of teachers per class (one, two, three), different training and teachers from different training schools (generalist and specialist). Thus, this study aimed to evaluate which model of teacher organization has the best student performance in the fifth year of elementary school. To answer this question, data from the school census and results of the Prova Brasil/SAEB of the fifth year of elementary school, both from 2017, are used. To assess whether the scores differed between the categories, an Analysis of Variance-ANOVA and Student's t-test were used. As a result, seven models of organization in the classroom were found, all with an average considered below adequate, with no difference between the number of teachers per class and training. There was a difference in relation to the training aspects. In general, it considers a negative result, because together with the lack of definition of the appropriate teacher profile for the respective grade, it is accompanied by poor student performance, raising an alert, and indicating the need for greater investments and planning in the processes of training, hiring and valuing teachers.

Keywords: Teacher organization, Training Strands, Prova Brasil/SAEB, Student Proficiency.

INTRODUCTION

The Brazilian educational process has gone through different periods. Each of them marked by influences from the historical moment in which the Western world was living. Over the years, in

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the educational aspect, there has been no policy that gave continuity to teaching, having models to meet the elite and the political needs of each historical period.

Regarding teacher training, in recent history, in 1971 Law No. 5,692 was sanctioned, which fixed the duration of 1st and 2nd degree education, and determined the reformulation of the teacher training course to work in the 2nd degree, offered through higher education, with specific qualifications by area of knowledge; and for the initial grades, 2nd degree training (SHEIBE, 2008). In short, it did not require higher education to work in the initial grades of the 1st grade. For Mello (2000), it is not justifiable that a person with only the 2nd degree could be prepared to act in the initial grades (1st to 4th). The course did not deepen the expected knowledge, and it was difficult for him to master the required content with this training alone.

From the end of the 1970s to the beginning of the 1980s, a movement for the reformulation of teaching degrees began, in the wake of discussions about the pedagogy course, which, although characterized as a teaching degree, predominantly trained "specialists" in education (SHEIBE, 2008). Dermeval Saviani (1986) was one of the educators engaged in these discussions, proposing that all teaching degrees would have to be specialists in generalities, with a focus on understanding, in depth, the conditions of development of education, where the essential thing would be to train the educator, replacing the specialist teacher with the teacher educator.

Consequently, the LDB (law 9.394/96) was responsible for a new wave of debates on teacher training in Brazil (PEREIRA, 1999). It is now demanded to raise the level of training of teachers, determining the mandatory nature of higher education for all teachers of basic education. Such legal guidelines resulted in a movement to expand the supply and demand for pedagogy or higher education courses, both aimed at teacher training (SARTI, 2012).

In recent years, the post-LDB period, debates on the problems of Brazilian basic education have intensified, seeking ways to improve the quality of education. In the midst of the event, there is a consensus, since Brazil is among the ten largest economies in the world, and occupies the last places in the ranking when it comes to educational quality, Brazilian education is doing badly (RAMOS, 2010; PISA 2015; SASSAKI et al., 2018).

From the international perspective of evaluations, discussions on how to improve national education constantly permeate teacher training (PEREIRA, 2013; VIANA, 2014; BAUER, 2017). Especially in a scenario in which in the 1990s there was a massive national higher education, without the return of quality according to the data of the evaluations (PEREIRA, 1999; SARTI, 2012).

In this theme, Saviani (2011), regarding the history of teacher training in Brazil, refers to the existence of two curricular models of training, the "model of cultural-cognitive contents" and the "pedagogical-didactic model". The first is of a specific nature that, according to the author, is exhausted in the specific domain of the contents of the area of knowledge corresponding to the

discipline that the teacher will teach. A model that has predominated in recent years in universities and other higher education institutions for training in specific areas. This branch is referred to in this work as the training of specialists.

The second was called the pedagogical-didactic model, as opposed to the previous one, considering that the training of the teacher itself is only completed with the effective pedagogical preparation of the teacher, considered as ideal. It prevailed in the training of primary teachers, pedagogy course (SAVIANI, 2011). This aspect is defended by the author, because teacher training institutions for basic education must ensure, in a deliberate and systematic way, through curricular organization, pedagogical-didactic preparation, without which, teacher training institutions will not be, in the proper sense, training teachers.

One aspect to be considered is that, although the training of the pedagogue is predominantly directed to the performance in the initial grades, there are different models of teacher organization. Specifically, in the 5th grade classes of elementary school in the State of Rondônia, there is a variety in the composition of the teaching teams. These classes can have one, two or three teachers, who have different backgrounds, covering degrees in pedagogy, Portuguese language, mathematics, among other areas. In addition, these teachers may come from different training schools, characterizing themselves as generalists or specialists, and, in some cases, may not yet have a higher education degree.

These organizational strategies vary both because of the scarcity of professors and because of the attempt to improve the rates of external evaluations. However, to date, there is no conclusive evidence to indicate whether such strategies result in significant improvements in student performance.

Thus, considering that large-scale studies are the elements implemented to investigate the quality of education, that the results of students in external evaluations are inadequate, especially in basic education, that the increase in the level of teaching (higher) in Brazil has not positively affected the performance of students, and that there are different models of organizations in fifth-grade classes. This work aims to evaluate which model of teacher organization has the best student performance in the fifth year of elementary school, considering the number, training and school of teacher training in the state of Rondônia.

MATERIALS AND METHODS

To answer the proposed objectives, the database made available by the National Institute of Educational Studies and Research Anísio Teixeira - INEP, an autarchy linked to the Ministry of Education - MEC (BRASIL, 2017), is used. Through the School Census files and the data with the results of the evaluations.

The microdata from the School Census, 2017 is interpreted and filtered. The School Census Microdata Manual, 2017 is used as support. This manual has information, at the national level, on Schools, Classes, Enrollments and Teachers. For this study, information regarding the State of Rondônia, data on teachers, classes of the 5th year of Elementary School, and the results of the external evaluation Prova Brasil/SAEB were selected. The reading and filtering of the database was performed in Microsoft Excel® software.

Therefore, new filters were applied, using the same methodological procedure. First, only schools in the municipal education network are maintained. Second, only schools in the urban area are maintained. Third, only schools with the same socioeconomic level were preserved, avoiding comparisons of results between schools of different levels. For this, the classification of the Socioeconomic Level Indicator of Basic Education Schools – INSE, made available by INEP, is used. A social indicator that categorizes schools into 7 (seven) groups (BRASIL, 2015). For this study, only the schools of group 3 – low secondary – were maintained, as it is the predominant group in the State of Rondônia.

