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The expansion of federal education policy and its impact on the indicator of adequacy of teacher training in Brazil

La expansión de la política educativa federal y su impacto en el indicador de adecuación de la formación docente en Brasil

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Abstract

The initial teacher training for basic education gained prominence on the Brazilian public agenda in the 2000s, leading to a series of public policies. One of these policies involved reserving 20 % of the seats in the newly created Federal Institutes for initial teacher training, in what were called undergraduate teaching courses. At the time, there was a growing shortage of teachers, both in quantitative terms (reflected in the lack of teachers) and qualitative terms (with many professionals in the classroom who did not have specific graduation in the subject they were teaching). This study specifically focuses on the Federal Institutes, with the aim of analyzing their impact on improving the educational indicator "teacher training adequacy," an instrument used by the Ministry of Education to monitor the progress of public policies designed to address issues related to teaching in basic education. Using a quantitative and descriptive correlational approach, the study uses three statistical databases from the Ministry of Education to explore the relationship between the availability of seats in teaching courses and the teacher training adequacy indicator. In the end, it confirms the hypothesis that the Federal Institutes contributed to raising the mentioned indicator: on average, the 336 Brazilian cities that have Federal Institutes showed a 5.2 % higher performance in teacher training adequacy when compared to cities without the presence of the institution.

Keywords: teacher training, educational indicator, adjustment of teacher training, Federal Institute of Education, Science, and Technology, educational public policy.

Resumen

La formación inicial de docentes para la enseñanza de la educación básica ganó protagonismo en la agenda pública brasileña en la década del 2000, generando una serie de políticas públicas. Una de estas políticas implicó reservar el 20 % de las plazas en los recién creados Institutos Federales para la formación inicial de docentes, en las llamadas carreras de licenciatura. En su momento se diagnosticó el agravamiento de la escasez de docentes, tanto en términos cuantitativos (traducidos en falta de docentes) como cualitativos (con muchos profesionales en las aulas que no contaban con una titulación específica en el componente curricular que impartían). Este estudio depende precisamente de los Institutos Federales y tiene como objetivo analizar su impacto en la mejora del indicador educativo "adecuación de la formación docente", instrumento utilizado por el Ministerio de Educación en el seguimiento de los avances en las políticas públicas destinadas a enfrentar los problemas que orbitan alrededor de enseñanza en la educación básica. Con un enfoque cuantitativo y de carácter descriptivo y correlacional, el estudio utiliza tres bases de datos estadísticas del Ministerio de Educación para explorar la relación entre la oferta de plazas en carreras de licenciatura y el indicador de adecuación de la formación docente. Al final, se confirma la hipótesis de que los Institutos Federales colaboraron para elevar el indicador antes mencionado: en promedio, las 336 ciudades brasileñas que tienen Institutos Federales que ofrecen cursos de licenciaturas presentaron un desempeño 5,2 % mayor en la adecuación de la formación docente en comparación con las ciudades sin la presencia de la institución.

Palabras clave: formación docente, indicador educativo, adecuación de la formación docente, Instituto Federal de Educación, Ciencia y Tecnología, política pública educativa.

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1. Introduction

A series of debates on the professionalization of teacher training marked the 1990s (Beraza & Cerdeiriña, 2012; Libâneo & Pimenta, 1999; Nóvoa, 1999; Tardif et al., 1998; Tardif, 2000), influencing changes in the format of initial teacher training courses in the approach to knowledge and in the structure and duration of practices. Tardif cited the impact of these debates on European, Latin American and North American countries, highlighting what he called "[...] a vast stream of professionalization of educational agents in general and teachers in particular" (Tardif, 2000, p. 6). Several initiatives were implemented, at different institutional levels, in the movement to expand and perhaps modify teacher training, although immersed in difficulties and contradictions, particularly with regard to the multiplication of neoliberal policies (Castelao-Huerta, 2021), the growth of the private sector (Altbach et al., 2009; Camargo and Medeiros, 2018; Neuhold & Pozzer, 2024) and the diffusion of degrees in distance learning and marketing (Rivas-Flores, 2014).

In Brazil, these debates resulted in a set of public policies from the mid-2000s onwards. The urgency of rethinking careers and training more staff for teaching in basic education gained prominence in 2007, when the National Council of Education launched the report *Teacher shortages in secondary education: structural and emergency proposals* (Ruiz et al., 2007). The study estimated, at the time, the lack of 235,135 professors of Portuguese Language, Mathematics, Biology, Physics, Chemistry, Foreign Language, Physical Education, Art, History and Geography in secondary education, whose audience are young people in the ideal age between 15 and 18 years. This number rises to 710,893 teachers if one also considers the second cycle of primary education, which caters for children aged 10-14.

In addition to the critical quantitative aspect, the literature highlighted two other dimensions: the "rate of places", characterized by the retirement of teachers and the non-occupation of their positions by new staff; aggravated, among other aspects by the high rate of student abandonment and the "hidden shortage", referred to the exercise of teaching by professionals without the considered adequate qualification (Abrucio et al., 2020). In this last aspect, the document points out that only 9% of the people who teach Physics in secondary school had the appropriate training, i.e., they had completed the degree in Physics. In other curricular components, the scenario was similar, with 13% in Chemistry, 20% in Art, 26% in Geography, 27% in Mathematics, 29% in Foreign Language, 31% in History. The best performing subjects had just over half of teachers with specific training in the area in which they worked, such as Biology (57%), Portuguese Language (56%) and Physical Education (50%) (Ruiz et al., 2007). The report projected a "blackout" on secondary education, in the sense that there would be no teachers to fill existing places without structural and emergency measures (Ruiz et al., 2007).

It was in this context of diagnosis of shortages of teaching professionals and debates that highlighted the need to renew teacher training that, during the governments of Luiz Inácio Lula da Silva and Dilma Rousseff, both from the Workers' Party, a series of reforms were implemented. Actions were planned to restructure initial teacher training in higher[1] education in Brazil (Neuhold & Pozzer, 2024). The Coordination for the Improvement of Higher Education Personnel (CAPES), a postgraduate and research institution linked to the Ministry of Education, assumed responsibility for planning and promoting initial training, with initiatives such as the Institutional Program of Initiation to Teaching Scholarships (Pibid) (Capes, 2012; Paniago et al., 2018) and the Pedagogical Residence Program (Ordinance No. 38, 2018; Faria and Diniz-Pereira, 2019). In 2007, Decree No. 6.096 of 24 April established the Program to Support the Plans for the Restructuring and Expansion of Federal Universities (Reuni). In addition to expanding places in established universities, the Reuni created eighteen new public universities in the period from 2003 to 2014,

