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ARTICLE

Connected Education Innovation Program: a new national policy for the use of digital technologies in public schools in Amazon[1]

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ABSTRACT

In this article, there is a contextualized analysis, through a critical approach, of Decree No. 9.204, of November 23, 2017, which instituted the Connected Education Innovation Program, the new Ministry of Education policy to replace the National Computer Program in Education, and its intertextuality, based on the legal normative framework initiated with the National Education Plan (2014–2024), considering the theoretical and methodological influences in the formulation of the cycle of national public policies for the use of digital technologies and their consequences on the education system in Amazonas. As a result, it was confirmed that only 4% of public schools in the state of Amazonas managed to adhere to Connected Education Innovation Program, while adherence as a regulatory mechanism of national policy proved to be excluding, and the goal of universal access to the internet in basic education public schools in Brazil until 2019 has not been achieved.

KEYWORDS

education; public policy; PIEC; digital inequality.

1 The analyzed object in question was the context of influence for the establishment of the Connected Education Innovation Program for schools in the education system in Amazonas.

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PROGRAMA DE INOVAÇÃO EDUCAÇÃO CONECTADA: A NOVA POLÍTICA NACIONAL PARA O USO DAS TECNOLOGIAS DIGITAIS NAS ESCOLAS PÚBLICAS NO AMAZONAS

RESUMO

Neste artigo é realizada uma análise contextualizada, por meio de uma abordagem crítica, do Decreto nº 9.204, de 23 de novembro de 2017. O decreto instituiu o Programa de Inovação Educação Conectada, a política do Ministério da Educação em substituição ao Programa Nacional de Informática na Educação, e sua intertextualidade a partir do marco normativo legal iniciado com o Plano Nacional de Educação (2014–2024), considerando as influências teórico-metodológicas na formulação do ciclo de políticas públicas nacionais para o uso das tecnologias digitais e suas consequências no sistema de ensino do Amazonas. Como resultado, confirmou-se que apenas 4% das escolas públicas do estado do Amazonas conseguiram aderir ao Programa de Inovação Educação Conectada, enquanto a adesão como um mecanismo regulador da política nacional revelou-se excludente e a meta da universalização do acesso à internet nas escolas públicas de educação básica no Brasil até 2019 não foi alcançada.

PALAVRAS-CHAVE

educação; políticas públicas; PIEC; desigualdade digital.

PROGRAMA DE INNOVACIÓN EDUCACIÓN CONECTADA: LA NUEVA POLÍTICA NACIONAL PARA EL USO DE LAS TECNOLOGÍAS DIGITALES EN ESCUELAS PÚBLICAS DEL AMAZONAS

RESUMEN

En este artículo, se lleva a cabo un análisis contextualizado, a través de un enfoque crítico, del Decreto No. 9.204, del 23 de noviembre de 2017, que instituyó el Programa de Innovación Educativa Conectada, la nueva política de Ministerio de Educación para reemplazar el Programa Nacional de Computación en Educación, y su intertextualidad basada en el marco normativo legal iniciado con el Plan Nacional de Educación (2014–2024), considerando las influencias teóricas y metodológicas en la formulación del ciclo de políticas públicas nacionales para el uso de tecnologías digitales y sus consecuencias en el sistema educativo en el Amazonas. Como resultado, se confirmó que solo el 4% de las escuelas públicas del estado de Amazonas lograron adherirse al Programa de Innovación Educativa Conectada, mientras que la adhesión como mecanismo regulador de la política nacional resultó ser excluyente y el objetivo del acceso universal a Internet en las escuelas públicas de educación en Brasil hasta 2019 no se ha logrado.

PALABRAS CLAVE

educación; políticas públicas; PIEC; brecha digital.

INTRODUCTION

The launching of the National Education Plan (PNE) (2014–2024), under Law No. 13.005 of 25 June 2014, required new policies to implement the goals and strategies. These strategies include the universalization of internet access at public schools for basic education in Brazil to promote the pedagogic use of digital technologies. In this context, the Program for Connected Education Innovation (PIEC) was established the new policy of the Ministry of Education (MEC) through Decree No. 9.204, of 23 November 2017, to substitute the National Program for Computing in Education, which was enacted in 1997 (Brasil, 1997). The investigative focus of this study is to reveal the influences for the establishment of the PIEC, its theoretical-methodological trajectory, and the consequences for the schools in the educational system of Amazonas.

This article[2] presents an analysis of the Decree that instituted the PIEC and its intertextuality for the contextualization of the locus of research in the five years delimited.[3] The analysis is based on the normative legal framework initiated by the PNE, using a critical approach, considering the theoretical-methodological influences on the formulation of national public policies concerning the use of digital technologies and their consequences in the educational system of Amazonas state. To coherently construct the study, a dialogical relationship with the thinking of multiple actors is necessary, which is attained mainly through the reading of Peroni and Rossi (2011), Peroni (2015) and Heinsfeld (2018). The categories (technology, education, and exclusion) were analyzed, mainly through the reading of Vilma Figueiredo (1989), Dermeval Saviani (1994), and Pierre Bourdieu (2015). Technology understood as a social product (Figueiredo, 1989) was an initial concept key to analyzing the impact of technology on the educational process considering multiple relations (Saviani, 1994). The consequences of public policies, influenced by the dominant ideology, can reproduce, and even expand, the model of inequality and exclusion (Bourdieu, 2015). Therefore, a deficit of cultural capital in the access to symbolic goods of each student can contribute decisively to the social model of schools, reproducing and legitimizing social inequalities, and maintaining the system of social values.

The execution of these policies in an acritical manner, in federal and state public spheres, establishes a relationship with the concepts exposed in this article and similarly allows conducting a reading of the changes in society and education in terms of the technical and collective dimensions of cognition, in which intelligent technologies are connected.

2 Investigates the context of influence in the formulation of national public policies for the use of digital technologies.

3 The study looked at the period from 2014 to 2019. Although the publication of Decree No. 9.204/2017 was beyond the schedule set by the PNE (2014–2024), the process of construction of this policy effectively began in 2015. The analysis, therefore, is not about what took place since November 2017, but since June 2014, with the institution of the goals and strategies of the plan.

The dilemma of expanding school programs using technological solutions, such as virtual learning environments, yet merely reproducing the dominant social structure, as occurs in conventional schools, can reduce the contribution of concepts of Bourdieu (2015) to determinism. However, it is relevant to understand that Bourdieu's (2015) sociological theory indicated that schools are not neutral; that is, the actions of schools and cultural practices are not neutral. Science and technology incorporate social values and, through their political dimension, become vehicles for control and power of the dominant ideology.