Based on this general spreadsheet, the schools were divided into groups according to teacher training and the total number of teachers working in the 5th grade class of Elementary School (Table 1).

Table 1 – School groups and the respective teacher training.

Groups	Teachers	Schools	Number of Schools
MG Group	Magisterium	School with classes with teachers who do not have higher education and have a high school teaching level.	06
OF Group	Other Formations	School with classes where teachers have higher education training other than pedagogy, Portuguese language, mathematics and physical education.	01
PD Group	Pedagogy	School with classes where the teacher has a degree in pedagogy.	62
LP Group	Portuguese Language	School with classes where the teacher has a degree in Portuguese.	03
PD+LP Group	Pedagogy + Portuguese Language	Schools with classes that have two teachers, one with a degree in pedagogy and the other with a degree in Portuguese.	15
PD+MT Group	Pedagogy + Mathematics	Schools with classes that have two teachers, one with a degree in pedagogy and the other with a degree in mathematics.	02
PD+LP+MT Group	Pedagogy + Portuguese Language + Mathematics	Schools that have classes with three teachers, one with a degree in pedagogy, another with a degree in Portuguese and the third teacher with a degree in mathematics.	02
Total			91

To verify whether there was a difference in the averages of the fifth year of elementary school, of schools with classes that have a single teacher in relation to schools with more than one teacher per class; From Table 3, three groups were separated, first, uniting Group PD and Group LP (schools with a single teacher per class). It should be noted that the MG Group was not included, as it did not have a teacher with higher education; and the OF Group for having a teacher with other training, not being Portuguese, mathematics and/or pedagogy. Second, the PD+LP Group and the PD+MT Group (schools with two teachers per class) were united. Third, it maintained the PD+LP+MT Group (schools with three teachers per class), see table 2.

Table 2 – Groups with number of teachers per class, formed from table 3, and the total number of samples.

Schools	Number of Displays
A teacher	65
Two professors	17
Three teachers	02
Total	84

To analyze whether there was a significant difference in the averages of the fifth year of elementary school, between schools with teachers with higher education in relation to schools with teachers without higher education; first, based on Table 3, the groups were separated, keeping the PD Group (undergraduate degree in pedagogy) representing the group with professors with higher education.

It is noteworthy that the other groups with teachers with higher education were not included in the samples, so as not to influence the type of training or number of teachers.

Representing the group that had teachers without higher education, the MG Group (high school education) was used, see table 3.

Table 3 - Groups with schools with higher education and without higher education, formed from table 3, and the total number of samples.

Schools	Number of Displays
With Higher Education	62
No Higher Education	06
Total	68

To find out if there is a difference in the averages of the 5th year of elementary school, between the two theoretical currents (generalist and specialist), first, from Table 3, the groups were separated, keeping the PD Group (generalist training), LP Group (specialist training) and the PD+LP Group, PD+MT Group and PD+LP+MT Group were united, groups with professors from both backgrounds (generalist + specialist) working in an alternation system, see Table 4.

Table 4 - Groups from their respective training schools, formed from table 3, and the total number of samples.

Schools	Number of Displays
Generalist	62
Specialist	03
Generalist+Specialist	19
Total	84

Subsequently, to test the factors (number of teachers, training and school of training) using the means of the Prova Brasil/SAEB of the schools, an Analysis of Variance (ANOVA) was performed for factors with more than two groups, and a Student's t-test for factors with two groups (VIEIRA, 2006). To evaluate whether the residuals had a normal distribution, the Shapiro-Wilk test was used, while the homogeneity of the variances was tested using the Bartlett test (BARTLETT, 1937). When ANOVA revealed that at least one of the means differs from the others, a Tukey test for multiple comparisons of means was used (TUKEY, 1993).

In all analyses, a significance level of $p \leq 0.05$ was adopted. All analyses were performed using the free program R (R Core Team, 2019).

RESULTS AND DISCUSSION

NUMBER OF TEACHERS PER CLASS, THEIR TRAINING, AND DISTRIBUTION IN SCHOOLS

In total, data from 91 schools were evaluated, and their distribution by groups is shown in Table 3. They are distributed across 34 (thirty-four) municipalities in the State of Rondônia, allowing a uniform urban sampling of the entire State.

Of the total samples, 93% have professors with higher education, and 68% are exclusively composed of professors with a degree in pedagogy (PD Group). On the other hand, 4.2% of the schools have teachers with a specific degree in Portuguese (LP Group) and other training (OF Group) (without a pedagogue). Although the pedagogy course, in its parameters, is intended for the exercise of teaching for early childhood education and the early years of elementary school, article 62 of LDB – 9394/96 (BRASIL, 1996), stipulates as one of the requirements for teaching in the first grades of elementary school, the teacher must be trained in a higher education course, not determining the area of the course. Thus, it indicates that training can take place in different degrees, which justifies having teachers with specific training working in classes of the 5th year of EF (4.2%) (BAUMANN and BICUDO, 2010; NASCIMENTO and LIRA, 2017).

Of the schools that had more than one teacher working in the same class, in an alternation system, 18.6% had two teachers (PD+LP Group and PD+MT Group) and 2.2% schools with three teachers (PD+LP+MT Group). In this aspect, nothing was found in the legislation that specifies or limits the number of teachers in the initial grades. Thus, in the absence of a specific determination, this type of organization is understood to be legal.

The results also showed that 7% of the sample belongs to the group of schools with teachers without higher education in the exercise of teaching (MG Group) (see table 3). This result is supported by the Law of Guidelines and Bases of National Education/LDB, because, although the law stipulates the obligation of higher education for all teachers, contradictorily, the same LDB admits high school level in the normal modality for early childhood education and the first 5 (five) years of elementary school (BRASIL, 9394/96 Art. 62). The studies by Martelli and Manchope, (2004) and Pereira and Cervi, (2019) also verify this ambiguity of the aforementioned law, because according to them, sometimes it validates training at the secondary level, sometimes it points out that only teachers with higher education will be accepted. Thus, due to this ambiguity, in the 2nd decade of the twenty-first century, teachers with only high school education still worked in elementary school.

