

Official documents on digital education in Higher Education in Brazil and Portugal: Content Analysis

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Abstract

Introduction: This study explores the intersection between education and ICT in Higher Education, focusing on the digital transition (DT) and the development of digital skills (DC), as essential factors to modernize education and promote social and digital inclusion, through a comparison between Brazil and Portugal. **Background:** This qualitative research analysis Brazilian and Portuguese official documents, through an exploratory research, collected, categorized and organized on the NVIVO 14 platform. Bardin's Content Analysis was employed to interpret the data, allowing a view of these documents on DT and DC in both countries. **Discussion:** The analysis of the documents showed differences and similarities between Brazil and Portugal regarding DT and CD in higher education. Portugal stands out for more robust policies, while Brazil faces challenges in terms of teachers continuing education and inequality.

Keywords: Educational documents; higher education; Brazil & Portugal; digital transition; digital skills.

Documentos oficiais sobre educação digital no Ensino Superior no Brasil e Portugal: Análise de Conteúdo

Resumo

Introdução: Este estudo explora a intersecção entre educação e TIC no Ensino Superior, com foco na transição digital (TD) e no desenvolvimento de competências digitais (CD), como fatores essenciais para modernizar a educação e promover inclusão social e digital, por meio de uma comparação entre Brasil e Portugal. **Metodologia:** Essa pesquisa qualitativa utiliza análise de documentos oficiais brasileiros e portugueses, através de uma pesquisa exploratória, coletados, categorizados e organizados na plataforma NVIVO 14. A Análise de Conteúdo de Bardin foi empregada para interpretar os dados, permitindo uma visão desses documentos sobre TD e CD nos dois países. **Discussão:** A análise dos documentos evidenciou diferenças e semelhanças entre Brasil e Portugal sobre TD e CD no ensino superior. Portugal se destaca por políticas mais robustas, enquanto o Brasil enfrenta desafios em termos formação continuada de professores e inovação pedagógica.

Palavras-chave: Documentos oficiais; ensino superior; Brasil e Portugal; transição digital; competência digital.

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Introduction

The intersection between education and Information and Communication Technologies (ICT) highlights the importance of solid educational documentation to guide the Digital Transition (DT) in higher education. In the current scenario, marked by rapid technological transformations and the growing demand for digital inclusion, higher education is faced with challenges that go beyond national borders, requiring policies and practices aligned with an increasingly globalized reality. Institutions are adapting not only to new teaching modalities, such as hybrid and remote teaching, but also to the development of Digital Competencies (DC), which are fundamental for the training of professionals prepared for today's job market. DCs are essential for citizens to be able to actively participate in the digital society (Ferrari, 2012), which reinforces the need for a structured approach to digital training in the academic environment (European Commission, 2020a).

DT impacts education by integrating ICT into the pedagogical and administrative spheres, as highlighted by the European Commission (2021). This process goes beyond the simple adoption of technologies, involving practical implications such as the need for teacher training, curriculum review, and adaptation of institutional infrastructure.

In this context, DT can be understood as the process of comprehensively integrating ICT into educational systems, with regard to structural, pedagogical and cultural changes that transform the ways of teaching, learning and managing institutions (Redecker, 2017; Ghomi & Redecker, 2019).

DCs, in turn, are a set of knowledge, skills and attitudes necessary for the critical, ethical, and creative use of digital technologies, ranging from instrumental skills to dimensions related to digital citizenship and innovation (Carretero et al., 2017; Moreira et al., 2020).

According to the Portuguese Charter of Human Rights in the Digital Age, "Everyone has the right to education for the acquisition and development of digital skills" (Assembleia da República, 2021, p. 5), highlighting the need for programs that

facilitate the population's access to digital tools, ensuring education through the internet.

In Brazil, policies such as the Brazilian Strategy for Digital Transformation (MCTIC, 2018) and the Connected Education Program (Programa Educação Conectada) (MEC, 2020) have sought to expand access, connectivity and teacher training, despite persistent regional inequalities (Valente et al., 2017; Loureiro et al., 2020). In Portugal, initiatives such as the Action Plan for the Digital Transition (Council of Ministers, 2020) and the Digital Training for Schools (Directorate-General for Education, 2023), and at European level, the Action Plan for Digital Education 2021-2027: Resetting Education and Training for the Digital Age (European Commission, 2020) show efforts to universalize access to technologies and strengthen teachers' and students' digital skills (Moreira et al., 2020; Almeida et al., 2025).

The official documents do not just regulate practices, but also establish guidelines for digital education, promoting inclusion and equity (UNESCO, 2023). These documents serve to ensure that access to ICT does not perpetuate inequalities (OECD, 2023). The modernization of higher education therefore requires constantly updated educational policies to prepare educators and students for the challenges of the digital age (Bressan et al., 2025; Hassan, 2023).

