

Digital technologies in post-pandemic education and blended education: effects, lessons and possibilities

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Abstract: The objective is to analyze the data from the second stage of the 2021 School Census, addressing the issue of the role of Digital Technologies in education in the post-pandemic period, with an emphasis on Blended Education. A documentary analysis is carried out, accompanied by a bibliographic survey. The results point to conceptual confusion and challenges for building an inclusive society, also in the technological dimension, whose meaning is democratic in the context of Digital Culture.

Keywords: Digital Technologies in Education; Didactic-Pedagogical Practices; Blended Education.

Tecnologias Digitais na educação pós-pandemia e Educação Híbrida: efeitos, lições e possibilidades

Resumo: Objetiva-se analisar os dados da segunda etapa do Censo Escolar 2021, abordando a questão do protagonismo das Tecnologias Digitais na educação no período pós-pandêmico, com destaque para a Educação Híbrida. É feita a análise documental, acompanhada do levantamento bibliográfico. Os resultados apontam confusões conceituais e desafios para a construção de uma sociedade inclusiva,

também na dimensão tecnológica, cujo sentido é democrático no âmbito da Cultura Digital.

Palavras-chave: Tecnologias Digitais na Educação; Práticas Didático-Pedagógicas; Educação Híbrida.

Tecnologías digitales en la educación pospandémica: efectos, lecciones y posibilidades

Resumen: El objetivo es analizar datos de la segunda etapa del Censo Escolar 2021, abordando el papel de las Tecnologías Digitales en la educación en el periodo pospandemia, con énfasis en la Educación Híbrida. Se realiza un análisis documental, acompañado de un levantamiento bibliográfico. Los resultados apuntan a confusiones conceptuales y desafíos para la construcción de una sociedad inclusiva, en la dimensión tecnológica, cuyo significado es democrático en la Cultura Digital.

Palabras clave: Tecnologías Digitales en la Educación; Prácticas Didáctico-Pedagógicas; Educación Híbrida.

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1 INTRODUCTION

Adélia Prado's female lyrical self (1993) poetically stated in "Poetic License" that pain is not synonymous with bitterness. We refer to part of her poem to address the period of the Covid-19 pandemic, caused by SARS-CoV-2, a virus from the coronavirus family that forced social distance as a way to contain contagion between people. Education has suffered, but to avoid bitterness, this text aims to analyze the document of the second stage of the 2021 School Census, which points out the strategies used in Basic Education during this period.

These strategies included the widespread mobilization of Digital Technologies (DT) as a way to somehow maintain didactic-pedagogical activities in educational institutions. Without romanticizing what happened during this period, including the problem of digital exclusion, it is pointed out that the mobilization of DT is seen as a collaborative and transversal way of exploiting the potential of different resources, such as making materials available, developing non-polarized interactional activities and promoting collaborative work as characteristic strategies.

It also addresses the question of how Blended Education (BE) emerges in the midst of conceptual confusion and simplification, as if the lesson learned was the possibility of promoting a block, thus watertight, of presential classes combined with online classes. The aim is to situate the concept more deeply in BE, as a possibility to use the potential of DT in didactic-pedagogical practices, so that the online moments would be an extension of the presential moments, articulated by the didactic-pedagogical planning and the objectives set for the teaching-learning process. Both presential and non-presential moments could be worked on, considering training as a continuous process that, through DT, would transcend physical and temporal barriers.

From this point of view, it should be emphasized that, far from ignoring the challenges related to the intensive use of DT in education, it is necessary to build a framework that can support it, confirming the historical struggle for a socially referenced quality public education, as proposed by Dourado and Oliveira (2009, p. 203, translated by us), that is, "having as its pedagogical north the social function of the school".

Thus, this text aims to analyze the strategies used in the pandemic period, through data from the second stage of the School Census 2021, addressing the issue of the role of Digital Technologies in Education, with emphasis on Blended Education, which emerges amidst conceptual confusion and simplification. Methodologically, a documentary analysis was carried out, accompanied by a bibliographic survey of authors and researchers who discussed this issue in depth.

