# A mosaic of ideas emerging from digital technologies in contemporary education

https://doi.org/10.56238/sevened2024.013-003

**Juvenicio Jesus dos Santos[1] and Eniel do Espirito Santo[2]**

**ABSTRACT**

The imperative of physical and social distancing, caused by the Covid-19 pandemic, has further highlighted the relevance of digital technologies in society. In this sense, this article aims to present a mosaic of ideas emerging from digital technologies for education in contemporary times, aiming to demonstrate the various possibilities of DICT for teaching, contributing to the promotion of a hybrid education. It is concluded that the DICT present numerous possibilities for carrying out hybrid teaching practices, allowing the DIY of audio, from the creation, mixing and remixing of the file; DIY in image and video, enables mass communication, through messenger applications, videoconferencing, through real-time communication, with several people at the same time, collaborative learning/online teaching, considering that the learning subjects already use DICT in their daily lives.

**Keywords:** Cyberculture, Digital culture, Digital interfaces, Digital Technologies.

[1] Master's degree in Science Education, Inclusion and Diversity from the Federal University of Reconcavo da Bahia (UFRB), 2024. Pedagogical Coordinator at the Bahia State Education Network. Researcher at the Research Group Training and Research in Teaching Practices (FIPE) Line - Digital Technologies in Education.
LATTES: http://lattes.cnpq.br/5250038462494455
ORCID: https://orcid.org/0000-0002-9579-4864
E-mail: Juveniciosantos@gmail.com

[2] Doctor in Education from the Universidad de La Empresa, UDE, Uruguay, 2008. Permanent professor of the master's/doctoral program of the Graduate Program in Interdisciplinary Studies on the University (PPGEISU), at the Federal University of Bahia (UFBA). Researcher at the Research Group Training and Research in Teaching Practices (FIPE) Line - Digital Technologies in Education.
LATTES: http://lattes.cnpq.br/6413416664003950
ORCID: https://orcid.org/0000-0003-0589-1298
E-mail: eniel@ufrb.edu.br

## INTRODUCTION

Given the potential of emerging digital technologies in the educational field, there is a need for educational institutions to resignify their pedagogical practices, bringing classes inspired by the principles of cyberculture, as proposed by Santos (2019), enabling young people to co-authorship in a network. As highlighted by Sales and Albuquerque (2020), learners use digital technologies on a daily basis to mediate their social relationships, as well as to construct knowledge, requiring educational institutions to promote pedagogical practices that allow the use of digital technologies in the construction of knowledge.

For Kenski (2009), digital technologies refer to electronic equipment that connects to the internet and enables network interaction and communication, encompassing computers, cell phones, *tablets* and many other devices. The author's definition of digital technologies is clear and comprehensive. For her, these technologies encompass a variety of electronic equipment. This broad understanding of digital technologies is critical to understanding their impact and potential in the various spheres of our lives, including education, work, and society as a whole.

Similarly, Valente (2013) points out that in addition to TDICs referring to electronic equipment that connects to the internet, they expand the possibilities of communicability of their users. The author's contribution adds an essential perspective on digital technologies. In addition to referring to electronic equipment connected to the internet, these technologies expand the possibilities of communication between users. This implies not only the exchange of information, but also the creation of meaningful connections and more dynamic interactions. This communicative dimension of TDICs is fundamental to understanding their impact on social relations, collaboration, and collective construction of knowledge.

In this sense, digital technologies present a mosaic of possibilities for subjects, being widely used, according to Sales and Albuquerque (2020), by learning subjects to communicate, interact in a network, create and share content. However, originally, most digital technologies are not developed for pedagogical purposes, requiring teachers to study their critical-reflective insertion in pedagogical planning, aiming at adapting and creating motivating and creative learning environments for students.

From this perspective, the context of the Covid-19 pandemic has made it possible for educational institutions to experiment, albeit forcefully, with the pedagogical use of digital technologies to mediate teaching. According to Santos, Santo and Souza (2022), the mandatory social physical distancing generated a process of compulsory migration from face-to-face to remote teaching, requiring teachers to use digital technologies as mediators in this process to ensure the continuity of the students' training path.