Various studies have analyzed the role of ICT and DCs, such as Redecker's (2017) studies on the structuring of educators' digital competences. More recent studies reinforce the relevance of the discussion, pointing out advances and limitations of educational digitization after the pandemic, especially in relation to equity, accessibility, and pedagogical innovation (Bressan et al., 2025; Luna & Breternitz, 2021; Mendes et al., 2021; Schneider et al., 2020; Silva et al., 2022; Siqueira & Vasconcelos, 2023).

However, there are still gaps in comparative analyses between countries that share cultural and linguistic heritages, such as Brazil and Portugal, especially with regard to the interpretation and application of official guidelines in different educational contexts. In addition, there is a need to deepen the core concepts of this research, such as DT and DC, understanding them not only as

technological phenomena, but as socio-cultural constructions influenced by public policies, institutional practices and 21st century demands.

DigCompEdu (Redecker, 2017), which has guided digital competence policies in different countries and enables informed comparative analyses. The justification for the research is based on the need to understand how two countries with a common historical and cultural tradition, but with different socio-economic and cultural realities, structure their digital education policies, contributing to the international debate on equity and innovation in higher education.

Thus, we start from the recognition of these gaps to outline the objective of the article, which is to analyze how Brazil and Portugal integrate ICT in higher education through the analysis of official documents, identifying similarities and differences in the approaches to DT and DC (Bressan et al., 2025). The aim is to promote a critical and grounded understanding of the implementation of digital education in different national contexts, contributing to theoretical and practical advances in the field of educational policy.

Methodology

Methodological Design

This qualitative study carried out a narrative literature review (Mattar & Ramos, 2021), focusing on the analysis of official documents related to the DT and DC in higher education in Brazil and Portugal. The aim was to understand how these policies have been formulated, implemented, and discussed in both contexts, in line with the general objective presented in the introduction.

A narrative review is a methodological approach that aims to synthesize and critically interpret information obtained from documents and sources (institutional, legal, and political) without following rigid systematic protocols (Mattar & Ramos, 2021). Although it is not systematic in the strict sense, clear rigorous criteria were applied (inclusion, exclusion, triangulation, and validation of the corpus), ensuring transparency and consistency in the analysis (Baethge et al., 2019; Greenhalgh et al., 2018).

The choice of this methodology is justified by the qualitative and exploratory nature of the study, which seeks to interpret, according to Santos and Pedro (2023), the complexity of public policies and their impacts on teacher training, infrastructure, digital inclusion, and institutional practices, encouraging critical reflection on digitization in higher education.

The narrative review is suitable for analyzing public policies on the DT and DC in higher education, as it adopts a contextual, historical, and interpretative approach, integrating multiple sources and overcoming the limitations of systematic reviews (Pedro et al., 2021). In the cases of Brazil and Portugal, it allows us to understand how legal frameworks, strategic plans, and educational guidelines orient DT and the development of DCs (Bressan et al., 2025), highlighting trends, gaps, and convergences (Mattar & Ramos, 2021).

Sources and Selection Criteria

The documents were retrieved through exploratory searches in institutional sources, such as the official websites of the Brazilian Ministry of Education, the Portuguese Directorate-General for Education, and the European Union, as well as institutional repositories. The documents were selected and collected between June and August 2024, with a time frame from 2014 to 2024, in order to include the main recent regulatory and strategic milestones on the subject of DT and DC.

The following descriptors were used in the searches: "official documents," "higher education," "digital education," "digital transition," and "digital competence," aimed at selecting documents with direct relevance to the analysis of educational policies on DT and DC.

The inclusion criteria were: (a) official documents of a regulatory, strategic, or guiding nature; (b) published by government bodies; (c) between 2014 and 2024; and (d) which directly addressed DT and/or DC in higher education.

The exclusion criteria included: (i) duplicate documents; (ii) opinion texts without institutional backing; (iii) materials aimed exclusively at basic education. Unlike the initial statement, these criteria were not only listed, but actually

applied during the reading and classification of the documents, leading to the exclusion of 28 materials and the retention of 19 for in-depth analysis.

Corpus and Data Organization

A total of 47 documents were selected, organized by country (Brazil and Portugal) and imported into NVIVO 14 software, which made it possible to manage, code, and categorize the documentary corpus.

Analysis Procedures

The data was analyzed using [Bardin's \(2020\)](#) Content Analysis (CA), a method suitable for interpreting normative texts, as it makes it possible to highlight meanings, inferences, and patterns in political and educational documents. The process followed three classic stages of CA ([Bardin, 2020](#)): i. pre-analysis, with floating reading and selection of the material; ii. exploration of the material, with coding and thematic categorization; and iii. treatment of the results, inference and interpretation.

