

EDUCATION AND DIGITAL INCLUSION IN THE PANDEMIC: AN EXPLORATORY REVIEW ON THE CHALLENGES OF THE BRAZILIAN CONTEXT.

EDUCACIÓN E INCLUSIÓN DIGITAL EN LA PANDEMIA: UNA REVISIÓN EXPLORATORIA SOBRE LOS DESAFÍOS DEL CONTEXTO BRASILEÑO.

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ABSTRACT

We discuss digital inclusion and its challenges for the educational scenario in a pandemic society. We reflect on the existing problem that was exacerbated by the precariousness of education during the covid-19 pandemic. We are based on an exploratory study based on scientific articles located in the electronic library SciELO, Google Scholar, as well as demographic data from different institutions and Brazilian legislation. We believe that the challenges of digital inclusion are not limited to understanding and managing digital technologies, but also to the first access to these instruments and to the digital environment. Thus, in the Brazilian context, the digital inclusion gap is one of the problems of public education, contributing to the generation and deepening of social and educational inequalities.

Keywords: Digital inclusion; Pandemic; Brazilian education; Literature Review.

RESUMEN

Discutimos la inclusión digital y sus desafíos para el escenario educativo en una sociedad pandémica. Reflexionamos sobre la problemática existente que se vio agudizada por la precariedad de la educación durante la pandemia del covid-19. Nos basamos en un estudio exploratorio basado en artículos científicos ubicados en la biblioteca electrónica SciELO, Google Scholar, así como datos demográficos de diferentes instituciones y la legislación brasileña. Creemos que los desafíos de la inclusión digital no se limitan a comprender y manejar las tecnologías digitales, sino también al primer acceso a estos instrumentos y al entorno digital. Así, en el contexto brasileño, la brecha de inclusión digital es uno de los problemas de la educación pública, contribuyendo para la generación y profundización de las desigualdades sociales y educativas.

Palabras clave: Inclusión digital; Pandemia; Educación brasileña; Revisión de Literatura

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INTRODUCTION

In November 2020, due to the covid-19 pandemic, Artur's family moved to the rural area of Alenquer, in Pará. Since then, Artur and his brother began to study in an emergency remote teaching regime. The two boys were looking for a cell phone signal in the community and it was under a hose that they realized that the cell phone had a signal. As he climbed the tree, the intensity increased more and more. Arthur and his brother even built a ladder, a stool and even a cell phone holder at the top of the tree. This was the way the boys found to follow remote classes.

The narrative described above is a report presented on *Fantástico* (TV BRASILEIRA) (Rodrigues, 2021), but dilemmas such as Artur's are situations experienced by different educational actors, especially teachers, students and their families. These are the ones that make up the scenario. The context begins with the *time* of such experiences, and can be demarcated from March 2020, when we came to exist in a new pandemic context caused by the covid-19 virus.

This scenario is full of romanticization of teaching conditions, such as the stories of teachers making individual efforts to cross land and rivers; the demigod facing dangers to fulfill his more than twelve tasks; romanticizing the study conditions of peripheral children alone at home or children in rural areas climbing trees in search of connection and connectivity; there is the myth and romanticization of school education, meritocracy and personal effort as overcoming all material conditions and limitations (Rodrigues, 2021). In this scenario, for some, social class does not figure. Globalization, information and communication technologies and worldwide connection through the internet have broken down barriers. Everything is within reach of a click!

What interests us when we start from this scenario is, in the first place, *how* these actors had their experiences in education influenced; but also to think how *much* the effects of this influence reflect the structure of Brazilian society and, consequently, of its education. This brought us to the central question: *How did the Covid-19 pandemic widen the digital inclusion gap in Brazilian education? We emphasize that here we take digital inclusion as a process by which it is possible to insert everyone into the information society, through competent and safe reading and use of technologies* (Oliveira *et al.*, 2021, p. 6).

Note that our question assumes the existence of a gap prior to the context of the scenario and its expansion due to this new context. This will lead us to try, initially, to answer if there was a digital inclusion gap in Brazilian education before the pandemic. Our way to identify the gap will be given in the first topic of this work.

