Digital Literacy: A framework to promote educational practices with digital technologies in education

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ABSTRACT

Digital Information and Communication Technologies (DICTs) have impacted society in the way it searches for, produces, and disseminates information and knowledge. The social changes resulting from technological advancements require educators to remain up-to-date and promote digital literacy practices with their students, preparing them to use DICTs more widely and deeply. Based on this, this article proposes a framework to assist teachers in fostering their students' digital literacy. This framework was created based on authors in the field of digital technologies in education, such as Manuel Castells, Pierre Lévy, José Manuel Moran, among others. It also draws from reflections on educational practices developed in teaching, research, and extension activities of the framework's proponents. This educational product is organized into five axes of practices for promoting digital literacy: research, development, communication, collaboration, and evaluation. The purpose of the framework is to inspire practices that promote students' reflective thinking, content production using different kinds of digital technologies, fostering their authorship and empowerment, collaboration and interaction in the learning processes, appropriate communication, and dissemination of productions, as well as strategies for monitoring and evaluating their productions. It is concluded that the use of DICTs in education should have a clear pedagogical intention and should be combined with teaching methods that promote the development of critical, autonomous, and collaborative students who can reflect, problematize, and create solutions based on reality.

KEYWORDS: Digital Literacy. Educational Practices. Digital Technologies in Education. Digital Information and Communication Technologies.

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INTRODUCTION

Information technologies began expanding rapidly in the 1970s, marking the emergence of a new social paradigm at that time (CASTELLS, 2002). According to Toffler (1980), this new paradigm refers to the emergence of a civilization created from Digital Technologies (DT), highlighting three major phases humanity went through: the first is the agricultural phase, where small native peoples lived from fishing, hunting, and farming. For him, this wave is nearly extinct, surviving only through small isolated tribes. The second phase is the industrial phase, with automobile factories, food production, textile companies, and others. Amid this phase, a third wave emerged, the wave of new discoveries based on more innovative technologies, leading to the creation of new models for social organization. In this new wave, the so-called knowledge society "is increasingly driven by digital lines. In many parts of the world, people live lives conditioned by a system of digital arrangements, digital artifacts, and digital practices" (SELWYN, 2017, p. 86).

This digital era differs from the previous ones because its rapid growth has caused changes in society's daily life, expanding the availability of resources to assist in everyday tasks and even utilizing artificial intelligence to carry out cognitive actions that were once exclusive to humans (BATES, 2017). Furthermore, DTs have "the ability to create an interface between technological fields through a common digital language in which information is generated, stored, retrieved, processed, and transmitted" (CASTELLS, 2002, p. 68). This information is managed in online databases and updated in real-time, generating new possibilities for human progress (LÉVY, 1999; TOFFLER, 1980).

Over the past decades, DTs have impacted relationships with different, now digital, media, modifying how information is searched for and produced, whether in creative expression or in ways to interact and act, consequently influencing daily life in all social, political, and cultural fields (ALEVIZOU, 2017; SANTAELLA, 2014). According to Castells (2002), these interactions occurring in cyberspace have formed new social relations, which he defines as a networked society. "Cyberspace is the digital interconnection between computers, connected in a network. It is a space that exists between computers when they are connected, allowing users to exchange data" (MARTINO, 2014, p. 29). With this, technologies have been driving new ways of accessing information as well as social relationships (FADANELLI; PORTO, 2020), influencing much of everyday actions.

On one hand, these resources have come to improve quality of life by offering rapid access to information, facilitating everyday situations, encouraging interaction, enabling knowledge production and innovation, among other potentials (MARTINS; MARTINS; ALVES, 2021). In this sense, cyberspace also modifies some cognitive functions traditionally belonging to humans:

> memory (databases, hyperdocuments, digital archives of all types), imagination (simulations), perception (digital sensors, telepresence, virtual realities), reasoning (artificial intelligence, modeling of complex phenomena) (LÉVY, 1999, p. 157).

On the other hand, the incorporation of these technologies into society requires critical reflection, as virtual interconnections also contribute to digital exclusion (FADANELLI; PORTO, 2020). For Pérez Gómez (2015), digital inequality

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occurs when individuals are unable to comprehend or efficiently utilize digital resources, leaving many marginalized from the hyperconnected networked society. This scenario may also be caused by socioeconomic factors, as many individuals lack access to these resources and, therefore, are excluded from the digital culture.

> In this context of cyberculture and the emergence of new information and communication technologies, cultural, social, and economic domination also presents itself with implications that exacerbate not only digital exclusion but also social and cultural exclusion (FADANELLI; PORTO, 2020, p. 42).