The analytical logic was hybrid, combining inductive and deductive movements. The inductive movement occurs when categories emerge from reading the material, i.e. when patterns, themes, and meanings are constructed based on the empirical evidence found in the documents. The deductive movement corresponds to the application of previously defined categories based on theoretical references and concepts that have already been consolidated—in this case, the DT and DC constructs, which were previously explained in the introduction section, and were broken down into four analytical sub-dimensions: public policies, teacher training, digital inclusion, and technological infrastructure. Thus, while the inductive approach expands the possibility of new interpretations based on the data, the deductive approach guarantees theoretical anchoring and coherence with the state of the art.

"Reading triangulation" consisted of the combined use of different interpretation and validation strategies: (a) independent reading by the researchers; (b) comparison of the codings in the NVIVO 14 software; and (c) discussion of

divergences until consensus was reached. This procedure ensures greater reliability since it reduces individual biases and promotes multiple perspectives on the same data.

In this triangulation process, the inductive and deductive movements manifested themselves in an articulated way: during the independent readings, the inductive movement prevailed, in which each researcher identified emerging meanings in the documents; in the comparison of the codings, the deductive movement was mobilized, when the pertinence of the findings in relation to the previously defined theoretical categories was verified; and finally, in the discussions for consensus, both movements were combined, articulating the originality of the emerging interpretations with the theoretical-analytical reference framework.

Quality Criteria

Methodological rigor criteria were adopted, such as:

- Data triangulation;
- Validation of the corpus by reapplying the selection criteria;
- Cross-checking of the coding in NVIVO;
- Theoretical saturation in the identification of categories*.

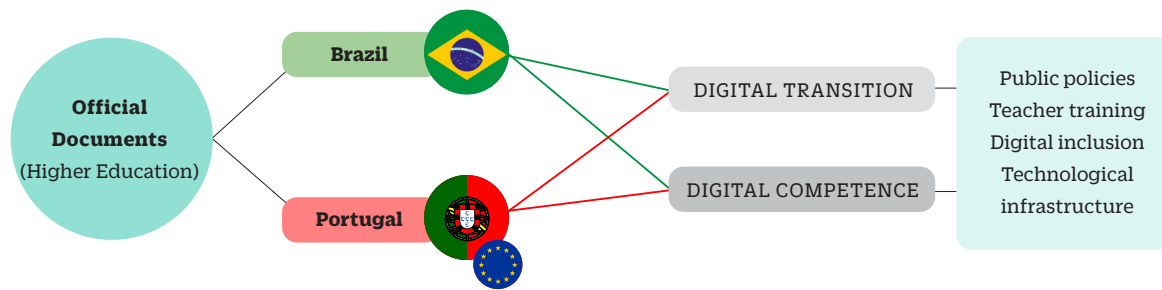
* **NOTE:** Theoretical saturation refers to the point at which the analysis of the documents stops adding new elements to the categories, indicating that these are already consolidated and sufficiently supported by empirical and theoretical evidence ([Flick, 2009](#)).

Ethical Aspects

The study respected the ethical principles of documentary research, ensuring the exclusive use of public, official, and open-access sources, without manipulating the data. The integrity and authenticity of the documents were preserved. In accordance with the guidelines of Resolution 510/2016 of Brazil's National Health Council (2016), research using exclusively public data is exempt from approval by an ethics committee.