Regarding the period stipulated for all teachers to be qualified at a higher level, LDB 9394/96, originally, in article 87 § 4 (BRASIL, 1996), determined ten years. However, after long debates by the legislative branch, the aforementioned paragraph was revoked by Law No. 12,796 of 2013. One of the arguments used was that the obligation could lead to the punishment of these professionals without higher education, causing mass dismissal (LARCHER, 2013; LIMA, 2013). Currently, there is no mandatory deadline for the transition from secondary level teaching to higher education. However, it is one of the objectives of "Goal 15" of the Brazilian Government's Plan of Goals, which stipulates a ten-year period to expand and ensure higher education for all teachers (BRASIL, law 13.005/2014). It should be noted that, in 2014, the year the Target Plan was sanctioned, there were approximately 24% of teachers without higher education, while in 2020 this total fell to 14.7% (PNE, 2015; OPNE, 2020). That is, gradually, not only Rondônia, but all of Brazil, is universalizing the higher education of teachers.

In view of the above, the results show seven different models of school organization in classes of the 5th year of elementary school. It is important to highlight that the data discussed were obtained after applying filters, indicating that, in their absence, the multiplicity in the school organization would be even greater (see table 3). That is, the result indicates a lack of definition about the area of qualified and/or recommended training to work in the first stage of elementary school (in the case of this study, specifically in the 5th year of EF).

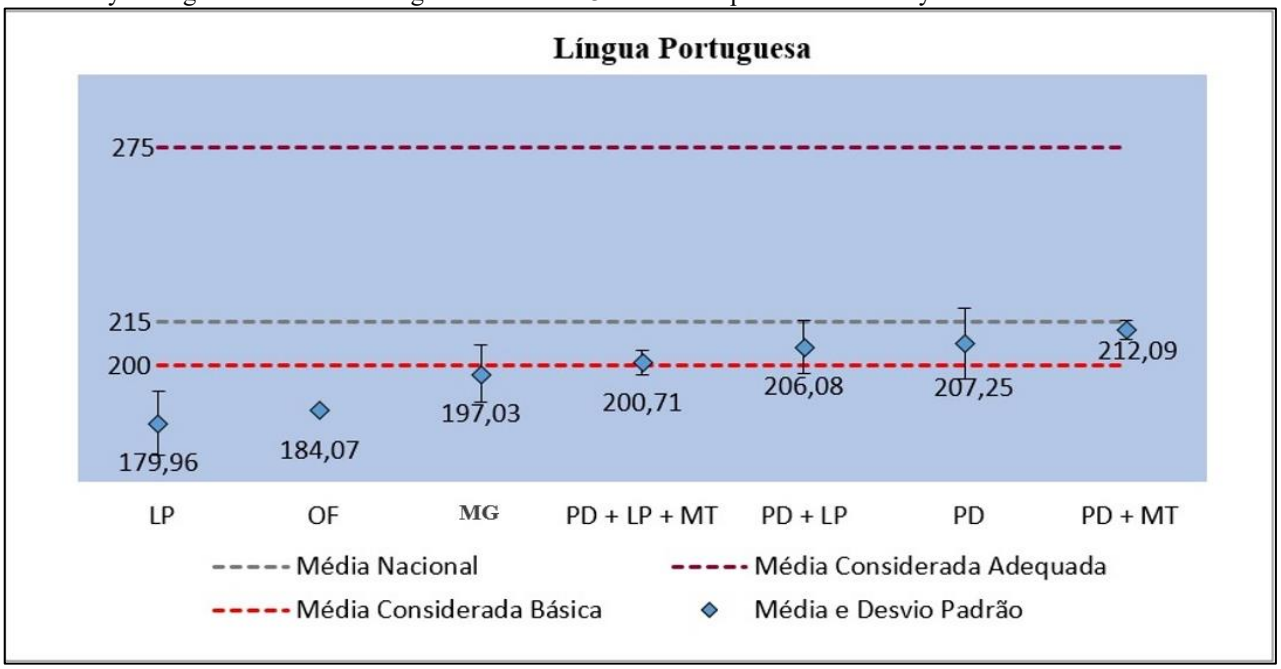
In this context (teacher profile), international literature emphasizes the importance of teacher organization and preparation, because considering the learning indices measured by PISA (2009 to 2018), it is clear that the countries that are at the top of the ranking have in common a great organization of teacher admission. According to Wang et al. (2003) and Akiba et al. (2007), high-performing countries (England, Hong Kong, Japan, Korea, the Netherlands, and Singapore) have centralized systems for teacher training and certification, with stricter regulatory control and

appreciation of the profession. All the countries mentioned have screening criteria at various times, entry into the teacher training program, evaluation of field experience, exit from the teacher training program or certification. In these cases, a teacher without higher education or qualified for a specific discipline would not teach classes in the initial grades of elementary school.

The factors that may have contributed to the result (seven models) were not investigated by this study. However, one hypothesis is that although the admission of teachers, according to the Constitution of the Republic of 1988, determines that it must occur through public competition, in case of need, it provides, in item IX of article 37, the possibility of temporary hiring, for a fixed period (BRASIL, 1988). For Gatti, Barreto and André (2011), the low approval of candidates in the competitions, the departure of teachers from the school system during the school period, retirements and the call of teachers who have passed public examinations for other functions have made it impossible to fully cover vacancies in schools, leading States and Municipalities to temporary hiring and reallocation of capacity. The relocation, or rotation, of classes and schools, weakens the condition of the teacher, since it makes their remuneration unstable, reduces the creation of bonds with students and the community (CENSO ESCOLAR, 2018 apud CAPUCHINHO, 2019), and reallocates the teacher in classes/schools outside their formative competence, despite being legally legal.

