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Information and Communication Technologies in the Curriculum of Basic Education in Brazil: Conceptions and Reality

Renata Luiza da Costa, Cláudia Helena dos Santos Araújo, Victor Freitas de Azeredo Barros, Alcides Hermes Thereza Júnior, Lorenna Silva Oliveira Costa

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Renata Luiza da Costa
Federal Institute of Goiás, Inhumas, Goiás, Brazil. renata.costa@ifg.edu.br
ORCID: https://orcid.org/0000-0002-2638-6314

Cláudia Helena dos Santos Araújo
Federal Institute of Goiás, Anápolis, Goiás, Brazil. helena.claudia@ifg.edu.br
ORCID: https://orcid.org/0000-0003-2453-4456

Victor Freitas de Azeredo Barros
University of Minho, Largo do Paço, Braga, Portugal. vfbarros@dsi.uminho.pt
ORCID: https://orcid.org/0000-0002-7318-8257

Alcides Hermes Thereza Júnior
State Univesity of Goiás, Inhumas, Goiás, Brazil. alcides.junior@ueg.br
ORCID: https://orcid.org/0000-0001-6628-2686

Lorenna Silva Oliveira Costa
Federal Institute of Goiás, Inhumas, Goiás, Brazil. lorenna.silva@ifg.edu.br
ORCID: https://orcid.org/0000-0002-1825-9606

ABSTRACT

The recommendation for the integration of Information and Communication Technologies (ICT) for Basic Education, in Brazil, has become more forceful with each curricular reform, under the justification that it is very relevant knowledge for actively participating in the 21st Century. With the Covid-19 pandemic in 2020, there was a significant stimulus to the uses of these technologies to support different forms of education, commonly called emergency remote education. Within this scenario, this article aims to discuss the conceptions of technology in the basic education curriculum and the real conditions of access to ICT. So that, literature review and documentary research were carried out. The document outlining the National Common Curricular Base (BNCC) of Brazilian education together with data from the Brazilian Internet Steering Committee census regarding access to ICT in schools and homes were analyzed. It has been noticed that research carried out in public schools over the last 8 years, already denounced the lack of investment in technology and in teacher training for the use of ICT in these schools. In other words, the exposure caused by the pandemic only led to broader public knowledge of what was already the precarious reality in Brazilian public schools. The theoretical conception that prevails in BNCC is not of integral formation, but instrumental. Although national curriculum recommendations increasingly encourage the use of ICT in school spaces, the reality exposes that investments in human and technological resources are not compatible even for limited instrumental teaching, even with the social pertinence of the theme.

Keywords:

Basic Education, Curriculum, Information and Communication Technology, ICT, BNCC.

AS TECNOLOGIAS DE INFORMAÇÃO E COMUNICAÇÃO NO CURRÍCULO DA EDUCAÇÃO BÁSICA NO BRASIL

RESUMO

A recomendação para a integração das Tecnologias da Informação e Comunicação (TIC) na Educação Básica, no Brasil, ganha força a cada reforma curricular, sob a justificativa de que é um conhecimento muito relevante para uma participação ativa no século XXI. Com a pandemia Covid-19 em 2020, houve um estímulo significativo ao uso dessas tecnologias para apoiar diferentes formas de educação, comumente chamadas de educação remota de emergência. Nesse cenário, este artigo tem como objetivo discutir as concepções de tecnologia no currículo da educação básica e as reais condições de acesso às TIC. Para tanto, foram realizadas revisão de literatura e pesquisa documental. Foi analisado o documento que traça a Base Curricular Comum Nacional (BNCC) da educação brasileira juntamente com os dados do censo do Comitê Gestor da Internet no Brasil sobre o acesso às TIC nas escolas e residências. Percebe-se que pesquisas realizadas em escolas públicas, nos últimos 8 anos, já denunciam a falta de investimento em tecnologia e na formação de professores para o uso das TIC nessas escolas. Ou seja, a exposição provocada pela pandemia só permitiu um conhecimento mais amplo do público sobre o que já era uma realidade precária nas escolas públicas brasileiras. A concepção teórica que prevalece no BNCC não é de formação integral, mas instrumental. Embora as recomendações curriculares nacionais incentivem cada vez mais o uso das TIC nos espaços escolares, a realidade expõe que os investimentos em recursos humanos e tecnológicos não são compatíveis nem mesmo para o ensino instrumental limitado, mesmo com a pertinência social do tema.
Palavras-chave: Educação Básica, Currículo, Tecnologia da informação e Comunicação, ICT, BNCC.