1 The complete undergraduate teacher training courses for basic education at higher education levels are called, in Brazil, "bachelor's degrees". Resolution of the National Council of Education/Plenary Council No. 2 of February 19, 2002, which establishes that the hourly load for undergraduate courses is at least 2800 hours, distributed among practices experienced during the course (400 hours), supervised curricular practices (400 hours), classes of curricular components (1800 hours), in addition to two hundred hours for other activities of an academic, scientific and cultural nature.

sixteen of which offered undergraduate degrees (Camargo and Medeiros, 2018). In the same scenario, in 2008, Law No. 11,892 created the Federal Institutes of Education, Science and Technology, a new institutionality (Ciavatta, 2015; Frigotto, 2018; Pacheco, 2015; Pozzer & Neuhold, 2024) with national capillarity, which must allocate at least 20% of its places to "[...] undergraduate courses, as well as special pedagogical training programs, with a view to the training of teachers for basic education, especially in the areas of science and mathematics, and for professional education" (Law No. 11,82 2, 2008), made possible by the innovation constituted by the verticalization policy, which allowed a close dialog between theory and practice, between the academic environment and everyday school life (Neuhold & Pozzer, 2024). With a multicampus structure, the 38 Federal Institutes arrived in 2022 distributed in 602 units, present in 552 of the 5668 Brazilian cities (Neuhold & Pozzer, 2023).

It is precisely to this public policy to which this work refers, inquiring on the impact of the implementation of the Federal Institutes on the increase of the "adequacy of teacher training", educational indicator of which the Ministry of Education, through the National Institute of Educational Studies and Research Anísio Teixeira (Inep), began to use it in 2013. The Inep clarifies, in technical note No. 020 of 2014, that the indicator of adequacy of teacher training classifies teachers in service in Brazilian basic education considering their academic training and the subject they teach. To analyze the adequacy of teacher training, the Ministry of Education establishes as a reference the legal precepts, which require a higher education degree to provide the fifteen compulsory curricular components in primary[2] and secondary education.[3]

To investigate the impact of the Federal Institutes on the increase in teacher training, this study compared the performance of Brazilian cities with the institution's campus with those without, in the period between 2013 and 2022. The guiding hypothesis was that the Federal Institutes increased the indicator of adequacy of teacher training, especially in small and medium-sized cities. It is worth noting that, historically, institutions of higher education in Brazil, especially universities, were located in large cities or metropolitan regions, which also resulted in the unequal distribution of professionals in the territory. In the case of the Federal Institutes, although they are present in all capitals and metropolitan regions, they were also strategically created in cities of up to 200 thousand inhabitants. This is because, beginning in 2003, the federal government began to recognize and prioritize local socio-spatial dynamics in its public policies. It is not surprising that the new Federal Institutes campuses were also distributed in small and medium-sized municipalities, offering defined careers based on participatory diagnoses committed to promoting the productive, cultural and social arrangements of those territories (Pozzer & Neuhold, 2024). These factors justify the central hypothesis, insofar as the territorial expansion of the Federal Institutes contributed to a greater capillarity and adequacy of teacher training, taking into account regions that previously did not receive assistance from higher education institutions.

The article is divided into five sections, including this introduction and final considerations, to which is added the methodology, presentation and discussion of results.

2. Methodology

This quantitative study used three statistical databases of the Ministry of Education: the Nilo Peçanha Platform, which collects, processes and disseminates official data from the Federal Network of Professional, Scientific and Technological Education, to which the Federal Institutes are linked; the School Census of Basic[4] Education, the main instrument of the Ministry of Education to collect information on

2 Art, Natural Sciences, Human Sciences, Physical Education, Religious Education, Geography, History, Modern Foreign Language, Mother Language (for indigenous populations), Portuguese Language and Mathematics.

3 Art, Biology, Physical Education, Philosophy, Physics, Geography, History, Modern Foreign Language, Mother Language (for indigenous populations), Portuguese Language, Mathematics, Chemistry and Sociology.

4 The School Census is coordinated by the National Institute of Educational Studies and Research (Inep), an agency of the Ministry of Education. Microdata open for public consultation are available on the Inep website.

Brazilian basic education; and the Higher Education Census, which collects data from higher education institutions, undergraduate students and teachers and sequential courses. To these three sources was added the Demographic Census (Brazilian Institute of Geography and Statistics [IBGE], 2023) to outline the profile of the cities served by the Federal Institutes of Education, Science and Technology.

With a descriptive and correlational nature, the study explored the relationship between the offer of places in the undergraduate courses, with emphasis on the Federal Institutes, and the indicator of adequacy of teacher training. Table 1 summarizes the analysis dimensions and data sources of this study.

Table 1. *Analysis dimensions of the study*

Dimension	Sub-dimensions	Data sources
Adequacy of teacher training	Time change of indicator	School Census
	Variation of the indicator according to the implementation of Federal Institutes	School Census
		Nilo Peçanha Platform
Bachelor's Degree Offer	Modality of teaching	Higher Education Census
		Nilo Peçanha Platform
	Records	Higher Education Census
		Nilo Peçanha Platform
	Finalizers	Higher Education Census
		Nilo Peçanha Platform
	Geographical profile	Demographic Census
		Nilo Peçanha Platform

It is worth clarifying that the indicator "adequacy of teacher training", to move away from a dichotomous approach that categorizes who has or does not have the expected training, classifies teachers in five groups, considering gradations, as shown in table 2. For the purposes of this research, however, only teachers classified in group 1 were considered, since the National Plan of Education, in force since 2014, established as a goal for the year 2024 that "[...] all teachers in basic education have specific training of higher level, obtained in a degree course in the area of knowledge in which they act" (Brazil, 2014).

Table 2. *Categories of adequacy of teacher training in relation to the subject taught*

Group	Description
1	Teachers with a bachelor's degree in the same subject they teach, or a bachelor's degree in the same subject with a completed pedagogical complement.
2	Teachers with a bachelor's degree in the corresponding discipline, but without a degree or pedagogical complement.
3	Teachers with a university degree in an area other than that in which they teach, or with a bachelor's degree in the subjects of the common curricular base and pedagogical complementation taken in an area other than that in which they teach.
4	Teachers with other higher education studies not considered in the above categories.
5	Teachers who do not have a degree in higher education.

Note. Technical Note No. 020 of 2014 of the Inep/Ministry of Education.

