

## Digital Literacy: mapping academic research and its relations with educational processes

### ABSTRACT

The integration of Digital Information and Communication Technologies (DICT) in education constitutes a dynamic process that redefines the paradigms of teaching, learning, and understanding of the digital world. In this context, Digital Literacy (DL) emerges as a fundamental competence for the education of critical citizens prepared to face contemporary challenges. Recognizing this importance, this article aims to present an overview of scientific production on Digital Literacy in Brazil through a bibliographic study. The study provides a mapping of academic production, with searches conducted in the Brazilian Digital Library of Theses and Dissertations (BDTD), using an analysis corpus composed of 24 theses produced between 2007 and 2022. The analysis mapped the characteristics of research on Digital Literacy, including the approach to the concept, teaching-learning processes, and teacher education, with the aim of analyzing the implications of scientific production for the field of research. The results indicate a strong concentration of studies on Digital Literacy in the field of Language, as well as a substantial body of knowledge focused on teaching and learning relationships and teacher education, grounded in different theoretical and methodological frameworks. It is identified that the field is expanding, presenting opportunities to broaden research related to the areas of Technology and Education.

**KEYWORDS:** Digital Literacy. DICT. Teaching-learning. Teacher education.

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## 1 INTRODUCTION

In an increasingly connected world, Digital Information and Communication Technologies (TDIC) have become essential tools for the development of society. Fundamental and highly present in forms of communication and knowledge production, TDIC have transformed social life, increasing the challenges for those who seek to use them in an efficient, ethical, and collaborative manner, since such use requires a set of specific competencies.

Reddy *et al.* (2020) highlight that these technologies are part of human life as an acceptable norm embedded in contemporary culture, thus requiring analyses and studies that problematize the ways in which individuals make sense of the uses of TDIC.

Sharma *et al.* (2019) state that TDIC contribute to educational development in its different dimensions, impacting everything from school management to student learning. Therefore, they are directly connected to the field of education. Considering that technologies enable the creation of immersive and interactive learning experiences, stimulating students' curiosity, creativity, and critical thinking, it is necessary to reflect on the ways in which this integration should take place. As pointed out by Rojo (2013, p. 7), it is necessary that "the school institution prepares the population for the functioning of an increasingly digital society and also to seek, in cyberspace, a place to encounter differences and multiple identities in a critical manner".

Ribeiro (2017) observes that the school institution still appears hesitant to incorporate TDIC into routines and pedagogical processes. The author notes that this institution "has entered the discussion, but in a very timid way," due to concerns about admitting technologies into the "intellectual life of children and adolescents (even though young people are already doing so on their own)" (Ribeiro, 2017, p. 31). For the author, TDIC should serve purposes closely related to real-life contexts, emphasizing that their role in educational processes must convey social meanings.

In order to understand these demands, there is an observable investigative trend linked to academic production on the educational field and TDIC, considering both theoretical and practical aspects. Ribeiro (2017) emphasizes that, in academia, this topic has been widely discussed, with reflections ranging "from those that focus on the technical conditions under which this could occur to those that debate concepts and the education of teachers qualified to deal with a new media system" (Ribeiro, 2017, p. 31).

According to Lima and Carvalho (2022), hypertextuality, the functioning and structure of digital texts, as well as cyberactivism, have been some of the themes debated in the academic production of knowledge concerning the relationship between educational processes and digital technology. From this perspective, many studies have sought to understand how educational processes have been appropriating these new elements and skills, analyzing and problematizing the ways in which they are incorporated into pedagogical practices.

It is evident that the incorporation of Digital Information and Communication Technologies into the educational context constitutes a dynamic and multifaceted process, generating significant impacts on pedagogical praxis and learning processes. This integration requires, on the part of students and educators, the

development of new skills and competencies to navigate this constantly changing digital environment. In this sense, Digital Literacy (DL) stands out as a competence that enables the use of TDIC, requiring from individuals not only technical mastery of technological resources, but also a critical and reflective approach to this context.

Digital Literacy encompasses a set of sociocultural skills (Selfe, 1999) that allow individuals to access, analyze, understand, interpret, communicate, and create information in different digital formats in a critical (Freitas, 2010), ethical, and reflective manner, using digital technologies safely and responsibly, thus enabling individuals to act autonomously and participatively in society (Ribeiro, 2009). In this context, DL emerges as a fundamental concept, transcending the mere use of technological tools and involving the critical capacity to produce and share information.

In light of this, this study aims to understand the knowledge produced on Digital Literacy through a survey of academic productions available in the Brazilian Digital Library of Theses and Dissertations (BDTD). The main objective is to present an overview of investigations related to Digital Literacy (DL) by mapping the production of doctoral-level graduate programs, analyzing 24 theses that address this topic.

From this point onward, the article is structured into five sections that address the relationship between Digital Literacy and Education, highlighting how DL can contribute to the improvement of teaching and learning processes, as well as its impact on teacher education. Subsequently, the methodology and investigative procedures employed are presented, accompanied by a detailed characterization of the sample, considering the locations where the 24 theses are concentrated, the Higher Education Institutions (HEIs) with the greatest prominence, and the Graduate Programs (PPGs) in which they are embedded. Finally, an overview of the knowledge produced is presented, emphasizing the relevance attributed by the theses to the theme of Digital Literacy and indicating possible directions for future research.

## **2 DIGITAL LITERACY AND EDUCATION**

Digital Literacy emerges as a crucial theme in the digital era, significantly impacting education and requiring new skills from individuals. Several authors conceptualize and define Digital Literacy (DL) from different perspectives, converging on the need to understand and use digital technologies in a critical, creative, and ethical manner in society.