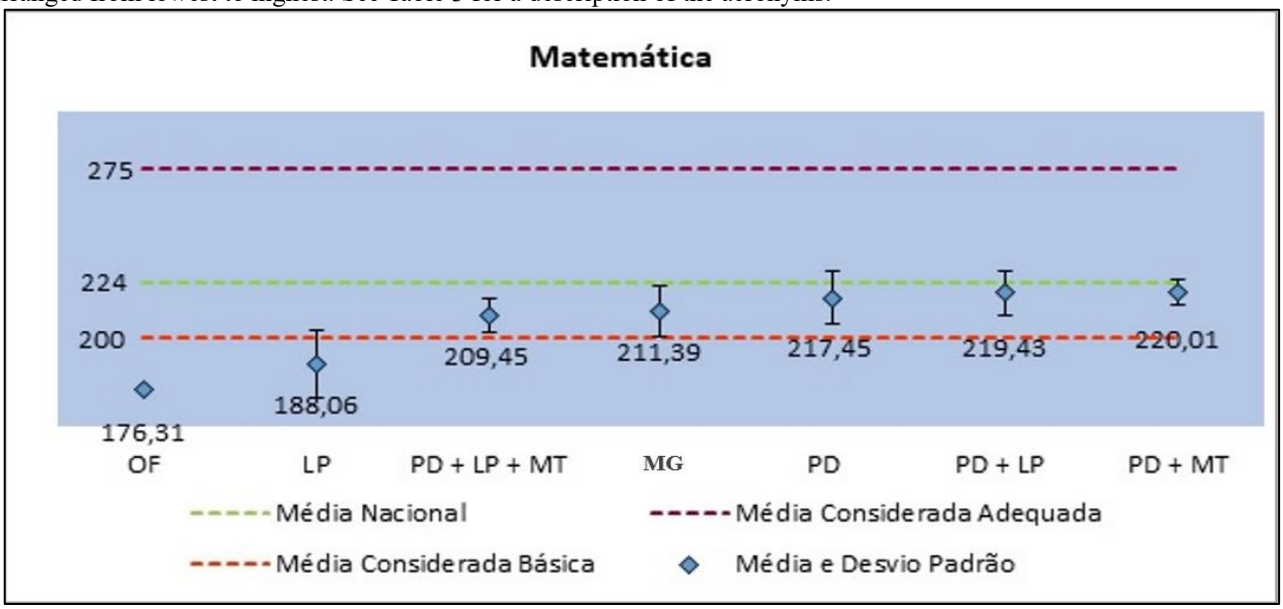
Regarding the student performance Prova Brasil/SAEB, all groups (seven models), in Portuguese language and mathematics, are below level 7 (seven), score between 275 and 299 points (figure 1 and 2), an average considered adequate according to the Ministry of Education (BRASIL, 2018).

Figure 1 – Mean and standard deviation of the Portuguese language Prova Brasil/SAEB 2027. The averages were intentionally arranged from lowest to highest. See Table 3 for a description of the acronyms.



Looking at the mean and standard deviation in Portuguese, it is noticed that the Group (LP) and Group (OF) are below the level considered basic, scores between 200 and 224 points. The Group (MG) reaches the basic level considering the standard deviation. Groups (PD + LP + MT), (PD + LP), (PD) and (PD + MT) reach the basic level. Considering the standard deviation, the Groups (PD + LP), (PD) and (PD + MT) reach the same national average of 215 points. However, all groups are below level 7, a score between 275 and 299 points, an average considered adequate according to the Ministry of Education (BRASIL, 2018).

Figure 2 - Mean and standard deviation of mathematics Prova Brasil/SAEB – 2017. The averages were intentionally arranged from lowest to highest. See Table 3 for a description of the acronyms.



In the Mathematics category, Groups (OF), (LP), are at level 3, average between 175 and 199 points, considered an insufficient grade. The groups (PD + LP + MT), (MG), (PD), (PD + LP) and (PD + MT) reach level 4, between 200 and 224 points, considered basic. Taking into account the standard deviation, it is observed that group (PD), (PD + LP) and (PD + LP + MT), reach level 5, score between 225 and 249 points, reaching the national average. However, kill yourself at the level considered basic. The average of all groups is far from level 7, a score between 275 and 299, considered adequate.

In the general aspect, both in Portuguese and mathematics, it is considered a negative result, because despite the differences in the teacher profile (training and quantity), none manages to reach the appropriate level. It is observed here that this result is not exclusive to the State of Rondônia, because considering the national average Prova Brasil/SAEB, both Portuguese language and mathematics are also below the average considered adequate.

The result found corroborates international evidence, where countries that have good student performance have a stricter control of the teaching profile for the respective grade/year. Thus, further

studies are suggested to understand the reasons that led to the hiring of teachers with varied profiles for the same year/grade. Thus, enriching educational debates, and collaborating with the formulation of public policies.

SCHOOLS WITH CLASSES THAT HAVE A SINGLE TEACHER, IN RELATION TO THOSE WITH MORE THAN ONE TEACHER PER CLASS

Regarding schools that have more than one teacher per class, two teachers (PD+LP Group and PD+MT Group = 18.6%) and with three teachers (PD+LP+MT Group = 2.2%), the E-teacher Group (2019), states that the action of having more than one teacher working in 5th grade EF classes can help students to begin to get used to the structure (of having more than one teacher) of the final years of Elementary School. In some schools, there is a rule that students have two teachers, who take turns in two general subjects. In view of this, the studies of Hauser (2007), Lameu and Quadros (2013) and Ferreira, (2018), highlighted that the student's entry into the sixth year is seen with concerns and expectations. The transition from one phase to another is loaded with changes present in the student's adaptation, whether in the educational structure, in the teachers, in the number of subjects.

Despite the positive psychological aspect (having more than one teacher), the student's proficiency performance, compared to the school group that has a single teacher (PD Group), both in Portuguese and mathematics, does not indicate a statistically significant difference (Tables 7).

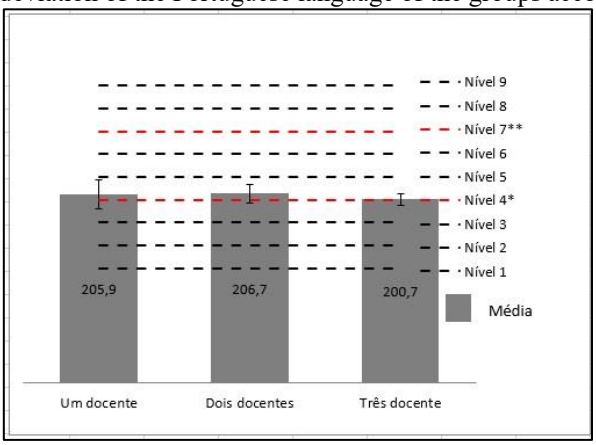
Table 7 – Mean, standard deviation and ANOVA result in comparison of the averages of students Prova Brasil/SAEB (2017) referring to the number of teachers per class.