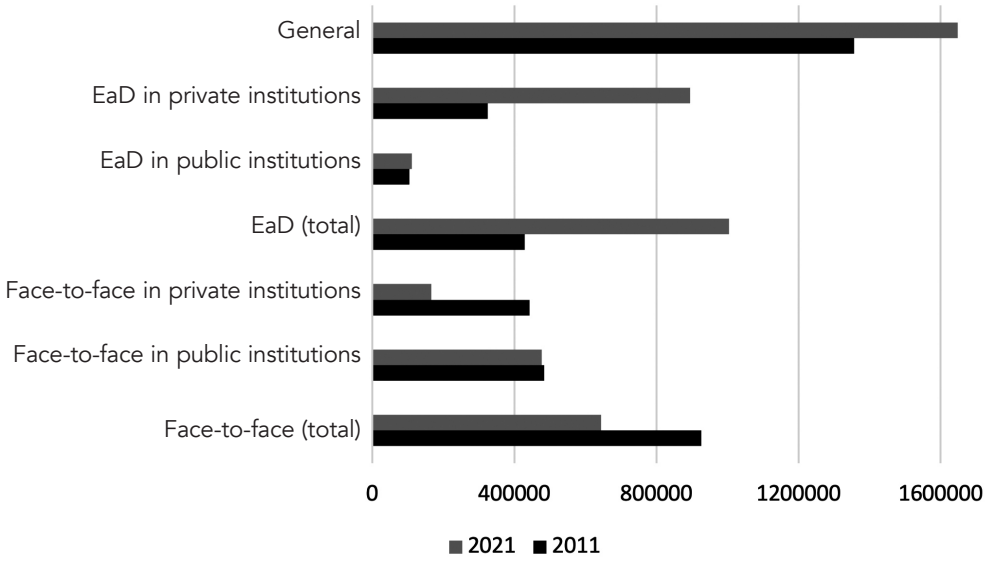
Finally, for comparison purposes, the Basic Education Census of 2021 was used, since the most updated data from the Higher Education Census available during the preparation of this work referred to that year.

However, the data for 2022 were also presented, as they are the most up-to-date and constitute a potential trendsetter.

3. Results

The expansion of higher education in the 2000s in Brazil followed, on the one hand, the trend of the previous decade, marked by the growth of the private sector, in line with the advance of neoliberal policies (Camargo & Medeiros, 2018). If in 2002 there were 1637 higher education institutions (88% of which were private and 12% public), ten years later there were 2416 (87.4% private and 12.6% public) (Brazil, 2002, 2012; Sguissardi, 2015). In addition, the period also experienced the expansion of higher education in public institutions, from 195 in 2002 to 304 in 2012 (Brazil, 2002, 2012), a growth of 56%, compared to 46.5% in the private sector.

Figure 1. *Enrollment in undergraduate courses by teaching modality (in person or EaD) - Brazil, 2011 to 2021*



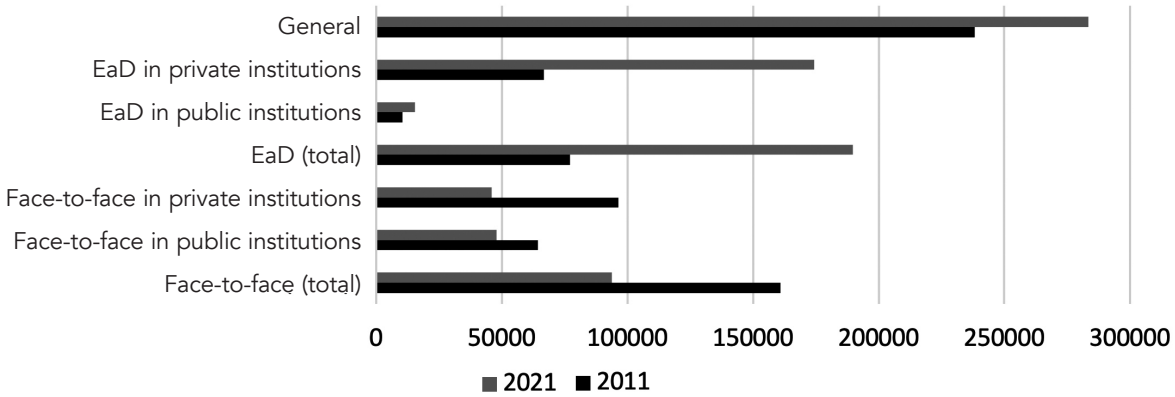
Note. Own elaboration based on data from the Higher Education Census (2021).

The latter is necessary to locate the historical series of the following years, particularly as it relates to bachelor's courses. To a large extent, the expansion of higher education has stabilized while the private sector has continued to advance. According to data from the Higher Education Census, between 2011 and 2021, enrollment in bachelor's degrees increased by 21.6 per cent from around 1.3 million in 2011 to 1.6 million in 2021. This growth, according to figure 1, was linked to the expansion of enrollment in courses in private institutions, offered mainly in distance education. This process was reflected in the number of graduates of these courses, 19.1% higher in 2021, compared to 2011.

Overall, the expansion of distance learning is notable: in 2011, 68.3% of undergraduate students were in-person, while in 2021 this percentage fell to 39% of students.

In relation to graduates, if in 2011 67.5% were in-person, in 2021 this percentage fell to 33.1% of the total (Figure 2).

Figure 2. *Number of graduates in undergraduate courses by teaching modality (in-person or EaD) - Brazil, 2011 to 2021*