Digital Literacy is associated with the transformations brought about by the increasing use of Digital Information and Communication Technologies (TDIC) in diverse social and cultural contexts. The concept is often linked to communication operations in digital channels, which require specific skills and competencies. Nascimento and Garcia (2015) mention that these skills and competencies are constantly changing due to the demands of the information society and are related to mastery of reading and writing in a digitally literate world.

Other meanings are also attributed to Digital Literacy. Among them, the ideas of Dudeney *et al.* (2016, p. 17) stand out, who define it as a set of “individual and

social skills necessary to interpret, manage, share, and effectively create meaning within the expanding scope of digital communication channels”.

From a more practical perspective, Xavier (2011) defines Digital Literacy as mastery of the functionality and actions necessary for the efficient use of digital technologies, such as personal computers and mobile phones, among others. From this perspective, Digital Literacy is more closely related to the usability of technological artifacts, requiring specific skills that can be taught and learned.

For Freitas (2010), DL goes beyond the usability of technologies, encompassing a set of competencies aimed at understanding and critically using information, thereby granting autonomy to those who possess them. The author emphasizes that DL refers to the “competencies necessary for understanding and using information (...) critically and strategically, enabling individuals to achieve their objectives and share them socially and culturally” (Freitas, 2010, pp. 339–340).

Thus, DL competencies are also linked to aspects that go beyond the usability of technologies, producing social meanings and expanding the capacities of those who develop them. De Paulo Moura (2019) states that DL is associated with the “mastery and competent use of reading and writing in the face of information and communication technologies, compelling another way of constructing, organizing, and disseminating knowledge” (De Paulo Moura, 2019, pp. 129–130). DL can also be understood as the use of social practices of reading and writing through digital resources, as pointed out by Soares (2014) and Buzato (2006).

It is observed, therefore, that definitions of Digital Literacy converge toward social practices mediated by increasingly complex technologies, consequently requiring new competencies. As emphasized by Rojo, “if contemporary texts have changed, the competencies/capacities for reading and producing texts required to participate in current literacy practices cannot be the same” (Rojo, 2013, p. 8).

Thus, DL is understood as practical knowledge related to skills, competencies, and mastery of the functionality and efficient use of digital technologies to achieve objectives. Communication and the sharing of knowledge are also highlighted, as they generate social and cultural impacts.

In this way, DL assumes a central role in the contemporary educational context, since TDIC are increasingly present in teaching and learning processes, involving the acquisition of skills and competencies, effective communication, the construction of knowledge, and its sharing, among other aspects.

In this sense, many studies have related education and DL from different perspectives, with particular emphasis on those that link DL to reading and writing practices in digital environments. For Ribeiro (2017), new media and new technologies for reading and writing have brought about distinct forms of contact and interaction, whose appropriation occurs through skills developed by individuals, guiding them toward efficient action and communication in these digital environments.

It is therefore evident that Digital Literacy is closely involved in the process of preparing individuals for the use of TDIC, especially with regard to new forms of reading and writing in digital contexts. From this perspective, this study undertakes an investigation into how Digital Literacy has been constituted as an element of analysis in Brazilian educational research, its main approaches and practices, as well as the contexts in which such investigations take place, with the aim of

composing an overview of the field and highlighting gaps and perspectives for expanding existing studies.

### **3 METHODOLOGY AND INVESTIGATIVE PROCEDURES**

This study adopted principles of the narrative literature review, which allows for a comprehensive description of the chosen topic, although it “does not exhaust all sources of information” (Cavalcante; Oliveira, 2020, p. 85), while also enabling a “rapid updating of studies on the topic” (Cavalcante; Oliveira, 2020, p. 85). According to Rother (2007), the narrative review is appropriate for broad, theoretical, or conceptual reflection on a given topic and on what has been produced about it.

In the present study, theses related to Digital Literacy made available in the Brazilian Digital Library of Theses and Dissertations (BDTD) were analyzed. The survey of studies was conducted through a search carried out in February 2023, using the terms “digital literacies” and “digital literacy,” applying the filters “Subject: Digital literacy” and “Document type: Theses”.

The initial search identified 42 documents. Based on Bardin’s (2016) Content Analysis approach, the method followed three main stages. Initially, a floating reading of the materials was carried out for the selection of the texts for investigation, which, after the exclusion of duplicates and other non-relevant materials, resulted in an analysis corpus composed of 24 studies (Appendix 1), produced between 2007 and 2022.

Subsequently, relevant excerpts related to the object of study were selected and read in order to construct a mapping of the knowledge produced. From this procedure, the following categories of analysis emerged: *I – DL and teaching and learning processes; II – DL and areas of knowledge; III – DL and its methodologies; and IV – DL and teacher education*. These categories served as the basis for the organization and qualitative interpretation of the data. The analyzed theses were coded as T1, T2 ... T24.