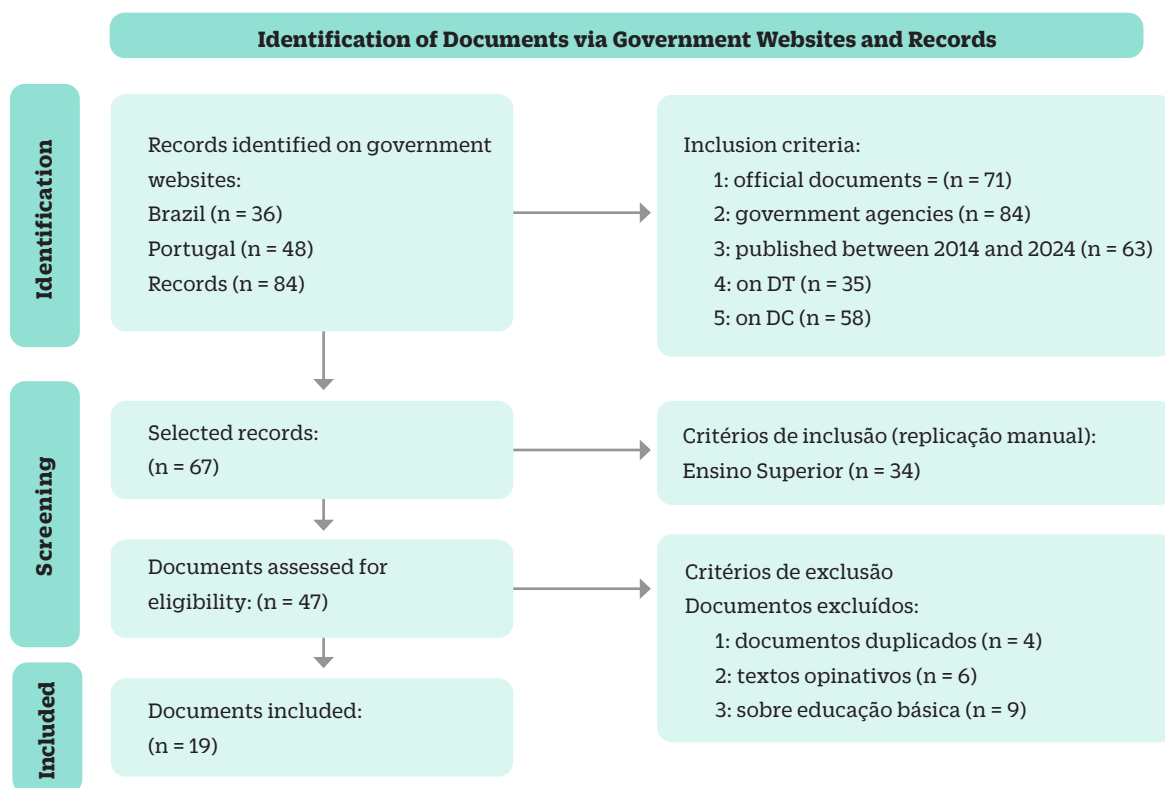
Figure 1 was constructed from the coding in NVIVO, summarizing the process of categorizing the documents into analytical dimensions and sub-dimensions (Appendix A Table A1 and

Figure 1
Categorization of Official Documents



Source: authors (2025)

Figure 2
PRISMA Flowchart



Source: authors (2025) based on Page et. al (2020)

Table A2). The organization followed a scheme inspired by the flowcharts of the PRISMA model (Page et al., 2020) as can be seen in Figure 2, without, however, strictly replicating it, allowing the selection and categorization process to be visualized more clearly.

Finally, aspects of temporality, typology, and convergence/divergence between the documents were also analyzed, seeking to identify patterns and tensions between the two contexts researched. This analysis was linked to recent literature on DT and DC in relation to higher education.

Results

Qualitative Characterization of the Documentary Corpus

The documentary corpus consists of 47 selected official documents, 22 from Brazil and 25 from Portugal. Of these, only 19 were analyzed in depth because they fully met the inclusion and exclusion criteria established, while the others were used for contextualization and general mapping.

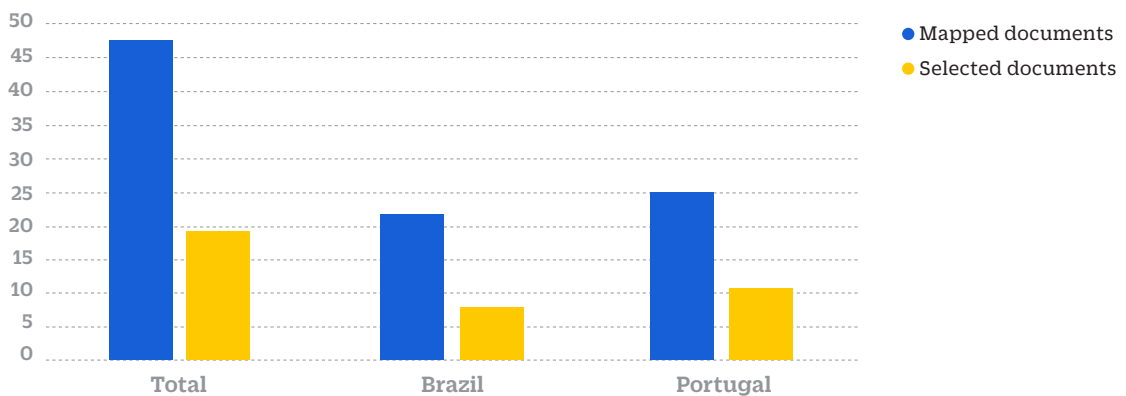
Brazil presented eight documents focused on higher education, while Portugal had 11 documents related to this level of education, five of which came from the European Union. The full list of documents and inclusion criteria can be found in Appendix A (Table A1 and Table A2).

Figure 3 summarizes the total number of documents mapped by country.

The time distribution of the selected documents covers the period from 2014 to 2023. In Brazil, there were no publications identified in the years 2017, 2018, and 2021, while in Portugal the publications were concentrated between 2017 and 2023, as illustrated in Figure 4.