	A teacher		Two professors		Three teachers		ANOVA Result		
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	F	Value of F	Value of P
Portuguese Language	205,9	±15.9	206,7	±10.6	200,7	±6.2	2; 80	0,14	**0,86**
Mathematics	215,7	±16.8	219,5	±12.4	209,4	±10.6	2; 80	0,56	**0,57**

DF=Degrees of Freedom; F=Statistics F; P=Probability of significance.

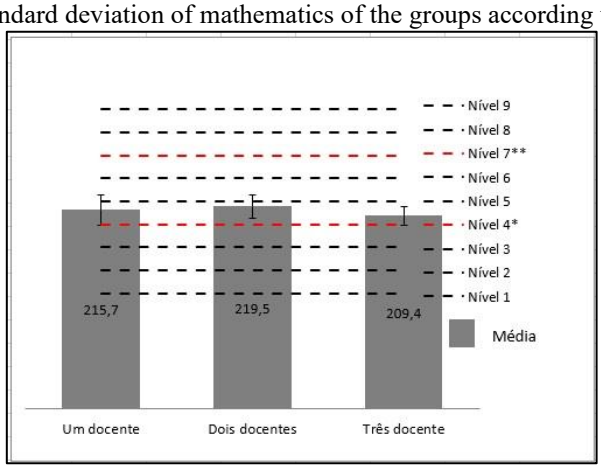
Considering the averages (table 7) of the groups with more than one teacher (two and three), despite reaching and/or exceeding the basic average of 200 points, none of the schools managed to reach the average considered adequate of 275 points. Both are equivalent to schools that have a single teacher per class (see figures 3 and 4).

Figure 03 – Mean and standard deviation of the Portuguese language of the groups according to the number of teachers.



** Average considered adequate.
* Average considered basic.

Figure 04 – Mean and standard deviation of mathematics of the groups according to the number of teachers.



** Average considered adequate.
* Average considered basic.

Thus, even if having more than one teacher may contribute to the student's adaptation in the transition from the 5th to the 6th grade, the result demonstrates that, in the State of Rondônia, it does not add to the student's proficiency. In view of this, it is believed that before thinking about the transition process from one grade to another, one must first think about the quality of teaching, providing the student with conditions to progress in relation to proficiency levels. This fact is not related to the number of teachers per class.

Since, in the current context, being irrelevant to student proficiency, it would be important to evaluate whether the sixth-grade classes that had students who went through the transition (5th grade to 6th grade) with more than one teacher, have better academic and/or psychological performance. In this way, it would be healthy to keep more than one professor, or to encourage this policy, since next year the students are already adapted, facilitating the transition.

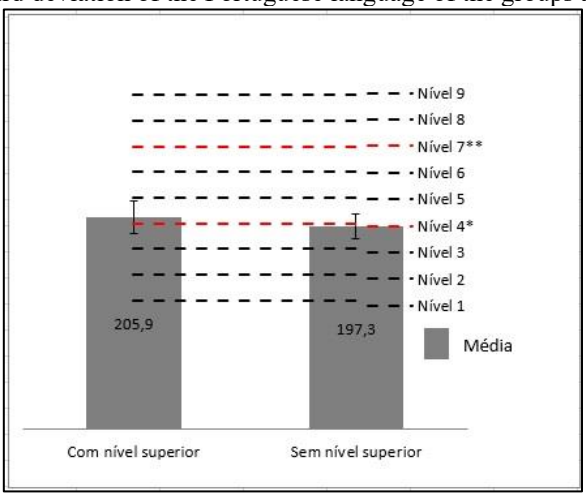
Schools with teachers with higher education (undergraduate degree in pedagogy) in relation to schools with classes with teachers without higher education (high school education).

The universalization of teachers with higher education is considered an advance for the improvement of education (JACOMINI AND PENA, 2016; NUNES AND OLIVEIRA, 2017; DAMASCENO AND FONTES, 2019). However, when comparing the results of schools that had teachers without higher education (MG Group) with the group that had teachers with higher education (PD Group) (see table 5), it was found that there was no statistically significant difference between the groups in the two categories, Portuguese language and mathematics (see table 8 and figures 5 and 6).

Table 8 – Mean, standard deviation and results of the Student's t-test in comparison of the Prova Brasil/SAEB student averages (2017) referring to schools with teachers with higher education in relation to schools with teachers without higher education.

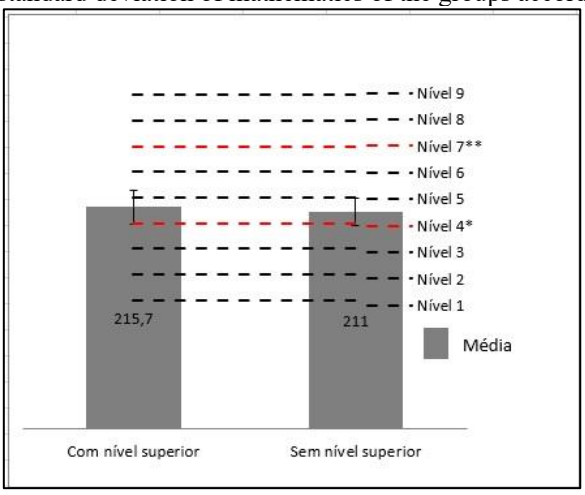
	With Higher Education		**No Higher Education**		**Student's t-Test Result**		
	Average	Standard deviation	Average	Standard deviation	DF	T Value	Value of P.
Portuguese Language	205,9	±15.9	197,3	±12.2	6,7	-1,66	**0,14**
Mathematics	215,7	±16.8	211,3	±13.0	6,6	-0,75	**0,47**

Figure 05 – Mean and standard deviation of the Portuguese language of the groups according to teacher training.



** Average considered adequate.
* Average considered basic.

Figure 06 – Mean and standard deviation of mathematics of the groups according to teacher training.



