

TECHNOLOGIES IN EDUCATION AND THEIR TRANSFORMATIONS: A LOOK FROM THE CONCEPT OF CULTURAL CAPITAL

TECNOLOGIAS NA EDUCAÇÃO E AS TRANSFORMAÇÕES: UM OLHAR A PARTIR DO CONCEITO DE CAPITAL CULTURAL

LAS TECNOLOGÍAS EN EDUCACIÓN Y SUS TRANSFORMACIONES: UNA MIRADA DESDE EL CONCEPTO DE CAPITAL CULTURAL

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ABSTRACT: This article aims to analyze aspects of the history of technologies inserted in education, aiming at educational development, under the light of Pierre Bourdieu's concept of “cultural capital”, considering part of the socio-historical process, changes and their uses in contemporary education that occurred in line with a new culture, since the school is not a neutral institution. We understand the socio-educational changes associated with a broader context. And the school is also transformed insofar as it includes in its curriculum and practices the use of communication and information technologies. We start from the problem related to the historical process of insertion of digital technologies in basic education and how can they lead to the development of the teaching and learning process? It will be a bibliographical research, taking into account the theoretical assumptions defended by: Bourdieu (2004); Saviani (1991); Kenski (2012) and Duarte (2008). The research showed that there were teachers who did not give the necessary attention, being reluctant to insert the TDIC in their classes. Others went in search of information and training so that they could teach classes in a virtual way, adding a new cultural capital to their practice.

KEYWORDS: History. Technology. Education. Cultural capital.

RESUMO: *Este artigo tem como objetivo analisar aspectos da história das tecnologias inseridas na educação, visando o desenvolvimento educacional, sob a luz do conceito de “capital cultural”, de Pierre Bourdieu, considerando parte do processo sócio-histórico as mudanças e usos delas na educação contemporânea que ocorreram em consonância com uma nova cultura, uma vez que a escola não é uma instituição neutra. Compreendemos as mudanças socioeducacionais associadas a um contexto mais amplo. E a escola também se transforma na medida em que inclui em seu currículo e nas práticas o uso das Tecnologias Digitais de Informação e Comunicação (TDIC). Partimos da problemática relacionada ao processo histórico da inserção das tecnologias digitais na Educação Básica e como podem acarretar no desenvolvimento do processo de ensino e aprendizagem? Será uma pesquisa bibliográfica, levando em consideração os pressupostos teóricos defendidos por: Bourdieu*

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(2004), Saviani (1991), Kenski (2012) e Duarte (2008). A pesquisa evidenciou que houve professores que não deram a atenção necessária, relutando em inserir as TDIC em suas aulas. Outros foram em busca de informações e capacitação para que pudessem ministrar aulas de forma virtual, agregando um novo capital cultural à sua prática.

PALAVRAS-CHAVE: História. Tecnologia. Educação. Capital cultural.

RESUMEN: Este artículo tiene como objetivo analizar aspectos de la historia de las tecnologías incluidas en la educación, con miras al desarrollo educativo, a la luz del concepto de “capital cultural” de Pierre Bourdieu, considerando parte del proceso sociohistórico, sus cambios y usos en la educación ocurridos en consonancia con una nueva cultura, ya que la escuela no es una institución neutral. Entendemos los cambios socioeducativos asociados a un contexto más amplio. Y la escuela también se transforma en la medida en que incluye en su plan de estudios y practica el uso de las tecnologías de la información y la comunicación. Partimos del tema relacionado con el proceso histórico de inserción de las tecnologías digitales en la educación básica y ¿cómo pueden conducir al desarrollo del proceso de enseñanza y aprendizaje? Será una investigación bibliográfica, teniendo en cuenta los supuestos teóricos defendidos por: Bourdieu (2004); Saviani (1991); Kenski (2012) y Duarte (2008). La investigación mostró que había docentes que no prestaban la atención necesaria, mostrándose reacios a insertar las TDIC en sus clases. Otros fueron en busca de información y capacitación para poder impartir clases de manera virtual, sumando un nuevo capital cultural a su práctica.

PALABRAS CLAVE: Historia. Tecnología. Educación. Capital cultural.