TECNOLOGÍAS DE LA INFORMACIÓN Y LA COMUNICACIÓN EN EL CURRÍCULO DE LA EDUCACIÓN BÁSICA EN BRASIL

RESUMEN

La recomendación para la integración de las Tecnologías de la Información y la Comunicación (TIC) para la Educación Básica, en Brasil, se ha vuelto más contundente con cada reforma curricular, bajo la justificación de que es un conocimiento muy relevante para participar activamente en el siglo XXI. Con la pandemia de Covid-19 en 2020, hubo un estímulo significativo para el uso de estas tecnologías para apoyar diferentes formas de educación, comúnmente llamada educación remota de emergencia. Dentro de este escenario, este artículo tiene como objetivo discutir las concepciones de tecnología en el currículo de educación básica y las condiciones reales de acceso a las TIC. Para ello, se llevó a cabo una revisión de la literatura y una investigación documental. Se analizó el documento que describe la Base Curricular Común Nacional (BNCC) de la educación brasileña junto con los datos del censo del Comité Directivo de Internet de Brasil sobre el acceso a las TIC en escuelas y hogares. Se ha notado que las investigaciones realizadas en las escuelas públicas durante los últimos 8 años, ya denunciaban la falta de inversión en tecnología y en la formación de docentes para el uso de las TIC en estas escuelas. En otras palabras, la exposición causada por la pandemia solo llevó a un mayor conocimiento público de lo que ya era la precaria realidad de las escuelas públicas brasileñas. La concepción teórica que prevalece en BNCC no es de formación integral, sino instrumental. Si bien las

recomendaciones curriculares nacionales fomentan cada vez más el uso de las TIC en los espacios escolares, la realidad expone que las inversiones en recursos humanos y tecnológicos no son compatibles incluso para una enseñanza instrumental limitada, incluso con la pertinencia social de la temática. **Palavras-clave:** Educación básica, Plan de estudios, Tecnología de la información y la comunicación, TIC, BNCC.

1. INTRODUCTION

The expansion of Information and Communication Technologies (ICT)[i] throughout different professional areas, leisure and public services, triggers the need for computer knowledge among different professionals and citizens. However, this need for technical knowledge is not a requirement only for those who make up the specific professional circle of Informatics. Not having an e-mail and not knowing how to use it, for example, can mean not using many public services. This example is minimal, because, in reality, citizens' need for IT knowledge goes way beyond their need for effective social participation.

Our current society is highly digitized, in terms of services, production and products. It is a Society of Networks, about which Castells (2000) explains that it becomes difficult to participate in actively and avail of what it offers, if one does not know about or is unable to deal with the digital culture.

As ICT is an important part of today's culture, it is relevant to economic and social objectives, in general, which reminds us of its importance for the broad formation of contemporary citizens, for their own benefit and for social transformation.

This reality justifies the inclusion of ICT teaching in the current basic education curriculum. On the other hand, unavoidably, it generates the need to think about how to use ICT pedagogically in school in a manner corresponding to the integral training of students, which includes planning the physical and human necessities involved.

Based on the above, this article discusses the recommendations on the use of ICT contained in the document of the National Common Curricular Base (BNCC) in Brazil and data on the reality of access and knowledge of ICT by the Brazilian population.

2. THEORETICAL REFERENCE

Technologies, in general, tend to be understood only partially in terms of what is known about them. The most publicized aspect of technological development is that of the positivity of the product and the beneficial solutions that it brings apart from its dialectical nature, that is, there is no exposure to the socio-historical relations between humanity and nature, which hinders deeper and more concrete analyzes.

Feenberg (2003) explains that, in modern society, technology is advancing as something that is free from previous values, and so, serves as a means to achieve human goals. For this author, this is an instrumental conception of technology, as it reduces it to the dimension of just a tool under human control. In this perspective, for example, bombs would not be intended to destroy, because that would be a human decision.

Another very common conception of technology, more associated with postmodernism, is the deterministic-technological one. According to this interpretation, technology is not only understood as neutral, but also as something that "controls humans, that is, it shapes society to the demands of efficiency and progress" (Feenberg, 2003, p. 7). Here we see statements that technologies solve all kinds of problems, without considering their socio-historical roots.

Feenberg (2003) states that there is still a substantive conception of technology that, despite understanding it as a determinant of social directions, assumes that it has intrinsic values, and it is not up to human beings to modify its purposes.

Searching for a more complete analysis of the relationship between technology and human beings, Feenberg (2003) explains that technologies need to be endorsed by more democratic and participative processes that contemplate them as cultural artefacts, that is, with their socio-historical relational aspects, so that their use is controlled by the collective, but based on the knowledge of its benefits and dangers.

Both the instrumental and the deterministic view, in placing technology as neutral, ignore its intrinsic, cultural and social values, blaming isolated human actions. While the instrumental view adopts only the dimension of a tool for technologies, the determinist one posits them as a solution to several social problems that have their origin outside technological development.

In Brazil, the pedagogical discourse based on technology is predominantly instrumental and deterministic (Peixoto & Araújo, 2012). In this line, the instrumental vision of ICT in education is understood only as a didactic resource, under the command of human action. Deterministic philosophy, on the other hand, believes in technological supremacy, placing it as the salvation of educational problems. According to these two trends, when things are not going well in school education, it is either because the teacher does not know how to use technologies or because the school has not adopted them in a structural way, which would transform education. These perspectives, in addition to blaming only a human dimension, do not take into account the social issues of students and their families, frees public authorities from the responsibility of their roles and do not seek to explain the reasons for the choices made in schools.