It should be noted that the PIEC is not the only public policy that has not adjusted to the regional needs of Brazil. It is also important to recognize that more than integrating and democratizing access by rural populations in Brazil, and especially in Amazonas, to technological innovations in education, the program is exclusionary. Society must be aware of the absurd condition of rural schools in the interior of Amazonas, which are disconnected from the future.

LEGAL FRAMEWORK

The legislation that established the PIEC of MEC is inserted in a conjuncture that began in June 2014, with the publication of Federal Law No. 13.005. In addition to the PNE (2014–2024), there are decrees, ordinances, and resolutions that compose the program's regulatory context.[4] Of these measures, considering the object of the documental research conducted, the principal one was Decree No. 9.204, signed by the minister of Education Mendonça Filho, during the government of president Michel Temer, in November 2017. It was this decree that established the PIEC.

However, before presenting the analysis of the decree, it is necessary to review the initiation of this legal framework, the PNE, to understand how technology was inserted in this context. For example, the word technology appears 16 times in this plan, associated with strategies of 11 of the 20 goals. However, when the term is cited, it is done so generically, as support, except for strategy 2.6, which refers to the goal of universalization of fundamental education:

> 2.6) develop **pedagogic technologies** that combine, in an articulated manner, the organization of time and didactic activities between the school and the community environment, considering the specificities of special education, rural schools, and indigenous communities and quilombolas; (Brasil, 2014, our translation [emphasis added]).

It is understood that "developing pedagogical technologies" is a practice that works with a concept of technology as part of a process and not as an isolated product, different from how it is presented in other strategies of the PNE that cite technology. This is, however, a sole reference in the document.

4 http://educacaoconectada.mec.gov.br/legislacao

Three of these strategies are associated with higher education,[5] which is not included in the object analyzed in this study. Thus, a dozen references remain in the strategies linked to basic education.[6]

The purpose of the PNE is to improve the quality of education in Brazil. The path it offers includes 20 goals and 254 established strategies. The term technology is cited in only 6.3% of these strategies. Of these, the new national policy for the use of digital technologies in basic education cites only one, 7.15. This technical and reductionist approach to technology in this plan was also analyzed by Heinsfeld[7] (2018, p. 77, our translation):

> Although there are points related to what would be pedagogical questions, it is seen that the technologies are portrayed in the policy document as mere strategic tools to allow attaining the established goals, presenting greater dialog with a perception of technology that is closer to the technical artifact. In this way, a gap emerges concerning the critical reflections on the role of technology in the school context.

Heinsfeld (2018, p. 81, our translation) also affirms that "[…] concern for the provision and access to equipment is necessary, but not sufficient to guarantee the appropriation and fruitful use of these technologies". It is, in fact, an initial reductionist vision that appears to expect results from simple exposure to technologies. Also, about the PNE, the author concludes:

> In sum, it is possible to infer that technologies are portrayed in the PNE 2014–2024 (Brasil, 2014a) as strategic tools for attaining the goals traced for the program, with no general concern for critical and reflexive depth about the role of digital technologies in the realm of schools (Heinsfeld, 2018, p. 82, our translation).

This lack of concern for critical and reflexive depth about the role of technologies can be seen in the analysis of the decree that follows.

5 Strategy 12.21, which addresses the infrastructure of multifunctional laboratories; strategy 14.4, which involves the expansion of the offer of graduate courses, using to do so technologies of distance education; and strategy 15.6 about the curricular reform of teacher education courses, incorporating to do so information and communication technologies.

6 These are 3.1 in the goal for high schools; 4.6 and 4.10 in the goal for special and inclusionary education; 5.3, 5.4, 5.6 in literacy; 7.12, and 7.15 in the quality of education; 8.1 in the goal related to average schooling; as well as 9.11 and 9.12 concerning youth and adult literacy; and 10.6 concerning professional youth and adult literacy.

7 In the mapping of academic production at the master's and doctoral levels conducted to identify work about this theme until December 2019 in Brazil, only one master's dissertation was located, which was published in April 2018 at PUC-Rio, entitled "Conhecimento e tecnologia: uma análise do discurso das Políticas Públicas em Educação", [Knowledge and Technology: an analysis of the discourse of Public Education Policies] by Bruna Heinsfeld.

DECREE NO. 9.204/2017

Decree No. 9.204, of 23 November 2017, begins, in its first article, by instituting the program and making an exclusive reference to strategy 7.15 of the PNE:

> Art. 1st: The Connected Education Innovation Program is hereby established **in keeping with strategy 7.15 of the National Education Plan**, approved by Law No. 13.005, of 25 June 2014, with the objective of supporting the universalization of access to high-speed internet and supporting the pedagogic use of digital technologies in basic education (Brasil, 2017a, our translation [emphasis added]).

This strategy of the PNE involves the universalization of access to the internet in schools by the fifth year of the plan, and tripling the number of computers to students by the end of the decade:

> 7.15) universalize, by the fifth year of this PNE, broad-band, high-speed access to the global computer network and triple, by the end of the decade, the computer/student ratio in the schools in the public network of basic education, promoting the pedagogic use of information and communication technologies. (Brasil, 2014, our translation)

Therefore, considering that the PNE began to be implemented on 25 June 2014, the universalization sought should have occurred by 25 June 2019, which it did not, as will be demonstrated in the analysis of the data. Moreover, it stands out that this historic period is marked by the political instability caused by the change of government and the discontinuity of programs and actions that made inviable the chronogram for a significant portion of the goals of the National Plan.

The other part of the strategy cited, which seeks to triple the number of computers for students, is still in course (until 2024). However, a similar quantitative focus is seen on the supply of equipment and technical infrastructure.

Thus, although it intends to promote the pedagogical use of information and communication technologies, the sole reference to the PNE that appears in the decree is limited to a strategy with an emphasis on objects. This is the concept of technology as a product, ignoring the other processes in the relationship between people in the school environment.

The second article of the decree refers to the conjugation of the efforts needed to assure the conditions needed to insert technology as a pedagogical tool in the daily use of public schools for basic education.

> Art. 2nd: The Connected Education Innovation Program seeks to conjugate efforts between Federal organs and entities, the States, the Federal District, Municipalities, schools, the **business sector,** and civil society to assure the conditions needed for the insertion of technology as a pedagogical tool for daily use in public schools of basic education.