Focusing on digital technologies as facilitators of the educational process, the scope of this study aims to present a mosaic of ideas about how digital technologies enable teachers to develop classes inspired by the principles of digital culture, allowing students to build knowledge using the potential of digital technologies. For Nonato (2020, p. 537), talking about digital culture "[...] implies an understanding of the role of digital technologies in human action [...]" in contemporary society, "without thereby implying an alleged rupture of the purity of a fully human culture now invaded by technologies" (p. 537). Emphasizing that "every human culture contains and presupposes the technique and technology that man produces as a condition and unfolding of his existence in the world" (p. 537).

Thus, we understand that digital culture refers to the set of social relations that human beings establish in a network, mediated by digital interfaces connected to the world wide web. That is, from the use of digital interfaces that help in urban mobility to facilitate movement through cities; through *delivery* apps, delivering the subjects' orders at home; through the use of social networks for sharing, interaction and entertainment. In short, in the various ways that subjects use digital devices connected to the internet to relate to the world and build their knowledge autonomously in their daily lives.

Thus, this study aims to present a mosaic of emerging ideas of digital technologies for education in contemporary times, aiming to demonstrate the numerous possibilities of digital technologies for teaching, contributing to the promotion of a hybrid education. The chapter is structured in three moments, the first seeks to list some notes about the learning subjects in the context of digital culture, pointing out that young people use technologies on a daily basis to build their social relationships and produce knowledge.

The second discusses the emerging ideas of digital technologies, presenting a framework with some possibilities provided by digital technologies in educational environments, signaling the need to develop effective hybrid teaching practices, ending with some final considerations.

## LEARNERS IN THE CONTEXT OF DIGITAL CULTURE: SOME NOTES

The advent of the internet and the exponential development of Digital Technologies have significantly changed people's perception of the world, being incisively present in the daily lives of individuals. From this perspective, the pandemic context resulting from the Covid-19 pandemic threw teachers and students into virtual learning environments, according to Santo, Lima and Oliveira (2021), forcing school institutions to use digital technologies to carry out classes and continue the teaching process. This shift to virtual environments allowed teachers to develop or improve various digital skills, favoring the development of dynamic classes, mediated by digital technologies in the post-pandemic period.

Digital technologies connected to the internet allow for an infinity of possibilities, however, they import everyday social problems into the network, such as racism, xenophobia, false information, etc. This reinforces the need to promote anti-racist education, based on values and respect for diversity. For Palfrey and Gasser (2011), the internet is characterized as a market, bringing the logic of the fallacious meritocracy, providing little in terms of *online equality*. This context requires the promotion of a counter-hegemonic education, which enables the student to actively participate in the network, to raise the critical sense, detaching from the mere reproduction of knowledge.

Reducing the digital divide requires the performance of a cybersituated teacher (Santos, 2019), that is, it asks the teacher to make pedagogical use of digital interfaces in their praxis, forming critical and reflective students (Freire, 2001). The pandemic context revealed digitally excluded teachers and students who had difficulties to keep up with the remote teaching process, bringing the need for a debate on the digital inclusion of teachers and students. However, this context also revealed teachers who engaged in the process and developed digital skills, which allowed them to act positively in the post-pandemic context. Nolasco-Silva and Lo Bianco (2022) state that the implementation of remote teaching revealed cyber-situated teachers, creating classes inspired by the principles of cyberculture.

According to Santos (2019), the construction of knowledge based on the principles of cyberculture means transgressing the mere reproduction of knowledge, placing the subjects as learners (Sales; Albuquerque, 2020) in the position of content creator and co-creator. For Santos (2019), the logic of *uploading and downloading* content, without interaction between the author and user, was part of the communication process characteristic of an early period of digital culture and counterproductive in contemporary times.

Thus, Santos (2019) points out that the current context brings as a principle the interactivity in a network, enabling authorship, co-authorship, the sharing of knowledge in cyberspace between subjects. Cyberspace is defined by Santos (2019, p. 30) as "a plural set of spaces mediated by digital interfaces, which simulate contexts of the physical world of cities, their institutions, individual and collective practices, already experienced by human beings throughout their history". Therefore, the author's definition of cyberspace is enlightening, because from this understanding, the ability of digital technologies to enable virtual environments that replicate and expand human experiences, allowing remote interactions and connections, is highlighted. Cyberspace thus becomes a hybrid space where social, cultural and communicative activities take place, providing new forms of interaction and engagement.