In the second moment, we will reflect on how this gap behaved from the pandemic context, seeking to identify the contributing elements to its expansion, some of its reflexes in the lives of educational actors, especially students and teachers. Finally, we will present a brief reflection on what perspectives we can have in relation to the future dynamics of the moat. A brief and humble exercise in predictive and inconclusive imagination. This entire trajectory was built with a documentary and bibliographic character using legislation, academic research and demographic data from different institutions, constituting a review study, as explained in the method.

METHOD

Situated in the contemporaneity of the phenomenon in question, the present study has an exploratory character, with a qualitative and conceptual approach, characterized as a state-of-the-art bibliographic research. Authors such as Romanowski & Ens (2006, p.39 - free translation) emphasize that carrying out these literature reviews “enables to contribute to the organization and

analysis in the definition of a field, an area, in addition to indicating possible contributions of research to the social ruptures". Here we aim to analyze the scientific discussion about digital inclusion in Brazilian schools in the face of the challenges of the Covid-19 pandemic context.

Initially, we aim to answer the question: *what is known about education and technology in the Brazilian social context?* The first step took us to Brazilian legislation and official sociodemographic data. Thus, we consider the scenario of Brazilian schools, the profile of students and their families and the accessibility to digital technology based on data from the CadÚnico profile, the Inep school census, the IBGE demographic census and the educational survey carried out by the Management Committee of Brazil Internet. We analyzed a clipping from 2010 to 2021 in order to obtain comparative scenarios of the Brazilian reality before and after the pandemic. call this step *what do we know?* Considering that much of the information and data on school infrastructure, connectivity and digital inclusion in schools existed before the conformation of the pandemic context.

In the second stage, we sought to know: *what are Brazilian academic productions saying about education, technology and inequality in the context of the pandemic?* For this, we carried out a review in the SciELO electronic library and Google Scholar. The survey was carried out in the search system of these sources using the descriptor *digital inclusion + pandemic*, with a time frame corresponding to the years 2020 to 2021, in order to obtain a contextualized discussion in the recent scenario of Brazilian education.

Thus, we located 28 scientific productions in the SciELO electronic library (five articles) and in Google Scholar (22 articles + 1 e-book). The productions raised, in general, discuss education in the context of a pandemic society linked to social inequalities, rights and public policies to guarantee accessibility for all, socio-geographical obstacles and the impacts of distance learning for teacher training.

Therefore, the intersection between these two corpus (legal documents and scientific research) constitutes this study, helping us to answer not only what we knew (the pre-existing context of the pandemic), but also what was done and what were the effects. immediate effects in the teaching and learning work process in Brazil.

WHAT IS KNOWN?

In the Brazilian context, it seems impossible for us to think about digital inclusion through education without relating education and inequality, specifically related to the dimension of income and food security, for example, due to the effects already discussed in literature, on the school learning process.

Considering this dimension, before the pandemic we already knew that the data from the 2010 Demographic Census indicated that 96% (in 2018 this number was already 99.3% - PNAD Contínua) of children and adolescents from 6 to 14 years old, age group of elementary school, were attending school. We also knew that most of these children and adolescents, enrolled in regular elementary education, were students from public schools and, when cutting this population by household income, the data indicated that 78.2% of children and adolescents lived in households whose income was up to 1 minimum wage *per capita* (Instituto Brasileiro de Geografia e Estatística [IBGE], 2010).

According to data from CadÚnico's Profile of People and Families (Brasil, 2014), of the more than 67 million people registered, 39% were children and adolescents from 6 to 15 years. Of those enrolled in the Bolsa Família Program – PBF, children and adolescents in this same age

group represented 43.1% of the people benefiting from the Program, meaning, consequently, that this public is the majority among the extremely poor, “which may indicate that the presence of children increases the vulnerability of families” (Brasil, 2014, p. 35).

If we think only of elementary school, the age group discussed above, in 2018 there were 82.3% of students enrolled in public schools, very similar to the data from the School Census, whose percentage for the year 2019 was approximately 82.6% of this group enrolled in public schools. (IBGE, 2019; Brasil, 2020).