> Sole paragraph. The execution of the Connected Education Innovation Program will take place in articulation with other programs supported technically or financially by the federal Government, dedicated to innovation and technology in education. (Brasil, 2017a, our translation [emphasis added]).

What stands out in the article previously cited is the addition of the role of the business sector in the main public education policy for the use of technologies in school spaces, in addition to the federal organs and entities, the states, Federal District, the municipalities, schools, and civil society, which are normally included in Brazilian educational legislation.

This may be directly related to the transfer of the government's responsibility in strategy 7.15 of the PNE. This strategy calls for the universalization of broadband and high-speed access to the global computer network. Thus, despite the democratic logic and in keeping with the orientation of the PIEC, public schools came to directly contract companies that provide internet services, using the Plan for Financial Attendance in the interactive system of the Direct School Funding Program (PDDE).[8] It thus maintains the normative centralization of the policy but determines that the public sector is no longer solely responsible for its financial and executive actions.

The third article of the decree presents the principles of the program. Items II and III address the equity of conditions among public schools for basic education concerning the pedagogic use of technology and the promotion of access to innovation and technology in schools located in regions of greater socioeconomic vulnerability and low performance in educational indicators.

In article four, the decree presents the actions called for to execute the program. The fifth article determines that the program will be made operational through the adhesion of the school systems and schools, according to criteria to be defined by MEC. The sixth one concerns the educational networks that have their own initiatives for connectivity and can adhere to the program to complement their own actions. This reflects a significant change in the orientation of public policies with this purpose.

The seventh article of the decree conditions adhesion to the proposal on the monitoring of all dimensions of the program. Although it does not present more details and does not explain these dimensions, this is a reference to the methodology for the construction of the policy, as will be demonstrated further on in this analysis.

The composition of the eleven members of the Advisory Committee for the Program is described in article eight. In addition to including representatives from the National Council of Education Secretaries (CONSED) and the National Union of Educational Administrators (UNDIME), the committee includes two representatives from private entities and civil society organizations. Article nine of

8 The interactive PDDE is a tool to support school administration developed by MEC to make viable financial assistance for schools. Available at: http://pddeinterativo.mec.gov.br/.

the decree defines the competency of the Advisory Committee for the Connected Education Innovation Program.

> Art. 9th – The Advisory Committee for the Connected Education Innovation Program is responsible for:
> I. monitoring and periodically evaluating the implementation of the actions proposed in the realm of the Connected Education Innovation Program, and proposing improvements in its administrative model;
> II. proposing modifications or adjustments in the actions of the Connected Education Innovation Program, to steer efforts to basic education schools and school systems that have greater difficulty assuring the conditions needed for the use of technology as a pedagogical tool;
> III. proposing parameters for connection speed for pedagogical use in basic education schools. (Brasil, 2017a, our translation)

Articles 10 to 14 define the competencies of the parties involved: MEC, the Ministry of Science, Technology, Innovations and Communications (MCTIC), the Brazilian Development Bank, public school networks, and schools.

In article 15th, the decree defines the program as a complement to other policies for the expansion of internet access and use of technology in schools and does not imply their termination or substitution, which, in a certain way, reiterates article five. Article 16th concerns contracts, technical cooperation accords, and other similar instruments:

> Art. 16 – To execute the Connected Education Innovation Program agreements, terms of commitment, cooperation agreements, terms of decentralized execution, adjustments, or other similar instruments can be signed with federal, state, district, and municipal administrative entities and organs, **and with private entities.**
>
> Sole paragraph. Financial support destined for states, the federal district, and municipalities are authorized for use to contract services related to the Connected Education Innovation Program (Brasil, 2017a, our translation [emphasis added]).

Once again, the inclusion of the business sector in public policy is evident as part of social regulation and legitimation.

> Article 17 of the decree concerns the costs of the PIEC:
> Art. 17. – The Connected Education Innovation Program will be funded with:
> I. federal budget allocations issued annually to the organs and entities involved in the program, observing the limits of movement, spending, and payment set annually; and
> II. other sources of resources, from public and private entities. (Brasil, 2017a, our translation)

It can be concluded that the inclusion of the private sector in an invasive form in this legislation reveals a process of transferring this social issue from the public to the private sector, as Heinsfeld (2018, p. 84, our translation) identified:

> Even if the focus of this study does not include a deeper look at these issues, it is not possible to ignore the marked presence of a large private group in the moment of formulation of this policy, which sought to make viable and concretize the PNE 2014–2024 (Brasil, 2014), and it is pertinent to indicate [the need for] a deeper analysis about the commodification of educational policies and their treatment as business opportunities.

This symbiosis between the public and the private was well analyzed by Peroni and Rossi (2011), who studied the participation of business leaders on councils, as is the case of Viviane Senna, from the Instituto Ayrton Senna, who served on the Federal Council of Economic and Social Development in 2003. In the educational field, Peroni and Rossi (2011, p. 36, our translation) also analyzed the case of the Everyone for Education Movement, created in 2006:

> It is interesting to observe that the strategy for action encompasses the monitoring and analysis of the official educational indicators, not only defining the agenda but monitoring and evaluating the results of the agenda for educational policy in the country.

The partnership between the public system and these third-sector institutions would thus result in the private sector interfering in the content of public education. According to Peroni and Rossi (2011), this intervention includes the influence on the school curriculum, administration, and organization. The redefinitions of the role of the state are part of social and economic changes, generating consequences in this correlation of forces, according to Peroni (2015, p. 31, our translation):

> We understand that the relationship between the public and the private in the direction and execution of education is a process of correlation of forces, which does not occur by chance and that is increasingly setting the direction of public policy. We struggle for democratic processes and social justice in education and the more we advance in this path, the more capital is organized to revive its role in education. We thus return to the idea that distinct social projects of class are involved in the relations.

This direction in public policies took another dimension in recent years in Brazil. To understand how this convergence of interests took place, it is necessary to understand the role of the CONSED and of the working groups created by this civil association for the construction and proposition of new policies, especially in the period of the government of president Michel Temer (2016–2018).