The effective performance of the school in this context demands from teachers the promotion of an education that teaches the student to think and reflect critically (Freire, 2001), going beyond the

mere reproduction of knowledge. The school's challenge in this context is to form an integral subject, with empathy, so that they can act in cyberspace without losing sight of ethical precepts, respect for diversity and critical thinking. The role of the school in the context of digital culture goes beyond the instrumentalization of young people to know the procedures for using a given digital interface. Far from it, its objective is the emancipatory and critical formation of this subject to act in the internet space as a citizen (Freire, 2001).

From this perspective, the basic principle of an integral education for the effective performance of the student in cyberspace demands transdisciplinary pedagogical proposals, based on values, based on citizenship and the understanding of the human being as a subject of rights and diversity. Therefore, it is necessary to inhabit cyberspace with people interested in creating bridges and not walls, because bridges connect, allow the sharing of knowledge, interaction between authors, enable co-authorship, the construction of knowledge in a collaborative way, while walls separate.

In this way, discussing the emergencies of DICT permeates issues related to the digital inclusion of learners and teachers; through the discussion about equal access to the network, requiring the formation of criticality for the emancipation of subjects (Freire, 2001). In this sense, the search to reduce online inequality goes beyond know-how, concerning the critical perceptions that are constructed of reality and the performance of these subjects not only as consumers of content, but as creators. According to Santos (2019), in the context of digital culture, knowledge is movement, possessing authorship, co-authorship, enabling interaction between authors. Therefore, the production of knowledge based on the principles of digital culture aims to transgress the reproduction of knowledge, encouraging students to exercise youth protagonism and the creation of knowledge networks.

## EMERGING IDEAS FROM DIGITAL TECHNOLOGIES

The context of the Covid-19 pandemic was for many public and private schools a living laboratory of pedagogical experiences, with the wide use of digital technologies in the mediation of knowledge. The health crisis forced teachers and students to be inserted into virtual classrooms, requiring them to develop digital skills to pedagogically circumvent the situation (Santo; File; Oliveira, 2021). This process brought to light the need to adapt pedagogical planning and discover the possibilities of pedagogical use of digital technologies to continue the teaching work.

This context has led school institutions to reframe their view and systematically analyze the infinity of pedagogical possibilities of digital technologies. They presented a universe of opportunities in the pedagogical practice of teachers, allowing the use of digital interfaces to create interactive and dynamic learning environments for students. As a result, digital technologies have

become allies in the development of innovative and effective educational practices, driving an education that is more adapted to the demands and potentialities of the contemporary context.

From this perspective, digital interfaces are indispensable for the development of classes inspired by the principles of digital culture. For Sales and Albuquerque (2020), learners use numerous digital technologies in their daily lives to relate and produce in society. In the school environment, this reality needs to be present, this requires studies to analyze the possibilities of using digital technologies in the school context so that hybrid teaching practices can be developed. In this sense, Chart 1 will present some possibilities for bricolage digital technologies.

Additionally, we clarify that the term bricolage in science refers to "the ability to employ multiple research approaches and theoretical constructs, it is the path towards a new form of rigor in research" (Kincheloe; Berry, 2007, p. 10, *apud* Rodrigues, 2016, p. 02). In the words of the authors, "scientific or epistemological bricolage can be seen as a postmodern way of doing research that, in a way, contributes to the desecration or questioning of science as a closed, insurmountable field restricted to select and reserved circles" (p. 02). In the everyday context, DIY is about do-it-yourself jargon, from the mixture of the aspects of a device that gives rise to a new one. In this sense, its use in this study is quite appropriate to refer to the possibilities of creation and co-creation of content, based on different rereadings.