2 PROBLEMATIZING THE USE OF DIGITAL TECHNOLOGIES IN EDUCATION

In today's educational scenario, the use of DT has become an increasingly present reality, bringing with it countless opportunities and challenges. Its integration into the educational context has the potential to contribute to the way students learn and teachers teach, allowing access to diversified information and resources, the personalization of studies, and the expansion of the teaching-learning process based on collaboration, dialogue, interaction, and cooperation. However, it also raises questions about equal access, for example from the point of view of what constitutes a barrier. In this context, this section proposes a critical reflection on the use of DT in education, seeking to understand its pedagogical, ethical, and social implications.

2.1 Digital technologies and changes in the educational environment

In education, embracing Digital Culture (DC) means adopting didactic-pedagogical practices that use DT critically and reflectively, maximizing the possibilities they offer for knowledge production and sharing. This does not mean that the use of DT should be seen as a ready-made solution to educational challenges, but rather as a possibility for more active, participatory, and collaborative teaching and learning.

Freire (1996) already pointed out that education should not be seen as a one-way process but as a relationship based on interaction, in which all participants learn and develop together, because "teaching is not the transmission of knowledge, but the creation of possibilities for its production or construction" (FREIRE, 1996, p. 41, translated by us), so teaching should be a process that stimulates dialogue and critical reflection, which allows students to question, investigate and construct knowledge in an autonomous and participatory way.

Based on this understanding, which goes beyond the use of DT as a mere tool, the inclusion of DT in educational processes brings about various transformations in educational institutions as a whole and contributes to "the emergence of new ways of understanding, studying, teaching and pedagogically monitoring the construction of knowledge" (SILVA, 2015, p. 19, translated by us). According to Gere (2008), these technological and cultural transformations that society has undergone since the end of the Second World War have paved the way for the emergence of new and different possibilities in teaching and learning that transcend the physical school space, but take place in a

decentralized way in different social spaces.

Careful consideration of this is extremely important, as it can lead to an instrumental and technocentric use of technology per se, rather than processes and procedures that promote meaningful learning. Peixoto (2015) criticizes the instrumental and technocentric use of technology, referring to the view in which technology is seen as a tool or means to achieve a specific end. In this sense, technology is treated as a single solution to a complex problem, without considering its broader social, ethical, and cultural implications. Therefore, it is essential to consider the human and social dimensions when designing, implementing and using technology, because "the relationship between technology and education is not reduced to the technical procedures to be followed, but refers to the assumptions that underlie theories of knowledge and the mechanisms that produce knowledge" (PEIXOTO, 2015, p. 320, translated by us).

In this configuration, the use of DM in education provides "a new pedagogical space that offers great possibilities and challenges for the cognitive, affective, and social activities of students and teachers at all levels of education" (KENSKI, 2012, p. 66, translated by us). This new didactic-pedagogical space provided by the use of DT allows a series of new experiences for subjects immersed in this context and can contribute to the reduction of social and cultural barriers, allowing greater inclusion and diversity in the access to and production of knowledge, to support the construction of new social relationships and the strengthening of identity and self-esteem.

In the educational field, DT offers a new pedagogical space full of possibilities, but it also poses challenges and, in order to overcome them, it is necessary to understand them as a means and not as an end in itself, in other words, they should be seen as resources to be used consciously and strategically, in line with the desired educational objectives, so that the student develops meaningful learning experiences, taking advantage of the various possibilities they generate in the formative processes aligned with DC.

To this end, public policies that promote, encourage, and guide ways of mobilizing DT as a potential for pedagogical mediation is essential, for example through continuous training to support the work of teachers. In this sense, the incorporation of DT in the teaching-learning process involves the selection of appropriate resources and methodologies that are in line with the objectives to be achieved, because DT alone does not transform didactic-pedagogical practices, requiring, as Moreira and Schelemmer (2020) point out, a (re)signification of how education is thought about, since the relationship between DT and education goes beyond the use of this or that technological artifact, which in turn constitutes teaching-learning also in digital spaces.