THE PROPOSITION OF THE NEW POLICY

The reproductive character of education does not change with technology. The increasing presence of it can reveal technological or computing capital in this power relation. The context of the influence of the neoliberal perspective had a new development in Brazil that impacted the formulation of public policies, especially in the educational field. It is thus necessary to understand the role of CONSED in this situation. The participation of CONSED in the formulation of national education policies had its symbolic beginning in December 1986, with the approval of the document *Educational Principles for the New Constitution*, which made proposals to the National Constitutional Assembly, which would only be established in February 1987. Although the Council presented itself as an interlocutor and articulator of the policies of the Ministry of Education about state educational systems, according to reports issued by CONSED, the relations with the Ministry of Education were marked by conflicts in the first years of activity of the Council, until the arrival of minister Murílio de Avellar Hingel (1992–1994), in the government of president Itamar Franco.

The Ten-Year Plan Education for All (1993–2003), issued by MEC in November 1993, in which CONSED participated in the drafting, was an important moment for the Council. The plan was dedicated to complying with the resolutions of the Global Conference of Education for All, organized in Jomtien, Thailand, in 1990 by the United Nations Organization for Education, Science and Culture; the United Nations Children's Fund; the United Nations Development Program and the World Bank.

In this regard, in 2002, professor Marcia Ângela Aguiar, of the Federal University at Pernambuco (UFPE), published the article "O Conselho Nacional de Secretários de Educação na Reforma Educacional do Governo FHC" [The National Council of Secretaries of Education in the Educational Reform of the FHC Government], highlighting CONSED's influence in the formulation and execution of government policies for basic education, in the context of the educational reform that was in course in the country at that time. Although the council had been created during Brazil's re-democratization process and was part of the social movements of resistance to the centralism of the Ministry of Education, according to Aguiar (2002, p. 77, our translation), with the change in the national socio-political situation "[…] CONSED's critical position would shift to a conciliatory behavior and a partnership with the Ministry of Education". In this context of educational reform during the government of president Fernando Henrique Cardoso, CONSED came to be an important ally not only in the formulation but also in the execution of government policies.

CONSED was created in November 1986 to represent the states while UNDIME[9] represents the municipal secretaries of education. Both are private, not-for-profit civil associations, that present themselves as articulators, but depend on the agendas of the state education secretariats and MEC. This article analyzes the role of the CONSED in the proposal of the new policy.

9 UNDIME was established in October 1986.

The change observed in CONSED's role can be related to the redefinitions of the role of the state in the 1990s. In this period, CONSED was no longer "[…] a passive defender of the interests of the states in relation to the initiatives of MEC and legislators" and was transformed into a "[…] pro-active instance for discussion and studies to become a source of ideas and leadership in the country's educational debate" (CONSED, 1996 *apud* Aguiar, 2002, p. 84, our translation).

This justification attends to the new configuration in the educational system proposed in the modernization project of the government of president Cardoso, in the administration of Education minister Paulo Renato Souza (1995–2002), and CONSED thus became a principal ally of MEC.

According to an analysis of the reports of CONSED (1996; 2000), in this period, the National Council expanded its influence in the elaboration and conduct of educational policies. This strategic position of CONSED in MEC became evident once again more recently in the administration of Education minister Mendonça Filho (2016–2018), during the government of president Temer, in the period of construction and launching of new policies by MEC, such as the High School Reform (Lei nº 13.415, de 16 de fevereiro de 2017), the PIEC (Decreto nº 9.204, de 23 de novembro de 2017) and approval of the National Common Curricular Base (BNCC — Portaria nº 1.570 , de 20 de dezembro de 2017).

To do so, CONSED created working groups in 2015 to discuss strategic initiatives and present proposals for new policies to MEC. There were at first six working groups:[10] Educational Financing; Technology and Innovation; Evaluation of Basic Education; School Administration; the National Common Curricular Base; and High School Education.

These working groups had the participation of state secretariats of education, representatives of the technical staff of each secretariat, as well as partners from the third sector. Although all of the working groups at CONSED had the same purpose — to present recommendations to MEC to assist in the drafting of national policies —, this study will focus on the working group for Innovation and Technology.

CONSED's Innovation and Technology Working Group was created in November 2015 to produce guidelines for the elaboration of a National Plan for Technology in Education. The first meeting of the working group was at CONSED's offices in Brasília, according to the documents analyzed.[11] The proposal was for a process of collaborative construction, with the participation of representatives of states, municipalities, and civil society. Partners in the third sector, such as the Fundação Lemann, the Instituto Inspirare, and the Instituto Singularidades, were responsible for conducting the initial work.

10 In addition to these groups, CONSED created the work fronts Regime for Collaboration, Communication and Engagement, as well as Continuing Education, to substitute the group for the National Common Curriculum Base, whose work had been concluded.

11 This was conducted in a document study of reports, meeting minutes, and agendas of the meetings of the CONSED working group, conducted in the development of the thesis that this article refers to in footnote 4.

The second meeting of the working group was held in São Paulo, in May 2016. The development of the guidelines was passed to a new partner of CONSED, the Center for Innovation for Brazilian Education (CIEB), which, according to information from the Center's website,[12] is a not-for-profit civic organization dedicated to promoting the culture of innovation in Brazilian public education.

The CIEB was created in March 2016, with the mission to organize CONSED's proposal to be presented to MEC by December of that year. The other partners in the third sector that participated in the initial meeting became maintainers of the CIEB,[13] and the responsibility to lead the strategic initiative of the working group for Innovation and Technology became exclusive to the Center for Innovation. Thus, in August 2016, CONSED and CIEB signed a Cooperation Agreement that defined the activities that would be undertaken for this purpose.[14]

The CIEB's methodology for the construction of a new policy, which was presented at its first participation in the CONSED working group, had been pre-defined. This can be seen in the documentation presented in the meetings of 2016. In addition to pre-established instruments, the CIEB presented a methodology that was based on the *Four in Balance* theory (Kennisnet Foundation, 2015), which had been implemented in Dutch schools in 2004. The theory of the Four Dimensions, or 4D, presented by CIEB sought to support schools in the development of actions to apply technology considering four dimensions — vision, competence, content, and digital and infrastructure resources —, with the first two understood to be human elements and the two others, as technical elements.

According to the premise of the theory of Four Dimensions, the four axes must be in balance, in an interdependent relation, for the actions to be effective. This would be measured in levels of one to five (exploratory, basic, intermediary, advanced, and highly advanced), used to classify the level of adoption of technology at each school. This is the focus of article seven of Decree No. 9.204/2017 concerning the monitoring of the PIEC.