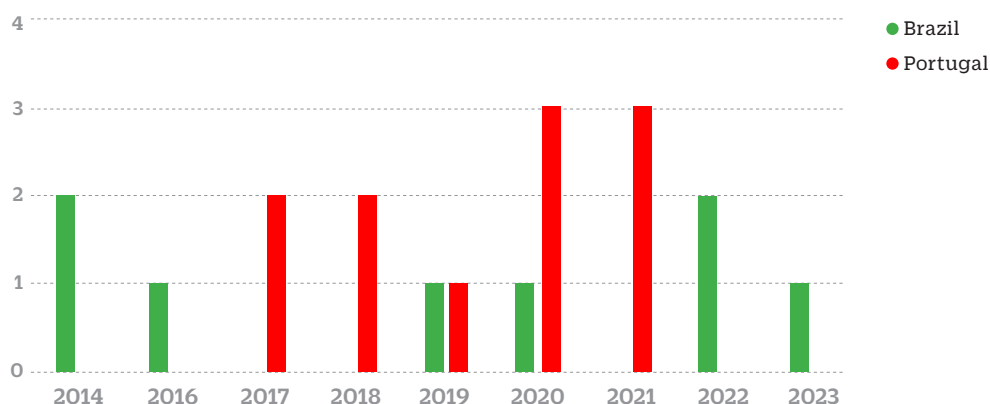
As for the typology (Figure 5) of the documents, it is possible to observe a distinction between the contexts: in Brazil, laws and normative opinions predominate, while in Portugal, structuring programs and strategic reference frameworks prevail. This difference suggests different approaches to formulating public policies for digital education.

Figure 3
Mapped and Selected Official Documents



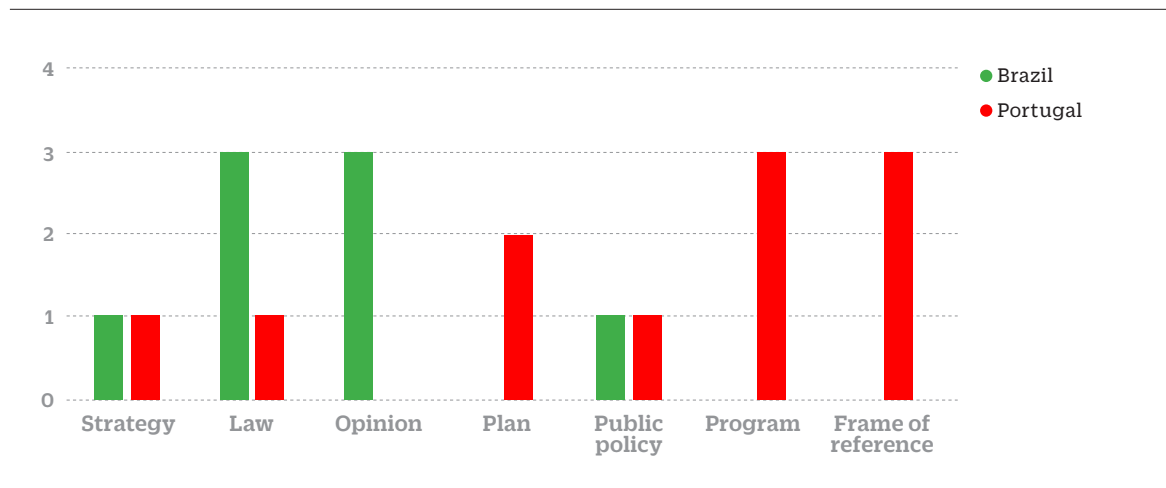
Source: authors (2025)

Figure 4
Publications of Official Documents by Year



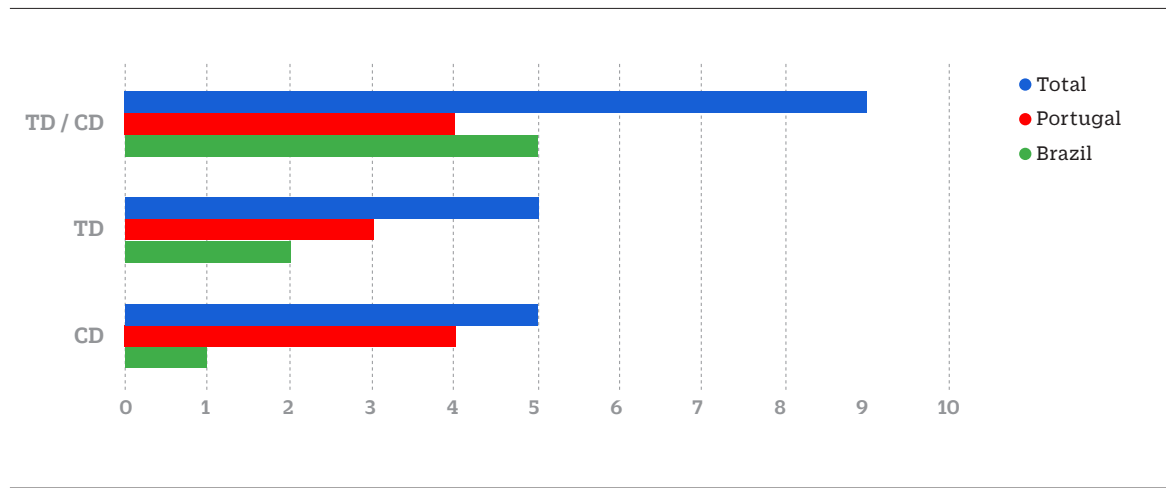
Source: authors (2025)