Introduction

Digital Information and Communication Technologies (DICT) in the classroom are increasingly necessary resources. Ensuring this access is fundamental, as knowledge is one of the basic social rights. The use of technology in the educational environment is a reason to reflect on the planning and methodologies employed by teachers, since we are in a globalized society, called the Knowledge Society, but, as Duarte (2008) states, a society permeated by illusion.

The so-called knowledge society is an ideology produced by capitalism; it is a phenomenon in the field of ideological reproduction of capitalism. Thus, to talk about some illusions of the knowledge society it is first necessary to explain that this society is itself an illusion that fulfills a certain ideological function in contemporary capitalist society (DUARTE, 2008, p. 13, our translation).

Knowledge and culture are immaterial capitals. In this sense, the article in question aims to analyze aspects of the history of technologies inserted in education, aiming at educational development, in the light of the concept of cultural capital, coined by Bourdieu

(2004). Cultural capital is personal, but it is also collective and inherited from the generations that preceded us. It is something that has been produced and is part of life, as a result of historically produced knowledge. A new perspective of teaching and learning, with the use of educational technologies, is linked to this idea of cultural capital, through the possession and mastery of technology and knowledge.

Bourdieu (2004) also presents the concept of habitus. This habitus goes beyond the unconscious and is present in the way a person lives, that is, it focuses on human action, for a social practice. It acts as a spring that needs an external action, that is, it cannot be seen in an isolated way, away from the specific societies or places where it is produced. It is associated with a context of changes in the ways of life, of production and socialization of knowledge.

The effectiveness of the ICTs with their recent and current use in education has increased due to the pandemic caused by the new Coronavirus, COVID-19, whose effects are still being felt, as it continues with variants of the virus. Through the new technological tools education continued to happen, in a reworked form, in an emergency context. However, this sudden search for the insertion of a virtual planning and methodology in education made more visible the great difference that exists in the conditions of access to knowledge. Many students didn't have access to the internet, or didn't have technological tools, or their families couldn't deal with software because they didn't have digital literacy.

This is a bibliographical research, taking into consideration the theoretical assumptions advocated by Bourdieu (2004), when relating the use of technologies in the classroom and the concept of "cultural capital"; Saviani (1991), when conceptualizing the nature and specificity of education; Newton Duarte (2008), who helps us to critically understand the term "Knowledge Society", as well as, along with the precepts advocated by Kenski (2012), the idea of technologies in the historical process. In the context of the pandemic, technologies were fundamental for students to continue having contact with school, friends and with school contents. We will look at this movement from Soares and Colares (2020), among others who analyze the relationship between education, information and communication technologies.

From this point of view, the article will be developed, first, with a historical retrospective about the technologies in education, as a social-historical and cultural process, having as a guiding element the idea of cultural capital, as a product of humanity and of each individual. Next, we will address the representations of the school and the teacher in relation to digital technologies in contemporary education.

The Technologies in Brazilian Education: Historical Process

In a society that is constantly changing, education is an increasingly intricate process, in which learning and teaching challenge us every day. Education today presents the models of face-to-face, semi-attendance, and distance learning, the latter allowing the student not to be physically in a formal teaching and learning environment.

According to Kenski (2012), the term technology comes from the Greek. It is formed by the word *techné*, which means to know how to do, and *logia*, from the Greek *logos* which means reason, so we can say that technology is the reason for knowing how to do. As Kenski explains (2012, p. 18, our translation):

Ao conjunto de conhecimentos e princípios científicos que se aplicam ao planejamento, à construção e à utilização de um equipamento em um determinado tipo de atividade nós chamamos de tecnologia. Para construir qualquer equipamento - seja uma caneta esferográfica ou um computador -, os homens precisam pesquisar, planejar e criar tecnologias.

Currently, there is an indiscriminate use of the term, thus creating different meanings that lead to other paths, as Pinto illustrates (2005, p. 219, our translation):

According to the first etymological meaning, technology has to be the theory, the science, the study, the discussion of technique encompassing in this last notion the arts, the skills of doing, the professions and, in general, the ways of producing something [...]. In the second meaning, technology is purely and simply equivalent to technique [...]. Closely linked to the previous meaning, we find the concept of technology understood as the set of all techniques available to a given society, at any historical stage of its development [...]. Finally, we find the fourth meaning of the word technology, the one that for us will have capital importance, the ideologization of technique [...].