Thus, based on experiences of the application of public policies for social exclusion in European countries like Holland and Norway, the recently created CIEB led the work front for CONSED that developed the document entitled *Diretrizes para uma política de Inovação e Tecnologia Educacional 2017–2021* [Guidelines for a policy of Educational Innovation and Technology], published in November 2016 (CONSED, 2016).

Thus, the results of the tools of the CIEB used in CONSED's working group for Innovation and Technology, such as Guia Edutec, Plataforma Edutec, Estudos Técnicos [Technical Studies], and others, recommended to MEC the implantation of the Dutch theory of Four Dimensions in the new national policy for the use of digital technologies in Brazilian schools.

One year later, after deliberations over Bill No. 9165/2017 in the Legislature, the decree that established the PIEC was signed by President Temer with all the recommendations from CONSED.

12 http://cieb.net.br/

13 Instituto Natura, Fundação Lemann, Instituto Península and Itaú Social.

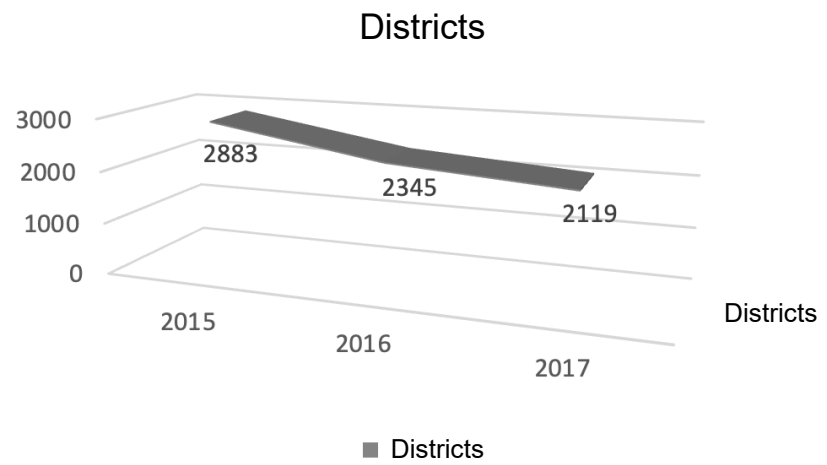
14 Termo de Cooperação CONSED/CIEB. Available at: http://cieb.net.br/.

DATA ANALYSIS

The emphasis on the technical elements, such as purchasing equipment and investment in infrastructure, expressed in Decree No. 9.204, of 23 November 2017, is a consequence of the redefinition of the role of the state. PIEC gave priority to technical modules and thus repeated the same errors as the previous policies, in name of good practices for the effective use of government resources. This was due to what Peroni (2015, p. 23) classified as the State's "structural incompetence" to administer what is a public right, leaving it up to the private sector to define what is most effective:

> The property remains public, but the direction of the content of educational policies is passed to the private sector. The public institutions, if democratic, are permeable to a correlation of forces, with decision-making processes in which they do not have prior control of the product.

The Four Dimensions methodology was successfully applied to a decentralized European school system. Dutch public schools, for example, have autonomy over curriculum and in the administration of the purchasing of equipment and technologies. By copying this methodology, so that Brazilian schools can directly contract internet services from providers using funds from PDDE, MEC excluded at first 2,119 Brazilian municipalities that did not have any internet provider via landlines available for a contract in 2017, according to data from the National Telecommunications Agency ,[15] as shown in Graph 1.



Graph 1 – Municipalities without internet providers (via landline) – 2015-2017.
Source: ANATEL (2018). Adapted by the authors.

15 https://www.anatel.gov.br/institucional/

The amount provided by MEC for the schools to contract internet services is another exclusionary factor. To define a standard amount for all schools in Brazil's 5,570 municipalities is an elementary error in public policy. The amount available in PDDE for the schools depends on the number of registered students, based on the School Census of the previous year. In schools with up to 199 students, the connectivity provided would be 20 megabits per second (Mbps[16]), up to a total cost of R$204.25 per month; and for schools with more than 500 students, the connectivity provided would be 100 Mbps up to the amount of R$324.33 per month, defined in the sole paragraph of the sixth article of Resolution nº 9, of 13 April 2018,[17] as presented in Chart 1.

Chart 1 – Amounts of Fundo Nacional de Desenvolvimento da Educação/Programa de Inovação Educação Conectada

Range of students	Avg. speed	Annual amount allocated	Average monthly cost
15 a 199	20 Mbps	R$2,451.00	R$204.25
200 a 499	50 Mbps	R$3,328.00	R$277.33
500 or more	100 Mbps	R$3,892.00	R$324.33

Source: Resolução nº 9, de 13 de abril de 2018 (Brasil, 2018). Adapted by the authors.

The idealizers of PIEC of MEC seemed to understand that a school in a rural community in Amazonas state could contract 100 Mbps of internet for precisely the same amount as a school in the capital cities of São Paulo or Rio Grande do Sul states. This is not the biggest problem, because the possibility does not even exist for contracting landline internet service even in urban areas in municipalities in Amazonas, except for the capital, Manaus.

The other possibility for schools excluded by PIEC would be the contracting of internet via satellite, yet the cost is much higher. But this has still not been made available on the institutional site of the PPDE[18] as of December 2019. Interested schools were only able to register for the program. Meanwhile, MCTIC partially attends rural schools with the former program Electronic Government – Citizen Attendance Service (GESAC), the federal government's digital inclusion program.

Therefore, the strategy of PNE (2014–2024) for the universalization of access [attending 100% of schools] to the global computer network at high-speed broadband for public schools up to the fifth year of implementation of the plan,

16 Mbps is the abbreviation used for megabit per second, an industrial standard measurement of internet speed.

17 Resolution that authorized the allocation of financial resources, in the operational and regulatory molds of the PDDE, by intermediary of the Unidades Executoras Próprias [Specific Administrative Units] (UEx) of municipal, state, and district schools selected in the realm of the PIEC, to help them insert technology as a pedagogical tool for daily use (Brasil, 2018).