Considering the objectives of Brazilian education, the function of the school is the integral development of students, not being restricted to skills for the labor market, as this restriction compromises "its role in relation to its priority purposes of teaching content and promoting the development of the students´ intellectual skills" (Libâneo, 2016b, p. 48) to survive in their society.

For intellectual development, the technical teaching of sciences as historically constructed by humanity is necessary, since it is from the domain of their logical thinking that each one can reason within different life situations.

Formal instruction that is taught at school must be oriented towards intellectual development, which occurs through scientific thinking:

> Formal instruction, which radically alters the nature of cognitive activity, greatly facilitates the transition from practical operations to theoretical operations. […] The

> significance of schooling is not only in the acquisition of new knowledge, but also in the creation of new reasons and formal modes of verbal, discursive and logical thinking divorced from immediate practical experience. (Luria, 2008, p. 133; 178).

In this sense, the instrumental and deterministic perspectives of technology will guide this same type of practice, which does not match the school purposes of intellectual and integral emancipation. Such perspectives emphasize only the face of technology as a tool at the service of humanity, regardless of other aspects. In the case of education, teaching how to operate tools is not bad, but it is insufficient for educational objectives, as it remains in use only at this level and does not advance to concepts, that is, to explanations and understanding socio-historical relationships. Furthermore, teaching restricted to the operational tends to remain part of fixed everyday knowledge.

Basic common knowledge is essential to trigger and develop scientific knowledge, that is, it has its relevance, but the school should not be restricted by it. The school exists to teach us what is not taught on a daily basis. Being stuck using only everyday knowledge does not raise the capacities of thinking, because, for that to happen, an understanding of the concept of things is necessary, to develop dialectical thinking from an early age. For example, there are many who know how to make bread, but not everyone knows how to explain the physical-chemical processes that take place for bread to become bread; and only those who know how to explain the reasons have mastery of the subject, being able to use this knowledge to analyze and recreate.

> The need to formulate dialectical thinking at all stages of education is a necessity. [...] Theoretical thinking does not arise or develop in people's daily lives; it develops only in response to instruction, where programs are based on the dialectical understanding of thought. It is precisely this teaching that has a developmental character. (Davydov, 1999, p. 5; 7).

Operational and everyday use only, as they are not explanatory and relational in their entirety, do little to contribute to knowledge that can support critical and creative thoughts. They are more about executing and fulfilling tasks rather than concerned about their explanation, so they do not contribute to broad intellectual development.

As for ICT, for example, many people use cell phones daily. However, most of them, if asked to open their e-mail on a computer, do not know how, because they do not know

what a browser, website or e-mail is, they do not know if they have a password, etc. These tools are used as applications on cell phones that are regularly open, and don´t require much knowledge for daily use. Knowledge of everyday use does not mean dominance to the point that the person knows how to use it in his / her favor in other situations (Souza et al., 2020; Peixoto, 2010) where they may require a little more knowledge, for example, in professional situations or to resolve academic issues.

The belief that the possession of digital equipment alone automatically leads to complete knowledge is a fallacy, since research (Peixoto & Araújo, 2012; Luria, 2008; Davydov, 1999) shows that knowledge depends, among other conditions, on receiving formal instruction, having concrete favorable teaching conditions, psycho-emotional conditions, etc., in addition to access to equipment. On the part of teachers, access to equipment and the internet alone are also not enough for them to be able to make pedagogical use of ICT in an integrated manner in their area of specialization, as they also need to acquire the necessary knowledge.

3. CONTEXTUALIZATION

With the transformation of the productive processes of today's society, many professional activities and services for citizens have been converted to digital models, which requires a minimal knowledge of IT. In the public sector at the federal level, in Brazil alone, according to the Digital Government Secretariat at the Ministry of the Economy, the digitization of services has already reached 54% of the public services offered to the population before the pandemic. By the end of 2020, the federal government had made more than 60% of its services available digitally, with the goal of reaching 100% by the end of 2022 (Brasil, 2020).

This movement towards high digitalization has been occurring more sharply in Brazil since the end of the 1990s. We are aware that this is not a natural course of events, but rather, the result of political-economic choices reflecting the Brazilian attitude to be part of a

globalized world (Enders, 2004; Akkari, 2011). These steps were further accelerated with the onset of social distancing triggered by the Covid-19 pandemic, resulting in the crisis dovetailing with a government project already underway.

Incentives for the implementation of the Digital Government project and other ICT integrations in public services are part of recommendations by international multilateral organizations (World Bank, World Trade Organization - WTO, Organization for Economic Cooperation and Development - OECD, etc.), especially of economic interest, but contrasts with the financing offered to Brazil (Libâneo, 2016a; Freitas, 2011; Evangelista, 2013).