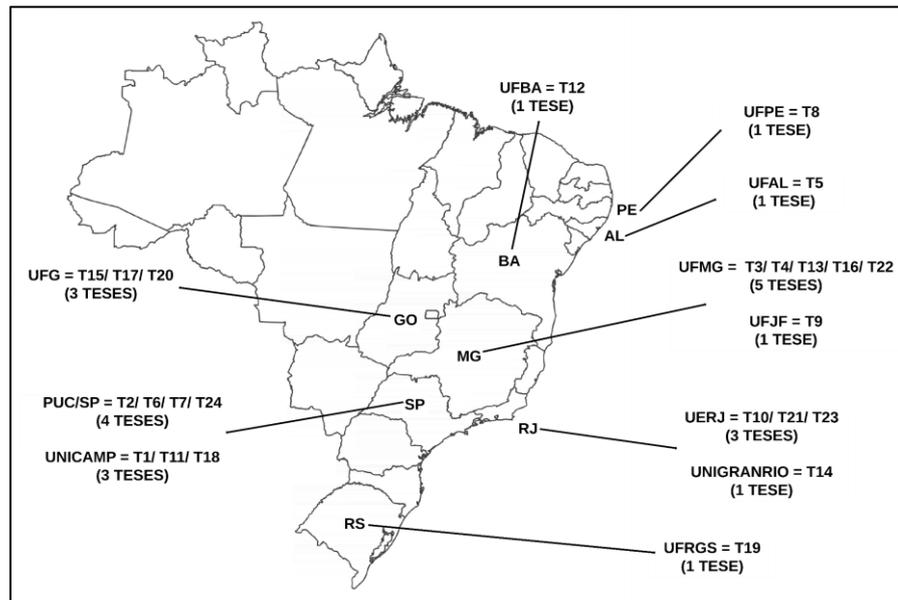
The results reveal a substantial body of research focused on DL, with different approaches and methodological procedures. However, there is a notable emphasis on the number of studies concentrated in the field of investigations addressing the relationship between DL and teaching and learning, whose characterization and analysis are presented in the following sections.

### **4 CHARACTERIZATION OF THE RESEARCH SAMPLE**

For the purposes of contextualizing and characterizing the studies analyzed in this research, aspects related to geographic location, the Higher Education Institutions (HEIs) of origin, the respective Graduate Programs (PPGs), and the year of theses defense were observed in the sample.

Figure 1 presents the distribution of the analyzed theses according to their geographic location and the institutions in which they were produced:

Figure 1 – Geographic and institutional distribution of the sample



Source: Research data (2024).

Based on the figure, it can be observed that there is a significant number of theses produced in the Southeast region, totaling 17 studies. The state of São Paulo stands out, concentrating seven studies, followed by Minas Gerais, with six theses. Therefore, the possibility and/or need to expand research on DL to other geographic regions of the country is evident.

In addition, this analysis raises concerns regarding the low production of theses in certain regions of Brazil, which may be related to limited access to technological resources and to disparities in the mastery and use of TDIC in these contexts.

According to data from the Brazilian Institute of Geography and Statistics (IBGE, 2023), the internet was used in 91.5% of Brazilian households in 2022. However, while the Central-West (94.5%), Southeast (93.4%), and South (93.0%) regions present rates above the national average, the North (88.2%) and Northeast (87.8%) regions show lower percentages. It is possible to correlate these disparities with the levels of research on Digital Literacy conducted in these regions, understanding them as a reflection of the different forms of development and technological access experienced across the country.

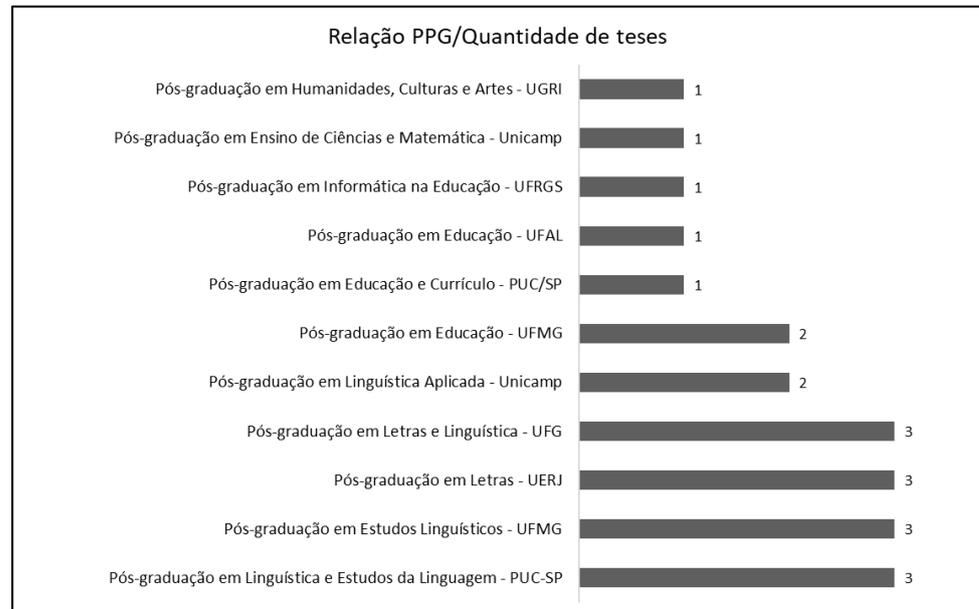
Thus, IBGE research data help explain the disproportionate access to one of the most important technological resources — the internet — which may be related both to the absence of studies and to a possible lag in academic problematization of TDIC. This scenario demonstrates the need to broaden the investigative focus on Digital Literacy in certain states, presenting opportunities for expansion within the field of knowledge.

Regarding the higher education institutions that produce research on the topic, the sample reveals a heterogeneous distribution among different Brazilian HEIs. The analyzed theses originate from 11 different institutions, of which nine are public HEIs and two belong to the private sector. Among these institutions, the Federal University of Minas Gerais (UFMG) and the Pontifical Catholic University of São Paulo (PUC-SP) stand out. Although in smaller numbers, private HEIs account

for approximately 20% of the sample (five theses), which may reveal a trend to be discussed in future studies.