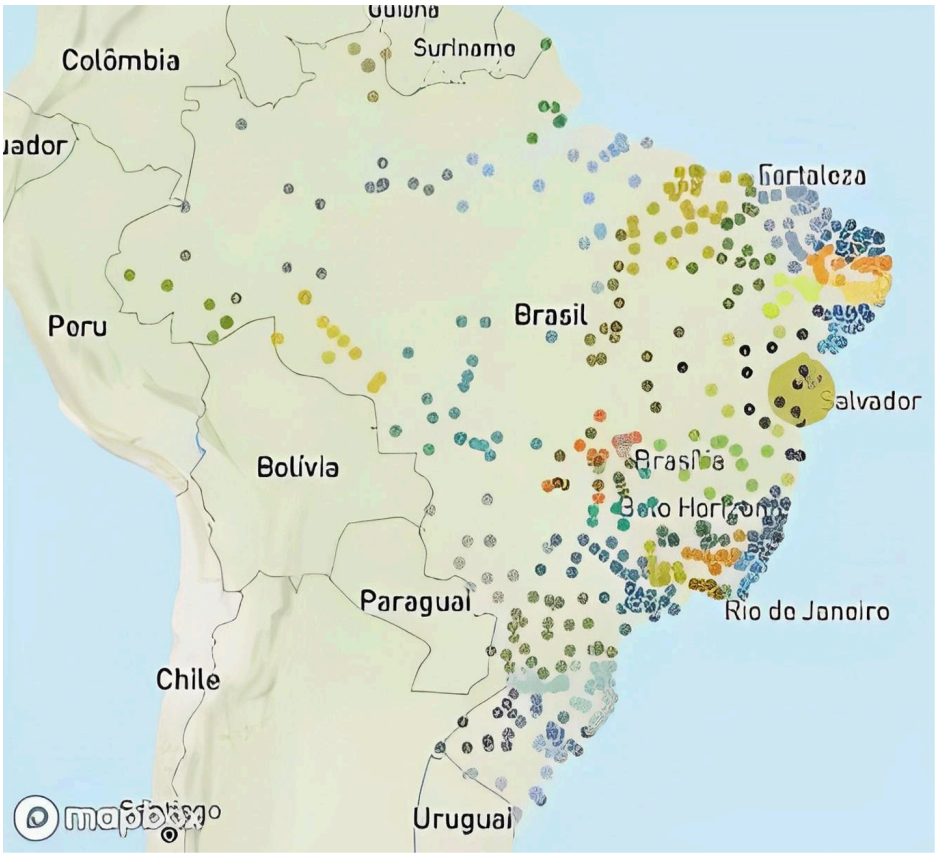


Note. Own elaboration based on data from the Higher Education Census (2021).

Regarding the Federal Institutes, it should be recalled that they were founded on the same legal framework that created, in 2008, the Federal Network of Professional, Scientific and Technological Education, becoming part of it. The Federal Network went from 144 pre-existing[5] units to 656 campuses in 2022, of which 602 are linked to Federal Institutes (Pozzer & Neuhold, 2024). Each of the 38 Federal Institutes is distributed in units, called campuses, which have relative administrative, financial, and academic autonomy with their own directors, ranging from six (in the smaller Federal Institutes) to 38 (in the larger ones, in the case of the Federal Institute of São Paulo). Figure 3 illustrates the capillarity of the Federal Institutes in the national territory.

5 The Federal Network of Professional, Scientific and Technological Education is the heir to a centuries-old history. Its history goes back to the 19 apprenticeship and craft schools founded in 1909 (Santos, 2016). Throughout the 20th century, those origins of what would later become the Federal Network underwent numerous transformations: from an institution focused on technical training to educate poor white men in the nascent urban centers that aimed for industrialization, it expanded its objectives to technical and technological training at the level of secondary education and, subsequently, to higher education. Especially in the Federal Centers of Technological Education, in addition to incorporating rural technical education, model farms were added to the scope of action of the Ministry of Education. The fact is that, between 1909 and 2002, on the eve of the beginning of the government of Luís Inácio Lula da Silva, of the Workers' Party, as president of Brazil, there were 114 institutions that were part of a federal system of professional education (Pozzer and Neuhold, 2019).

Figure 3. *Territorial distribution of the campuses of the 38 Federal Institutes - Brazil, 2022*



Note. Nilo Peçanha Platform, 2022.

While Law No. 11,892 (2008), which created the Federal Institutes indicated that each campus should allocate at least 20% of places to bachelor's degrees and special pedagogical training programs, only 363 campuses out of 602 offered bachelor's degrees in 2022. Although deficient, this supply expanded by 30.9% between 2017 and 2022, as shown in Table 3.[6]

Table 3. *Number of careers offered by Federal Institutes-Brazil, 2017 to 2022*

	2017	2018	2019	2020	2021	2022
IF Baiano	7	8	10	10	11	11
IF Farroupilha	19	22	25	24	28	30
IF Goiano	11	16	18	20	20	20
IF Sertão PE	18	19	20	21	21	21
IF Sudeste MG	7	8	8	9	11	11
IFAC	8	7	7	7	7	8
IFAL	18	19	20	22	21	24

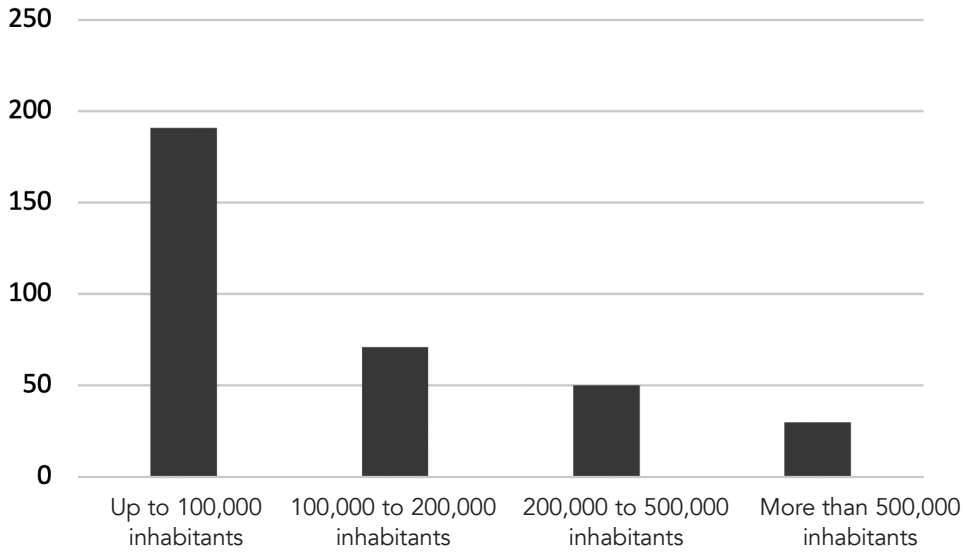
6 The table does not detail the campuses, it only presents the sum of courses from each of the 38 Federal Institutes.

	2017	2018	2019	2020	2021	2022
IFAM	15	13	13	11	12	11
IFAP	10	12	24	24	24	23
IFB	17	16	17	17	17	17
IFBA	19	24	26	31	26	27
IFC	12	14	14	14	15	15
IFCE	62	75	85	91	93	98
IFES	18	18	17	19	21	21
IFF	12	14	15	14	14	16
IFG	19	25	26	26	28	25
IFMA	45	49	49	53	53	51
IFMG	9	9	11	11	11	12
IFMS	1	2	2	2	2	2
IFMT	16	16	18	17	18	18
IFNMG	13	14	15	15	15	15
IFPA	47	44	37	44	48	52
IFPB	12	12	14	15	16	18
IFPE	9	9	12	12	12	13
IFPI	31	36	38	38	38	39
IFPR	17	21	26	28	27	27
IFRJ	9	9	11	10	10	10
IFRN	33	33	35	39	38	41
IFRO	7	8	12	12	12	12
IFRR	13	14	11	11	10	11
IFRS	21	26	24	26	24	24
IFS	3	3	5	4	4	5
IFSC	14	14	14	14	12	10
IFSP	51	55	57	59	61	69
IFSUL	5	16	16	21	23	21
IF Sul de Minas	16	16	19	20	20	20
IFTM	10	10	11	11	9	9
IFTO	12	13	13	14	15	15
Total	666	739	795	836	847	872

Note. Platform Nilo Peçanha (2023)

The 872 undergraduate courses offered by the Federal Institutes are distributed across 363 campuses, located in 336 cities,[7] 78% of which are established in cities with up to 200,000 inhabitants (Figure 4).