In spite of the advantages of flexible services for the population via ICT, in fact, what motivates this race are economic and control interests between developed and developing countries. The commercialization of ICT and its services is hidden behind citizenship discourses. Brenda et al. (2018, p. 5) explain that "citizenship has been subject to deep forms of marketization. The right to have rights is therefore conditional on the market and sharply graded around organized and organizable capacities, resources, interests, etc.". These are other reasons why the intensity of the recommendations and implementations of the use of ICT in different services should be critically evaluated, since, on the one hand, they may impact on less investments for the government, but on the other hand, this may mean more exclusion and a lower quality of services that require human resources, such as education, for example.

In the case of Education, the process of digitalization has also followed the economic line, trying to invest less and less in teacher training and in the formation of society in general, and increasingly in technologies that control the management of public departments and replicate didactic content without spending on human resources (Libâneo, 2016a; Freitas, 2011; Evangelista, 2013). On the quality of learning, the substitution of teachers for digital didactic resources feeds a process of reproduction of the current system, which serves the dominant elites, as the insufficient pedagogical quality significantly weakens the quality of learning, failing to achieve even technical objectives of training (Costa & Libâneo, 2018; Nascimento et al., 2020).

Despite these motivations, in the face of this highly digitalized scenario that has a tendency to increase, instead of denying it, we need to be concerned about offering quality access and training to the population. Also in terms of ICT, permitting that citizens are emancipated and can use these services, as well as achieving a level of employability and, in general, remain participative in this society.

IBGE surveys (2018) show that 33% of the Brazilian population is somehow digitally excluded. It may seem like a good result if we consider that, in 2009, it was practically the opposite: only 39% of the population accessed the Internet. However, when we look closely at the current data, it is observed that 50% of the Brazilian population of classes D and E still do not have access to the Internet; while more than 90% of classes A and B have such access (CGI.br, 2019a). These figures show that, fundamentally, the digital divide is not the result of an age group that has or has not had contact with ICT since childhood. Despite some advantage of the so-called digital natives, digital exclusion has more to do with the opportunities for access to digital devices, as well as with their learning opportunities (Conceição, 2019; Krug et al., 2018).

Digital exclusion can be treated, in general, in two aspects, in which one compounds the other: exclusion of access to equipment and the Internet; and exclusion from digital knowledge. In any case, the digital exclusion indexes are more linked to the socioeconomic issues of each citizen, that is, to the socioeconomic inequalities historically continued in Brazil, which precede the existence of this intense digital world of today.

According to the research, ICT Education 2018 (CGI.br, 2019b), young people's ability to use the Internet is closely linked to self-taught experiences. According to the study, 80% of students in public and private schools in the country learned to use the Internet by themselves, which indicates learning more focused on basic common knowledge. Later, in the same research, it is noted that "the available evidence points to the continuity of inequalities between schools, both in terms of the use of technologies and in the conditions of access of the population to education in general". (CGI.br, 2019b, p. 116).

Every Brazilian citizen in training has the right to technical-scientific knowledge developed by humanity throughout its history. Thus, with regard to the appropriation of knowledge of digital technologies, it cannot be different:

> An omission by educators in relation to the social demands posed by the new paradigm of the productive process would tend to be detrimental to the interests of the excluded social sectors. The resistance to a widespread diffusion of new information and communication technologies, in public schools under the argument that they are inserted in the logic of the market and cultural globalization, would have the effect of more exclusion and more social selectivity. This is due to their non-integration with the teaching practices and would impede opportunities for students to receive and divulge information, leaving them unattended in the face of the onslaught of cultural and political manipulation [...] It is not fair, therefore, that alongside the intensification of the production and dissemination of information, a large contingent of the population should be excluded as a result of this process. (Libâneo, 2011, p. 61).

Knowing that more than 81% of Brazilian students in basic education attend public schools, be they municipal, state or federal (INEP, 2019), it is relevant that the teaching of ICT is part of the school curriculum at this educational level in Brazil and should also be taught in public schools, the principal space for formation for most Brazilians.

4. RESEARCH METHODOLOGY

In pursuit of the goals established, we have been guided by the historical-dialectical materialist method (MHD) to carry out bibliographic and documentary research.

Cury (1986, p. 27) explains that contradiction is a basic category of MHD dialectics. Contradiction is the "[...] internal motor of development, it reflects the most original movement of the real". The search for contradictions, whether in documents or empirical manifestations, aims to highlight the historicity and complexity of social relations, which helps to demystify deterministic positions.

As for the analysis of documents, it is noteworthy that

> Documents disseminate statements about the world in which we live that both intend to offer unique representations of reality and bring idealized solutions to diagnosed problems. It should be noted that any discourse, by emphasizing certain objects and certain concepts, omits others [...] this distorted discourse can help dominant groups, but it is doubtful whether these benefits will be shared by those who do not belong to these groups. (Ball, 1994 apud Shiroma et al., 2005, p. 439).