2.2 Digital exclusion as an anti-democratic aspect

Given that we are living the DC, citizens must share the possibility of accessing society through DT. In this sense, for Gere (2008), DC transcends the view of Digital Technologies as mere tools and includes the ways of thinking and doing embedded in computers and the media and communication devices that make their development possible. The author argues that DC gives rise to technical-scientific discourses on information and systems, countercultural utopianism, critical theory and philosophy, and subcultural formations, stating that "Digital culture has emerged from the complex interactions and dialectical compromises between these elements" (GERE, 2008, p. 18-19, translated by us).

In this context, Blikstein et al. (2021, p. 14, translated by us) argue that full access to computers and the Internet is an educational enabler, as evidenced by the pandemic, as long as "access to equipment that allows diversified use is guaranteed, avoiding the digital divide between students with greater or lesser access to resources and infrastructure. To this end, educational and government policies must address this issue and seek to guarantee equal access to technological resources for all students, promoting initiatives to reduce digital inequalities in communities and schools.

Data from the Continuous National Household Sample Survey (PNAD), which aims to monitor the evolution of Brazil's socio-economic development, on the Information and Communication Technology module, conducted in 2021 by the Brazilian Institute of Geography and Statistics (IBGE), indicate that the Internet is accessible in 90% (65,620) of Brazilian households. It is also important to note that of the 149 million Internet users in Brazil, more than 92 million, or about 62%, access the Internet only through their mobile phones, according to the ICT Households Survey (BRASIL, 2022).

Graphic 1. Number of households with cell phone and internet access - Brazil 2021



Source: Continuous PNAD Panel (2021).

However, it is worth noting that private school students (98.2%) have more access to the Internet than public school students (87%) (IBGE, 2021). Furthermore, we recognize that access to DT alone is not enough. Education must also include the development of digital skills and competences so that students can make responsible and engaged use of the technological resources available to them. This includes not only the basic use of devices, but also the ability to critically evaluate online information, to advocate for the veracity and authenticity of messages shared, and to use DT as a collaborative learning opportunity.

In the same sense, Tezani (2011) argues that mobilizing the use of DT in the educational sphere can contribute to the development of personal skills and abilities that are important for personal, academic and professional life, broadening the possibilities for inclusion in contemporary society.

Bobbio (2021, p. 177, translated by us) points out that democracy "denotes the form of government in which political power is exercised by the people" and states that it is an interrelated concept: "it cannot be understood in its specificity except concerning the other concepts of the system, of which it delimits the scope and is delimited by them". It is in this line of reasoning that we approach digital inclusion in a broad sense, as a source of democratic exercise, of participation in today's society. In this way, we emphasize that digital exclusion is seen here as an obstacle to democratic participation in Digital Culture.

2.3 Didactic-pedagogical practice in the context of the pandemic

There is no denying that the COVID-19 pandemic was a milestone in rethinking teaching

practice, as the suspension of classroom activities led to questions about the continuity of activities amid deaths and waiting for the vaccine. Studies are still underway to understand the impact of Emergency Remote Teaching (ERE) on the teaching-learning process in both basic and higher education.

Data from the study "Educational response to the Covid-19 pandemic in Brazil", referring to the school year 2021, was obtained through the questionnaire applied between February and April 2022, during the second phase of the School Census 2021. The school census, compulsory for public and private primary education institutions and regulated by Decree 6,425/2008, consists of a statistical survey carried out annually in two stages by the Anísio Teixeira National Institute for Educational Studies and Research (INEP), in collaboration with state and municipal education departments (BRASIL, 2008).