The term educational technology cannot be confused with digital technology, that is, we cannot overlap one concept with the other. Sancho-Gil (2018, p. 611, our translation) points out that making this overlap may cause a reductionism.

From this perspective, superimposing educational technology over ICTs brings with it a reductionism that can mean "the loss of historical perspective. The history of ET has shown how each technological development - from books to movies, through radio, video, and the Internet - was celebrated, in its time, as the panacea of education. [...].

When we approach the subject of technology, it is valid to go back a little in the history of human society. From ancient times until the present day, we know that humanity has produced great and determining discoveries, which have led to physical changes, the formation of affective bonds, and socialization. These were possible due to the ability to learn

and use the accumulated knowledge. According to Brito and Purificação (2012, p. 20, our translation),

O ser humano, ao longo do seu desenvolvimento, produz conhecimento e o sistematiza, modificando e alterando aquilo que é necessário à sua sobrevivência. Suas ações não somente biologicamente determinadas - dão-se também pela apropriação das experiências e dos conhecimentos produzidos e transmitidos de geração a geração. O conhecimento humano nas suas diferentes formas - senso comum, científico, filosófico, estético, etc. - está entrelaçado numa rede de concepções de mundo e de vida.

These characteristics differentiate human beings from other animals, being able to think, to learn, to develop their capacities and, mainly, to transmit what they have learned to their descendants, besides making new discoveries. Human beings have the ability to constantly change, transforming the world and the society in which they live. According to Pinto (2014, p. 14, our translation),

This is a basic element of differentiation of humans from the other animal species on Earth: the ability to discover new things and to transmit these discoveries to other members of the species, who can learn from the experience of others, incorporate this knowledge into their own, and make new discoveries. Thus, the human species came to be able to change itself and the world around it like no other.

We can observe, therefore, that writing, a new way for humans to communicate, was not invented by just one person, but was the creative result of an entire society, which improved this technology over time, as explained by Pinto (2014, p. 19-20, our translation):

[...] This new communication technology, writing, was not invented by one individual or even a small group of individuals. It was the creative result of many people who, over hundreds or even thousands of years, slowly improved upon the existing forms of writing. There was a support technology (clay tablets), writing tools (reed styluses) and a set of well-defined rules to guide the writing and reading process, all of which were continuously being improved. But all this was not enough to ensure that writing would be perpetuated: there had to be social conditions necessary for its advancement. First, the society in which writing appeared needed to see some use for its use and, second, this society had to be able to sustain expert scribes to maintain and perfect writing.

Writing was one of the great elements of social and cultural transformation. Davis' (1990, p. 184, our translation) research on the impact of the printed word among French workers in the 16th century reveals aspects of the dissemination of the printed word among workers and the transformations it operates in this context.

On the whole, it seems to me that the first 125 years of the printed word in France, with the small changes they brought about in rural areas, strengthened rather than undermined the vitality of the menu people culture in the cities. That is, they brought contributions both to its realism and to the richness of its dreams, both to its self-respect and its ability to criticize itself and others.

The press, in that period, represented a new technology that brought systematized knowledge to the workers, through the printed word. Davis emphasizes, that "[...] they were not passive receivers (nor passive beneficiaries, or victims,) of a new kind of communication." (DAVIS, 1990, p. 194, our translation). Those who had access to books interpreted what they "read and heard," resulting in an improvement of these materials, as well as strengthening the organization of society and people. In other words,

Protestantism and certain characteristics of humanism converged with the printed word, to contest traditional hierarchical values and to postpone the establishment of rigid new ones. The economic control of publishing was not concentrated in the firms of the great merchant-publishers, but was shared by a diversity of producers (DAVIS, 1990, p. 185, our translation).

With the printing press and literacy, knowledge became popular, accessible to social classes that until then had been excluded from systematized knowledge and that were possible through writing. Orality prevailed. This transformation, which can be considered as technological, was fundamental for the speed in the socialization of ideas and conceptions of the world, as explained by Bourdieu, we have the expansion of cultural capital. Pies (2011) states that the expansion of cultural capital is directly linked to social capital, that is, social capital is a resource linked to the individual, the group, or the institution that keeps them together, and can increase social relations and expand the recognition of different cultures.

One of the ways of disseminating systematized knowledge, associated with the linear idea of progress, was public schooling. In Brazil, the organization and dissemination of public elementary schools was great, especially in the beginning of the 20th century, with the industrialization. It is in this context that we approach the idea of educational technology, which according to Tajra (2012, p. 48, our translation) is not something future, but part of social change.