Table 1 - Mosaic of possibilities of digital technologies

| **Audio DIY** | **Image & Video DIY** | **Mass communication** | **Video conferencing** | **Collaborative Learning/Online Teaching** |
|---|---|---|---|---|
| Creation, Recording, Mixing and Remixing. | Image creation, video, editing. | Creation of groups in messenger applications. | Real-time communication with multiple people. | Sharing, authoring, co-authoring. |

Source: Prepared by the authors (2024)

Chart 01, divided into 5 (five) blocks, shows in general some possibilities of digital interfaces that allow audio DIY; image and video; mass communication; video conferencing; Collaborative learning/online teaching. The possibilities listed in this framework enable hybrid pedagogical practices, using the best of digital culture, intertwined with all the benefits of face-to-face teaching (Christensen; Horn; Stacker, 2013). This situation demands from teachers directions of the possibilities of DICT to favor a pedagogical praxis inspired by the principles of digital culture (Santos, 2019), allowing subjects to actively participate in the network, overcoming vertical communication, in which the author does not interact with the reader, seeking to establish a

relationship of horizontality, based on co-authorship, building knowledge in a shared and interactive way.

The possibilities of audio DIY allow learners (Sales; Albuquerque, 2020) the creation, recording, mixing, and remixing of audio. The possibility of remixing is emphasized, as it enables interaction between authors, enabling subjects to re-read original recordings. Also in this sense, it emphasizes the possibility of converting voice into text, proving to be relevant, for example, in the treatment of data from a scientific research, being able to automatically transform audio into text.

This possibility is very important for those who do an interview for their scientific research, using the recording of the conversation, who need to transcribe the speeches later. This process can be simplified by the facility provided by DICT. Still within the scope of the possibilities of DIY with audio of digital interfaces, the creation of a podcast stands out, based on a language close to the reality of the students in a dynamic and interactive way. Some interfaces allow the use of audio mixing resources at the time of recording, such as background music, applause, making it possible to broadcast in real time or record the content for later publication.

The creation of a *podcast* in the educational context makes it help in a positive way in the subjects' study routine, allowing them to create and reproduce complementary content of the subjects on their own cell phones, both in the school environment, in the classroom, on the school premises, in collaboration with groups of friends, and on the way to school. Podcasts are interesting digital interfaces to promote important debates, present different opinions and build self-learning. They stimulate the autonomy of the student, enabling him to develop youth protagonism, becoming a network content creator, developing a more active role in his study journey. Finally, these digital interfaces allow subjects to host material on educational platforms and share it, generating open educational resources, contributing to the exchange of ideas between teachers, students and other users of the network.

As possibilities of DIY with images and videos (Chart 1), we observed that these allow teachers and students to create, co-create and share content through static language, through photographs, stickers, or even through videos, *gifs*, languages that allow sharing on social networks, making the author meet the user. enabling co-authorship and interaction. DIY with images and videos is essential for creating content in the format and language of the main social networks, such as Instagram, Facebook, Youtube, Whatsapp, Tiktok, Kawaii, Twitter, among others.

These possibilities allow teachers to develop a pedagogical praxis contextualized with the reality of the learner (Freire, 2001), contributing to overcoming banking education and promoting a liberating education (Freire, 1974), encouraging youth protagonism in cyberspace (Santos, 2019).

In addition, we highlight the possibilities of mass communication provided by DICT (Chart 1), which can be exercised through the creation of groups in messenger applications to share content

in real time or asynchronously, enabling interaction between authors. In the educational field, they allow teachers to create specific groups for their subjects, as well as for pedagogical coordinators to create groups of student leaders, school boards, teachers, allowing the approximation and dialogue with the school community.

In addition, within the scope of the possibility of mass communication, we emphasize online forms, which are seen as great data collection devices for a given group, allowing the management of responses in a satisfactory way. Through them, teachers can carry out evaluation activities, providing multiple-choice questions, open-ended questions, image readings, etc. Through the online forms, pedagogical coordinators can carry out pedagogical surveys on socioeconomic issues, access to the students' internet to update the pedagogical political project of the school unit. Finally, the use of these possibilities in the school environment can contribute to the development of hybrid practices in accordance with the principles of digital culture.