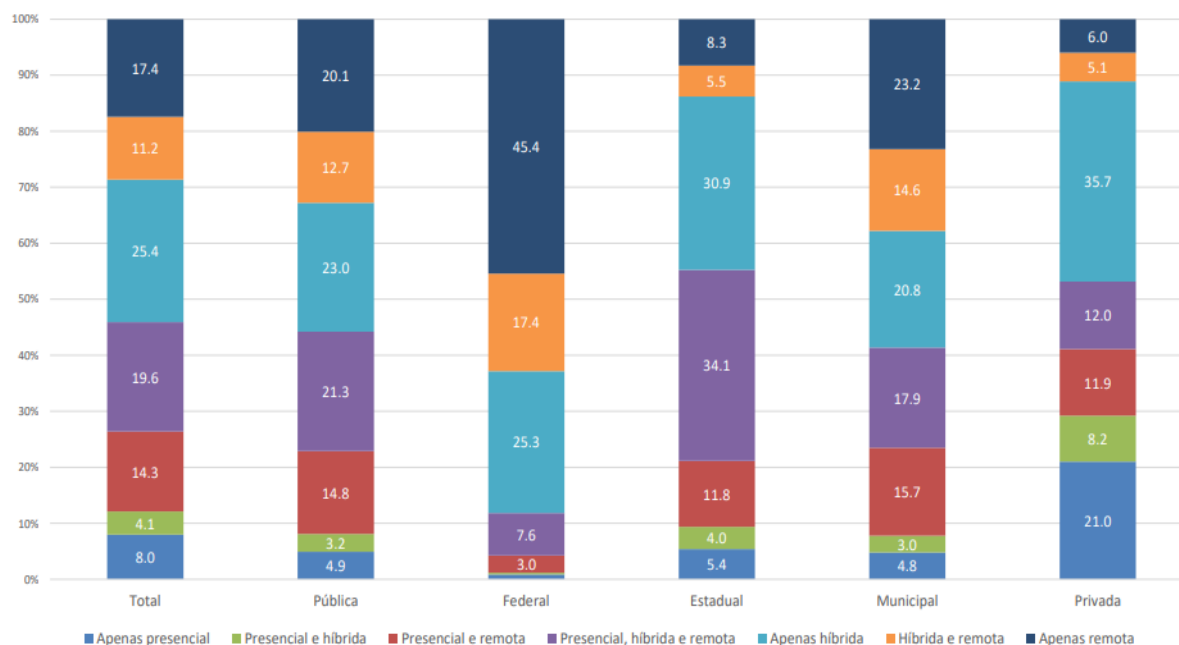
The announced objective of the survey was to identify the actions taken by Brazilian schools in the face of the need for measures to combat the spread of the new coronavirus. A total of 162,818 (91.4%) schools responded to the questionnaire. This percentage corresponds to 131,808 (95.6%) public schools and 31,010 (76.9%) private schools (BRASIL, 2021).

Among them, the data of the schools that maintained their didactic-pedagogical activities only through the mediation of remote teaching during the school year of 2021 indicate that 26,492 (20.1%) public schools and 1,861 (6%) private schools did so (BRASIL, 2021). It should be recalled that the World Health Organization (WHO) declared that the viral outbreak constituted a public health emergency of international concern so in March 2020, Covid-19 was characterized as a pandemic. It was not until May 2023 that the WHO declared the end of the public health emergency.

The survey of strategies adopted by basic education schools (kindergarten to high school) is divided into what are known as presential, remote, and blended strategies. What they call "blended only" was the most adopted in all public and private networks, as can be seen in Graph 1. Thus, in the universe of public schools, "blended only" was the predominant strategy with 23%, and the same scenario took place in private schools with 35.7% (Brazil, 2021).

In total, 25.4% of the Basic Education schools in the total universe of public, federal, state, municipal, and private networks indicated "blended only" as the strategy used in 2021, while "presential only" was 8%, "presential and blended" 4.1%, "presential and remote" 14.3%, "presential, blended and remote" 19.6%, "blended and remote" 11.2%, and "remote only" 17.4% (which adds up to 100% of the universe of 162). 818 schools that participated in the 2021 school census) (BRASIL, 2021).