[...]educational technology is related to the old instruments used in the teaching-learning process. The chalk, the blackboard, the overhead projector, the video, the television, the printed newspaper, a stereo, a tape and video recorder, the radio, the book, and the computer are all instrumental component elements of educational technology.

Science and technology are related, especially when referring to the development of society and education. As Kuhn (1998) explains, these changes are not only caused by discoveries, but have a broader context that involves society and the emergence of new theories. We can state that there is an accumulated cultural capital that allows these changes, but many times the new technological apparatuses are not accessible to everyone. Thus,

Desde a década de 1950, teóricos chamam a atenção para a caracterização da sociedade pela tecnificação crescente nos mais variados setores sociais. Já havia preocupações no sentido de que os meios de comunicação constituíam uma escola paralela onde as crianças e os adultos estariam encantados e atraídos em conhecer conteúdos diferentes da escola convencional. (DORIGONI; SILVA, 2007, p. 6, our translation).

Thus, technologies begin to influence the way of perceiving the world, of transforming it and expressing oneself in it, a "Cultural Industry" begins, that is, there is the interest of keeping the man as a consumer. However, Duarte (2008, p. 27, our translation) points out that:

I must emphasize that the appropriation of a natural object by human beings, which transforms this object into a human instrument, can never take place independently of the original objective conditions of this object, even if these undergo enormous qualitative transformations as a result of human activity, generating phenomena unprecedented in natural history. The object, therefore, is not totally subtracted from its natural logic, but it is inserted in the logic of social practice. Human beings do not create human reality without appropriating natural reality. It happens that this appropriation is not accomplished without human activity, both that of using the object as a means to achieve a conscious purpose, and also, and mainly, as an activity of transforming the object so that it can serve more adequately the new functions it will fulfill, when inserted in social activity.

Such considerations lead us to reflect on the use of technologies in the educational environment, considering the cultural and social capital for the use of these technologies in the classroom, refuting, many times, the terminologies employed, such as "Knowledge Society".

Digital technologies at school

The role of Digital Information and Communication Technologies (DICT), in the educational field, is linked to multiple factors, and among them, the teacher training has great prominence, because teachers act for the dissemination of knowledge and the intellectual, social and affective development of the individual. If the computer can be a tool to help this development, the teacher must be aware of how to use it with competence and efficiency, in

order to enable the development of cooperative learning projects. In order for this to really happen, we are studying how the teacher's training should be, and its results.

Educational models need to be updated and innovated in order to continue performing their functions in society, as we can see in the Law of Directives and Bases for National Education (LDBEN), Law no. 9.394/96 (BRAZIL, 1996), in which education must keep up with social transformations. In the respective document, we note that the use of technologies in the classroom is paramount to the development of the teaching and learning process.

Digital technologies in school environments allow new opportunities to be built, respecting individual differences and conditions. Schools are responsible for encouraging the use of new communication technologies and having a transformation process in such a way that the teacher's performance can be compatible with the new needs. However, we know that, according to Duarte (2008), this is an illusion, because schools do not have the physical and structural conditions to effectively put into practice the use of digital technologies.

The student's logical reasoning also changes with the use of technologies. It is part of several activities, as Pierre Lévy (1993, p. 79, our translation) asserts:

The teacher becomes the reference point to guide his students in the individualized process of knowledge acquisition and, at the same time, offers opportunities for the development of the collective construction of knowledge through corporate learning.

The teacher's work must follow the direction of encouraging learning and thinking, so that Lévy's statement becomes true it is also necessary to make the student aware of a critical reflection of what is being researched. The access to information and the speed with which it is propagated, making everything easily accessible can also hinder. It is necessary to have a good critical sense, since the internet takes us to an incredible world of knowledge at the same speed that it also takes us to the world of contents not linked to the school process.

But the presence of digital technology in education does not guarantee an increase in the quality of education, since the technological advance into the classroom can disguise traditional teaching. Even with the forced insertion of remote teaching in education, due to the COVID-19 Pandemic, there is no clear change in the use of digital technologies, only the use of an apparatus for the development of a remote class.