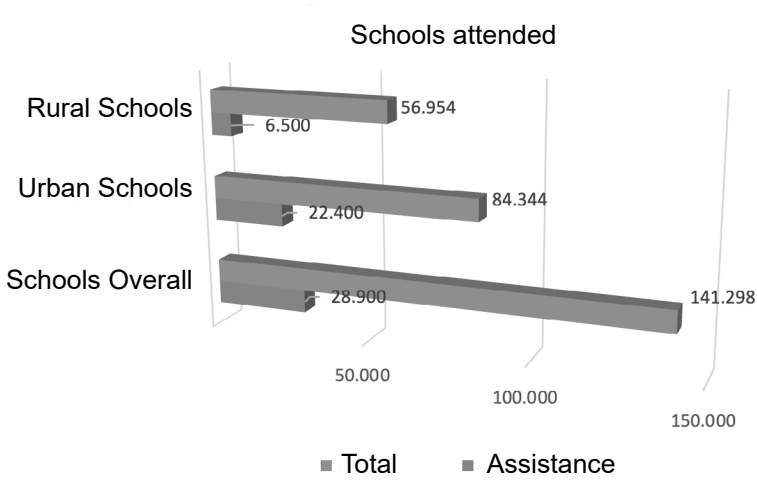
18 http://pddeinterativo.mec.gov.br/

that is, June 2019, was not fulfilled. Only 52%[19] of Brazilian schools had some form of broadband internet access by this date.

Because of this difficulty in meeting the deadlines, MEC changed the schedule for the program guidelines, and established three phases:

- Induction: serving 22,400 urban schools (internet via landlines) and 6,500 rural schools (internet via satellite), in the period from 2017 to 2019.
- Expansion: serving 68,500 urban schools (internet via landlines) and 7,500 rural schools (internet via satellite) in the period from 2019 to 2021.
- Sustainability: serving 100% of the urban and rural schools in the period from 2022 to 2024.

To serve 22,400 urban schools until 2019 in the Induction phase, and a total of 28,900 schools, represents only 26.56% of the 84,344 urban schools and 11.41% of the 56,954 rural schools, that is: the program reached only 20.45% of Brazil's 141,298 public schools until 2019, as demonstrated in Graph 2 below. The partial goal of 52% of the National Education Plan indicated in the previous graph indicates that the difference in the percentage of schools served is the result of their internet access under previous programs.



Graph 2 – Schools served in the Induction Phase of the Programa de Inovação Educação Conectada – 2019.
Source: MEC (2019). Adapted by the authors.

In addition, leaving 89% of rural schools, those with the greatest difficulty in gaining internet access, to be contemplated with satellite internet only in the last three years of the plan is an indication of the lack of priority for those that are already most excluded.

19 https://www.observatoriodopne.org.br/

This analysis does not consider access to mobile internet networks by schools for two reasons: the first is that this type of service is not included in PIEC; the second is the situation of exclusion due to the precarious coverage of 3G or 4G data services in the regions analyzed.

The impasse in the execution of the public policies for the continental dimension of Brazil is in the attendance of remote and isolated regions such as the rural schools in the interior of Amazonas. These schools remain excluded by the acritical and decontextualized attempt of transferring and outsourcing models, such as this one based on the Dutch reality.

Holland's territorial dimension of 41,543 km^2 is smaller, for example, than 24 of the 26 Brazilian states. Only Alagoas and Sergipe have a smaller land area than Holland, as well as the Federal District. The Brazilian population is 12 times greater than that of Holland: there are 211.8 million Brazilian (44 million of whom are younger than 14) compared to 17.1 million Dutch (2.69 million up to 14), according to Worldometer.[20] The investment per student in basic education and the cost of implantation of the technology in the schools are completely different, as well as the cultural capital.[21] While according to the Organization for Economic Co-operation and Development[22] Holland invests US$14,500 per high school student, Brazil invests an average of only US$3,800.

This is not to ignore good international practices and experiences. It is a question of recognizing the Brazilian social context, considering its multiple realities. The standardization of solutions has demonstrated that this process does not allow Brazilian social policies to meet the country's needs.

Moreover, in the implantation, registration in the program becomes a regulatory mechanism in national policy, as a form of control. According to the orientations of the Program,[23] registration is a necessary condition for a school to receive technical and financial support from MEC, despite the distinct reality of the Brazilian situation.

According to the site that monitors the Connected Education Innovation Program (http://medidor.educacaoconectada.mec.gov.br/), which allows accompanying data about the program, in a consultation realized in October 2019, the following data were found for Brazil's northern region and Amazonas:

Note that, in the previous table, only 4% of public schools in Amazonas state and 8% of public schools in the Northern region were able to register in the program. The average speed of internet access of eight and six *megabits* per second (Mbps[24]), respectively, reveals the low capacity of access to digital content, making

20 https://www.worldometers.info/

21 In the concept of French sociologist Pierre Bourdieu (2015), in which cultural capital would be obtained through a set of intellectual qualifications of an individual transmitted by the family, inherited cultural capital, or even produced by a determined school system.

22 Education at a Glance 2018: OECD Indicators.

23 http://educacaoconectada.mec.gov.br/#orientacoes

24 Mbps is the abbreviation used for megabit per second, an industrial standard measurement of internet speed.

it inviable for a simple online video to be watched as a classroom activity by a group of students. MEC recommends a minimum of 100 Kbps of speed per connected student. Thus, in a school with 200 students, the internet speed contracted should be 20 Mbps. In addition, the internet speed of megabits per second is only one of the variables for evaluating the quality of connection in the schools. The packet loss and latency must also be considered.[25]

In addition to the technical aspect, the number of 216 schools participating in Amazonas indicated in Chart 2 includes municipal public schools. In reality, there are only 56 schools in the state public system, 52 of which are in the capital, Manaus. This means that 57 of the 61 Amazon municipalities in the interior of Amazonas do not have any public school in the state network that adhered to PIEC of MEC by 2019, and among them, absolutely no rural school.

Chart 2 – Data of Programa de Inovação Educação Conectada – North region and Amazonas

Data	North	Amazonas
Participating schools	1.623	216
School Census	8%	4%
Internet speed (average)	6.33 Mbps	8.47 Mbps
Packet loss	2.24%	15.15%
Latency (ms)	95.15	50.83

Source: MEC (2019). Adapted by the authors.

The responsibility for adhesion is not the only problem. Many schools cannot register for the program because the registration system is exclusively online. After the registration of a municipal school system, each school must register. Each school unit must then complete the diagnosis on the online platform *Guia EduTec*.[26] Later they must present a price study, a financial execution plan, and their bookkeeping. All of these steps must be done online in the system of the Ministry of Education. In addition to the bureaucratization of the adhesion as an imposition for the schools to receive something to which they have a right, there is the standardization of the costs of the services that makes it inviable to execute the service in remote regions, such as the interior of Amazonas state.