Figure 5
Types of Official Documents by Context



Source: authors (2025)

Figure 6
Documents by Categorization and Context



Note: DC=Digital Competence; DT=Digital Transition

Source: authors (2025)

With regard to thematic categorization, the documents were classified according to their emphasis on digital transition (DT), digital competence (DC) or both (DT + DC). There was a balance: five documents dealt exclusively with DT, five with DC, and nine covered both categories, in both contexts, as shown in Figure 6.

Integration of Qualitative Results

The qualitative analysis was conducted with the support of NVIVO 14 software, allowing for the coding and organization of patterns in

the texts. Two main categories were identified: Digital Transition (DT) and Digital Competence (DC), each subdivided into four subtopics: public policies, teacher training, digital inclusion, and technological infrastructure (Table 1).

The quantitative comparison of the documents analyzed in the contexts of Brazil and Portugal (Table 2) highlights criteria that allow us to visualize the differences and similarities between the two countries in terms of normative and guiding production in the field of education and ICT.

Table 1

Qualitative Data on Digital Transition (DT) and Digital Competence (DC) in Higher Education (Brazil and Portugal)

Category Code	Subtopic	Documents	Key Data/Findings	Notes
TD1	Public Policies: government strategies and regulations that guide the digital modernization of educational institutions, such as national connectivity plans, innovation technology and alignment with international agendas.	Brazil: - National Education Plan (PNE, for its initials in Portuguese) 2014-2024 (Brazil, 2014a); - National Digital Education Policy (PNED, for its initials in Portuguese) (Brazil, 2023); - Brazilian Digital Transformation Strategy (E-Digital) (Brazil, 2022a); - Civil Rights Framework for the Internet (Brazil, 2014b)	General guidelines for DT, promoting innovative educational environments and integrating ICT into university curricula	DT aligned with inclusion and innovation, but fragmented; PNED reinforces modernization
TD2		Portugal: - PATD (Council of Ministers, 2020); - Charter of Human Rights in the Digital Age (Assembly of the Republic, 2021); - QDRCD (INCoDe.2030, 2021); - ICT@EDU (Directorate-General for Education, 2020)	Continuous teacher training, need for critical appropriation of technologies	Teacher training essential to avoid superficial DT
TD3	Teacher training: Training initiatives for teachers to adapt to new technologies and the organizational changes of digital education.	Brazil: - National Curriculum Guidelines (DCN, for its initials in Portuguese) Teacher Training (Brazil, 2022b)	Emphasis on technical, pedagogical, and ethical training; structured programs	More detailed teacher training, systemic approach
TD4		Portugal: - QDRCD (INCoDe.2030, 2021)	Ênfase em capacitação técnica, pedagógica e ética; programas estruturados	Formação docente mais detalhada, abordagem sistêmica
TD5	Digital Inclusion: policies and actions that seek to expand access to connectivity, digital equipment, and services, reducing social and regional inequalities in the digitalization process.	Brazil: - BNCC (Brazil, 2018); - ENCTI 2016-2022 (Brazil, 2016); - PNED (Brazil, 2023); - E-Digital (Brazil, 2022a)	Use of ICT as an equity strategy; inclusion of AI and Big Data in curricula; focus on vulnerable populations	DT linked to digital citizenship
TD6		Portugal: - Charter of Human Rights in the Digital Age (Assembly of the Republic, 2021); - Erasmus+ (European Commission, 2021); - Certificate of Digital Competencies (Government of Portugal, 2021)	Universal internet access; equitable training programs; regional and generational policies	DT and digital inclusion articulated with social policies