** Average considered adequate.
* Average considered basic.

The result is considered negative, because together with the elevation of teachers to higher education, an increase in student performance was imagined. It should be noted that this result does not mean that teachers are to blame, since the factors that can influence student performance are multiple, not only linked to teacher training (GOMES and REGIS, 2012; PALERMO, 2012; MALTA, 2014). Some studies, for example, have found little evidence that teacher certification is systematically related to student performance (GOLDHABER AND BREWER, 2000; RICE, 2003). On the other hand, in recent years, many scholars have highlighted that high-quality teachers do indeed increase student performance. They agree that the most important resource a school can do is to provide good teachers to its students (OECD, 2005). For example, evidence from countries with good educational performance demonstrates a better performance of students taught by teachers who had met their country's criteria for obtaining full certification at the higher level (ROCKOFF, 2004; AKIBA et al., 2007; ZONATTO, 2013; HANNUKAINEN, 2019 and CRUZ, 2020).

The study by Hannukainen (2019) reveals a strong relationship between teacher cognitive abilities and student performance. One of the author's conclusions is that if each country raised its teachers to the level of cognitive ability of Finnish teachers, the most qualified teachers in their sample, the dispersion of PISA scores would be reduced by about a quarter. Another study, in its conclusions, highlights that teachers' skills, measured at the country level using PIAAC, are positively associated with student achievement measured using PISA (MERONI, TOSCANO and COSTA, 2015). In other words, as much as there are multiple factors that can influence student performance, empirical evidence suggests that increasing the quality of teachers, initial and continuous, can be an essential instrument to improve student results. The countries that have made the most progress in terms of learning are those that have opted for a strategy that focuses on investment in the teacher (ZONATTO et al., 2013; HANNUKAINEN, 2019). Thus, the need for a trained and updated faculty is fully recognized as being essential. The indifference in the result

indicates, at the very least, the urgency of new studies to ascertain the training process and working conditions.

In view of this, hypotheses are opened that may contribute to understanding the result obtained in this study.

First, teacher training, because in the post-LDB period (9394/1996), it led not only the State of Rondônia, but all of Brazil, to graduate, at once, a large number of teachers in service; this under specific conditions characterized, above all, by limitations of time and space, and by the reduction of the financial resources employed. Thus, the urgency to qualify a large number of teachers without the corresponding investment led to a scenario of improvisation and lightening, not contributing to quality training (PEREIRA, 1999; SARTI, 2012). According to the school curriculum, in recent years, this curriculum has been stiffened and narrowed to adapt to large-scale assessments, causing a process of regulation, not only in the production of rules, but also the readjustment of actions, influencing teaching practice (BARROSO, 2005; LIBÂNEO, 2016; MENDES, 2018; APPLE, 1999; KUENZER, 2002; RITTER and MALDANER, 2014; JOLANDEK, PEREIRA and MENDES, 2019). Third, the precariousness of teaching work, where the literature points to the precariousness and intensification of teaching work, implying both the increase in the demands and diversification of their activities and the weakening of their working conditions (APPLE, 1995; RODRIGUES, 2002; OLIVEIRA, 2004 and VARKEY FOUNDATION, 2018). Fourth, large-scale assessment, as many efforts today seek to use such large-scale assessments to shed light on students' thinking and learning processes (MESSICK, 1996). However, Azevedo (2016) highlights that there is a differentiation in teaching from one school to another, and this happens as a result of possible heterogeneity, and the large-scale testing model cannot account for the specificities, both because it disregards the possible differences in the pace of learning, and because it does not contemplate these students in the way the performance test is carried out (TAVARES, 2013; DALBEM AND ALMEIDA, 2015). Another point is the difficulty of students to answer the questions of evaluations in large schools, for example, the study by França (2008), when analyzing the student performance in the SAEB evaluation in mathematics, found that the greatest difficulty faced by the students was in understanding the statement of the questions, giving meaning to the data of the problems. Sassaki et al. (2018), suggest that Brazil's poor performance in PISA is mainly due to the fact that most respondents were unable to reach the end of the test.

Although the hypotheses described are possibilities to explain why there was no significant difference between schools that had a teacher with higher education in relation to schools with a teacher without higher education (secondary level teaching), it is believed that the main determinant is the teaching experience in the classroom. Considering the legislation (LDB 9394/1996), which after sanctioning motivated a policy of not hiring teachers without higher education, the current

teachers with teaching training have probably been working for more than ten years. In this sense, one of the conclusions of the Machado et al (2015) studies, when analyzing the student proficiency of the 5th year of elementary school in the 2011 SAEB evaluation, was that the teaching experience (more than ten years) contributes significantly to the improvement of the student proficiency result. In this aspect, it can justify the result found in this study.

It is important to emphasize that, although the factors that influence student proficiency are multiple and complex, the scientific literature demonstrates that teacher training is one of the main factors responsible for improving student performance. The fact that schools with teachers with higher education did not present statistical difference in relation to schools where teachers do not have higher education, contradicts all national and international empirical evidence, raising an alert, and indicating the need for greater investments and planning in the processes of training, hiring and valuing teachers to improve the educational quality offered to students.

Is there a difference in the averages between schools that have teachers with generalist training in relation to schools that have teachers with specialist training?

The theme of teacher training is the daily object of debates not only in the academic environment, but also in the national media. Currently (2021) there are two types of teacher training: the cultural-cognitive content model and the pedagogical-didactic model (Saviani, 2011), in practice in the 5th grade classes of elementary school (here called, respectively, generalist and specialist training).

When comparing the results of the performance in the Prova Brasil/SAEB, between the two formations, the result pointed out that there is a difference in the average value of the tests in the two categories (Portuguese Language and Mathematics). It is noted that the Groups that make a significant difference are the same between the two categories (Portuguese Language and Mathematics). Among the schools with teachers from the Specialist Group in relation to the Generalist Group; and Generalist + specialist groups in relation to the Specialist group (see tables 9 and 10).

Table 9 – Mean, standard deviation and ANOVA tests in comparison of the student averages Prova Brasil/SAEB (2017) referring to schools with teachers with generalist, specialist and generalist + specialist training.