Furthermore, it must be remembered that the improper use of technologies can bring unforeseen consequences, causing numerous problems (SELWYN, 2017). Examples include various types of computer viruses, the spread of fake news, and the unauthorized sharing of personal data online, which can lead to the misuse of information and cybercrimes (MARTINS; MARTINS; ALVES, 2021). Another point highlighted by Selwyn (2017) is that technologies are not neutral; they are developed according to social, political, and economic interests. Thus, with the widespread use of Digital Technologies, and particularly the internet, there is an urgent need to prepare citizens to navigate cyberspace safely and effectively (MARTINS; MARTINS; ALVES, 2021; SANTOS; AZEVEDO; PEDRO, 2015). Digital Literacy is a concept that emerged to address these needs.

According to Santos, Azevedo, and Pedro (2015), Digital Literacy is defined as:

> A combined set of knowledge, skills, and attitudes that enable citizens to engage effectively with the media and other information providers, [...] developing critical thinking and lifelong learning skills that allow them to become active citizens (SANTOS; AZEVEDO; PEDRO, 2015, p. 29).

Moreover, it involves cognitive and socio-emotional aspects necessary for individuals to perform effectively in a digital environment (SANTOS; AZEVEDO; PEDRO, 2015). In short, it refers to learning how to use technologies properly and responsibly (LOUREIRO; ROCHA, 2012). Digital Literacy also facilitates the identification of vulnerabilities that can occur within cyberspace, as discussed earlier (MARTINS; MARTINS; ALVES, 2021). Karpati (2011) underscores the importance of Digital Literacy:

> Information and communication technologies (ICT) have permeated every area of contemporary life. In this context, Digital Literacy has become much more than the ability to operate computers [...]; it encompasses a set of basic competencies that include the use and production of digital media, information processing and retrieval, participation in social networks for knowledge creation and sharing, and a wide range of professional computing skills. [...] It also acts as a catalyst by enabling the acquisition of other life-important skills" (KARPATI, 2011, p. 1).

At this point, it is important to note that much of the literature refers to DT as Information and Communication Technologies (ICT). In this article, the term Digital Technologies (DT) is used to emphasize those technologies based on digital means and information processing that need to be integrated into educational spaces, considering that education already made significant use of non-digital information and communication technologies.

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Thus, Digital Literacy should provide knowledge and attitudes enabling citizens to develop competencies in digital environments that will be used throughout their lives (SANTOS; AZEVEDO; PEDRO, 2015). It also cultivates critical citizenship regarding the use of Digital Technologies and promotes "ICT competencies, civic competencies, learning-to-learn competencies, and adult participation in lifelong learning" (KARPATI, 2011, p. 2, our translation). These competencies are fundamental to functioning in the network society (LOUREIRO; ROCHA, 2012).

Digital Literacy, by equipping individuals with the ability to use word processors, the internet, and social interaction networks, develops the knowledge needed to seek, produce, and communicate scientific information using Digital Technologies (ARAUJO; GOUVEIA, 2020). It transforms users from passive recipients of information into active and reactive users—searching, creating, sharing, and commenting on content and contexts (LOUREIRO; ROCHA, 2012, p. 2726). Thus, Digital Literacy is associated with the effective performance of everyday activities, including the ability to read and interpret available information, produce knowledge, evaluate, and apply these skills within digital environments. In short, Loureiro and Rocha (2012) propose several competencies that digitally literate citizens need to develop:

> - Knowing how to access and collect information in virtual/digital environments;
> - Managing and organizing information for future use;
> - Evaluating, integrating, interpreting, and comparing information from multiple sources;
> - Creating and generating knowledge by adapting, applying, and recreating new information;
> - Communicating and transmitting information to different and varied audiences through appropriate media (LOUREIRO; ROCHA, 2012, p. 2729).

The International Society for Technology in Education *(*ISTE) highlights a set of competencies for student learning in the digital world. According to ISTE (INTERNATIONAL SOCIETY FOR TECHNOLOGY IN EDUCATION [ISTE], 2016), when using Digital Technologies (DT) in learning processes, schools must promote: empowered learners who are active and demonstrate competencies in achieving their learning goals; digital citizens who recognize their rights and responsibilities in the digital world, acting safely, legally, and ethically; knowledge constructors who can appropriately use digital resources to generate meaningful learning; innovative designers capable of identifying and solving problems in innovative and creative ways; computational thinkers who can develop strategies and methods to understand, solve problems, and test solutions; creative communicators who know how to express themselves creatively using appropriate formats according to their objectives; and global collaborators who share and collaborate both locally and globally.