TD7	Technological infrastructure: investments in connectivity, laboratories, platforms, and equipment needed to support the digitalization of higher education.	Brazil: - E-Digital (Brazil, 2022a); - ENCTI 2016-2022 (Brazil, 2016); - PNED (Brazil, 2023)	Need for connectivity, modernization of laboratories rooms; gaps in implementation	DT supported by detailed infrastructure and strategic funding
TD8		Portugal: - PATD (Council of Ministers, 2020); - ICT@EDU (Directorate-General for Education, 2020); - Horizon 2020 (European Commission, 2020b)	Investments in connectivity, equipment, ongoing maintenance; encouragement of emerging technologies	TD apoiada por infraestrutura detalhada e financiamento estratégico
CD1	Public policies: legal guidelines and programs that deal with the integration of DC as a transversal axis of citizen, academic, and professional training.	Brazil: - PNED (Brazil, 2023); - PNE (Brazil, 2014a); - LDB (Brazil, 1996)	DC linked to citizen training and employability; legal basis allows ICT integration	DC considered cross-cutting competence; policies under development
CD2		Portugal: - QDRCD (INCoDe.2030, 2021); - DigCompEdu (Lucas & Moreira, 2018); - DigComp 2.2 (Lucas et al., 2022)	Structured frameworks; cross-cutting integration; focus on real and collaborative contexts	Systematized DC, aligned with European standards
CD3	Teacher training: development of technical, pedagogical, and critical skills that enable teachers to appropriate digital technologies and use them in innovative ways in their practices.	Brazil: - PNED (Brazil, 2023)	Training from initial to continuing education; technical, didactic and critical integration	Teacher training in DC still being consolidated
CD4		Portugal: - DigCompEdu (Lucas & Moreira, 2018); - TIC@EDU (Directorate-General for Education, 2020); - Digital Teacher Training (Diário da República, 2021)	Structured programs with cultural and institutional diversity	More consolidated and strategic training
CD5	Inclusão Digital: promoção de equidade no desenvolvimento de CD, assegurando que diferentes públicos tenham condições de exercer cidadania digital plena.	Brazil: - Civil Rights Framework for the Internet (Brazil, 2014b); - PNED (Brazil, 2023)	Legal guarantees of secure access; social justice; digital equity	Digital inclusion linked to DC and public policies
CD6		Portugal: - Charter of Human Rights in the Digital Age (Assembly of the Republic, 2021)	Legitimate access to digital resources; policies for different audiences	Convergence between countries in integrating inclusion + DCD
CD7	Technological infrastructure: provision of digital learning ecosystems and pedagogical tools that enable the practice and development of DCs.	Brazil: - PNED (Brazil, 2023)	Need to modernize equipment and networks; digital learning ecosystems	Infrastructure linked to the implementation of DCs
CD8		Portugal: - Horizon 2020 (European Commission, 2020b); - Erasmus+ (European Commission, 2021); - DigCompEdu (Lucas & Moreira, 2018)	Promotion of technological innovation and teacher support; use of emerging technologies	Technological structure planned to support DC and DT

Note: DC=Digital Competence; DT=Digital Transition
Source: authors (2025)

Table 2
Quantitative Comparison of Documents (Brazil and Portugal)

Criteria	Brazil (n=8)	Portugal (n=11)
Thematic scope	ICT in education, focusing on basic education	DT and DC, with a focus on higher education
Period of publication	Mostly pre-pandemic (n=4)	Most between 2020-2021 (n=6)
Post-pandemic	3 documents	6 documents
Document type	Laws (n=3), opinions (n=3) - mandatory	Reference frameworks (n=3), government programs (n=3), action plans (n=2) - normative action plans (n=2) - normative
Focus on DC	1 document	4 documents
Focus on DT	2 documents	3 documents
DT and DC	5 documents	4 documents

Source: authors (2025)

Discussion

The analysis of the documentary corpus sought to understand how Brazilian and Portuguese policies integrate ICT for modernization and inclusion in higher education. Examining the material revealed common elements and differences, allowing us to identify government priorities regarding the DT and DC required for students, teachers, and institutions, as well as nuances in the strategies, evolution, and challenges in implementing digital practices. This understanding is fundamental to support strategic public policy decisions and academic practices in the Lusophone context.

Quantitative and Qualitative Findings

The documentary analysis showed a greater volume and timeliness of Portuguese policies (n=11) compared to Brazil (n=8), especially in the post-pandemic context. Portugal demonstrates a more structured, flexible approach aligned with European frameworks [DT2/DC2—public policies articulated with European standards], while in Brazil, the predominant normalization is aimed at basic education, with less specific focus on higher education [DT1/DC1—fragmented Brazilian public policies] (Table 2). These findings suggest that, despite recent progress with the PNED, Brazil still faces challenges in systematically integrating ICT into higher education.