Graph 2. Percentage of schools (Basic Education) according to the teaching mediation strategy adopted, by school network, during the 2021 school year - Brazil 2021



Source: Inep/School Census 2021.

It can be seen that there is a confusion of nomenclature that does not help to interpret the strategies used in the period in question. For example, it is not clear what is meant by the term blended. What is the concept of blended that would distinguish it from presential and remote?

We think it is fundamental to dissociate BE from a simplified, decontextualized project of education and training, reduced to a more intense use of DT. Therefore, it is considered necessary to recover the sense of the complexity of the processes of teaching and learning in digital culture, taking into account the interactions and mediations that constitute them, to denote what education implies: a project whose horizon is emancipation and understanding of socially established relations.

The proposal is to conceptualize BE based on the assumption of a culture marked by the production of content and the networked circulation of information and knowledge, so that the emergence of new educational and training practices would be coherent, updating the pedagogical practices of digital culture, relating them to the collaborative and interactive demands of contemporary society. This contextualization with the present would highlight the "provisional syntheses that are organized in the teaching process" (FRANCO, 2015, p. 545, translated by us), respecting collective deliberations and negotiations in which all subjects involved in the educational process have a voice.

We agree with Menegotto (2006) when he states that these pedagogical practices are expected to be based on humanist epistemological conceptions, especially interactionist and constructivist ones. Therefore, the "blended" in the field of education can, if not should, be seen as something that is constituted by integrated dynamics of elements seen in continuum (sequential and uninterrupted), of didactic-pedagogical planning, to promote the institutionalized educational process, permeated by the purpose for which it is intended: in our conception, emancipation, democracy and socially referenced quality.

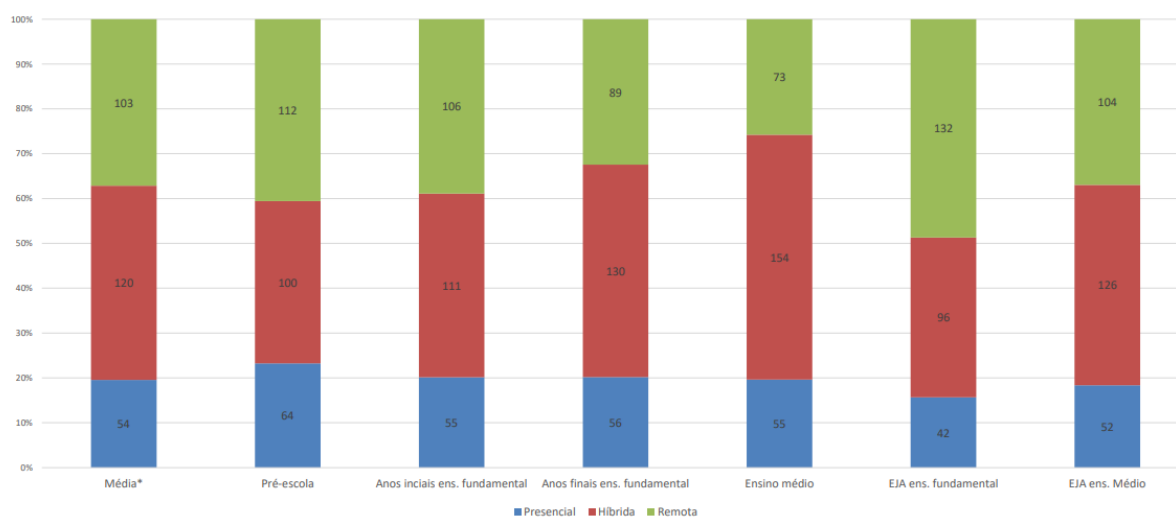
Among the key elements, we highlight virtuality and the use of online space as an integral part of educational processes. From this perspective, BE is understood not only as the mere incorporation of DT into the classroom but as a model for organizing the teaching-learning process that includes online, offline, and presential strategies and methodologies. This approach allows the simultaneity of spaces occupied by subjects and the diversification of the same time spaces, mobilizing DT in harmony with Digital Culture.