Developing such competencies demands that schools engage in a permanent process of educating for the effective and appropriate use of DT, especially regarding research, production, and communication of knowledge generated within the school environment. However, it is often observed that students are not well-prepared for appropriate and effective use of DT. Frequently, teachers themselves are also not fully prepared and may experience difficulty or insecurity in proposing the use of technologies to students in their projects. Therefore, the

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importance of Digital Literacy in forming global citizens is justified, so that individuals can develop competencies—knowledge, skills, and attitudes—that enable them to understand the responsible use of DT, as well as their consequences, contributions, and impacts on society. Digital Literacy "prepares individuals for the exercise of citizenship at a more conscious level; at the same time, it enhances their ability to deal with the idiosyncrasies of the digital environment" (MARTINS; MARTINS; ALVES, 2021, p. 01).

In consequence, it becomes necessary to develop Digital Literacy from the early stages of individuals' use of DT. Children and young people are considered digital natives, meaning those who were born into environments already immersed in such technologies (PRENSKY, 2001). Therefore, it is essential for these individuals to use technologies reflectively, identifying both the potentials and the challenges associated with their use. Digital Literacy also includes equipping individuals with the technical knowledge necessary to develop a secure digital posture (MARTINS; MARTINS; ALVES, 2021). Literacy in education encompasses these aspects and also:

> enhances the understanding of society, its characteristics, formalities, and specificities associated with online behavior, from a more critical perspective, minimizing the chances of individuals becoming easy targets of fraudulent schemes. (MARTINS; MARTINS; ALVES, 2021, p. 01).

Based on this context, the present article aims to propose a guide to assist teachers in encouraging their students' Digital Literacy. The research procedure was based on a bibliographic study, gathering works that support and discuss the topic. Thus, the guide was created through dialogue with key authors in the field of Digital Technologies in Education, with special emphasis on Pierre Lévy and José Manuel Moran, as well as on theoretical perspectives regarding digital literacy.

The guide is also the result of an empirical observation process based on reflection about educational practices developed by the authors in teaching, research, and extension activities, whether in undergraduate and graduate (*stricto sensu*) education programs or in teacher training and induction projects. A key action in validating the guide is the fieldwork described in Hamann (2022), which discusses a process of integrating DT to connect with nature through field activities conducted by Science Clubs. This project was developed with basic education students and was sustained by the triad of teaching, research, and extension. The frameworks created to support the actions of the club participants, proposed by Hamann and Lopes (2022), were strongly inspired by the perspective outlined in the present guide regarding the use of DT in educational processes.

GUIDE FOR THE DEVELOPMENT OF DIGITAL LITERACY

Digital Literacy in education is a widely discussed topic in several countries around the world, given that society has become immersed in what is termed digital culture. In this context, there is an increasing need to integrate Digital Literacy across curriculum components in a transversal manner at all levels of education (MARTINS; MARTINS; ALVES, 2021). Discussions surrounding this topic recognize the potential of Digital Technologies (DT) to amplify the possibilities of teaching and learning processes, aiming to make them more adaptive and interactive (KARPATI, 2011).

According to Loureiro and Rocha (2012), the diversity of information available on the internet is one of the main causes of challenges in these processes. Thus, they argue that Digital Literacy must be addressed from a scientific perspective, developing research skills, data selection abilities, and information evaluation competencies (LOUREIRO; ROCHA, 2012). By developing these competencies, students can engage in online communities and fulfill their roles as digital citizens (KARPATI, 2011).

In this regard, the present article proposes a guide to assist teachers in promoting their students' Digital Literacy, which is summarized in Figure 1. This guide was developed through dialogue with various authors in the field of Educational Technologies and through reflection on educational practices conducted in extension and teaching activities.