With respect to the graduate programs (PPGs) that support the research, Chart 1 presents the diversity of programs in the sample:

Chart 1 – Graduate Programs in which the theses were produced



Source: Research data (2024).

It is observed that, among the 11 graduate programs identified in the sample, five correspond to the field of Language, focused on Applied Linguistics, Language/Linguistic Studies, and Letters. In the field of Education, four graduate programs were identified, with only one specifically focused on Educational Informatics. These data corroborate the studies by Ribeiro (2009), who states that the concept of literacy is widely employed in academic work within the Brazilian context, especially in studies addressing education and reading practices.

It is noteworthy that, within the sample, there is only one study in the field of Education with a focus on Informatics, which reveals an opportunity to complement and expand this area of investigation, given that the concept of Digital Literacy is directly linked to TDIC. This situation highlights a potential research gap concerning Digital Literacy in graduate programs that integrate education and technology, once again indicating opportunities for research and expansion in this field.

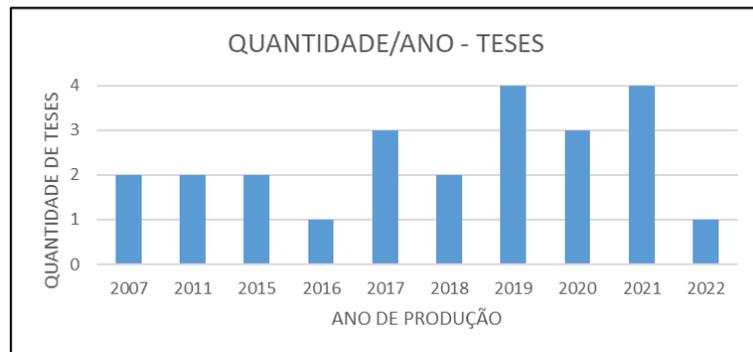
This study is based on the assumption that the context of the higher education institution (HEI) and, in particular, the graduate program in which the thesis is embedded are relevant to the choice of the DL theme. As an example, the Graduate Program in Linguistic Studies at the Federal University of Minas Gerais (UFMG) is highlighted, which comprises three areas, among which Applied Linguistics stands out in this study. This area aims to “elucidate issues related to meaning-making and human communication through theoretical, empirical, and experimental research, as well as issues related to teaching and learning” (Poslin-UFMG, 2024).

This area includes the research line “Language and Technology,” which encompasses studies that problematize the role of technology in mediating the

organization of language, focusing on themes such as “digital and media genres, discursive practices and online education, interaction and media,” and “linguistic manifestations of cyberculture,” among others (Poslin-UFMG, 2024). The existence of this research line favors the attraction and development of studies related to DL, stimulating the production of knowledge in this domain.

Continuing the effort to characterize the sample, Chart 2 is presented, which highlights the period during which the analyzed studies were produced:

Chart 2 – Period of production of research on Digital Literacy



Source: Research data (2024).

The theses listed in this study are situated within the period from 2007 to 2022, presenting intervals that indicate both growth and decline in the number of studies. The years 2017, 2019, 2020, and 2021 stand out as those with the highest number of theses. It is noteworthy that the figure recorded in 2022—with only one thesis—may not represent a decrease in research on the topic, but rather indicate the need to update the consulted database, in addition to reflecting the impacts of the previously experienced pandemic period.

In some theses defended between 2020 and 2022, a period marked by the COVID-19 pandemic and its repercussions, it is possible to identify, in the introductory texts, elements that demonstrate how this context impacted the research, especially with regard to the use of digital technologies and, consequently, the concept of Digital Literacy embedded in the studies, as evidenced by arguments presented in some of these theses.

For example, in study T22, the author states that, during the process of finalizing her research, she encountered the suspension of the 2020 academic year due to the COVID-19 pandemic. As a result, the mediation of the video production used in the thesis had to be carried out through digital resources, such as *WhatsApp* and *Google Meet*.

Thesis T20 states that concerns regarding Information and Communication Technologies (ICT) anticipated practices that became frequent during the COVID-19 pandemic and, consequently, in the context of distance learning. A similar situation is described in study T23, in which the author states that it was necessary to alter the data collection methodology due to the COVID-19 pandemic in order to ensure safety in the development of the research.

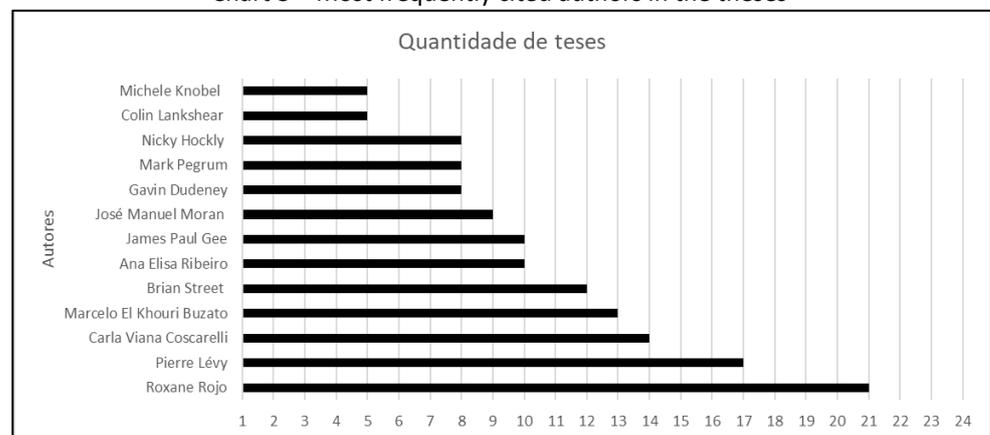
Arguments related to situations of digital exclusion are also presented, as in thesis T17, which emphasizes that the pandemic aggravated “dehumanizing scenarios.” The author criticizes the use of technologies for the dissemination of

fake news and the extent to which this problem compromises access to quality information, in addition to the risks of exposure to the virus that such fake news entail.