85% of students aged 15 to 17 who attended regular high school in a public school were 87% in 2018, and in 2019 the percentage was 86.9% enrolled in public schools, the overwhelming majority in state schools and a small portion (3%) in federal schools. Of this group of students, in 2010, 65.3% were from households whose monthly *per capita income* was up to 1 minimum wage (R\$510.00 at the time). (IBGE, 2010; 2019; Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira [INEP], 2020).

We think that these, available even before the context of the pandemic, help us to highlight the relationship between education and poverty as well as to visualize the role of the public school as one of the strategic focal points for the confluence of social policies, since the public network of education, mostly municipal and state networks, absorb most of the school-age public and, consequently, the poorest part of this population. Hence the importance of school lunch programs, for example.

Therefore, we can infer, then, the centrality of the public school in guaranteeing not only the right to education, but also the importance of guaranteeing food security for the most impoverished portion, which has influenced the widening of the Brazilian social gap; in such a way, understanding Brazilian education in its relationship with digital inclusion and the challenges experienced in the pandemic period, requires a systemic view that takes into account the contexts and social elements that touch the teaching-learning process (Cardoso *et al.*, 2020).

Regarding digital inclusion, we were already aware of the existence of the Marco Civil da Internet, Law number 12.965/2014, which regulates the use of the internet in Brazil and aims to promote the right of everyone to have access to the internet, access to information and promotion to the diffusion of new technologies, as expressed in its article 4 and article 7, establishes that “access to the internet is essential for the exercise of citizenship”. In this context, the legislation establishes the responsibilities of the federated entities, including those related to the promotion of information and training on the use of the internet.

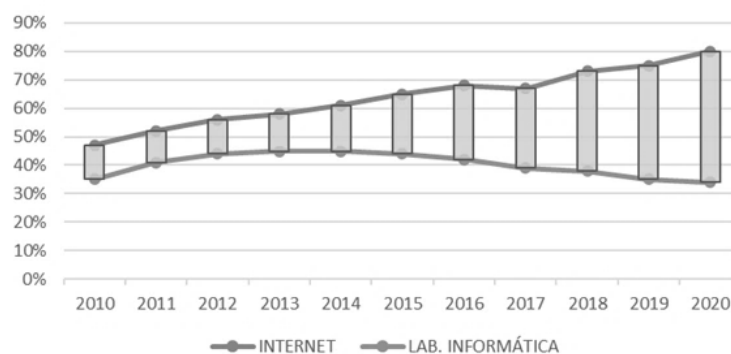
Finally, in articles 26 and 27, we can expressly see the relationship between digital inclusion and education as a right for all and a responsibility of the State, including the requirement of “training, integrated with other educational practices, for safe, conscious use and responsible for the internet as a tool for exercising citizenship, promoting culture and technological development” and creating promotion of inclusion, reduction of regional inequalities in access, informative content and studies on the use of the internet at the national level.

That said, six years before the pandemic, Brazil had legislation guiding the use of the internet and establishing its indispensable condition as a right to access information as a condition of citizenship. As we have seen in relation to income and food security, the school will also be this focal point for promoting digital inclusion. However, how has the relationship between the Brazilian school and technology been?

To get an idea, let's look at Graph 1, below, with data from the School Census that help us understand the movement based on the availability of internet and the existence of a computer

lab in schools over the last 10 years. It is possible to notice that from 2014 onwards the percentage of public schools with a computer lab began to regress proportionally to the school universe of the following years, while the percentage of schools with internet connection followed an expansion flow. As a result, we have an increase in the distance between the percentage of students with internet in relation to the percentage of schools with a computer lab.

Figure 1. Percentage of Brazilian public schools with Internet and Computer Labs



Source. School Census (INEP, 2020). Authors' elaboration.

If, on the one hand, we can infer that the reduction in the number of laboratories follows the process of expansion and popularization of mobile devices, especially smartphones, which led many school networks to replace laboratories with a set of tablets or notebooks; on the other hand, we also know that the school internet mostly meets administrative demands and is not available for use by students, as already pointed out by data from Cetic.br in its ICT Education surveys, also between 2010 and 2020.