	Generalist		Specialist		Generalist+Specialist		ANOVA Result		
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	DF	Value of F	Value of P.
Portuguese Language	207,2	±14.9	179,9	±15.9	206,1	±10.3	2; 80	5,36	**0.006**
Mathematics	217,0	±15.6	188,0	±20.1	218,4	±12.3	2; 80	5,49	**0,005**

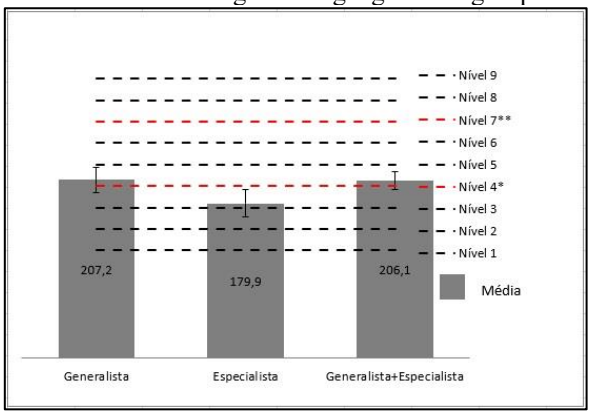
DF=Degrees of Freedom; F=Statistics F; P=Probability of significance.

Table 10 - Tukey test of multiple comparison of the student averages Prova Brasil/SAEB (2017) referring to schools with teachers with generalist, specialist and generalist + specialist training.

Portuguese Language		**Mathematics**	
Schools	Value of p.	Schools	Value of p.
Generalist - Specialist	**0.004**	Generalist - Specialist	**0.004**
Generalist + Specialist - Specialist	**0.010**	Generalist + Specialist - Specialist	**0.005**
Generalist+Specialist - Generalist	**0.952**	Generalist+Specialist - Generalist	**0.936**

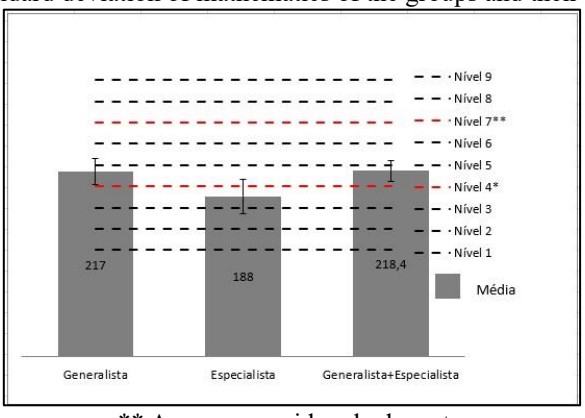
This result indicates a trend towards improved grades when there is the presence of a teacher with training in pedagogy (generalist). Graphs 07 and 08 show that schools that have exclusive teachers with specific training are below schools that have a teacher with generalist training. When specialist teachers work in partnership with pedagogues, the result improves, being level with the other groups with teachers with generalist training.

Figure 07 – Mean and standard deviation of the Portuguese language of the groups and their respective training model.



** Average considered adequate.
* Average considered basic.

Figure 08 – Mean and standard deviation of mathematics of the groups and their respective training model.



** Average considered adequate.
* Average considered basic.

Regarding generalist training, the authors Evangelista and Triches (2008), Gatti et al. (2009), Barbosa (2017) and Pimenta et al. (2018), criticize, arguing that the scope of knowledge, present in the generalist course, does not contemplate, in a more in-depth way, the specific contents of the disciplines to be taught, compromising their performance as a teacher.

The authors Gatti et al. (2009) researched the curricula and syllabuses of pedagogy courses. They analyzed 71 face-to-face undergraduate courses in Pedagogy, distributed throughout the country, concluding that the curricula are fragmented, with a set of non-congruent disciplines. Only 7.5% of the subjects are intended for specific content to be taught in the initial grades of elementary school. It is evident that the specific contents did not appear as objects of study in the pedagogue's initial training courses. For Curi (2005), the disciplines related to mathematics, when they are offered in the Pedagogy courses, have a very reduced workload, only 4% of the total course load. The studies of Hilário and Pereira (2015), Nacarato, Mengali and Passos (2009), highlight the difficulty of future teachers of the early years on the conceptual mastery of the mathematics contents of the 4th and 5th grades. Other studies discuss that the breadth of the curriculum, in the formation of the pedagogue, ends up making it superficial, not contemplating the requirements, mastery of the specific content of each subject. Thus, they agree and affirm that it is unlikely that a single teacher has all these domains in a hybrid course, with such a broad curriculum (BARBOSA, 2017; PIMENTA ET AL, 2018).

Despite what has been described, the results in Portuguese language and mathematics showed that schools that have teachers with generalist training obtained the best results compared to schools with only teachers with specific training (see graphs 07 and 08). That is, even though generalist training can be broad, the result showed that replacing it with a professional with specialized training does not add to the student's proficiency. Regarding the average, the generalist group in relation to the specialist group, in the two categories studied, has a higher value, of 27.3 points in Portuguese Language, 29 points in mathematics. Similar results were obtained between the Generalist + Specialist Group in relation to the Specialist Group, obtaining a higher result for the Generalist + Specialist Group of 29 points in Portuguese, 30.4 points in Mathematics (See Table 9). In this study, the result of student proficiency in the Portuguese language is noteworthy, even though the teacher with specific specialist training in the Portuguese language taught the content, obtained a lower result in relation to the groups in which the generalist teacher taught the content (see table 9; see graphs 07 and 08). In this aspect, the result is in accordance with the studies of Baumert et al. (2010), who highlight that teachers who have a strong pedagogical knowledge are more effective than those with knowledge only of the content. According to them, the students in the study whose teachers had strong pedagogical knowledge were likely to learn a full year more than those whose teachers had poor pedagogical knowledge (BAUMERT et al. 2010).

This result (the tendency of the pedagogue (generalist) to collaborate for better student performance) also corroborates the training strand defended by Saviani (2007, 2008 and 2011), arguing that all teaching degrees should have a solid pedagogical theoretical foundation, according to the requirements of educational practice, making him a polyvalent professional subject, whether in the pedagogy course or not. In this way, Saviani (2006, 2009, 2011) came to divide the models of

teacher training into two. The first is of a specific nature, entitled the model of cultural-cognitive contents, aimed at the teacher of a specific discipline. And the second, generalist, pedagogical-didactic model, aimed at the training of the pedagogue. Thus, according to the author's studies, the cultural-cognitive model should be subsequent to the pedagogical-didactic model, in a system of complementation. For Saviani (2011), teacher training institutions for basic education must ensure, in a deliberate and systematic way, through curricular organization, pedagogical-didactic preparation, without which teacher training institutions would not, in the proper sense, be training teachers.