Thus, it is observed that the production during this period was affected by the restrictions imposed by the pandemic on educational spaces. However, this context also gave rise to developments and problematizations related to the topic, which may continue to emerge in the coming years.

Still within the effort to characterize and present an overview of the field of investigation, the study sought to identify other points of convergence among the theses, which became evident in the recurrence of certain authors who guide and underpin the studies. Accordingly, Chart 3 synthesizes the most frequently cited authors across the theses, considering only those whose contributions fall within the fields of literacy, multiliteracies, digital literacies, TDIC, and other theoretical aspects related to technology and its relationship with society and/or education.

Chart 3 – Most frequently cited authors in the theses



Source: Research data (2024).

There is, therefore, a significant association among the theses with regard to the authors who underpin the studies. This association highlights the existence of a core group of authors whose reflections and works are fundamental for grounding discussions aimed at the construction of knowledge on the topic of DL, thus serving as a foundation for new investigations. Among these authors, Roxane Rojo, Pierre Lévy, and Carla Coscarelli stand out.

It is worth noting that, among the theses in the sample, the researcher Marcelo Buzato—the author of thesis T1—is cited in another 13 theses analyzed in this article, which reveals the importance of his reflections and scholarly contributions to the field of DL. These data demonstrate that the scientific knowledge production carried out in graduate programs is significant and impactful, serving as a reference to foster further research across a diversity of graduate programs (PPGs) and higher education institutions (HEIs).

It is also emphasized that the very sample analyzed in this article can be understood as a relevant body of knowledge, capable of serving as a starting point for even greater advances in research, and also constituting an important reference with regard to the main investigations on Digital Literacy in Brazil.

## 5 OVERVIEW OF KNOWLEDGE ON DIGITAL LITERACY

Through the reading of the analysis corpus, the study sought to reveal the meanings attributed to Digital Literacy (DL) by researchers, aiming to understand the scenario constituted by the studies. Such understanding is important for identifying trends, gaps, and opportunities for expanding the field of research that articulates DL and teaching–learning processes, in addition to highlighting an existing body of knowledge that can be adapted to different educational contexts and demands.

Based on Bardin's (2016) methodological framework, four categories of analysis emerged, which are presented as a relevant strategy for constructing the investigative overview. The categories of analysis are: *I – DL and teaching and learning processes; II – DL and areas of knowledge; III – DL and its methodologies; and IV – DL and teacher education*. It is worth noting that these categories are not mutually exclusive, and a single thesis may fall into two or more of them.

Through these categories, the study seeks to understand the meanings attributed to DL and how it has been conceived in the educational context, with a focus on teaching and learning processes. Thus, the aim is to observe different approaches, highlight methodologies, and analyze their impacts on the relationship between education and technology, as well as on the education of individuals—especially teachers—for the effective development of DL skills and competencies.

### 5.1 Category 1 – Digital Literacy and teaching and learning processes

The first category of analysis addresses DL as mobilized within research contexts focused on teaching and learning processes. Based on the reading of the thesis abstracts, 22 studies were identified that fall within this category, allowing for the identification of trends in how DL is addressed in teaching–learning processes.

The integration of technologies in education, innovation, and their impacts is observed, with an emphasis on the use of digital technologies as pedagogical resources, as in the case of study T2; reflections on the effectiveness of writing instruction methodologies through digital resources (T20); as well as research related to specific objects and areas of knowledge. From this perspective, studies were identified that address analyses of digital natives and immigrants and discussions on the impacts of Digital Information and Communication (TDIC) (T6); understanding how the appropriation of Information Technology is reflected in teaching–learning processes of reading and writing (T17); textual practices carried out in online environments and their dialogue with the work of Machado de Assis (T9); the role of multiliteracies in the teaching and learning of literature (T10); and reflections on how reading and textual genres typical of print media are impacted and transformed when virtualized (T23).

Such studies reveal the multiplicity and complexity of research on Digital Literacy, as they are developed in different contexts. There is also an emphasis on didactic resources that promote the development of skills related to DL, such as in study T7, which presents a mapping and description of digital literacy competencies in the development of educational materials, and in study T12,

which offers reflections on the didactic treatment of discursive genres in textbook collections.

Within the scope of teaching and learning processes from a Digital Literacy perspective, it was also possible to identify studies that analyze the mismatch between educational legislation for upper secondary education and the documents regulating initial teacher education with regard to technology integration, as evidenced in thesis T14.

Another educational stage addressed in the set of analyzed studies was Early Childhood Education, as shown in study T4, which discusses the implications of the potential use of computers in the initial literacy period, and in study T5, which presents reflections on children's relationship with mobile device technology (tablets).

With regard to Higher Education, one study (T13) was identified that analyzes the skills and strategies of undergraduate students when performing reading and internet navigation tasks for academic purposes. Study T15, in turn, examines reading and writing in the university context, focusing on the production of textual genres in relation to Information and Communication Technologies (ICT).

Based on the assumption that Digital Literacy is not merely a cognitive process, study T11 investigates DL practices developed by individuals with little or no knowledge of computing. Study T22, in turn, highlights the importance of systematic mediation carried out by teachers in guiding the use of the internet as a source for school research.