From the perspective of finding contradictions between idealized solutions and reality, the Internet Steering Committee in Brazil (CGI.br, 2018a, 2018b, 2019a, 2019b) collected the BNCC data on Brazilians' access to ICTs for 2018 and 2019. The results of these documentary analyzes are discussed in categories A and B for the next section.

5. RESULTS AND DISCUSSION

The analyzes were organized into three categories: a) Conceptions that guide Brazilian ICT recommendations in basic education; b) The Brazilian reality regarding access to computer and internet equipment; c) The population's knowledge of DICT.

A) Conceptions that guide Brazilian ICT recommendations in basic education:

In the first documents with curricular guidelines, at national level, in Brazil (Brasil, 1997; 1998), instrumental and deterministic trends of understanding of technology were already appearing (Costa, 2020). Such documents guided Brazilian basic education until 2017, when the final version of the National Common Curricular Base (BNCC) was published (Brasil, 2017), and is a document currently in force.

In the BNCC, the focus is on digital information and communication technologies (DICT), and according to goal 5 is recommended as a structuring goal, (Brasil, 2017, p. 9), at all levels of basic education and, later, in all specific areas. Thus, the transversality of DICT in the document creates possibilities for its permeability at all levels and areas of knowledge, becoming one of the pillars of the Brazilian school curriculum.

In another section, it states that digital culture is responsible for significant social changes, without considering political-economic choices, assuming it as a natural and not a social process. Therefore, the adoption of DICT is regarded only as a beneficial tool, something more linked to the consumption and the preparation of human labor for work than the development of critical and creative thinking:

> It must also be considered that digital culture has promoted significant social changes in contemporary societies. As a result of the advancement and multiplication of information and communication technologies and the growing access to them due to the greater availability of computers, cell phones, tablets and the like, students are dynamically inserted into this culture, and not only as consumers. (BNCC, 2017, p. 61).

The lack of criticism in the document stands out, by affirming digital culture as a determinant and assuming the population as digitally included. This uncritical assumption of technologies is explained by the adopted views of deterministic and instrumental philosophies that, on the one hand, regard technologies as a sure solution to problems and, on the other hand, transfer responsibility to those who will or will not use them (Feenberg, 2003), without any questions about the abilities they have for this.

It is not part of developing critical thinking, but the use of DICT at school is assumed and encouraged in a vacuum unaccompanied by supporting data and evidence of context viability. Consequently, it views them as another teaching resource that will be used, according to how the teacher chooses. Further on in the document, the BNCC reaffirms that the practices of digital culture must be prioritized because the quality of learning is dependent on it:

> Thus, work proposals that enhance students' access to knowledge about the digital world and the practices of digital culture should also be prioritized, as they directly or indirectly impact their daily lives in the various fields of social action and arouse their interest in and their identification with DICT. Its use at school not only allows *for greater technical and critical appropriation of these resources, but also determines meaningful and autonomous learning by students*. (BNCC, 2017, p. 487 - emphasis added).

The implicit understanding of learning and the development of autonomy regarded as dependent on DICT demonstrates the deterministic orientation of the document in question. It is understood that the use of DICT alone does not enable the development of critical and reflective capacities, and is not even a condition for meaningful learning. As researchers into intellectual development explain, (Davydov, 1999; Luria, 2008; Libâneo, 2011), meaningful learning for the student depends on teaching that involves logical-investigative procedures for each science, which means that the pedagogical approach, oriented by the teacher, is

what impels the student for learning and, later, for development. Long before DICT existed, teachers had already developed this type of teaching.

It is one thing to recognize DICT as part of the developed human culture. Another thing is to propose them as unique solutions to social problems arising from socio-historical choices, as if technological artefacts could solve any of these problems and, even more, as if the relationship with them only produced good results.

The emphasis placed on the BNCC is to provide service to the labor market:

> It is necessary to guarantee sufficient learning for young people to work in a society in constant change, to prepare them for professions that do not yet exist, to use technologies that have not yet been invented and to solve problems that we do not yet know. Certainly, most future professions will involve, directly or indirectly, computing and digital technologies. (BNCC, 2017, p. 473).

The relationship between an instrumental curriculum, deterministic-technological orientations and the emphasis on the labor market reveal that economic interests predominate in the document in question. Hence, there is no need for emancipatory proposals. Boom (2004, p. 220 apud Libâneo, 2016b, p. 46) writes "despite the fact that this new strategy is expressed in terms of humanitarian goals and the preservation of freedom, it seeks a new form of control over nations and their resources".

In several other excerpts, the defense of teaching only how to use the tools at the expense of critical and creative teaching is clear. In this way, the intention of the document in question is evident in favoring an operational teaching of DICT and is superficial with regard to intellectual development.