Figure 1 - Guide for the Development of Digital Literacy
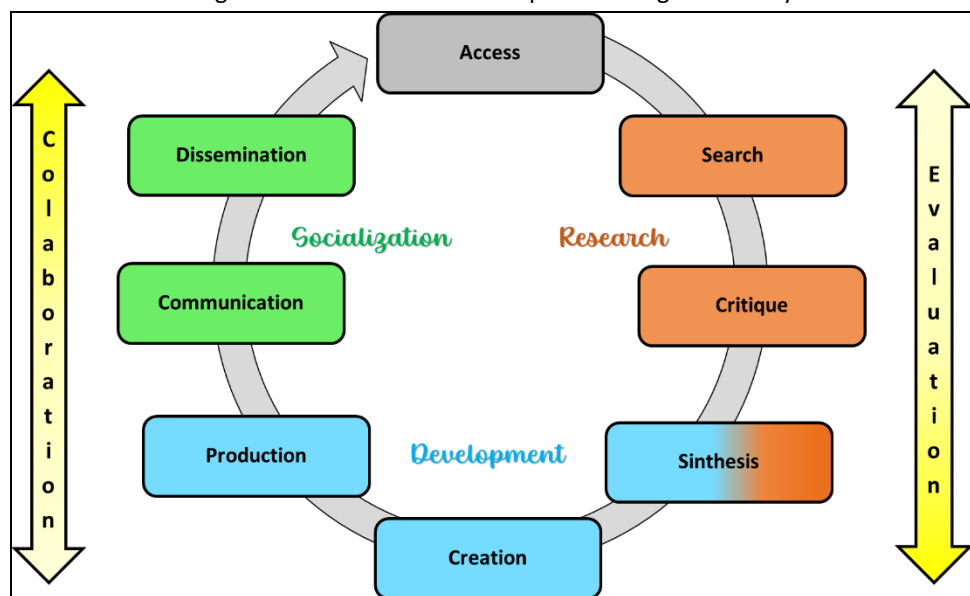
Source: The authors (2025).

As shown in Figure 1, the integration of Digital Technologies (DT) into educational processes can be organized into six groups of activities, which will be detailed below: access, research, development, socialization, collaboration, and evaluation.

Access is the foundation of the process. Many educational institutions still lack sufficient resources or limit students' access to technologies. This issue must be addressed institutionally, whether at the school leadership level or by educational authorities. Restricting access contradicts the reality of a society increasingly permeated by digital resources and denies students the primary source of knowledge in today's society. As Gatti (2016) points out,

> In this society that is emerging as an information-cybernetic society, education is called upon to prioritize mastery of certain related skills. Those who do not possess the skills to manage information, or who lack the knowledge valued by networks, are entirely excluded. Gaps and distinctions between human groups are thus widened. Therefore, educational actions, formal or otherwise, are at stake and are positioned between promoting transformation or exacerbating exclusion. (GATTI, 2016, p. 165)

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Thus, it is necessary to assume the role of educators committed to the appropriate and respectful use of technologies, both within educational settings and broader community interactions. Similarly, it is essential to ensure students' access to technologies beyond educational environments, especially since they are frequently assigned tasks to complete at home. In this regard, it is important to note that internet access has been recognized by the United Nations (UN) as a right associated with the Declaration of Human Rights; however, in Brazil, a strong public policy to guarantee its universalization is still lacking (MACHADO, 2017), a reality that was starkly highlighted during the COVID-19 pandemic. Ensuring access is part of forming digital citizens, securing their rights, and promoting inclusion.

The second fundamental process in the development of digital literacy is **Research**. Many teachers assign research projects to students by simply announcing a topic. Often, students take the easiest route: they search the topic on Google and copy and paste from the first two or three results. In the age of artificial intelligence, this process has become even easier. However, the research process is crucial and requires close attention from teachers. As illustrated in Figure 1, research is subdivided into four activities:

a) **Search:** the moment when students conduct searches on a particular topic;

b) **Critique**: the moment when students critically select their research sources, analyzing both the content and the credibility of the information;

c) **Synthesis**: the moment when students organize and systematize what they have researched.

In the **Search** phase, teachers must be attentive to the sources of information students use. Teachers should often recommend reliable sources in the form of texts, audios, or videos, engaging in curatorship to guide students toward accurate information. Many websites offer misleading, ambiguous, or overly simplified information on certain topics, leading students to develop superficial understandings. This issue should be addressed in the **Critique** phase, which demands careful scrutiny of investigated content, examination of sources, and critical questioning. It is worth noting that **Synthesis** is a transitional phase between the activities of Research and Development, as in this phase, students organize their findings and begin to produce original work.

Thus, considering the school as a locus for the development of Digital Literacy, the integration of Digital Technologies must be carried out creatively and critically to promote student autonomy (BACICH; TANZI NETO; TREVISANI, 2015). The use of the internet enables quick access to knowledge, experiences, and practices, as well as the immediate dissemination of research through communication channels (MASETTO, 2013). Moreover, it fosters multiple forms of learning, in which students research, select, compare, analyze, critique, and organize information (MASETTO, 2013), a process that must be encouraged and closely monitored. Therefore, students must be motivated to search for information available on the internet, so that during the production process, they can create relevant and meaningful knowledge (BEHRENS, 2013).