These elements demonstrate that, in teaching and learning processes mediated by TDIC, it is necessary for teachers to have knowledge of the dimensions and implications of technologies in the educational process, which underscores the importance of DL in this context. In this regard, thesis T19 investigated the trajectory of teachers from digital alphabetization to the achievement of Digital Literacy.

From this perspective, among the analyzed theses, studies were identified that address the constitution of discursive practices in virtual learning environments among pre-service teachers, as expressed in thesis T3. These factors are also connected to study T16, which mapped and problematized the personal and professional Digital Literacy profile of teachers.

The theme of teacher education proved to be highly recurrent in the studies within this category. Among the research, emphasis is placed on studies that problematize DL in initial teacher education programs (T18), investigate how reading in digital environments is introduced and addressed (T21), and point to innovative pathways—such as in T24, which proposed digital photography as a resource for the construction of teacher identity.

It is therefore observed that DL has an intrinsic relationship with teaching and learning processes in the digital era, highlighting the need for adequate teacher education and practices that enable the development of skills that go beyond the technical mastery of technologies. The multiplicity of themes and approaches reveals numerous possibilities for the research field, as well as opportunities for continuity and improvement of studies from the perspective of teaching and learning.

## 5.2 Category 2 – Digital Literacy and areas of knowledge

The second category of analysis groups the theses in which it was possible to identify a subject or area of knowledge from which Digital Literacy skills were addressed, as presented in Table 1:

Table 1 – Disciplines/areas of instruction of the theses

Discipline/ Area of Instruction	Theses
English	T2, T7
French	T21
Pedagogy	T3, T4, T5
Letters/Linguistics	T8, T13, T15, T23
Portuguese Language/ Literature/ Writing	T12, T14, T16, T9, T10, T17, T20
Computer Science/ Informatics	T11
Sciences (Biological Sciences/ Chemistry)	T18

Source: Research data (2024).

A strong tendency can be observed toward addressing DL in disciplines involving the teaching of reading and writing, with particular emphasis on Portuguese Language, which underscores the importance of DL in the development of these practices in digital environments. It is reiterated that only one thesis is related to the teaching of Informatics, which may suggest the need to expand studies that mobilize DL in methodologies aimed at fostering the competencies already mentioned in this article, especially considering reflections by authors who advocate the “use of information through the computer–internet” (Freitas, 2010) and proficiency in the “efficient and rapid use of equipment equipped with digital technology, such as personal computers and mobile phones” (Xavier, 2011).

Another point of emphasis concerns the teaching of Natural Sciences, since only one thesis falls within this area. Attention is also drawn to the absence of research in the field of the Humanities, which represents a relevant gap in the research field. Thus, opportunities emerge for studies that discuss the promotion of DL in education in a broader sense, expanding and fostering reflections that are not restricted to specific areas of knowledge and that encompass different educational stages and modalities.

## 5.3 Category 3 – Digital Literacy and its methodologies

For the third category of analysis, the aim was to gather studies that reveal the ways in which Digital Literacy is addressed, with particular emphasis on its methodological aspects. Considering the characteristics of doctoral research in Brazil, it is observed that investigations on the topic of Digital Literacy mobilize processes of knowledge construction and sharing by researchers within their different contexts. In Table 2, the theses that present these characteristics are listed, as well as the approach adopted in each study with regard to the mobilization of knowledge about DL:

Table 2 – Main approaches in investigations on DL

Course/Training	Thesis
Online course developed by the author	T2
Learning pathway workshops	T5
Continuing education course for the development of digital educational materials	T7
Course for the use, enhancement, and diversification of digital technologies for teaching	T16
Blended-learning course and continuing education in active methods mediated by ICT	T19
Online writing course	T20
Teaching project	T22

Source: Research data (2024).

The variety of strategies and methodologies proposed in the sample for the enhancement of Digital Literacy reveals that this form of literacy can contribute significantly to fostering the skills and competencies required by individuals involved in educational processes impacted by the use of Digital Information and Communication Technologies (TDIC). Such practical experiences can be replicated in contexts similar to those of the authors, provided that they are appropriately adapted to the specific needs of each reality.

These methodologies can also serve as a basis for the construction of other diversified strategies capable of meeting the demands of educational contexts different from those presented in the theses analyzed in this article, thus enabling the expansion of investigations and contributing to the continuous development of the research field.

#### 5.4 Category 4 – Digital Literacy and teacher education

Based on the reading of the abstracts, it is observed that the studies included in this category reiterate the need to prepare teachers for the use of Digital Information and Communication Technologies, emphasizing that teacher education should include the development and appropriation of Digital Literacy skills and competencies. In this way, they align with the perspectives discussed in this study, especially when DL is understood as: competencies for understanding and using information through computer use; skills necessary for operating efficient communication in digital or virtual environments; and competent mastery of actions developed through Digital Information and Communication Technologies.

Table 3 highlights the theses that proposed or analyzed courses/training programs as strategies aimed at teacher education and innovation in the teaching and learning process, contributing to the production of social and cultural meanings.