Regarding the possibility of real-time communication, observed in Chart 01, its importance for the development of synchronous online classes is highlighted. The possibilities of videoconferencing are a strategy that students already experiment with on a daily basis (Sales; Albuquerque, 2020) to communicate and build their social relationships. Therefore, its use in teaching practice becomes a necessity, as it moves towards the promotion of an education mediated by DICT for a digital society.

In this sense, the possibilities of constructing learning collaboratively/online education, as pointed out in Chart 1, are important for the construction of knowledge by teachers and students in a participatory way. For Santos (2020), online education is an invention practiced in a network, in the daily life of joint education, co-author, maker of multiple forms, because in this aesthetics of learning to teach "form is content". For the author, online education should not be confused with distance education (EAD) and much less with emergency remote teaching. Distance education is a teaching modality provided for in Brazil, with its own methodology, with planning, teaching teams for the elaboration of content, training and tutoring. Remote teaching was the pedagogical strategy adopted by schools in the period of social physical isolation in the face of Covid-19, configuring itself as a mere transposition of face-to-face teaching to digital platforms.

Thus, the possibilities of digital interfaces are not new, but the direction of their potential for the mediation of teaching was somewhat amplified in the pandemic context, despite the fact that many public and private schools already make use of the potential of DICT in their pedagogical processes. However, studies on the use of DICT as learning mediation devices have highlighted new and successful pedagogical experiences in school contexts.

In this sense, Serres (2015) invites us to reflect on the subjects who are in the educational process in the era of digital information and communication technologies. The author points out that

young people with their thumbs master technologies in the palm of their hand, from the use of DICT to mediate their daily relationships. The role of the school in this context is not limited to teaching the student the procedural use of digital interfaces, but to re-signify the look at critical use, placing the student in this space as an active subject in the process of knowledge construction so that they exercise youth protagonism, and that the school surpasses banking education (Freire, 1974). Digital devices connected to the internet allow students and teachers to access too much information, requiring training from the school so that students can critically filter information, permanently combating the phenomenon of false information or *fake news* (Bauman, 2001).

In this way, the possibilities of digital audio DIY interfaces, allowing the creation, mixing and remixing of the file; DIYing in image and video, through the creation of images and videos; mass communication, through messenger applications, videoconferencing, through real-time communication, with several people at the same time and collaborative learning, online teaching favors the promotion of a hybrid education for a society immersed in digital culture, in which learners already use DICT in their daily lives to build knowledge.

## SOME FINAL THOUGHTS

The study demonstrated that digital technologies are fundamental for the promotion of education based on the principles of digital culture, allowing students to interact with content on a network, going beyond the mere reproduction of knowledge. From them, students have the possibility of transforming cyberspace, leaving the limited phase of the beginning of the internet, emerging the pedagogical practice contextualized with the digital culture, in which knowledge is shared, created in collaboration, in a dialogical and horizontal perspective, allowing students to DIY in audio, video, images, among others.

In this sense, DICT is effective in favoring dynamic and interactive learning environments, allowing the development of hybrid teaching practices. Digital technologies enable learners to use the best of DICT, accompanied by all the benefits of the face-to-face classroom. DICT also allow the bricolage of audio, images, videos, allowing learners to create and co-create content on the network, proving to be relevant in the realization of videoconferences, allowing mass communication and the development of online education.

From this perspective, the digital inclusion of students is a crucial factor for the enjoyment of the pedagogical potential of digital interfaces in the teaching-learning process, demanding effective public policies in schools from the public authorities to create the conditions for access to devices, with internet connectivity for students and teachers, enabling hybrid teaching practice. Thus, the supply of the school with digital devices and access to the internet is a fundamental condition for the

development of pedagogical practices enriched by DICT, capable of promoting the emancipation of the student, immersed in the context of digital culture.

To this end, the outline of the theme presented here does not exhaust the discussions, in view of the growing development of new digital interfaces and the rise of generative artificial intelligences, which will require studies for their critical appropriation in pedagogical processes. In this sense, it is necessary to continue research in this perspective in order to deepen the studies, with a view to reporting the successful experiences of critical use of emerging technologies and their digital interfaces, capable of promoting hybrid and emancipatory pedagogical practices in the context of the present society.