Outside of school, in 2019, about 28% of households did not have access to a computer or internet. Among those who accessed the internet in that year, 99% did so mainly by cell phone, with 58% accessing it exclusively through this route. After the first year of the pandemic, 86% of schools pointed out that the lack of devices (tablets, computers, and cell phones) connected to the internet in the students' homes was the main challenge faced in carrying out school activities during the pandemic; 71% of schools claimed lack of Internet access infrastructure in the school itself and in the region (CETIC.BR, 2020). As evidenced by Cardoso *et al.* (2020), the resulting or deepening post-pandemic economic crisis will amplify the access challenges of the most vulnerable strata of society, widening the social, economic, and educational disparity.

If we consider the percentage of school-age students in a situation of greater social vulnerability, the lack of internet access outside of school; the continuous decrease in the percentage of public schools with computer labs and that the internet available in schools is more directed to administrative use, we now have new elements that help us understand the digital inclusion gap and its expansion prior to the pandemic that, as we saw earlier, impacted students' access to education.

WHAT IS BEING DONE?

Education as a process of humanization, as a path to the appropriation of knowledge historically produced by humanity, is a right for all. However, in a class society, social exclusion ends up becoming a condition for widening inequalities that, in sequence, lead to an increase in the digital divide (Araújo *et al.*, 2020).

The problem of the deficiency of technological infrastructure and, therefore, of the obstacle of access to the World Wide Web is not an isolated one. On the contrary, it is associated with economic exclusion and socio-spatial segregation that constitute an irrefutable reality in Brazilian cities and are part of a vicious cycle of fostering inequalities that, although inaugurated in the colonial period and aggravated by the perverse way in which the abolition of slavery in the country, needs to be faced by the government and civil society and broken with initiatives that recognize the hierarchy present in Brazilian social and spatial relations (Aalfonsin & Chala, 2020, p. 2290 – our translation).

In this way, given the Covid-19 pandemic scenario, such social inequalities that had long existed have been even more evident. Having access to digital technologies does not guarantee digital inclusion, because, as we pointed out earlier, the inequalities intrinsic to this social system were not created by the use of these technologies.

As an emergency alternative to replace face-to-face classes and avoid the complete suspension of classes in the pandemic scenario, a remote teaching format mediated by digital technologies was adopted, applied synchronously and/or asynchronously, however, all dependent on internet access. This action taken under an urgent, flexible, and disorganized character resulted in a widening of the gap, as each teacher, student and educational institution adapted in the way that was appropriate for them to remain in the “new normal” of the learning process: Teaching-learning. In this way, the vulnerabilities generated by social inequalities have become even more evident in the various educational scenarios in the country (Augusto & Santos, 2020).

That said, assessing the size of the digital divide in Brazilian education in a society marked by several layers of inequalities is a complex task, as we are faced with different educational realities faced in our country, each with its own demands and peculiarities. We have contrasts between public and private institutions, classrooms located in urban and rural areas, native schools in the north-northeast of the country and schools in the south-southeast, large, and small schools, as well as the nuances between the different levels and modalities of basic education and higher education (CETIC.BR, 2020).

Faced with these scenarios, we reflect: *But what is being done?* According to the survey carried out at Cetic.Br (2020), given the difficulties of accessibility for students, many schools chose to hold classes asynchronously through video classes previously recorded by teachers and sharing material on social networks. It is said that 79% of teachers recorded video lessons and made them available to students and 91% of schools created groups on apps or social networks (WhatsApp or Facebook) to send material and receive activities. Complementary evidence is presented by Marcon (2020, p.95), according to which more than 50% of teachers from public or private schools used the smartphone to develop pedagogical activities, with only something between 25% and 30% of teachers and only 7% to 10% of students said they used the school's connection infrastructure.

In this way, most schools (93%) observing the lack of resources of many students, chose to schedule a day and time so that parents/guardians can pick up/deliver activities and activities to the school printed teaching materials. Some teachers even risked going out in the middle of the pandemic and going personally, from door to door, handing in their students' tasks. And yet 62% of schools have partnered with community leaders to purchase resources in the neighborhoods and establish a communication network with the school community (Marcon, 2020).

However, it is seen that teachers did not have previous skills to adapt to this new educational reality and, therefore, many had to learn for themselves through tutorials on YouTube videos or other applications on how to use virtual environments, how to produce and make recorded classes available. Only 68% of schools offered some type of training for teachers on the use of technologies in pedagogical activities in the last 12 months. However, only 32% is focused on serving students with disabilities. That said, we consider that the widening of the gap has direct impacts on teacher training and, in turn, on the teaching-learning process.