In this way, BE seeks a flexible use, not prescribed for specific moments or spaces, but guided by the objectives of the desired training, prioritizing collaborative and interactive interactions, fundamental characteristics in the educational practices of Digital Culture.

We also agree that constituting a BE means considering the relationships and interactions between practices and participants in the educational process, so that DT would no longer be just resources to support education, but part of the school culture, being present as an approach in both the process and practice of teaching and learning, thus breaking down "boundaries not only of time and space but also of forms and methods of teaching and the concept of learning, which is now extended to different experiences that students have inside or outside the educational environment" (LIMA; RODRIGUES; CRUZ, 2021, p. 65, translated by us).

On the other hand, the term remote comes from an attempt to designate the emergency strategies adopted during the period when presential activities were suspended, so it was called ERE. But again we see (Graph 3) that the idea of presential, remote, and blended mediation persists, without a definition of what would characterize the blended, which once again appears with the longest average time, established in days, for all the stages of Basic Education: 100 days in Preschool, 111 in the first years of Primary School, 130 in the last years of Primary School, 154 in High School, 96 in the Youth and Adult Education (EJA) stage of Primary School and 126 in the EJA stage of High School (BRASIL, 2021).

Graph 3. Average time (in days) in which presential, remote and blended mediation were adopted by schools, by grade level, in the 2021 school year - all networks - Brazil 2021



Source: Inep/School Census 2021; **Note:** * Simple average of results from all stages of education.

Catanante, Dantas and Campos (2020) provide data on the use of DT in the context of the pandemic, with a survey conducted in a public school of primary II and secondary education, with 481 students, in the municipality of Miracatu/SP, located in a peripheral area. A closed-ended questionnaire was administered to each student's parent or guardian when they came to the school to pick up the printed materials provided for study during the pandemic, to analyze the reasons for the low incidence of access to virtual classes or non-presential activities. The focus was on one of the classes, 8th grade B of Cycle II Elementary School.

The same authors reported that of the 36 students in the 8th B class, 16 participated actively, 11 participated partially, and 9 did not participate at all. Together with the management team, Catanante, Dantas and Campos (2020) studied the reasons or hypotheses for absenteeism, which were as follows: lack of equipment and Internet access; having a cell phone but no Internet access and a broken cell phone.

Also in the study by Catanante, Dantas and Campos (2020, p. 985, translated by us), there is an interesting fact about the use of WhatsApp, which was pointed out as one of the most recurrent resources mobilized during the pandemic period in 2021 (Graph 3): "a family requested a printed activity for their child, despite having equipment and Internet access, because they couldn't get him to focus on the activities guided by WhatsApp. The school provided the printed material".

In terms of the digital platforms or resources used, we see that messaging apps were predominant in the schools that participated in the 2021 School Census, both in the state (97.1%) and