25 The measurement of packet losses refers to the percentage of content that may be lost in the data transmission. Latency is the time of transmission of a packet, roundtrip. According to Resolução nº 574, de 28 de outubro de 2011, of the Agência Nacional de Telecomunicações - Anatel, which approved the Regulamento de Gestão da Qualidade do Serviço de Comunicação Multimídia [Regulation for Administration of Quality of Service of Multimedia Communication], the service provider must guarantee that packet loss be no greater than two percent and that the latency up to eighty milliseconds (via landline) and nine hundred milliseconds (via satellite). That is, in addition to the average connection speed, the packet loss and latency cannot be high, as indicated by the data presented in the table about the PIEC data.

26 http://guiaedutec.com.br/

Even if the problem of the lack of connectivity and limitation of the technical infrastructure could be resolved with the uniform guidelines of the program, which clearly did not consider Brazil's regional contexts, the success of MEC's new policy for the use of digital technologies in public schools would depend on a change in the processes, although this has still not been called for. It is also necessary to create customized options for the development of the subjects, thus avoiding the imbalance generated by the model for reproduction.

The theoretical-methodological choices of the policy proposal demonstrate that they were not guided by technical criteria. The model for the construction of the program incorporates ideological values that reproduce and expand the existing model of inequality and exclusion.

The items of the third article of the decree that directly concern the equity of conditions among public schools and the promotion of access in schools located in regions of greater socioeconomic vulnerability are contradictory to the model presented and appear to be unattainable by the ideological concept proposed.

As a reference, in 2018, 40.3% of Brazilian public schools were located in rural areas, according to the 2018 School Census. In Amazonas, rural public schools are 72% of the total. There are 3,637 rural schools of a total of 5,050 in the entire state.

This particularity of the schools of the public school system in Amazonas state has another predominant characteristic: 85.5% of the schools are located in the municipalities of the interior and only 14.5% in the capital. There are 4,319 schools in the interior without suitable infrastructure and limited access to technological equipment.

According to research by the Internet Management Committee in Brazil,[27] only 34% of the 57 thousand[28] rural schools in the country have at least one computer connected to the internet. A comparison of the macro-regions of the country reveals the depth of this inequality because it is seen that while only 14% of rural schools in the North region have at least one computer connected, in the South region 84% have at least one computer connected (CGI.BR, 2019).

Even when there is a minimum of connectivity, the most common use of technology in rural schools is still administrative. The pedagogical use of technology in remote schools is practically nonexistent (CGI.BR, 2019). These students are denied the fifth general competence of basic education, foreseen in BNCC (Brasil, 2017b, p. 9, our translation):

> To understand, use and create digital information and communication technologies in a critical, significant, reflexive, and ethical manner in the various social practices (including schools) to communicate, access, and disseminate information, produce knowledge, resolve problems and exercise protagonism and authorship in personal and collective life.

27 Source: CGI.br/NIC.br, Centro Regional de Estudos para o Desenvolvimento da Sociedade da Informação (Cetic.br), Pesquisa sobre o uso das tecnologias de informação e comunicação nas escolas brasileiras — TIC Educação 2018.

28 56,954 schools.

Since 2009, for example, Fundação Qatar recognizes innovative projects throughout the world that address global educational challenges and that have already demonstrated a transformative impact on individuals, communities, and the society of their context. In the Foundation's online innovators Directory (https://www.wise-qatar.org/innovators-directory/), a review of educational initiatives throughout the world can be found and those that are closest to each reality. For example, there are innovative initiatives in Morocco, India, Bangladesh, Ghana, Nicaragua, Nigeria, and Peru. All of these are implemented with success in poor and rural areas of these countries.

A policy to equalize opportunities based on a country without critical inequalities such as Holland does not appear to be the most suitable route to attaining the objectives of the proposal in a country as diverse as Brazil. In fact, the theory of the Four Dimensions was not completely reflected in the text of Decree No. 9.204, of 23 November of 2017, which established the Innovation Program.

The promotion of digital culture in schools for the critical use of digital technologies is something desirable and should be guaranteed by public policies, but this situation is far from being attained in Brazil, particularly in rural schools of the North region, as indicated by the data presented. The analysis of the results reveals models that maintain differences for the elites and needy communities, with distinct concepts in the application and access to technologies, thus reproducing inequality.

The study also indicated that one of the main reasons that these rural schools do not have internet connections in Brazil in 2018 is the fact that the needed technical infrastructure does not exist. And when it does, the cost is high (CGI.BR, 2019). Thus, this great challenge complements the lack of other basic public services that interfere with the provision of the internet. According to the survey of CGI.BR, 9% of rural schools in Brazil do not even have electrical energy and in 12% the supply is intermittent. In the North region and Amazonas, this situation is historically even more precarious: in 66% of the rural schools in Amazonas, there is no electrical energy from a public grid and in 91% there is no water supply from a public network, as indicated by the School Census of 2018.

Social exclusion is related to digital inequality and vice-versa, while the policy that should encourage inclusion creates an overly bureaucratic process and does not equitably serve schools. For example, it would not be admissible to condition financial allocations under the National School Meals Program or for the National Program for Support to School Transportation to a bureaucratic registration process like that used in PIEC. An absence of school meals or the lack of school transportation for students could not be justified if a school had not registered for a certain program or completed a diagnostic formula. The payments per capita are made automatically based on the number of students registered. If a student is in school, they must receive a meal and transportation service every day.

According to the 2018 School Census, 100% of the 3,637 rural schools in Amazonas offer school meals to their students, while absolutely none can adhere to PIEC in the registration phase and thus remain excluded from being served by MEC's new connectivity policy.

Ordinance No. 29 of the Secretariat of Basic Education of MEC, published on 25 October 2019, defined new criteria for the expansion phase of the program regarding the allocation of financial resources to public schools. The technical criteria were the following:

> Art. 3th – The criteria for eligibility include:
> I. an urban school located in a region with terrestrial internet connection via fiber optic cable, according to the indications provided by the Ministry of Science, Technology, Innovations and Communications (MCTIC);
> II. a school with electricity; and
> III. a school with an Administrative Unit - UEx. (Brasil, 2019)

Instead of creating options for inclusion, the criteria for eligibility under the ordinance restrict the application of a national policy to urban schools and those connected to an electric grid. In addition, the criteria for inclusion required that a school have a minimum quantity of equipment, although the program resources are also allocated for purchasing equipment.