WHAT ARE THE IMPACTS FOR TEACHING AND LEARNING?

Stands out unanimously *lack of resources* to carry out activities in the online format. According to Pereira e Silva (2021), both students and teachers accuse the precariousness of their computers, tablets, and cell phones, which, in many cases, need to be shared with family members. As well as signaling, mainly, a huge difficulty in getting access to the internet of quality in their homes or in the educational institution itself.

Alfonsin and Chala (2020), remind us of the three requirements for quality access, one of which is subjective, which are equipment, connection, and communication infrastructure and “cognitive adaptation”, in such a way that. So, the obstacles to teaching in the pandemic are not just about getting the internet signal or not, whether you have digital technology at your fingertips. Difficulties are also present in the pedagogical service according to the variety of *the student's profile*. The younger the student, the more he will depend on adult supervision to carry out remote activities. If a child received guidance and care from teachers and assistants at school to read and handle the pedagogical material, now, in their homes, these children depend exclusively on their parents and guardians to help them, which, in many cases, are not available, and much less qualified to perform such a function.

Within this point, we also have the issue of accessibility for students with disabilities. In the Brazilian educational reality, there has always been a lack of attention to students with disabilities or some special learning need, even though there are laws and decrees to support their school inclusion. In the pandemic scenario, social exclusion was reflected in digital exclusion, especially for those students who have motor, speech or vision difficulties, fundamental senses for active participation in virtual classes. Thus, there is an increase in school dropout in this category (Basilio, 2021), once again, due to the historical lack of infrastructure and teacher training capable of enabling and guaranteeing access to various software and teaching materials (Borges *et al.* , 2020) or favoring the adaptation of existing resources.

One of these two obstacles mentioned above, the conflict in the family-school relationship arises. With teaching being adapted in their homes, students' families were forced to find ways for their children to have access to classes, often having to balance remote teaching with home office work sharing the same resources, creating an exhausting situation, and tiring in the already shaken family-school relationship. Parents and guardians also had to be available to help children connect in virtual learning environments, receiving, sending, and even adapting teaching materials and carrying out activities.

Finally, the *geographic issue* also presented itself as an obstacle to digital inclusion. Teachers and students residing in isolated or remote areas, for example, rural communities, riverside communities, quilombolas, indigenous peoples; whose access to their own school environment was already difficult, faced an even greater challenge in keeping in touch virtually. Leading some to adopt risky measures, such as, for example, climbing large trees to reach the cellular data signal, already mentioned at the beginning of this article.

In this way, faced with a society where digital technologies are becoming increasingly indispensable, we have as a side effect a worsening of social, economic, and regional inequalities that exist around the world. (Rodrigues *et al.*, 2020).

WHAT ARE THE IMPACTS FOR TEACHING PERFORMANCE AND TRAINING?

The education scenario was being reshaped by the context of social isolation fostered by the Covid-19 pandemic. In this way, the exercise of teaching mediated through digital technologies was induced as an alternative to traditional forms of teaching work. According to Oliveira & Mill (2020), this new structure highlights some issues regarding the precariousness of working conditions and the emotional exhaustion of the teacher in these times of digital culture, configuring work processes marked by intense technological mediation.

Thus, this emergency way of teaching through virtual means, exploring the almost ubiquitous potential of digital technologies, ends up making working hours and places more flexible, resulting in an increase in the overload of demands. and emotional strain on the teacher. Factors that impact the way teachers reframe their work.

In addition to the already discussed obstacles of the digital inclusion gap experienced by students and family members, there are also those experienced by many teachers, especially those who did not have contact or previous skills with the use of technology in their teaching practices and who, unexpectedly, needed to start planning and teaching classes virtually, putting their training skills in check (Cardoso *et al.*, 2020).

Teachers listed as the biggest challenges of teaching during the pandemic: the *precariousness of training* reflected in the lack of skills of teachers to use technology resources in pedagogical activities and unpreparedness of training programs; to *work overload* increased demand for teachers' work and changes in work routines; and, in turn, the *health impacts* that result in illness that leads the teacher to abandon the profession (CETIC.BR, 2020).