Figure 4. *Number of cities with Federal Institutes of Education, Science and Technology campuses offering undergraduate courses by population-Brazil, 2022*



Note. Platform Nilo Peçanha (2023)

In terms of teaching modality, of the 872 teacher training courses offered in 2022 by the Federal Institutes, 754 courses (86.5% of the total) were face-to-face and 118 (13.5%) were distance learning. A year earlier the percentage was similar, being 86.2% and 13.8% respectively (Table 4).

Table 4. *Bachelor's degrees on the Federal Institutes of Education, Science and Technology campuses by modality-Brazil, 2021 and 2022*

Year	Modality	Campus	Courses (%)	Places (%)	Graduates (%)	Titled by places
2021	In person	319	730 (86.2)	22 635 (88.4)	4251 (72.3)	18.8%
	Distance education	85	117 (13.8)	2969 (11.6)	1629 (27.7)	54.9%
	Total	359*	847 (100)	25 604 (100)	5880 (100)	--
2022	In person	324	754 (86.5)	23 280 (88.5)	5639 (80)	24 %
	Distance education	82	118 (13.5)	3023 (11.5)	1412 (20)	47 %
	Total	363*	872 (100)	26,303 (100)	7051 (100)	--

* It does not correspond to the sum, since there are campuses that offer face-to-face and distance courses.

Note. Own elaboration from data extracted from the Nilo Peçanha Platform (2021, 2022).

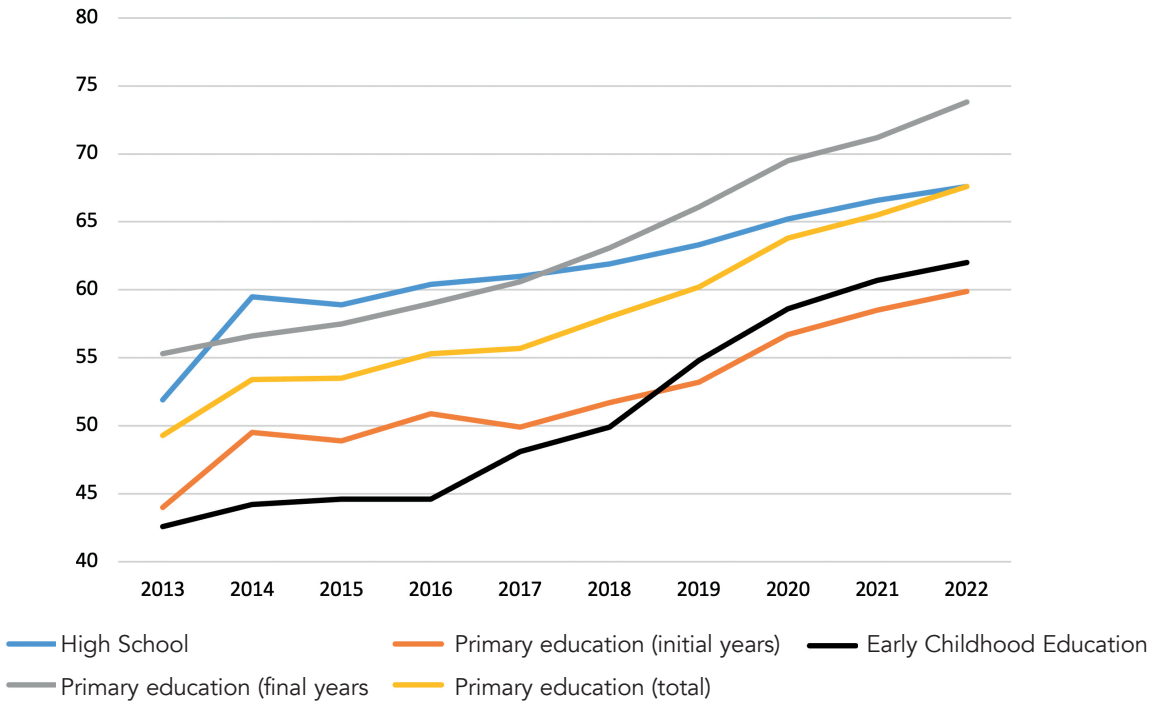
Brazil's 2021 National Census of Basic Education showed that 85% of early childhood teachers in the Brazilian public network had higher education, a 27% increase compared to 2013. In primary education, teachers with higher education accounted for 92%, up 15% from 2013. In secondary

7 Some cities, in general the capitals that are constituted as metropolis, have more than one campus.

education, 97% of teachers had higher education, 4% more than in 2013 (Inep, 2021). However, as seen in Figure 3, this increase in teacher training did not necessarily occur with the subjects taught in schools.

Although the National Education Plan (PNE) for the decade from 2014 to 2024 has established in its target number 15, aimed at the training of education professionals, the guarantee that "[...] all teachers of basic education have specific competences of higher level training, obtained in a bachelor's course in the area of knowledge in which they teach" (Brazil, 2014), this reality is still distant. Although there has been a significant improvement in the adequacy of teacher training (Figure 4), by 2024, the deadline defined by the National Education Plan, the target has not been achieved. According to the 2022 Basic Education Census, the best indicator was that of primary education in the initial grades, with 73.8% of teachers with adequate teacher training. However, in the last grades of primary education, the indicator suggests that only 59.9% of teachers have adequate teacher training.