Chart 1 presents some teaching strategies for each of these activities. Chart 2 outlines resources that can be applied across all of them.

Chart 1 - Teaching Strategies

Activities	Strategies
Search	Guide students on what an internet search entails and the precautions that should be taken during this process. Assist in establishing keywords that define the topic. Work with students to formulate investigative questions. Recommend reliable research sources related to the topic. Encourage students to search for additional sources.
Critique	Assist students in identifying the source of the publication (author, institution, etc.). Encourage students to learn more about the source. Request that students classify research sources with identical or similar content and attempt to identify the original production. Prompt students to express their opinions about the content. Guide students to identify contradictions and ambiguities. Encourage students to reflect on the relationships between the content and the authors/institutions that produce it, as well as the ways in which they communicate with readers.
Synthesis	Request a concise and critical written production about the consulted sources, highlighting the main aspects observed regarding the topic. Promote the production of different media formats to express understanding (concept maps, drawings, infographics, diagrams, videos, audios). Require that all consulted sources be properly referenced. Provide feedback on the research and the synthesis produced.

Source: The authors (2025).

Chart 2 – Resources for Reaseach

Activities	Resources
Search	Internet search tools: Google, Bing, etc.
Critique	Video lessons related to the content: YouTube, etc.
Synthesis	Audio applications: SoundCloud, etc. Online book portals or applications: Google Books, etc. Portals or applications for online digital resources: MEC RED Platform, Educapes, etc. Specialized content websites: Wikipedia, etc. Scientific content websites: Scielo, Google Scholar, etc.

Source: The authors (2025).

Research, therefore, is a fundamental basis for **Development** (Figure 1), the stage in which students can exercise their protagonism and authorship. It is subdivided into three activities, one of which is **Synthesis**, already presented earlier:

a) **Creation**: the moment when students formuate their ideas and plan what they are going to develop;

b) **Production**: the moment when students develp a product related to the studied object.

In the **Creation** stage, students' curiosity should be stimulated so that they can present their product creatively, focusing not only on form but especially on content. **Development** should bring students closer to their object of study, whether through simpler methods, such as creating slides, or more elaborate approaches, such as producing a prototype or a product. Digital Technologies (DT) in education allow students to learn through a variety of resources, thus having the potential to meet individual characteristics and preferences while fostering new skills in the use of these resources (BATES, 2017).

Moran (2015) highlights that, in this process, it is possible to achieve a blend of knowledge and areas (interdisciplinarity), through various problem-solving activities, project development, and the use of different materials and spaces, combining the best aspects of traditional classrooms with digital resources:

> Spaces multiply even if we do not leave the room (multiple differentiated activities in the same classroom). Classrooms can become spaces for research, project development, online communication, and publication, combining the best of face-to-face and virtual environments at the same time. In this way, it is possible to research in every way, using all media, all sources, all forms of interaction — sometimes all together, sometimes in small groups, or even individually; researching at school or across various spaces and times. (MORAN, 2013, p. 31)

Another potential of **Production** with DT is the practice of **authorship**. Authorship is a term with multiple definitions and perceptions. According to Carvalho and Pimentel (2020), it refers to the process of creation or to a product that is created, understood, felt, or manifested by students through writing texts, producing videos, sounds, images, illustrations, interacting with simulations, and developing projects, activities, or games. Everything that is created entails an authorial learning process, based on what is developed, produced, or constructed, whether individually or collectively. The perspective of a student-author or group-author aims at forming creative individuals who seek to express their ideas and are motivated to materialize them (CARVALHO; PIMENTEL, 2020).

> Authorship promotes learning when it demands from the author the act of researching, appropriating, re-signifying, reflecting, theorizing, connecting, weaving with personal experiences, producing, and negotiating meanings, among others. (CARVALHO; PIMENTEL, 2020, p. 01)

At the moment of **Production**, authorship also provides opportunities for learning how to research, discover, and reflect, which is conducive to fostering scientific knowledge, given that it is expected that the author:

> - In addition to being a critical reader of the world, is also a creator of culture;
> - Participates and intervenes in class activities;
> - Researches through multiple sources of information and considers multiple perspectives (from theorists, the teacher, and peers);
> - Produces new knowledge and publishes it to engage in discussions with others;
> - Debates, counters, and co-creates ideas, sharing knowledge and experiences;
> - Is a subject with a personal history of education and formation. (CARVALHO; PIMENTEL, 2020, p. 01)

Thus, creating and producing places the student in an active and authorial role, moving beyond being a passive respondent to content.