Studies on teacher training analyze whether the proposal of educational processes mediated by digital technologies has been contemplated in the curricula of undergraduate courses and data indicate that only 43% of teachers had taken a subject, generally of an elective nature, during graduation on the use of technologies in learning and 41% participated in courses, debates or lectures on the use of technologies in the classroom and carrying out projects on technologies in teaching-learning activities (Marcon, 2020).

In view of the above, we understand that the implications of digital exclusion in teacher training have direct impacts on their pedagogical practices, affecting the quality of teaching offered in this remote format, especially when we consider that not all teachers participated in digital inclusion processes during their initial training and/or did not receive training during the transition. Thus, there is an urgent need for training proposals articulated with the contemporary communicational and technological context, no longer dissociated from technology appropriation processes.

WHAT ARE THE FUTURE PROSPECTS?

We have seen that the widening of the gap caused by the alarming picture of social inequality across the country is worsened by the lack of public policies for digital inclusion, accessibility, and training. During the pandemic, exclusion was wide open, generating a series of emergency proposals to mitigate the damage generated in education. Here are some of these proposals.

Covering society in a broad way, the *Bill n. 172/2020*, which aims to ensure the use of the resources of the Fund for Universalization of Telecommunications Services (FUST – traduction by the authors) in the expansion of broadband internet access. Also aiming to guarantee accessibility, the *Bill n. 3.462/2020*, created by Senator Paulo Paim, proposes the *Auxílio-Conexão* to guarantee internet access for low-income students. Senator Jorge Kajuru presented the *Bill n. 3,466/2020* that creates a permanent subsidy through the *Bolsa Internet Program*, intended for internet connection services for low-income families (Rodrigues *et al.*, 2020).

Authored by deputy Tereza Nelma, *Bill n. 3815/2020*, which proposes that each student in the public basic education network be offered a *Digital Inclusion Aid*, worth R\$ 70, with the aim of providing access to constant educational content on the internet. Senator Dário Berger proposed *Bill n. 2,775/2020*, which consists of free access to virtual distance learning applications through fixed and mobile broadband connections for students in the public education network. In this case, companies providing telecommunications services would no longer charge for using the internet when these students were participating in virtual distance learning classes. With a similar objective, several deputies proposed *Bill n. 3,477/2020*, which provides for exemption from consumption or the provision of an additional quota by companies providing personal mobile telephony services to students of public basic education institutions (Alfonsin & Chala, 2020).

In higher education, some public universities launched the *Emergency Aid for Digital Inclusion* with the intention of making cell phone chips available to enable vulnerable students to access the internet. Other universities also collected tablets for students with the same profile (Rodrigues *et al.*, 2020).

Such initiatives presented above constitute a range of viable options to enable the internet to reach those who are currently digitally excluded from society. However, we emphasize that most of these proposals are currently limited to the scope of idealization. And while alternatives are discussed, the gap continues to widen. For the post-pandemic period, some hope that hybrid education (in person and remote) will become a reality, and, in this way, we must learn from mistakes and rethink what we have lived, but with good infrastructural conditions that allow quality access and remote teaching, with quality, as suggested by Cardoso *et al.* (2020).

We propose a simple reflection on the impacts of digital inclusion in the face of the current educational scenario altered by the Covid-19 pandemic. Given the above, we affirm the predominance of attempts at approximation and certainties of distancing technology and knowledge from society, in confluence with social inequalities and exclusionary processes.

Teachers and students experienced a sudden change in their routines, which is characterized by the instrumentalist and utilitarian relationship with digital technologies in all spaces and, regardless of the fact, that they have not been guaranteed a structure for remote teaching, which includes internet connection, electricity, equipment (often shared by several members of the same family), ergonomic conditions, among others (Augusto & Santos, 2020).

That said, the overexploitation of teaching work and the precariousness of teaching acquires nuances depending on the context, but these have in common the lack of training and resources for this type of emergency teaching proposal. Thus, there is also an excessive responsibility of the students themselves for their learning and that of their families. Social inequality ends up being reflected in school inequality, not providing students with the same guarantees of access and permanence in the digital divide (Pereira & Silva, 2021).

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