This is because we carry cultural heritages. Although we have changes in the organization of the school and in the conception of the teaching and learning process, there are, on the other hand, permanences. As Santinello (2013, p. 44, our translation) points out, the teacher needs to be digitally literate "[...] enhancing the creation and recreation of content,

so that each one can appropriate the information contained specifically in virtual space (named as: Cyberspace - Internet)". Considering the specifics of research and historical time, in the early twenty-first century, Moran (2003, p. 12, our translation) warned about the role of technology in the classroom:

The conception of teaching and learning is revealed in classroom practice and in the way teachers and students use the technological resources available. The presence of technological resources in the classroom does not guarantee changes in the way teaching and learning take place. Technology should serve to enrich the educational environment, enabling the construction of knowledge through an active, critical and creative performance by students and teachers.

The primary function of the school is the critical formation of the students. Saviani (1991, p. 25, our translation) warned that "[...] the classic in school is the transmission-assimilation of systematized knowledge. This is the end to be achieved. It is there that the natural source is to be found to elaborate the methods and the forms of organization of the set of school activities [...]". The student, through learning, acts freely from his knowledge and "[...] at that very moment he stops being a learner", states Saviani (1991, p. 27, our translation). Therefore, considering the specificities of research, it is up to the teacher to teach him/her to access and make use of the information that is available in his/her environment, that is, it is not thinking about what the computer will do for us, but what we will be able to do with it aiming at quality in teaching and, mainly, the contribution of these technological apparatuses in the critical formation of our students.

The New Information and Communication Technologies (DICT) did not come to take the place of teachers. We search Saviani (1991, p. 30, our translation) for arguments that refer to education and the specificities of pedagogical studies, which should be organized based on "[...] natural and cultural elements necessary for the constitution of humanity in each human being and the discovery of appropriate forms to achieve this goal.

The creation of learning environments needs to take into account the nature of education. From a critical perspective, even with the use of ICT resources, the use of the computer provides an opportunity for a new worldview for both the student and the teacher. In this way, we again seek support from Saviani (1991, p. 29-30, our translation), who explains what is essential in this non-material work that pertains to education:

[...]the understanding of the nature of education as a non-material work whose product is not separated from the act of production allows us to situate the specificity of education as referred to knowledge, ideas, concepts, values, attitudes, habits, symbols under the aspect of elements necessary to

the formation of humanity in each singular individual, in the form of a second nature [...].

When we associate the pedagogical practices with the use of technology, it represents a new possibility for the teacher to organize the teaching and learning processes, in which the student becomes more critical, knowing his reality and exploring solutions to problems and study situations. It is a new way of building knowledge, in which a new element is introduced at school, as a way of disseminating knowledge.

However, we cannot lose sight of the great diversity of socioeconomic conditions of the Brazilian population. While some have full access to technology, others do not. This reality has become even more evident in the current context, when schools have been forced to work remotely with students, due to social withdrawal as a way to prevent the contagion of COVID-19.

We point out, however, that coping with this pandemic, with education remotely, was possible because of the Internet. However, as we have already explored, this resource is not yet a reality for everyone. As per Ferrari (2018, p. 379, our translation):

The Internet has significantly changed the culture, the way people live, and the way they do business. It has also had a significant impact on education. A first example of how the Internet has impacted education is the new way of accessing information - for possible knowledge construction in formal or non-formal contexts. Via the Internet, we have access, for example, to countless books (e-books), databases of scientific articles, and various types of information (scientific or otherwise) on a wide variety of subjects. In different ways and through multiple devices, the internet has also been used as a means of interaction between students and teachers [...].

The Internet, in the educational field, transforms knowledge and even enables an interactive learning environment. But the teaching and learning process is related to a set of conditions that exist within the school routine and in society. The school has a mediating character within society, as Saviani (1991) points out, and the teachers' actions take place in this mediating space permeated by cultures.

Technology in the teaching and learning process will enable communication between teachers and students in an alternative, original and creative way, as Kenski (2012, p. 93, our translation) states, "the technological evolution redesigns the classroom into a new virtual learning environment. And the Internet in the classroom will enable an improvement in the student's writing and reading, because according to Lévy (1993, p. 55, our translation):

[...]the texts on the Internet are presented in the form of a chain of information, with a free sequence for the user (or learner) connected in a

creative way by means of links. These texts can be modified, expanded and reconstructed through research in different areas of knowledge, found in the "virtual world", breaking with the hierarchical form of the traditional school structure.