Table 3 – Themes of the training programs proposed in the theses

Objective	Strategy	Thesis
Training for the pedagogical use of <i>Microsoft</i> applications ( <i>Word</i> , <i>Paint</i> , and <i>PowerPoint</i> ) and for the creation of what the author referred to as <i>WebPages</i> , combined with the use of the Internet as pedagogical resources.	Online course proposed by the author	T2
Monitoring the initial education of undergraduate students to investigate existing discursive practices among these individuals in order to understand the relationship between text authorship and DL.	Virtual learning platform	T3
Investigating the contributions of the course to teachers' DL. Training teachers to develop digital competencies aimed at the creative and innovative use of Digital Information and Communication Technologies in the development of Digital Educational Materials.	Course "Development of Digital Educational Materials – Basic Level" – Continuing education	T7
Identifying the relationship between teachers' personal and professional profiles, recognizing their important role in the teaching–learning process of reading and writing through digital social practices. Encouraging teachers to acquire competencies to use, enhance, and diversify digital technologies in teaching practices.	Teacher education course	T16
Facilitating the trajectory of digitally migrant teachers from digital alphabetization to Digital Literacy.	Blended-learning course / Continuing education in active methods / Flipped classroom	T19
Understanding how technology-mediated reading is introduced and addressed in teacher education.	Teaching practice / Supervised internship	T21

Source: Research data (2024).

It can be observed that most of the theses listed in this category proposed or analyzed practical and specific courses and training programs aimed at stimulating and strengthening DL, so that teachers may become active agents in the challenging process that encompasses education and Digital Information and Communication Technologies (TDIC).

Other theses, in turn, propose methodologies focused on teacher education, though not necessarily through structured courses or formal training programs. As an example, thesis T14 is highlighted, which included, among its research stages, the analysis of educational documents in order to understand how DL was addressed in these materials, which underpin guidelines and educational policies in initial teacher education.

In study T18, the assumption was that there is a social and technological context that exerts pressure on teachers to use new media in their pedagogical activities; the investigation sought to understand what type of DL would be necessary for the exercise of teaching.

In thesis T24, the author advocates the use of digital photography as an instrument capable of contributing to the construction of teachers' professional identity through memory. The methodology involved the participation of education professionals who narrated their life stories based on photographic archives, relating photographic memories to the formation of professional identity.

Considering the entire analysis undertaken in this investigation, it is evident that the knowledge produced across the theses presents a significant degree of convergence, since most of them relate DL to the teaching and learning process, fostering the development of skills and competencies—as demonstrated in the analytical categories. The reflections proposed in the theses also align with the ideas of the authors used as the theoretical framework in this article, especially in their defense of the efficient use of TDIC, meaning-making, and the sharing of knowledge in the educational context.

Despite this convergence, the theses, in their specificities, also present considerable diversity, as they address different research problems or develop themes involving theoretical or instrumental aspects—such as legislation and textbooks—across different educational segments, including Early Childhood Education, Secondary Education, Higher Education, and Youth and Adult Education. Furthermore, these studies target the Digital Literacy of different groups of individuals, with particular emphasis on teacher education.

Another relevant aspect of this diversity concerns methodologies developed for specific disciplines, such as English or French. There is also a notable concentration of research in the field of Portuguese Language, with theses focused on reading, writing, the teaching of literature and composition, among other aspects related to DL. These findings corroborate the reflections of authors cited in this article, such as Ribeiro (2017) and De Paulo Moura (2019).

It is evident that the knowledge produced in the theses can be used both for reflection and for practice in different educational contexts, contributing to the process of Digital Literacy for different individuals in varied social and cultural circumstances. Such production enables individuals to “create meaning within social communication channels” (Dudeny *et al.*, 2016) and to “act and communicate efficiently in digital environments” (Ribeiro, 2017).

Finally, in light of the richness of approaches and meanings attributed to Digital Literacy, it is evident that this topic can be further explored in research within the fields of Exact Sciences and the Humanities, thus expanding the scope of investigation. There are also opportunities for research that integrate Digital Literacy and education from a broader perspective, a demand that could be addressed by a greater number of graduate programs in Education.

## 6 FINAL CONSIDERATIONS

This article highlighted the growing importance of Digital Information and Communication Technologies (TDIC) for communication in contemporary society, characterized by intense hyperconnectivity, relating these technologies to the educational context. Based on the assumption that Digital Literacy is fundamental in this scenario, this study aimed to understand the panorama of academic research related to this topic.

In order to outline this panorama, the study delimited research conducted within *stricto sensu* Graduate Programs, specifically at the doctoral level, with the aim of mapping theses produced with a focus on DL. The analysis corpus consisted of 24 theses defended between 2007 and 2022, from which it was possible to identify relevant trends.

The categorization of the sample showed that the Southeast region concentrates the majority of the studies, which made it possible to observe a shortage of research in other regions of the country. This finding may be associated with disparities in the distribution of technological and academic resources, thus prompting new investigations that take diverse regional contexts into account.

It was also possible to observe that the structure of Graduate Programs, as well as their research lines and groups, exerts a significant influence on the choice of Digital Literacy as a research theme—an aspect clearly identified in the theses produced at the Federal University of Minas Gerais (UFMG). Overall, the Graduate Programs that presented the highest number of theses are linked to the fields of Letters and Linguistics, evidencing a strong association between DL and studies related to reading and writing practices.

Among the set of analyzed theses, a strong connection between DL and teaching and learning processes also stands out, as evidenced by the proposal of a significant variety of methodologies aimed at developing DL skills and competencies, especially in the areas of reading and writing and teacher education.

Thus, the analysis demonstrates that the research panorama presented reveals both consolidated trends and investigative gaps, which may be seen as incentives for conducting new studies in different regions of Brazil and in other Graduate Programs and Higher Education Institutions. In this context, the need to expand research in the field of Sciences is emphasized, as well as the absence of investigations within the scope of the Humanities.