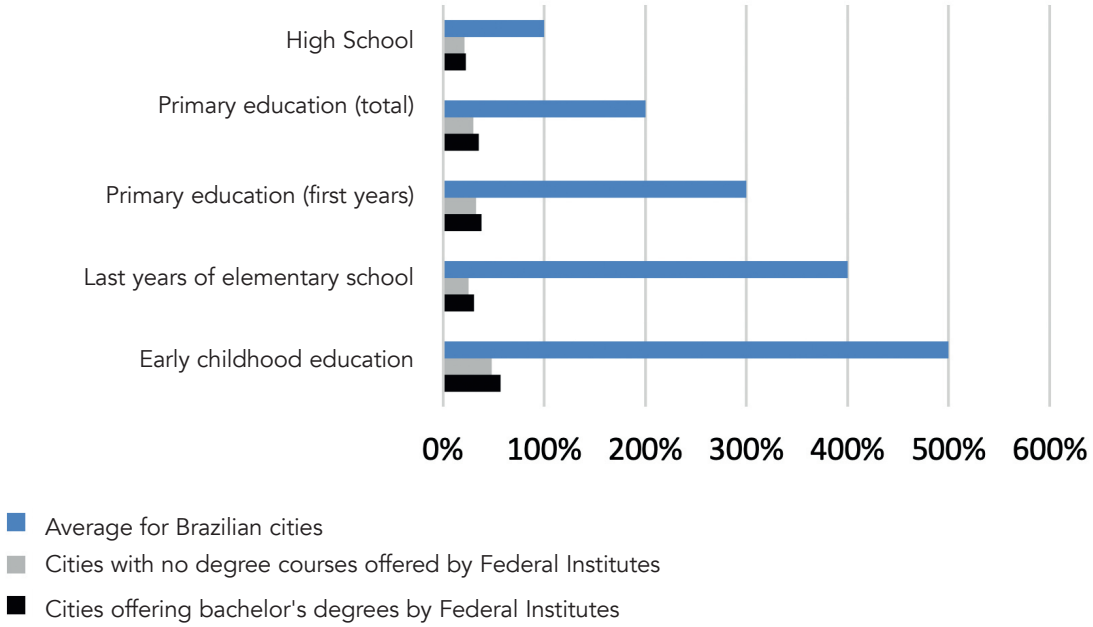
Figure 5. *Average change in the adequacy indicator of teacher training-Brazil, 2013 to 2022*



Note. Own elaboration based on data extracted from INEP (2013-2022).

The rate of growth of the indicator of adequacy of teacher training was higher at all levels of education when compared with the performance of cities that have degrees offered by Federal Institutes compared to others (figure 5). In secondary education, cities with Federal Institutes degrees performed 1.40% better, on average, than others. This difference was, on average, 5.25% in primary education and 9.07% in early childhood education. In this way, the impact of the presence of Federal Institute bachelor's degrees on the teacher suitability index can be seen by the difference in the average growth rate achieved by cities that enjoyed the public policy implemented by the federal government.

Figure 6. *Average growth rate of the teacher adequacy indicator-Brazil, 2013 to 2022*



Note. Own elaboration from data extracted from INEP (2013, 2022).

The data show that, on average, cities with bachelor's degrees offered by Federal Institutes perform better in the adequacy index of teacher training in the Basic Education Census 2022 (Table 5), a factor that was not observed in all stages of teaching in 2013. In that survey, the adequacy rate of teacher training in early childhood education in cities with Federal Institute campuses was 40.59%; and the rate was 42.78% in cities without institutions.

Table 5. *Average adequacy index of teacher training in cities-Brazil, 2013 to 2022*

Teaching stage	General (2013)	General (2022)	Without bachelor offered by Federal Institutes (2022)	With bachelor offered by Federal Institutes (2023)
Secondary education	51.9	63.2	63.2	68.0
Primary education (initial years)	44.0	44.0	55.5	59.6
Primary education (final years)	55.3	55.3	73.5	74.6
Primary education (total)	49.3	49.3	64.4	67.3
Early childhood education (initial?)	42.6	42.6	64.1	63.7

Note. Own elaboration from data extracted from INEP (2013, 2022).

The progress in the indicator of adequacy of teacher training reflects a higher qualification of teachers in relation to the subjects they teach, indicating progress in public policies aimed at the initial and continuing training of teachers. In addition, it highlights the impact of initiatives such as the expansion of federal institutions of higher education, programs to promote teacher training, such as PARFOR and PIBID, and the strengthening of undergraduate careers in priority areas. This movement demonstrates a coordinated effort to comply with the requirements of the Law of Bases and Guidelines of National Education (LDB), which establishes the objective of adequate training of all education professionals, thus promoting greater equity and quality of teaching throughout Brazil.

4. Discussion

The data collected in this article show that, between 2011 and 2021, there was a significant growth in the enrollment of bachelor's degrees, with an emphasis on distance education, especially in private institutions. This increase was reflected in the number of graduates, which also showed growth in the period, although with regional differences and academic efficiency between teaching modalities.

It is beyond the scope of this article to analyze this complex data on the types of face-to-face and distance courses. However, it is important to contextualize them to place the participation of the Federal Institutes in the offer of higher education teacher training courses.

At the origin of the Federal Institutes, it was established that 20% of their places would be allocated to undergraduate courses. Although it can be observed that the Federal Institutes have not been able to reverse the logic of discredit faced by teacher training in society (Neuhold et al., 2025) and only 363 of its 602 campuses effectively offered courses of this type until 2022 when the Federal Institutes expanded the offer of degrees in small and medium municipalities. In this way, they began to serve historically underserved regions, contributing to the internalization of teacher training (Neuhold and Pozzer, 2023). In other words, higher education courses for teachers have traditionally been concentrated in public universities, most of them in urban centers, or in the private sector in distance education, for which small and medium-sized cities have less economic interest. This scenario changed from the middle of the first decade of the 2000s.

Based on a solid policy of expansion and internalization of the Federal Institutes, the federal government established a vector to promote local and regional development. It is true that, at that time and for the same purpose, there was an effort by the federal government to internalize universities as well, understanding this process as "[...] essential to combat the imbalance in regional development and reach students unable to travel to other regions" (Brazil, 2014). In 2003, 29 of the existing 44 federal universities were located in state capitals, compared to 14 in the interior. In 2014, of the 63 federal universities, 31 were located in capitals and 32 in cities of the suburbs (Camargo & Medeiros, 2018).

It should be noted that the Federal Institutes are divided into 602 campuses, reaching 552 cities, considering data from 2022. This means that the territorial capillarity is more extensive than that of universities, although the latter, in general, offer a greater variety of careers. In addition to this territorial capillarity and the legal provision to allocate 20% of their places to teacher training, the Federal Institutes also have unique characteristics that position them as an innovative response to the initial and continuous training of teachers. As Neuhold and Pozzer (2024) highlight, the institutional architecture of the Federal Institutes shapes them as a unique environment for teacher training, by reducing the distances between university, school and profession. This is due, among other factors, to the fact that in the same academic environment teachers-researchers who train teachers in higher education also teach students of basic education.

Hence the potential of the Federal Institutes' teaching, research and outreach activities not only to boost local productive, cultural and social arrangements (Pozzer & Neuhold, 2024), but also to affect the socio-economic indicators themselves, including educational indicators. An example, addressed in this work, is the indicator of adequacy of teacher training.

Regarding the indicator of adequacy of teacher training, there have been significant advances since it began to be used in 2013, monitoring the relationship between higher education of teachers and the subject taught. However, the target set by the National Education Plan (2014-2024) has not yet been achieved.