Thus, creating and producing places the student in an active and authorial role, moving beyond being a passive respondent to content. Chart 3 presents a set of teacher strategies for each of the **Development** activities. Chart 4 outlines resources that can be applied across all of them.

Chart 3 - Strategies for Development

Activity	Strategies
Creation	Identify the resources that students are already familiar with. Present possibilities for diversified content creation. Stimulate students' creativity and curiosity. Request the construction of scripts, outlines, or models.
Production	Identify necessary complementary training. Provide the minimum necessary resources but also encourage students to seek their own resources. Establish interdisciplinary or interinstitutional partnerships. Mediate the production process in synchronous or asynchronous, face-to-face or remote environments. Highlight the importance of documenting the production process.

Source: The authors (2025).

Chart 4 – Resources for Development

Activity	Resources
Creation	Electronic books (e-books). Presentations: PowerPoint, Google Slides, Sway. Videos, documentaries, or productions that include dynamic elements or stop motion: Movavi, HitFilm Express, among others. Dialogued podcasts and opinion-based recordings: voice recorder. Concept maps: Coggle, Mindomo, Goconqr.
Production	Infographics: Canva, Infogram, Genially. Comic strips or animations: StoryboardThat, Powtoon, Pixton, Comics. Digital whiteboards: Jamboard, Miro. Simulation tools: PhET, GeoGebra. Georeferencing: Google Maps, Google Earth. Application development: AppInventor, Thunkable. Free creation of scenarios, games, or simulations: Minecraft, Scratch, SketchUp. Application development for virtual reality headsets: Unity, ArtSteps. Robotics: Robomind, Lego. Maker experiences with material production: recyclable materials, laser cutters, 3D printers. Models with programmable elements: Arduino, ESP, among others.

Source: The authors (2025).

Authorial productions within educational spaces need to be communicated and disseminated. Thus, another important action is **Socialization**, in which students can present the results of their productions. It is subdivided into two activities:

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a) **Communication**: the moment when students develop the format for communicating their investigation;

b) **Dissemination**: the moment when students publish the results of their investigation.

Communication involves guiding students on how to present the results of their production in a critical and conscious way, making use of various forms of languages and media. Moran (2013, p. 41) emphasizes that "with the internet and mobile technologies, *we have developed comprehensive forms of communication*, writing, speech, and audiovisual storytelling" (author's emphasis). Moreover, students are increasingly immersed in a multimodal society, not merely as passive recipients of what is communicated, but also as active producers. Media and Digital Technologies indeed expand the possibilities for work produced in the classroom, and it is up to teachers to encourage well-communicated productions so that they can later be disseminated.

Buckingham (2012, p. 55) points out that "new media also offer new opportunities for participation, for creative communication, and for content generation, at least for some people and in specific contexts," but he warns that this is not a natural or automatic process simply because younger generations are immersed in digital contexts. Guidance, supervision, and even formal training are necessary, as not everyone has easy access to multimodal content production. Communicating using media and technologies involves exposing oneself or one's peers, taking the work out of the teachers' "filing cabinets" or "drawers."

Therefore, different from **Communication**, where the primary objective is learning how to present the work, **Dissemination** is the stage where these results are actually shared — whether through virtual environments, events, or other means of publication.

Disseminating work involves careful attention to content quality, as well as respect and ethics regarding published materials. It also presents an opportunity to strengthen relationships with other schools or learning communities through the exchange of experiences and knowledge. However, it is crucial to guide students on how to navigate digital spaces safely, protecting their privacy and security (ANGELINI, 2018). Working on aspects related to the safe, critical, responsible, and inclusive use of technologies is one of the dimensions of teachers' digital competencies, as proposed by the Innovation Center for Brazilian Education (CIEB) in a document addressing initial teacher education (ARARIPE, 2020).

Chart 5 presents some teaching strategies for each of the **Socialization** activities. Chart 6 presents various resources that can be applied to all of them.

Chart 5 - Strategies for Socialization

ACTIVITY	STRATEGIES
Communication	Indicate the importance of communicating not only the result but also the process, in order to inspire the use of the experience by other teachers and students in different educational contexts. Guide students on the use of clear, concise, correct language that is aligned with the purpose of what was produced. Encourage students to engage in authorial, critical, and reflective communication.

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ACTIVITY	STRATEGIES
	Stimulate the creative use of different media or means of communication.
	Inspire students to reflect on and select the best ways to communicate their ideas.
Dissemination	Guide students on the necessary precautions when operating in online environments.
	Reflect with students on the content and ethics of what is produced and shared.
	Explore with students the social relevance of disseminating the knowledge they have produced.
	Take care to protect students' privacy and exposure in online environments.