B) The Brazilian reality regarding access to computer and internet equipment:

In order to ensure the integration of DICT into the teaching-learning processes, which are also the basis of the current distance education processes, it is necessary to consider, at least, the issues of equipment and internet ownership, at school and at home. The issue of having sufficient knowledge to handle study tasks in addition to readings and videos, that is, thinking about the production of activities in digital mode, as well as the ability to share them is also something important to be considered. In this way, the student, in fact, can continue

the study process wherever he is, including completing homework assignments. There are other dimensions such as emotional, family and financial aspects that deeply affect a student's studies, which demonstrates that the flexibility of the integration of DICT, even when it culminates in possibilities for distance study, does not guarantee academic success (Costa & Santos, 2017; Costa et al., 2020). However, here in this text focus will be maintained on such aspects as the physical conditions of possession and acquiring knowledge of technology, both in public spaces and homes, to construct satisfactory situations for education and study with and via DICT.

Research data from the Internet Steering Committee in Brazil in 2019 showed that 64% of Brazilian public schools have computer labs and 57% have access to the Internet (CGI.br, 2019b). However, this access has been limited to the administrative sectors of the schools and many laboratories have been abandoned due to the lack of investments in technical maintenance and adequate human resources. Thus, the devices and internet access that exist in schools are not available to students in more than 70% of the schools that have them. Only 34% of public schools were able to update their equipment in the period from 2015 to 2018 (CGI.br, 2018a, 2018b, 2019b), as they do not receive regular investments to keep computer labs, mobile devices and even the Internet functioning.

It was also noted that in 26% of urban schools there is no computer available for students to carry out any type of consultation and only 14% of the public use some virtual teaching-learning environment even on an infrequent basis. As for rural schools, 40% of them have only one computer, 52% of teachers say they use cell phones for activities and 65% of managers use personal cell phones for administrative activities.

This data shows that the physical and technological inadequacies of both urban and rural schools (which are even worse) cannot sustain the pedagogical integration of DICT. In spite of the fact that data shows that 64% of urban public schools have computer labs, it must be made clear that they are spaces that do not accommodate an entire class of 30 students, for example. Most of these laboratories (78%) have less than six computers and

only 9% have slightly more than 21 computers (CGI.br, 2018b, 2019b). Most classes starting the second phase of elementary school in Brazil have more than 35 students.

As for other public spaces that could serve the population with access to computers and the internet, significant investments were made, especially between 2002 and 2012 (Bueno, 2017). However, in recent years, only 45% of them remain in operation and conditions are insufficient, just as in schools (CGI.br, 2018b, 2019b). These public spaces include libraries and technology centers, also known as the Educational Technology Center (NTE). For some years these were spaces open to the public where the population could attend, free of charge, to do research on the internet. They could also avail of such services as generate a copy of their personal public accounts (utilities) to be paid, enrollment for public services and tenders and digital services in general. In addition, basic computer courses were offered to the community and to teachers (Bueno, 2017). This type of location, although not the main one for a student, served as a support and complement for them and indeed for the entire population.

With regard to access at home, despite the research showing interesting quantitative data such as, for example, that 67% of the Brazilian population over 10 years old have internet and more than 95% have cell phones (CGI.br, 2018a, 2019a), an analysis of this data is needed to identify the bottlenecks and show how much investment is still needed in this area for the lower classes, especially if they require digital environments to participate in distance activities. Of the internet that appears in households, 56% is via cell phone and only 28% of these homes have some streaming service (Idem). This means that access is limited and shared between the family, both from the point of view of capacity and equipment, because cell phones are not sufficient for the purposes of study.

When doing an analysis by social class, it is observed that only 37% of the total Brazilian households have a computer and Internet together. Thus, classes D and E are dependent on Wi-Fi and cell phones, which results in a lower average daily use.

Ownership of computers in Brazilian households reached 56% in the years prior to 2016 but is currently below 40% in the homes of public school students (CGI.br, 2018,

2019a). It is observed that, from 2011 to 2019, the increased possibility to own cell phones implied the abandonment of having computers. This is possibly due to the need to choose between one and the other, and the cell phone is preferred due to the lower price, its communicative functions and its easier mobility. Thus, it is noted that the use of the Internet has only increased via cell phones, as the number of computers per household, public telecenters and computer labs active in schools has decreased.

On average, 70% of the population has access to the Internet, but more than 90% is via cell phone (CGI.br, 2019a). On the one hand, cell phone access helps because it increases the chance of accessing the Internet, but on the other hand, it can indicate both loss of purchasing power and little knowledge about computer uses, and / or difficulty in purchasing computers and contracting better internet services. The cell phone is also associated with faster, everyday operational uses, which does not always indicate the mastery of academic and professional knowledge of these tools. For the purposes of longer studies, for example, reading and tasks requiring digital production, the most suitable devices are computers.