In any case, the impact of the Federal Institutes in improving the indicator is remarkable. Cities with campuses offering bachelor's degrees showed higher growth rates than others at all levels of education. In secondary education, for example, the average difference was 1.40%, while in early childhood education it reached 9.07%. These data reinforce the strategic role of the Federal Institutes in the qualification of the teaching staff, although fully adapting the training to the area of activity remains a challenge in different contexts.

Without ignoring the policies combined with the objective of advancing in the adequacy of teacher training in the country, in addition to the proliferation of places in educational institutions, the expansion and internalization of the Federal Institutes

(Neuhold & Pozzer, 2023) constituted an accelerator of the process. Although insufficient to achieve the stated objective, the capillarity of the campuses throughout the territory and the profile of the cities served were important in the process of expanding the adequacy of teacher training.

The process of decentralization and territorialization promoted by the Federal Institutes may be serving as an "alternative" to distance learning, since it brings the student closer to the territory, minimizes the need for large displacements and even migratory processes to search for professional qualifications, which constitute a great differentiator for distance learning courses (Karpinski et al., 2017). It also allows course graduates to work, after graduation, in their home territory.

The 102,626 students enrolled in undergraduate degrees at Federal Institutes in 2021 accounted for 6.2% of all undergraduate students in Brazil. In terms of the academic offer in public institutions (federal, state and municipal), the Federal Institutes absorbed 17.5% of the enrolled students. Of the enrollments in careers offered by public institutions, 18% of the students of face-to-face courses were from Federal Institutes, as well as 15.3% of the enrollments in distance careers, which represents the rapid relevance of the network began within the policies of teacher training.

Of those who completed undergraduate courses, in 2021, 9.3% of graduates from public institutions came from Federal Institutes. In the field of face-to-face careers offered by public educational institutions, 8.9% of students graduate from Federal Institutes, a percentage that rises to 10.5% if considering graduates of distance careers.

In conclusion, it can be suggested that the political process of decentralization of higher education institutions, which led to the creation of the Federal Institutes, consisted of a paradigm shift in that public policies of teacher training ceased to concentrate on large urban centers and extended to small and medium-sized cities, also constituting an alternative to the degree courses offered remotely.

5. Final considerations

The initial training of basic education teachers gained prominence in the Brazilian public agenda in the 2000s, which resulted in several public policies. One of these policies involved the allocation of 20% of places in the newly created Federal Institutes for higher education teacher training courses, in so-called degrees, with the aim of addressing the shortage of teachers, both in terms of quantity (lack of teachers) and quality (professionals without the appropriate degree to the subjects they teach).

This study focused on the Federal Institutes, with the aim of discussing its impact on the improvement of the educational indicator "adequacy of teacher training", used by the Ministry of Education to monitor the progress of public policies related to basic education. With a quantitative approach and a descriptive and correlational character, it used three sets of statistical data provided by the Ministry of Education: the School Census, the Higher Education Census and the Nilo Peçanha Platform.

Based on data from these sources, the relationship between the offer of places in undergraduate careers and the indicator of adequacy of teacher training was explored. The Nilo Peçanha Platform provided information on the offer of undergraduate courses for initial teacher training by the Federal Institutes, from 2017 (when the data were initially available) to 2022 (the last available data collection). The data of the educational indicator "adequacy of teacher training" were obtained from the School Census of Basic Education, referring to the years 2013 (year of creation of the indicator) and 2022 (last data collection available). The Higher Education Census allowed data to be collected to identify changes in the careers and participation of the Federal Institutes.

The study confirmed the hypothesis that the Federal Institutes contributed to raising the indicator mentioned. On average, the 336 Brazilian cities that have Federal Institutes showed a 5.2% higher performance in the adequacy of teacher training compared to cities that do not have this institution.

In short, as emphasized throughout the article, the implementation of the Federal Institutes sought to influence the economic, cultural and social dynamics of the territories in which they operate, from the relationship with the community and from courses and research and extension projects, among them those aimed at the initial and continuous training of teachers. It was found, however, that, despite the legal requirement to offer 20% of places for initial

teacher training, 60% of Federal Institutes campuses do not have bachelor's degrees.

In this sense, it is possible to conclude that, although the Federal Institutes have an undeniable potential to contribute to the initial and continuous training of teachers, there are important challenges to face so that this contribution reaches its maximum potential. The first issue concerns the need for more accurate diagnostics, capable of mapping the careers offered on each campus and relating them directly to local demands and the indicator of adequacy of teacher training, especially in subjects in which the shortage of teachers is more pronounced.

In addition, it is essential to investigate the factors that have inhibited the full implementation of the legislation that provides for the allocation of 20% of places in the Federal Institutes for undergraduate courses. Understanding the reasons that limit the opening of new courses and creating strategies to overcome them are fundamental steps. This also implies the formulation of policies that guarantee the technical and pedagogical conditions to consolidate the role of the Federal Institutes as centers of teacher training, strengthening the relationship between higher and basic education and expanding the impact of these institutions on the educational indicators of the country.

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References

Abrucio, F., Burgos, F. & Andrey. G. (2020). *Oferta e demanda de Professores no Brasil.* Instituto Península. https://bit.ly/3PdQmIZ

Altbach, P. G., Reisberg, L. & Rumbley, L. (2009). *Trends in global higher education:* tracking an academic revolution. United Nations Educational, Scientific and Cultural Organization. https://bit.ly/41FPGDS

Beraz, M. & Cerdeiriña, M. A. (2012). *Profesoras(es) y profesión docente: entre el "ser" y el "estar".* Narcea.

Camargo, A. M. & Medeiros, L. G. (2018). Expansão da educação superior, cursos de licenciatura e criação das novas universidades federais. *Revista Educação em Questão, 56*(47), 244-274. https://doi.org/10.21680/1981-1802.2018v56n47ID14006

Castelao-Huerta, I. (2021). Investigaciones sobre los efectos de la neoliberalización de la educación superior pública en América Latina1. *Educação e Pesquisa, 47,* 1-24. https://doi.org/10.1590/S1678-4634202147232882

Ciavatta, M. (2015). *O trabalho docente e os caminhos do conhecimento: a historicidade da educação profissional.* Lamparina.

Conselho Nacional de Educação. (2001). *Parecer CNE/CP nº 28, de 2 de outubro.* Dá nova redação ao Parecer CNE/CP nº 21/2001, que estabelece a duração e a carga horária dos cursos de licenciatura, de graduação plena, de formação de professores da educação básica em nível superior. Ministério da Educação.

Conselho Nacional de Educação. (2002). *Parecer CNE/CP nº 2, de 19 de fevereiro de 2002.* Institui a duração e a carga horária dos cursos de licenciatura, de graduação plena de formação de professores da Educação Básica em nível superior. Ministério da Educação.