Source: The authors (2025).

Chart 6 – Resources for Socialization

ACTIVITY	RESOURCES
Comunication	Site ou blog: Blogspot, Google Sites, Wix, …
Dissemination	Redes sociais: Facebook, Instagram, WhatsApp, TikTok, ...
	Plataformas de conteúdos educacionais. Portal MEC RED, Educapes, ...
	Eventos ou feiras presenciais ou *on-line.*

Source: The authors (2025).

Two other actions that should permeate the use of technologies in education to promote Digital Literacy, also represented in Figure 1, are **Collaboration** and **Assessment**, which must occur transversally throughout the entire process:

a) **Colaboration**: the moment the students interact and collaborate on their productions;

b) **Assesment**: the moment when students receive or provide feedback on theor learning process.

Many digital tools offer resources for remote collaboration and assessment. Thus, different resources can be used depending on the needs of each activity, and their use should be encouraged by the teacher.

In this sense, **Collaboration** should be promoted from the **Research** stage, where students can exchange information and knowledge, through the **Development** stage, where they can help each other in creating and producing their work, and into the **Socialization** stage, where they can further learn through dialogue and engagement with their peers' creations.

According to Santaella (2014), one of the factors enabling new ways of interacting with information through digital resources is the emergence of multidirectional, interactive, and collaborative platforms. More connected schools can better integrate different social environments and may:

> "[...] transform into a network of spaces rich in meaningful face-to-face and digital learning experiences, motivating students to learn actively, to research constantly, to be proactive, to take initiative, and to interact" (MORAN, 2013, p. 31).

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Thus, it is important to understand and encourage the use of collaborative platforms throughout all activities.

In this regard, collaborative practices must be carefully designed, monitored, implemented, and assessed using technologies, given that activities requiring research, choice, debate, and discovery promote the development of cognitive, emotional, and communicative competencies (MORAN, 2015). Digital Technologies change the relationships between those involved in the educational process, both inside and outside the classroom, through interaction channels that enable knowledge sharing among individuals, increasing the potential for collective intelligence (LÉVY, 1999).

Similarly, **Assessment** can no longer be limited to isolated content-based tests. Rubric systems can help students identify where they need to invest more time and energy in their learning process and assist teachers in providing more personalized support to each learner.

Carvalho and Pimentel (2020) highlight that with the use of technologies, it is possible to track:

> The traces students leave in digital environments as they participate in learning situations orchestrated by the teacher, making it possible to conduct competency-based assessments, valuing not only knowledge (knowing what things are, concepts, formulas) but also skills (knowing how to do, knowledge in action) and attitudes: presence, participation, and collaboration (CARVALHO; PIMENTEL, 2020, p. 01).

Accordingly, they propose assessment practices based on both hetero-assessment and self-assessment, as well as collaborative evaluation, valuing different perspectives from everyone involved in the learning process. Technologies can support students in: "Becoming aware of their ongoing learning process" (CARVALHO; PIMENTEL, 2020, p. 01), balancing personalization with sharing, so that each individual can identify the competencies already developed and those that require more focused attention.

As highlighted, Digital Technologies expand the possibilities of assessment processes beyond those based solely on exams and tests, since: "Implementing formative, continuous, collaborative, and multi-instrumental assessment has become more manageable with the support of networked Digital Technologies, especially through virtual learning environments" (CARVALHO; PIMENTEL, 2021, p. 01).

The rubric system is an interesting alternative for the assessment process using technologies, as it can provide an online dashboard of each student's situation, considering the competencies developed—or not—regarding specific knowledge, skills, or attitudes, moving toward a formative evaluation approach (PADILHA, 2021).

Chart 7 presents some teaching strategies and resources for each of the activities of Collaboration and Assessment.

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Chart 7 - Estratégias e Recursos para a Colaboração e Avaliação

ACTIVITY	STRATEGIES	RESOURCES
Colaboration	Preferably promote collaborative work over individual work. Request the documentation of tasks and monitor their progress. Observe how students engage and act within the collaboration process. Create spaces for information exchange and discussions among groups.	Collaborative platforms for online content production. Social networks.
Assesment	Encourage students to contribute, comment on, or evaluate the productions of their peers/groups. Provide both individual and collective feedback. Promote student self-assessment to encourage reflection on their own learning pathway.	Assessment systems in Virtual Learning Environments. Online collaborative rubric platform: CoRubric.

Source: The authors (2025).