C) What the population knows of DICT:

As for knowledge about DICT, it is worth stating that the lack of this knowledge affects the general population, including teachers and students. When analyzing classes A and B, it is observed that, at least 90% of people have a working knowledge of IT (CGI.br, 2019a). However, among the lower classes, this is not true, as this type of education does not yet exist in the public school, where most of them study or studied. Neither are they able to pursue private courses due to financial and working conditions. When questioned, about the reason they do not know basic informatics, people from classes D and E stated that it is due to the costs involved (CGI.br, 2019a, 2018a).

In general, 56% of internet users regularly request a service. Among these services, there are requests for transportation (32%), movie-streaming services (28%), requests for delivery of meals (12%), and paid courses (6%), among others.

As for teachers, 56% say they know how to manipulate files / folders and 29% know how to create files for a slide show (CGI.br, 2019b). Note that they are simple activities but yet, the number of teachers who can master them remains low. Only 34% of teachers over 30 years of age participated in continuing education, 54% of teachers up to 30 years of age took some discipline on ICT during their college education years and 70% of teachers use DICT only for their pedagogical and academic planning.

In addition to the data from CGI.br, the bibliographic survey carried out regarding teacher training in DICT allowed us to verify that, at the level of initial teacher training, there has been little curricular change, even though ICT has been recommended as part of the official Brazilian curriculum since the mid-1990s (Gatti & Barreto, 2009; Lopes & Furkotter, 2016; Dorneles, 2012; Santos, 2009; Marinho, 2008).

Lopes and Furkotter (2016) explain that, in most college degree courses, the most common scenario is of an almost total absence of subjects that address the possibilities of using ICT in the teaching-learning process. When these themes are mentioned in the curricula of undergraduate courses, they are usually technically focused and isolated from other disciplines.

As for the continuing education of teachers, Marinho (2008) demonstrated that, although some government programs were widely available, the outreach was low and, in fact, it was initial training for most teachers, although what was needed was to update their initial training and plan more consolidated ongoing training.

Another important fact regarding the human resources that would make the pedagogical use of DICT feasible, is the regular presence of a multidisciplinary team, composed of at least, a computer technician and a pedagogical facilitator. The former of these professionals was a reality from 2006 to 2013 in the State of Goiás and it varied across Brazil. In essence, their role was to assist teachers in computer labs, mainly with the pedagogical aspect of ICT integration and disciplinary knowledge (Bueno, 2017; Brito, 2008). In most schools, the facilitator was a teacher, and could be from any area. It was a multitasking profile, but in some municipalities, he may have been a computer technician.

The variety of functions exercised by this individual meant that a focus on the pedagogical function was not always possible, which was further impaired when the professional did not have a teaching background.

The presence of a motivating individual in the laboratories, in a way, generated security for the teacher regarding the technical environment of the laboratory and its possible complications, in addition to supporting the development of content, the selection of tools, etc. The role of this professional should have been more directed to the pedagogical area and not exclude the presence of a technician in the school, since the latter is technical support and the former should be specialized support in the pedagogical use of DICT. Currently, the presence of this motivator is almost non-existent in public schools (Brito, 2008). There is also no computer technician per school.

In view of the analyzed data, it appears that access to ICT in Brazil, despite having evolved quantitatively via cell phone, has decreased qualitatively, because access to the computer devices that enable more elaborate studies and professional activities has decreased sharply, as well as access to it through schools and other public spaces, as shown earlier. Access to academic and professional knowledge about ICT has evolved very little for teachers, as shown by the research of the aforementioned bibliographic review.

As for the general population, access to knowledge in DICT has not evolved as it remains outside the formal instruction in public schools with their lack of technological and human resources, and so are, justifiably, unable to implement it. The social classes that most need this learning at school, classes D and E are the poorest and if they want to learn basic computing, they need to pay for this training in other private spaces, as the public telecenters are also in precarious situations as described above. This situation means they only have a very basic routine knowledge of these tools, if even this.

More than 90% of the use of DICT by Brazilians is related to everyday uses, usually restricted to communication by instant messages and posting on social networks (CGI.br, 2019a). This of course is linked to the use of cell phones, and as such does not guarantee sufficient technical understanding for the intellectual and integral development of individuals.

It is essential not to take access to cell phones as an indication of growth and evolution in the mastering of IT, much less considering the type of knowledge we have about their functions.

Returning to Davydov (1999), basic IT knowledge is not enough for the superior development of individuals. Thus, having a cell phone, even a robust one, but not knowing how to use it or its technical potential, indicates a false evolution in terms of digital inclusion rates and in terms of technical knowledge and access to IT.

6. FINAL REMARKS

Given the scenario we have outlined, it can be said that this reality of insufficient technological infrastructure in public schools and in households corroborates the idea that neither one nor the other are prepared for a curriculum that requires the use of digital equipment and technical knowledge. Added to this difficulty is the insufficient training of teachers to ensure the development of their area of specialization in conjunction with DICT in curriculum development.