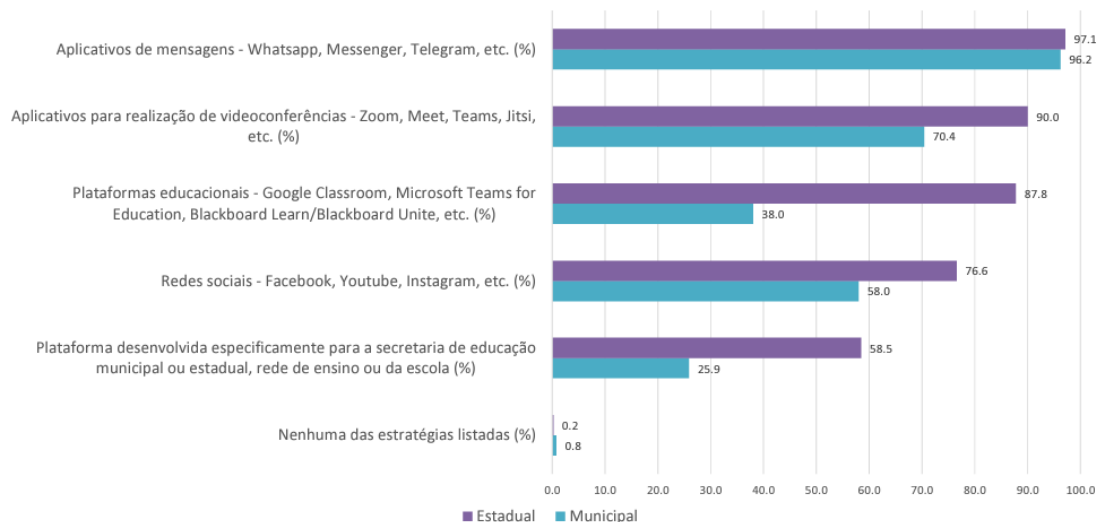
municipal (96.2%) networks (Graph 4). WhatsApp appears, along with Messenger, Telegram, and others, as the most used tools (in the sense of the 2021 School Census document itself) in Brazilian schools. Next, we note the great recurrence of the use of videoconferencing applications, such as Zoom, Meet, Teams, Jitsi, among others, 90% in public schools and 70.4% in municipal schools. Educational platforms appear in 87.8% of state schools and 38% of local schools. There is also a significant use of social networks, 76.6% in public schools and 58% in municipal schools (BRASIL, 2021).

It is worth approaching the adoption of what are called platforms/tools from the critical point of view of the relationship between DT and marketing aspects, and therefore economic issues, returning to the notion of the education business, described as a field of lucrative power. It cannot be denied that there are large market conglomerates that have lent themselves to meeting the needs of a society for which social distancing has been recommended, but not without the interest of offering services a posteriori and loyalty that underlie the cultural model of the present.

Regarding the development of a customized platform for the respective departments of education, educational networks, or specific schools, 58.5% of the schools indicated that this occurred in the state network and 25.9% in the municipal network (BRASIL, 2021). While none of the strategies listed was the response of 0.2% of schools in the state network and 0.8% of schools in the municipal network.

Graph 4. Percentage of schools by digital platform/tool - Brazil 2021

Percentual de escolas por **plataforma/ferramenta** digital utilizada nas atividades desenvolvidas pela internet
- Brasil 2021.



Source: Inep/School Census 2021.

We consider the analysis of the document produced by Inep to be relevant, especially concerning the year 2021. We conclude that there is a need for: conceptual debates and in-depth academic studies on hybridity in education, the notion of presentness, and the recovery of the meaning of distance. We cannot understand a strategy that calls itself blended and presential. What notion of BE does it contain? What about presentiality? Furthermore, it seems appropriate to deepen the strategies mobilized in terms of how they extend beyond the pandemic period, bearing in mind that "technology itself is becoming increasingly invisible as it becomes an integral part of the fabric of our existence" (GERE, 2008, p. 224, translated by us).

2. 4 Blended Education: some necessary considerations

Given the (mis)understandings on the part of the official documents themselves about the use of important terms in the 2021 School Census without further reflection, without a deeper conceptual understanding that allows, for example, the combination of "blended and remote" and "blended and presential", it is worthwhile in this item to point out some necessary and important questions about BE, as described in the perspective presented in the previous point, it is not limited to the inclusion of DT in the teaching-learning process, but must also be understood as a more comprehensive organizational model that integrates online, offline and presential strategies and methodologies to



create a more dynamic, adaptable and connected learning environment.

The concept of blended education, in addition to considering the combination of presental and online moments, breaks the boundaries not only of time and space but also of forms and methods of teaching and the concept of learning, which is now extended to the various experiences that students have inside or outside the educational environment (LIMA; RODRIGUES; CRUZ, 2021, p. 64, translated by us).