Conselho Nacional de Educação. (2015). *Parecer CNE/CP nº 2, de 09 junho de 2015.* Diretrizes Curriculares Nacionais para a Formação Inicial e Continuada dos Profissionais do Magistério da Educação Básica. Ministério da Educação.

Coordenação de Aperfeiçoamento de Pessoal de Nível Superior. (2012). Pibid - Programa Institucional de Bolsa de Iniciação à Docência. https://bit.ly/3BIgCIz

Decreto n. 6.096, de 24 de abril de 2007. Institui o Programa de Apoio a Planos de Reestruturação e Expansão das Universidades Federais (REUNI). *Diário Oficial da União,* Brasília, DF: Presidência da República.

Faria, J. B. & Diniz-Pereira, J. E. (2019). Residência pedagógica: afinal, o que é isso? *Revista de Educação Pública, 28*(68), 333-356, maio/ago. Cuiabá, ttps://doi.org/10.29286/rep.v28i68.8393

Frigotto, G. (org.) (2018). *Institutos Federais de Educação, Ciência e Tecnologia: relação com o ensino médio integrado e o projeto societário de desenvolvimento.* Laboratório de Políticas Públicas, UERJ.

Instituto Brasileiro de Geografia e Estatística. (2022). *Censo demográfico 2022:* Resultados preliminares. IBGE. https://bit.ly/3BuY5zr

Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira. Censo Escolar.

Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira. (2021). *Censo da educação*

superior 2020: notas estatísticas. Ministério da Educação.]

Karpinski, J. A., Mouro, N. F. D., Castro, M. de y Lara, L. F. (2017). Fatores críticos para o sucesso de um curso em EAD: a percepção dos acadêmicos. *Avaliação: Revista Da Avaliação Da Educação Superior (campinas), 22*(2), 440-457. https://doi.org/10.1590/S1414-40772017000200010

Lei nº 11.892, de 29 de dezembro. Institui a Rede Federal de Educação Profissional, Científica e Tecnológica, cria os Institutos Federais de Educação, Ciência e Tecnologia, e dá outras providências. Presidência da República.

Libâneo, J. C. & Pimenta, S. G. (1999). Formação de profissionais da educação: visão crítica e perspectiva de mudança. *Educação & Sociedade, 20*(68), 239-277. https://doi.org/10.1590/S0101-73301999000300013

Neuhold, R. R. & Pozzer, M. R. O. (2023. Covid-19). cierre de escuelas y enseñanza remota: el tiempo de respuesta de los sistemas de educación brasileños. Íconos. Revista de Ciencias Sociales, (76), 55-75. https://doi.org/10.17141/iconos.76.2023.5719

Neuhold, R. R. y Pozzer, M. R. O. (2024). A tríade universidade, escola e profissão na formação docente: Considerações sobre a verticalização nos Institutos Federais de Educação, Ciência e Tecnologia. *Revista Portuguesa De Educação, 37*(1), e24006. https://doi.org/10.21814/rpe.28819

Neuhold, R. R., Pozzer, M. R. O. & Pellejero, D. C. (2025). A desvalorização das licenciaturas na educação superior brasileira: análise do planejamento estratégico dos Institutos Federais. Revista Actualidades Investigativas em Educación, 25(1), 1-33. https://doi.org/10.15517/aie.v25i1.60755

Nóvoa, A. (1999). Os professores na virada do milênio: do excesso dos discursos à pobreza das práticas. Educação e Pesquisa, 25(1), 11-20. https://doi.org/10.1590/S1517-97021999000100002

Pacheco, E. (2015). *Fundamentos políticos e pedagógicos dos Institutos Federais: diretrizes para uma educação profissional e tecnológica transformadora.* IFRN.

Paniago, R., Sarmento, T. & Rocha, S. (2018). O Pibid e a inserção à docência: experiências, possibilidades e dilemas. *Educação em Revista, 34.* https://doi.org/10.1590/01024698190935

Plataforma Nilo Peçanha. (n.d.). *Indicadores da educação profissional e tecnológica.* https://bit.ly/41EJNa2

Portaria nº 38, de 28 de fevereiro de 2018. Institui o Programa de Residência Pedagógica. Diário Oficial da União, Brasília, 2018b.

Pozzer, M. R. O. & Neuhold R.R. (2024). El desarrollo regional como eje estructural de los Institutos Federales de Educación, Ciencia y Tecnología. Prometeica - *Revista De Filosofía Y Ciencias,* 29, 41-82. https://doi.org/10.34024/prometeica.2024.29.15280

Pozzer, M. R. O. & Neuhold, R.R. (2019). A educação profissional no Brasil: a Rede Federal de educação profissional, científica e tecnológica. En Pozzer, M.R.O. & Neuhold, R.R. (orgs.), *O contexto da educação profissional técnica na América Latina e os dez anos dos Institutos Federais* (2008-2018). Maceió, Café com Sociologia.

Resolução CNE/CP 1, de 18 de fevereiro de 2002. Institui Diretrizes Curriculares Nacionais para a Formação de Professores da Educação Básica, em nível superior, curso de licenciatura, de graduação plena.

Resolução CNE/CP 1, de 18 de fevereiro de 2002. Institui Diretrizes Curriculares Nacionais para a Formação de Professores da Educação Básica, em nível superior, curso de licenciatura, de graduação plena.

Resolução do CNE / CP nº 2, de 19 de fevereiro de 2002. Institui a duração e a carga horária dos cursos de licenciatura, de graduação plena, de formação de professores da Educação Básica em nível superior.

Resolução do CNE / CP nº 2, de 19 de fevereiro de 2002. Institui a duração e a carga horária dos cursos de licenciatura, de graduação plena, de formação de professores da Educação Básica em nível superior. Rivas-Flores, J. I. (2014). Narración frente al neoliberalismo en la formación docente. Visibilizar para transformar. *Magis, Revista Internacional de Investigación en Educación, 7*(14), 99-112. https://doi.org/doi.org/10.11144/Javeriana.M7-14.NFNF

Ruiz, A. I., Ramos, M. N. & Hingel, M. (2007). *Escassez de professores no ensino médio: propostas estruturais e emergenciais.* Conselho Nacional de Educação / Câmara da Educação Básica.

Sguissardi, V. (2015). *Democratização ou massificação? Política de expansão da educação superior no Brasil 2002–2012.* Diagrama Editorial.

Tardif, M. (2000). Saberes profissionais dos professores e conhecimentos universitários: elementos para uma epistemologia da prática profissional dos professores e suas consequências em relação à formação para o magistério. *Revista Brasileira de Educação,* (13), 2000, 5-24. https://bit.ly/41LTK5x

Tardif, M., Lessard, C. & Gauthier, C. (1998). *Formation des maîtres et contextes sociaux.* PUF.