Although new possibilities present themselves, the essence of school and education does not change with the use of technologies. It is up to the teacher to understand what are the possibilities of its use in the educational context, to seek appropriate conditions for the effective development of the teaching and learning process in a dynamic way, to mediate work, to instigate the investigative power of his students. Each teacher must have the perception to integrate technology within their methodological procedures.

As far as pedagogical and material conditions exist, the relationship of the teacher and the students with the technologies in the classroom tends to reorganize itself. This process can be understood based on Bourdieu (2004), for whom the subject is formed by its social origin or socially incorporated provisions throughout life, i.e., he has a habitus that is directly linked to certain cultural capitals, i.e., economic, symbolic, cultural, social.

For Moran (2003, p. 38, our translation):

It is important to always connect teaching with the student's life. Reach the student by all possible means: by experience, by image, by sound, by representation (role-plays, simulations), by multimedia, by online and offline interaction.

The teacher needs to be open to these innovations and changes in education, and the one who evolves together has greater sensitivity to the need for this modernization and human transformation.

Under this view, schools must act in accordance with the technological advances of modernity, they should not remain stagnant in time and consider the only technology the blackboard and the chalk, that is, for this work to materialize satisfactorily, all those involved in the process of teaching and learning must improve and know the technologies that can be used in the classroom as a tool to facilitate the learning of our students. However, we know that many public schools are not able to keep up with these technological advances, resulting in a digital exclusion, due to financial, structural, and public policy issues focused on this cultural capital.

In this view, the school needs to adapt, to reorganize its environments, the traditional classroom needs to be remodeled, because it is the place for the organization of didactic procedures, where students will be instrumented and motivated to research and only then return to the exchange of experiences, the contextualization of learning, and that this

preparation happens outside of it, with daily situations, that is, the classrooms to be more comfortable and adapted to the new resources should provide access to videos, DVD, internet and websites. In accordance with the words of Duarte (2008), this would be another society of illusions, all these changes, when considering the reality of our public schools, is utopian, an illusion.

Besides restructured classrooms, the teacher's use of virtual environments is another important point for an increase in quality, starting with visits to computer labs and research orientations so that students can meet information and learn to distinguish those relevant to their knowledge. We have to take them to navigate against technology, getting to know virtual platforms such as forums, chats, and, in this way, the student will become familiar with the options that the internet has in its favor when it comes to the teaching and learning process. And according to the school planning, to make available resources such as digital whiteboards, mixed reality, creation of motivating environments with media that provide the student with the opportunity to learn with more quality. However, we know that this is the ideal reality, but, as explained by Duarte (2008), it is far from the reality that we experience in public school, where access to these technological devices does not exist or is very precarious.

There are many paths to a transformation in education, but the teacher needs to understand how its use will bring to the classroom a favorable environment for reflective learning processes, and that the Internet is an example of an accessible possibility that can transform teaching, provided it is used in a consistent and coherent way. Another issue that must be taken into account is the reality of the public school, which needs public policies aimed at the insertion of digital technologies in the classroom and that this becomes effective as cultural capital.

Final remarks

The general objective of this article was to analyze the history of technologies inserted in education, aiming at the educational development, under the light of Pierre Bourdieu's concept of cultural capital, considering part of the socio-historical process, the changes and uses of digital technologies in contemporary education that occurred in accordance with a new culture, since the school is not a neutral institution.

We know that this search for methodologies that incorporate the use of digital technologies in the classroom is not a new study; however, the search for training to work

with these technological devices in the classroom has led to a change in the habitus of these teachers and also of the students inserted in the contemporary educational context.

The discussions about the use of digital technologies in the classroom have been going on for a few years in our educational environment; however, many teachers did not give the necessary attention and, many times, refused to insert them in their classes. It was with the Pandemic, caused by the Coronavirus, that many teachers went in search of information and training, so that they could teach their classes in a virtual way, adding a new cultural capital to Brazilian education.

Thus, there was a need for technological devices for these classes to be transmitted, such as: smartphones, computers, notebooks, internet, and many students did not have these resources at their homes, resulting in a digital exclusion that had significant repercussions on the development of our students, even though different ways to work on the content were presented, the lack of teacher mediation was clear.

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