In this context, BE allows those involved in the educational process to occupy simultaneous spaces, which means that students can be involved in both presentially and online activities at the same time. In addition, it seeks to diversify time spaces, that is, it doesn't restrict learning to specific times or places but allows it to take place more flexibly, adapted to students' needs. Looking at blended, Moran (2015) states that education has a history of combining spaces, activities, methodologies, etc., which has been broadened and deepened with the connectivity and mobility of DT.

The integration of DT is fundamental in this sense, promoting and providing resources that can enhance learning opportunities and enrich didactic-pedagogical practices. This is due to the collaborative and interactive interactions themselves, in other words, BE aligned with educational objectives can promote active student participation, encouraging knowledge sharing, collaboration, autonomy, and engagement with content in a more meaningful way.

Therefore, BE goes beyond the mere incorporation of DT in the teaching-learning process, in the same way, that it extrapolates this idea of sometimes presentially and sometimes not, it represents a change in the way the teaching-learning process is organized, valuing flexibility, collaboration and interaction, and harmoniously integrating the opportunities offered by DT and DC in the education of students (the understanding of BE is based on part of the work carried out by the Quality and Regulation Research Network in the context of Open, Flexible or Distance Education - Brazil - International).

3 LESSONS LEARNED AND OTHERS TO COME

When we look at post-pandemic education, we have the opportunity to (re)think and (re)organize the didactic-pedagogical practices already in place, as well as to take a critical look at the conceptual confusion between what is remote, blended and

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presential (including the reference to the combination of presential and blended as a mediation strategy, without conceptually distinguishing what it is), to incorporate the lessons learned during the crisis, and to explore new possibilities to promote a more inclusive, adaptive and student-centered education. In this sense, it is essential to consider the impact of the pandemic and work to overcome inequalities and ensure that all students have access to quality educational opportunities.

As we have seen, during the pandemic, it was not only the lack of vaccines that affected the Brazilian population but also the lack of Internet access for the same population, especially children and adolescents in public education, who suffered and were victims of the neglect and abandonment of governments for what would be the minimum: providing schools with daytime and efficient access so that students and teachers could do their work. This is a fundamental lesson for us to think about and propose experiments that strengthen and encourage the use of DT in educational processes. The lack of access to the necessary conditions for DT to support educational practices will only increase the inequality gap in our country. Therefore, the slogan "Quality Internet for Brazilian Public Schools" is central to and in the construction of new pedagogical practices mediated by them.

In this sense, it is essential to recognize that DT should not be seen as a single or definitive solution, but as a complementary and empowering tool for the teaching-learning process, which must be carefully planned, taking into account the specific needs and realities of each educational context. This implies considering public policies that bring together funding for this purpose, as well as issues of access and adequate training for educators to use it effectively.

In line with learning objectives, DT can be seen as a facilitating resource that broadens horizons, promotes collaboration, enriches learning experiences and prepares students for a constantly changing society. In this sense, the results show that there is still a task for educational researchers in the fight for an inclusive society, also in the technological dimension, which has a democratic meaning in the context of Digital Culture.

On the other hand, it would be promising if we could get researchers and governments to listen sensitively to teachers, students, and their families about the challenges of the ERE, but recovering the experiences and work done in and by schools and those who kept them "open" during this period would be an important step toward recognizing how much they produced. Recognition, listening, and collaboration seem to be relevant ways of dealing with a future that takes place every day in school spaces, for better or for worse. Likewise, a public policy that is disconnected from the desires of those who carry out Brazilian public education (students and teachers) will further weaken the relationship between school and society. More than ever, DT is implicated in the ways of acting and feeling and

in DC. To separate public schools from this context would be to condemn them to social and cultural apartheid, implying a reductionism about learning, which is always imbued with the cultures and environments we experience.

Returning to the idea that pain does not mean bitterness, we note that Prado (1993) invites us to look at the complex and painful situation and extract a learning interface. The reference to his slender angel, one of those who announce good news, leads us to conclude that there are possibilities to find in the deconstruction and burning pain of the losses, isolation, crying, despair and unpreparedness of the pandemic period, the power of DT as a way to build the inclusive and democratic society and education that we want to see.

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