> Art. 4th – The criteria for inclusion are:
> I. a school with more than 14 registered students;
> II. a school with at least 3 computers for use by students;
> III. a school with at least 1 computer for administrative use; and
> IV. a school with at least 1 functioning classroom. (Brasil, 2019)

As a consequence, no Brazilian rural schools meet the criteria for receiving financial allotments for this phase of expansion of the program and will depend on other programs for digital inclusion, such as that of GESAC, which is a solution created under another proposal and that has proven to be inefficient, as demonstrated by Melo Neto (2005). In contrast, the criteria for classification for GESAC are the following:

> Art. 5th – The criteria for classification are:
> I. a school with performance below the national average on the last result of the Basic Education Development Index – IDEB.
> II. a school located in a municipality of high socio-economic vulnerability, according to the Municipal Human Development Index – IDH-m.
>
> §1º The criteria for classification were selected considering the determination in art. 3th, item III, of Decree No. 9.204, de 2017, and will only be applied if there are new schools in a number higher than the financial limit destined to this action.
>
> § 2º If the number of pre-selected schools remains at a quantity beyond the budget limit, priority will be given to schools that fulfill, cumulatively, the criteria of items I and II of this article, classifying them by the criteria defined in item I, from the lowest to the highest results (Brasil, 2019).

On one hand, the decree precisely excludes those schools with the greatest difficulties in gaining access to essential services because they are far from urban centers, and on the other hand gives priority to schools with lower performance and low Human Development Index.

Ordinance No. 29 – Secretariat of Basic Education/MEC also reinforces the use of MEC's online systems as criteria for confirmation, in addition to the registration method:

> Art. 6th – The criteria for confirmation include:
> I. selection of schools, benefited and new, by the educational director, through an operation to be conducted in the Integrated System for Monitoring and Control – Simec, under the deadlines established by the Ministry of Education; and
> II. registration of the school, by the school director, to the Interactive PDDE System, whose effectuation will depend on the preparation and electronic delivery of the Financial Application Plan, by the deadlines established by the Ministry of Education.

According to data from the 2018 School Census, there are 261,405 students registered in the 3,637 rural schools in Amazonas and 2,522 computers, although only 6% of these schools have computer laboratories. The ratio is thus 103 students per computer.

Strategy 7.15 of PNE and the first article of the decree that instituted PIEC refer to the universalization of internet access in basic education public schools in Brazil and to tripling the number of computers to students by 2024 to promote the pedagogical use of information and communication technologies.

Tripling the number of computers to students by the end of the decade means that the projection is for Amazonas to have an average of 34 students per computer in their rural schools in 2024, 10 years after the launching of the plan. However, the size of this goal for Amazonas is the same as Brazil's national average in 2014, when the PNE was implemented, revealing a decade of delay in the ratio of computers to students in the state.

These schools' options for access to information are compounded by their lack of basic equipment. The situation of absence of basic infrastructure is critical and compromises pedagogical work and school results, with grave consequences.

FINAL CONSIDERATIONS

The implementation of public policies is a dynamic and not a linear process. This article analyzed Decree No. 9,204, of 23 November 2017, to demonstrate a model of theoretical-methodological influence in the formulation of public policies in Brazil concerning the use of digital technologies with consequences in the educational system in Amazonas. To do so, it was necessary to understand the actions of CONSED, which, by representing state secretaries of education, revised its role as an articulator and created a single agenda with hegemonic intentions.

By developing working groups dedicated to proposals of MEC, with third-sector consultants, CONSED did not consider the social dynamic of the results and context of the policy strategy. As this study demonstrated, the technical consultants to the working group for Innovation and Technology of CIEB based the group's proposal on the Dutch model of the Theory of Four Dimensions, thus maintaining a decontextualized model clearly developed for another reality. The working group thus did not consider Brazil's broad diversity and need for technical infrastructure in rural areas, such as that found in the municipalities in the interior of Amazonas state, which generated grave consequences.

A balance of power is a requirement for the democratic construction of a policy (and for its decision-making process), which should be beyond the interests of a given group or ideology. The document analysis and interpretation of the evidence conducted in this study did not find this balance and the policy result was compromised.

Public social policy has among its goals to confront the inequalities between individuals in society. These inequalities are produced by the capitalist system. The concept of an equalizing policy of opportunities systematized by Pedro Demo (1994) is relevant in this case. Demo (1994, p. 14) affirms that some social policies run "the intrinsic risk of being a strategy for social control and demobilization of the 'unequal', following 'the logic of power'".

To combat this real possibility, it is necessary to intervene in the historic process with a contextualized public policy. The existing options go beyond that of good international practices found in Europe, which are difficult to implement in the Brazilian reality.

In the case of the Netherlands, public schools are financed by the Ministry of Education, Culture and Science, which defines the standards of quality and legal requirements, but the administrative system is decentralized, and schools have autonomy, for example, to implant a technological solution directly with companies. This structure is similar to that presented in Resolution No. 9, of 13 April 2018, which authorized the allocation of financial resources from PDDE for schools in PIEC.

The theory of the Four Dimensions was not completely reflected in the text of Decree No. 9,204, of 23 November 2017, which established PIEC. This is because there was an emphasis, perhaps a deliberate one, on the technical elements, as demonstrated in this analysis. This conditioned the incorporation of technologies in schools to a technical model, forgetting that innovation in education is not a product. Innovation is not purchased with resources from PDDE, because innovation is a methodological process. The treatment of technology as merely a product to be consumed and accounted for through MEC's online systems proved to be ineffective. In the case of the interior of Amazonas, the level of school adhesion close to zero reveals the failure of one more policy that follows the market logic.

The mechanism for regulation of registration in the program, to receive something that schools have a right to, proved to suppress participation. Rural schools, in general, were not considered in the text of the ordinance,[29] which de-

29 Portaria SEB/MEC nº 29, de 25 de outubro de 2019.

fined the criteria for the expansion phase of the program and the allocations of financial resources to public schools. As a result, the fact that only 20.45% of the 141 thousand Brazilian public schools contemplated by PIEC were actually served five years after the launching of PNE (2014–2024) is a direct consequence of this inappropriate model for transfer and outsourcing.

The initial goals of the National Plan were not attained, as demonstrated in the analysis, and it will be extremely difficult to meet the final goals because priority was not given to the context of rural schools. The harm to the subjects, both teachers and students, who live, work, and study in remote areas, goes beyond digital inequality. By not resolving this structural problem, it is Brazilian society that loses.

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