Considering that this reality preceded the pandemic period, this explains the wide and deep difficulties faced by school teams, parents and students in making adaptations for emergency remote education in such a short period. For this reason, before encouraging and allowing the continuation of different models of distance education, it is essential that the public authorities assume their responsibility to regularly renew and maintain an adequate technological infrastructure in schools and focused teacher training. Brenda et al. (2018, p. 5) state that "the state has retreated from the social commons, only appearing to aid the grip of privatization and speculation.". They should also initiate projects to promote this enhanced usage of IT in households where there are students. It is not enough to put it on the national curriculum, the State needs to provide the population with the proper means.

The BNCC reflects a belief that these technologies are the determinants of and savers of Brazilian educational problems. But what should be incorporated and integrated as increased knowledge historically produced by humanity, comes rather with its own interests,

intensely influenced by market interests, in a way that is out of context of the Brazilian socio-economic reality. Its recommendations are, fundamentally, focused on providing teaching tools, which really should only constitute part of the knowledge to be imparted to students in ICT. It does not mention how and when investments will be made in the technological infrastructure of schools, nor in the training of teachers to work with digital technologies at the expected intensity and, does not guarantee internet access in homes.

Although the BNCC's guidance on DICT is not critical and emancipatory, we understand that its absence in schools only denies its materiality in today's real concrete society, which also fuels the *status quo* of the dominant classes. By denying the integration of ICT in school processes, under the discourse that not everyone has the capacity to access them, it neither protects those who do not have access, nor fights for improvements in conditions that need to change to stop feeding the system that excludes them. Furthermore, by not integrating ICT in school processes, the opportunity to do so from a critical perspective is lost, and ensures continued space for instrumental and deterministic interpretations to consolidate, more and more.

The necessary conditions are insufficient, both in public schools and in households in classes D and E, which are those who attend this type of school. Most Brazilian public schools do not have human or technological resources to support the development of teaching permeated by ICT, either in person or at a distance. In reality, what can be done, and has been done even during the pandemic period, amounts only to the delivery of materials sent by different messaging applications. Then, students do the tasks and return them using the same devices. There has been no distance education, as it is not possible under these conditions. Thus, the discourse of flexibility and advantages of distance studies, of using devices in general, has been used to convince people, but, in practice, there has been no online education guided by interaction and integral training, as shown by authors (Costa & Libâneo, 2018), since before the pandemic.

Investments in technological infrastructure in schools, in incentives for students to acquire equipment and the internet, and in training teachers to use ICT are not proportional

to the recurring insistence that ICT and hybrid teaching methods should be used in Brazil. The government invests in the digitalization of its services, but it does not invest in infrastructure or in developing and disseminating knowledge in people so that in fact they can participate in these services. The government is absent from investments related to the population and focuses on digitalization that will bring savings to public spending.

The BNCC, on the one hand, deals with the use of ICT removed from the Brazilian school and home reality. On the other hand, it institutionalizes the public interest and creates a legal mechanism that can trigger investments and other corresponding changes so that its established objectives are achieved. Thus, it is essential to seek from public agencies the requirements for investment in schools, teacher training and specific access packages to be made available to the homes of students in public schools.

In addition to school environments, the government needs to ensure quality access to computers and the internet, as school life continues at home with tasks and projects that often require Internet research and online collaborative work. Otherwise, they will just continue to renew their old correspondence education into digital correspondence education.

The necessary inclusion of ICT in education cannot be denied due to its cultural role in today's society. Instead, it is more relevant to include them using critical pedagogical approaches that consider their socio-historical and cultural aspects for broad human development. Otherwise, it contributes, on the one hand, to the digital exclusion cycle for low-income populations especially, and, on the other hand, it maintains the space already well occupied by instrumental and deterministic pedagogical approaches, contributing to the consolidation of these approaches. Instead of denying the integration of DICT in schools, which continues to exclude people and generates even more exclusion, it is necessary to strive for conditions of excellence in public schools, as well as appropriate human resources in order to qualify teaching.

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Authors' contribution statement

Conceptualization, R. L. C., C. H. dos S. A., and L. S. O. C.;

Methodology, R. L. C., C. H. dos S. A., A. H. T. J., and L. S. O. C.;

Data curation, R. L. C.;

Formal analysis, R. L. C. and A. H. T. J.;

Writing—original draft preparation, V. F. A. de B., R. L. C., and A. H. T. J.;

Review and editing, R. L. C., C. H. dos S. A., and A. H. T. J.;

Supervision, V. F. A. de B.;

Project administration, R. L. C., and L. S. O. C.;

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Conflict of interest statement

The authors declare that there is no conflict of interest.

i In this text, although the Brazilian national curriculum uses the term Digital Information and Communication Technologies (DICT) more, we use the term Information and Communication Technologies (ICT) more because it includes DICT and meets the general concept of what we are dealing with, in addition to be a better known term. In some specific moments of reference only to digital technologies, we use DICT.

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