## REFERENCES


1. Bauman, Z. (2001). *Modernidade líquida*. Rio de Janeiro: Editora Zahar.

2. Christensen, C. M., Horn, M. L. B., & Stacker, H. (2013, maio). *Ensino Híbrido: uma Inovação Disruptiva? Uma introdução à teoria dos híbridos*. Clayton Christensen Institute. Disponível em: https://porvir.org/wp-content/uploads/2014/08/PT_Is-K-12-blended-learning-disruptive-Final.pdf. Acesso em: 29 mar. 2022.

3. Freire, P. (1974). *Pedagogia do oprimido*. São Paulo: Paz e Terra.

4. Freire, P. (2001). *Educação como prática da liberdade* (25. ed.). Rio de Janeiro: Paz e Terra.

5. Kenski, V. M. (2009). *Educação e tecnologias: o novo ritmo da informação*. Campinas, SP: Papirus.

6. Nolasco-Silva, L., & Lo Bianco, V. (2022). *Os isolados e os aglomerados da cibercultura: ensino remoto emergencial, educação a distância e educação online*. Salvador, BA: Devires. Disponível em: https://www.queerlivros.com.br/pagina/ebooks-gratuitos.html. Acesso em: 22 mai. 2022.

7. Nonato, E. do R. S. (2020). Cultura digital e ensino de literatura na educação secundária. *Cadernos de Pesquisa*, 50(176), 534-554. Disponível em: https://publicacoes.fcc.org.br/cp/article/view/7126. Acesso em: 7 nov. 2022.

8. Palfrey, J., & Gasser, U. (2011). *Nascidos na era digital: entendendo a primeira geração de nativos digitais*. Porto Alegre: Artmed.

9. Rodrigues, C. S. D., et al. (2016). Pesquisa em educação e bricolagem científica: rigor, multirreferencialidade e interdisciplinaridade. *Cadernos de Pesquisa*, 46(162), 966-982. Disponível em: https://doi.org/10.1590/198053143720. Acesso em: 7 nov. 2022.

10. Sales, K. M. B., & Albuquerque, J. C. M. de. (2020). Práticas Híbridas dos Sujeitos Aprendentes - Uma Proposição de Modelagem para Análise das Formas de Hibridismo Presentes nas Instituições Formativas. *Revista Prâksis*, (2), 162-186. Disponível em: https://doi.org/10.25112/rpr.v2i0.2193. Acesso em: 10 abr. 2022.

11. Santo, E. do E., Lima, T. P. P. de, & Oliveira, A. D. de. (2021). Competências digitais dos professores: da autoavaliação da práxis às necessidades de formação. *Trabalho Digital*, (21), 113-129. https://doi.org/10.25029/od.2021.323.21.

12. Santos, E. (2019). *Pesquisa-Formação na Cibercultura*. Teresina: EDUFPI.

13. Santos, E. (2020, agosto). EAD, palavra proibida. Educação online, pouca gente sabe o que é. Ensino remoto, o que temos. *Notícias, Revista Docência e Cibercultura*. Disponível em: https://www.epublicacoes.uerj.br/index.php/redoc/announcement/view/1119. Acesso em: 30 abr. 2022.

14. Santos, J. J. dos, Santo, E. do E., & Souza, N. S. (2022). Educação no Contexto da Pandemia: Percepções Críticas da Coordenação Pedagógica. *EaD em Foco*, 12(3), e1913. https://doi.org/10.18264/eadf.v12i3.1913. Disponível em: https://eademfoco.cecierj.edu.br/index.php/Revista/article/view/1913. Acesso em: 18 abr. 2024.

15. Serres, M. (2015). *Polegarzinha – Uma nova forma de viver em harmonia, de pensar as instituições, de ser e de saber*. Rio de Janeiro: Bertrand Brasil.

16. Valente, J. A. (2013). Integração currículo e tecnologia digitais de informação e comunicação: a passagem do currículo da era do lápis e papel para o currículo da era digital. In A. Cavalheiri, S. N. Engeroff, & J. C. Silva (Orgs.), *As novas tecnologias e os desafios para uma educação humanizadora*. Santa Maria: Biblos.