In graphs 07 and 08 it is possible to see that the Specialist Group, in Portuguese, does not even reach the average considered basic of 215 points. In mathematics, the specialist group reaches the basic average, but is well below the other groups. On the other hand, the Groups that have a teacher with generalist training (pedagogue), considering the standard deviation, reach and/or exceed the average considered basic. It was also found that the Generalist Group and Generalist + Specialist Group reached the national average of 215 points (considering the deviation). As a result, one of the factors that may have contributed to the better performance of schools with generalist teachers (pedagogues) is the professional adequacy to the grade (5th year of Elementary School), where the set of students' educational needs are minimally met by adequate generalist training. The teacher, by applying the pedagogical tools appropriate to the teaching stage, improves the student result. The expression "pedagogical tools", understood as any object, natural or constructed by man, whose purpose can be defined as facilitating the apprehension of reality to a given phenomenon. That is, to designate strategic instruments auxiliary to teaching practice (KOMOSINSKI AND LACERDA, 1998; CRUZ ET AL., 2012).

Even with the data of this study showing that generalist teacher training results in greater student proficiency in the Prova Brasil/SAEB, it does not mean that it is a good student result, as all groups are below what is considered adequate (275 points**,** graphs 07 and 08). Faced with this reality, Mello (2000) and Trindade (2011) investigate the need for an articulation between the two models. There is a need to rethink the relationship between scientific training (specific) and pedagogical training (generalist) as components of teacher training projects, whatever the level of education considered (TRINDADE, 2011). According to Mello (2000), the two models of teacher training make mistakes that hinder the learning process. In the case of the generalist teacher, the preparation is reduced to abstract pedagogical knowledge, that is, he does not have the mastery of the content to be taught. In the case of the specialist, the knowledge of the content does not take as a reference its relevance for teaching-learning, and the situations do not favor the articulation of this content with didactics; In both cases, the teaching practice is also abstract. It is noteworthy that, even though there were groups of schools with classes with generalist and specialist teachers, they worked in an

alternation system, and not together, which may explain why there was no statistical difference in relation to the school that had only the pedagogue.

Mello (2000) adds that in addition to the articulation between the two strands (generalist and specialist), there is a need to link the practice of teaching in the training process, because there is a distance between what is taught at the university and what occurs in practice. Being one of the ways to comply with what is in the LDB (9394/96 Art. 61 and 35), having a teacher training articulated with practice, and to build in its students the ability to learn and relate theory to practice in each subject of the curriculum.

In this perspective (articulation between theory and practice), Nóvoa (2009) and Lüdke and Boing (2012) state that there is a lack of practices in the teacher training process, and institutions are much more concerned with theoretical training. Teacher education continues today to be a prisoner of traditional models, of very formal theoretical models, which give little importance to this practice and its reflection (LÜDKE AND BOING, 2012). In this formative perspective, generalist training, when compared to specialist, is the one that comes closest to the "ideal", which explains the better results obtained.

Based on the data of the study, it is important to investigate whether those trained by a mixed curriculum, or articulated with the two strands (generalist and specialist) as proposed by Mello (2000) and Trindade (2011), would have positive effects on student performance. It is also noteworthy the need for studies on a larger scale, because due to the control of the variables, there was a difference in the sample size between the groups.

FINAL CONSIDERATIONS

The results showed seven models of teacher organization, allowing different backgrounds, and number of professionals, to work in the same grade/class. This multiplicity of models is considered a negative result, since international evidence shows that good student performance is linked to a rigid control of the teaching profile that will be current in a respective grade/year. Being one of the factors that can explain the student performance in the Prova Brasil/SAEB below the average considered adequate of 275 points.

Regarding schools that had more than one teacher working in the same class, in an alternation system, there was no significant difference compared to schools with a single teacher (pedagogue). Thus, the number of teachers is not a relevant factor for the performance in the Prova Brasil/SAEB in the context in which the model and the test are applied.

There was no significant difference between the group with teachers without higher education than the group with teachers with higher education (undergraduate degree in pedagogy). Some indications that may have contributed to this result are the rigid educational system (curriculum),

precariousness of teaching work, and inadequacy of large-scale evaluation. However, even if these factors may influence, the result can be considered negative, because together with the elevation of teachers to higher education, an increase in student performance is expected. This result contradicts national and international empirical evidence, raising an alert, and indicating the need for greater research, investments and planning in the processes of training, hiring and especially teacher appreciation to improve educational quality.

Regarding the groups with teachers with generalist training *versus* specialists, it can be concluded that the students of the 5th year of EF from schools that had teachers with generalist training had better performance in the Prova Brasil/SAEB. However, it does not mean that the result is good, because both schools with teachers with generalist training and specialists are below what is considered adequate.

It is concluded that all models of teaching organization in classes of the fifth year of EF do not have positive results, and all are below adequate. Even though there is a tendency to improve the results when there is the presence of the pedagogue, it is not enough to achieve the appropriate result.

The seven models of teacher organization and the absence of difference in student proficiency observed between the number of teachers per class, and between higher education in relation to higher education, and the subtle difference in relation to generalist strands in specialist comparison, show a major systemic problem of structural planning, training and valorization of teaching work. In this context, the teacher with generalist training at a higher level (pedagogue), working alone in the classroom, presents himself as the best alternative.

Finally, this study notes the absence of evidence on a series of factors that could influence teaching work and student performance in the state of Rondônia. Thus, it is suggested that the following investigations be carried out:

i. Understand the reasons that led to the hiring of teachers with varied profiles for the same year/grade and the correlation with student performance;
ii. To investigate the influence exerted by the curriculum on teacher training. Because if it is not aligned with the objectives of pedagogical practices, it becomes a hindrance to obtaining good results;
iii. To analyze the influence of the school curriculum on teaching practice, and whether there is a relationship with student performance;
iv. To evaluate whether the mixed curriculum in teacher training, articulated with the two strands (generalist and specialist), would have positive effects on student performance;
v. To evaluate the influence of the Prova Brasil/SAEB model on the measurement of student proficiency.

Thus, from these studies, and other possibilities, they can enrich reflection and guide public educational policies more safely.

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