It is concluded that Digital Literacy has been closely associated with education and teaching and learning processes, constituting a productive field for the generation of relevant, innovative, and applicable knowledge across diverse educational contexts. Nevertheless, the topic still holds potential for reflection and application in other areas of education, raising new questions that may be explored in future investigations with a view to expanding the research field.

# LETRAMENTO DIGITAL: MAPEAMENTO DAS PESQUISAS ACADÊMICAS E SUAS RELAÇÕES COM OS PROCESSOS EDUCATIVOS

## RESUMO

A integração das Tecnologias Digitais de Informação e Comunicação (TDIC) na educação configura-se como um processo dinâmico que redefine os paradigmas de ensino, aprendizagem e compreensão do mundo digital. Nesse contexto, o Letramento Digital (LD) emerge como uma competência fundamental para a formação de cidadãos críticos e preparados para os desafios contemporâneos. Reconhecendo essa importância, este artigo tem como objetivo apresentar um panorama da produção científica sobre Letramento Digital no Brasil, por meio de uma pesquisa bibliográfica. O estudo apresenta um mapeamento da produção acadêmica, com buscas conduzidas na Biblioteca Digital Brasileira de Teses e Dissertações (BDTD), utilizando um corpus de análise composto por 24 teses produzidas entre 2007 e 2022. A análise mapeou as características das pesquisas sobre Letramento Digital, incluindo a abordagem do conceito, os processos de ensino-aprendizagem e a formação de professores, com o objetivo de analisar as implicações da produção científica para o campo de investigação. Os resultados apontam que há grande concentração de estudos sobre Letramento Digital no campo da Linguagem, bem como uma profícua produção de conhecimento voltada às relações de ensino e aprendizagem e à formação de professores, fundamentada em diferentes aportes teóricos e metodológicos. Identifica-se que o campo encontra-se em expansão, apresentando oportunidades de ampliação das pesquisas voltadas às áreas de Tecnologia e Educação.

**PALAVRAS-CHAVE:** Letramento Digital. TDIC. Ensino-aprendizagem. Formação de professores.

## NOTES

AUTHOR 1: Conceptualization, survey of theses, and manuscript writing.

AUTHOR 2: Methodology refinement, supervision, and manuscript writing.

AUTHOR 3: Advising, revision, and manuscript writing.

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**APPENDIX 1**

Code	Thesis Title	Author	Year
T1	Between the border and the periphery: language and literacy in digital inclusion	Marcelo El Khouri Buzato	2007
T2	Technological training and the English teacher: exploring levels of digital literacy	Cynthia Regina Fischer	2007
T3	Digital literacy in contexts of authorship on the internet	Zulmira Medeiros Roque	2011
T4	Influences and convergences of the use of digital writing media in the literacy of children in the 1st year of the first cycle	Julianna Silva Gloria	2011
T5	Touching and uncovering: a study with young children and mobile devices	Cleriston Izidro dos Anjos	2015
T6	<i>Digital natives versus digital immigrants: an interpretivist analysis of differences in the use of ICT in everyday life and perceptions of contemporary education</i>	Clara Vianna Prado	2015
T7	<i>Contributions of the course "Development of Digital Educational Materials – Basic Level" to the digital literacy of English teachers   Simone Telles Martins Ramos</i>	Simone Telles Martins Ramos	2016
T8	Cyber-article: a model of (hyper)textual production in online scientific communication	Lucas Pazoline da Silva Ferreira	2017
T9	Reading Machado / accessing Machado: reinvention of the Machadian classic in cyberspace	Marina Leite Gonçalves	2017
T10	Literature teaching and multiliteracies	Luciana da Silva Dias Messeder	2017
T11	Digital literacy practices: learning to use the computer in a telecenter in Campinas	Rodrigo Prates Campos	2018
T12	The approach to discursive genres in Portuguese language textbooks in the final years of elementary education: the challenge of didacticizing digital discursive genres	Verena Santos Abreu	2018
T13	Digital literacy and academic literacy: navigation and reading strategies of undergraduate students in Letters	Leila Rachel Barbosa Alexandre	2019
T14	Digital literacy and educational guidelines: digital reading and writing in secondary education	Elaine Vasquez Ferreira de Araujo	2019
T15	Interlocution between academic literacy and digital literacy: the effects of new technologies on reading and writing habits	Guido de Oliveira Carvalho	2019
T16	Digital literacy of Portuguese language teachers: scenarios and possibilities for teaching and learning through the use of Digital Information and Communication Technologies	Josiane Brunetti Cani	2019
T17	Dialogism and virtual environments: empowerment and citizenship in literacy processes at UFG	Rosângela Costa da Silva	2020

Code	Thesis Title	Author	Year
T18	The use of new media in the education of science teachers: investigating the digital literacy of teacher educators	José Adolfo Mota de Almeida	2020
T19	Praxital Literacy: an approach to mobilizing teachers' knowledge, skills, and attitudes to enhance pedagogical practice mediated by ICT	Ernesto Javier Fernandez Tovar	2020
T20	Writing development: digital literacy as a teaching strategy	Carolina Santos Melo de Andrade	2021
T21	Reading education and digital literacy of French teachers in the context of teaching practice	Patricia Ana Wechsler	2021
T22	Teacher mediation in web-based school research processes: strategies for the development of digital literacy	Roberta Garcia	2021
T23	Reading textual genres in digital environments: the category of digital immigrant analyzed through the comprehension of exploratory hyperfiction	Viviane da Silva Santos	2021
T24	Digital photography and the construction of educator identity	Cláudia dos Santos Almeida	2022

Source: Research data (2024).