Accordingly, the guide has the potential to inspire teachers in the integration of technologies, considering the multiple dimensions of the educational process. Digital Literacy within the educational context enables students to develop learning competencies that are closely aligned with their everyday social skills, expanding their experiences beyond the recreational use of digital resources. A digitally literate individual "will be well-prepared to seize and create the best opportunities for a productive life in a technological and globalized society" (MARTINS; MARTINS; ALVES, 2021, p. 01), and the guide offers teachers pathways for incorporating Digital Literacy into their educational practices.

FINAL CONSIDERATIONS

The guide proposed here aims to promote several dimensions of Digital Literacy within educational processes.

Digital competencies are still rarely taught or explored in the school context, often leaving students to complete their activities without proper instruction or guidance. However, these are sets of knowledge, skills, attitudes, and values that must be developed within the school environment, given that the use of Digital Technologies (DT) by children and adolescents is often associated more with leisure than with knowledge acquisition and production.

Thus, in the context presented here, six major dimensions of the educational process were defined in which DT can be applied to foster digitally literate individuals: access, research, development, socialization, collaboration, and assessment. Access is a fundamental condition for equity in education, as

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underprivileged individuals cannot be excluded from the potential offered by DT. Research must be guided and built together with students, especially in times of generative artificial intelligence, when it may seem that everything is already prepared and finalized. Development focuses on fostering creativity and practical knowledge, which are greatly enhanced through digital resources.

Socialization of what was produced requires careful mediation, ethical responsibility, and appropriate language. Finally, DT offers extensive resources for promoting collaboration among students, enabling them to work together and supporting a continuous, process-based, and formative assessment of their learning.

DT are part of a social process that promotes changes in the ways people think and act. Although not yet fully understood or incorporated into school environments, the advancement of digital resources presents numerous possibilities—as well as many uncertainties—regarding the educational processes that may be adopted.

However, the new generations currently within educational spaces live in an increasingly digital society and, therefore, expect that teaching and learning processes will also involve the use of these technologies. Hence, it is the role of educators within educational spaces to show students that technologies are indeed an important tool to enhance their learning, going far beyond casual use. In this sense, the present guide intends to inspire teachers to develop practices with DT in order to promote digital literacy, considering the wide range of possibilities for their use. It is important to highlight, however, that the potential of DT can be maximized when combined with active teaching and learning methodologies, which require teachers to assume different roles, such as curator, mediator, facilitator, and learning activator, in forming reflective, autonomous, collaborative students who are capable of critically reflecting on and problematizing their reality.

LITERACIA DIGITAL: UM GUIA PARA PROMOVER PRÁTICAS EDUCATIVAS COM TECNOLOGIAS DIGITAIS NA EDUCAÇÃO

RESUMO

As Tecnologias Digitais de Informação e Comunicação (TDIC) têm impactado a sociedade em sua forma de buscar, produzir e disseminar informações e conhecimentos. As mudanças sociais advindas dos avanços tecnológicos requerem que o professor se mantenha constantemente atualizado e promova práticas de literacia digital com seus estudantes, de modo a prepará-los para usar as TDIC de forma mais ampla e aprofundada. Com base nisso, o presente artigo propõe um guia para auxiliar os professores a incentivarem a Literacia Digital dos seus estudantes. O guia foi criado a partir da interlocução de diferentes autores do campo das tecnologias digitais na educação, tais como Manuel Castells, Pierre Lévy, José Manuel Moran, entre outros autores. Também parte da reflexão de práticas educativas desenvolvidas em ações de ensino, de pesquisa e de extensão dos proponentes do guia. Este produto educacional é organizado em cinco eixos de práticas para a promoção da literacia digital: a pesquisa, o desenvolvimento, a comunicação, a colaboração e a avaliação. O guia tem o propósito de inspirar práticas que desenvolvam o pensamento reflexivo dos estudantes, a produção de conteúdos com tecnologias digitais diversas, fomentando sua autoria e protagonismo, a colaboração e a interação nos processos de aprendizagem, a adequada comunicação e disseminação das produções, bem como estratégias de acompanhamento e avaliação das produções. Conclui-se que o uso de TDIC na Educação deve ter clara intencionalidade pedagógica e precisa estar combinada com métodos de ensino que promova a formação de estudantes críticos, autônomos e colaborativos e que saibam refletir, problematizar e criar soluções a partir da realidade.

PALAVRAS-CHAVE: Literacia Digital. Alfabetização e Letramento Digital. Práticas Educativas. Tecnologias Digitais na Educação. Tecnologias Digitais de Informação e Comunicação.

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