Contrast with the Literature and Main Findings: Interconnection between DT and DC in Higher Education

Public Policies

The relationship between Digital Transition (DT) and Digital Competence (DC) in the field of public policy is intrinsically interdependent. DT creates the legal, strategic, and organizational structures that guide the modernization of higher education, while DC translates these guidelines into concrete skills and practices for teachers and students. In Brazil, documents such as the PNED and the Civil Rights Framework for the Internet provide the regulatory framework for DT [DT1], but its effectiveness is only realized when it is linked to the development of DC as a transversal competence provided for in the PNE [DC1] (Brasil, 2014b, 2022a, 2023). In Portugal, the situation is even clearer: INCoDe.2030 and alignment with DigCompEdu [DT2/DC2] demonstrate how public policies can simultaneously support digitization and guide skills training (European Commission, 2020; Lucas & Moreira, 2018). Thus, without clear public policies, DT tends to fragment; and without DT, DC is reduced to technical modernization without pedagogical transformation (Toledo, 2022).

Portugal shows greater alignment with European policies, such as DigCompEdu and Horizon 2020 [DT2/DC2 - strategic integration

of DT and DC with international benchmarks], promoting modernization, digital inclusion and systematic evaluation ([European Commission, 2020](#); [Lucas & Moreira, 2018](#)). In Brazil, recent policies such as PNED and E-Digital advance inclusion and training, but in a more fragmented way [DT1/DC1 - general guidelines without full articulation] ([Brasil, 2022a, 2023](#)). These findings coincide with [Silva and Behar \(2021\)](#), who advocate ICT curriculum integration, but contrast with studies that point to gaps in the effective implementation of digital policies in Brazilian higher education.

Teacher Training

In the field of teacher training, the interconnection between DT and DC is revealed in the fact that digitalization only makes sense when accompanied by teacher training. DT establishes qualification programs and creates institutional conditions for ongoing training [DT3/DT4], while DC constitutes the content of this training, integrating technical, pedagogical and critical dimensions [DC3/DC4]. In Portugal, DigCompEdu guarantees a structured model that links the technological transition to the consolidation of teachers' digital competence, ensuring practices aligned with pedagogical innovation ([Redecker, 2017](#); [Lucas & Bem-Haja, 2021, 2024](#)). In Brazil, although DT is present in the DCNs for teacher training and in the PNED, DC is still being consolidated and is often treated generically or depends on local initiatives ([Pacheco et al., 2020](#); [Riedner & Pischetola, 2021](#)). Therefore, teacher training is the link that transforms infrastructure and policies into effective practices, making the interdependence between the two categories visible ([Savione et al., 2020](#)).

Continuous teacher training is recognized in both contexts. Portugal presents detailed training plans with targets, self-assessment and certification [DT4/DC4 - structured teacher training with a systemic approach] ([Lucas & Bem-Haja, 2021, 2024](#)), while Brazil emphasizes initial and continuing training in a more generic way [DT3/DC3 - need for critical appropriation of technologies, but still incipient] ([Pacheco et al., 2020](#); [Riedner & Pischetola, 2021](#)). The literature reinforces that structured teacher development

strategies are essential for the consolidation of DT and DC, indicating that isolated or fragmented policies have limited effectiveness.

Digital Inclusion

The dimension of digital inclusion clearly shows how DT and DC complement each other. DT seeks to increase access to digital resources, connectivity, and devices [DT5/DT6], while DC ensures that this access is converted into critical, ethical, and citizen use of technologies [DC5/DC6]. In Brazil, initiatives such as the PNED and the legislation of the Civil Rights Framework for the Internet promote the expansion of access, but it is digital competence that transforms this right into social participation, research, and meaningful learning ([Brasil, 2014b, 2023](#)). In Portugal, policies such as the Digital Rights Charter and the Erasmus+ programs link digital inclusion to skills training, reducing regional and generational inequalities ([Diário da República, 2021](#); [European Commission, 2021](#)). In this sense, without DC, digital inclusion runs the risk of being limited to technical access; without DT, digital citizenship does not take place across the entire academic population ([Roda et al., 2021](#); [Toledo, 2022](#)).

Portugal highlights policies linked to European programs and formal certifications ([European Commission, 2021](#); [Diário da República, 2021](#)) [DT6/DC6 - digital inclusion linked to social policies and formal certifications], while Brazil focuses on legislation and recent technological inclusion initiatives [DT5/DC5 - digital inclusion as a strategy for equity and digital citizenship] ([Brasil, 2023](#)). Both realities converge with the literature that recognizes digital exclusion as a multidimensional phenomenon ([Roda et al., 2021](#); [Toledo, 2022](#)). In addition, the study shows that digital inclusion policies must consider socio-economic, regional, and generational aspects in order to guarantee effective equity.

Technological Infrastructure

In the infrastructure dimension, DT is implemented through funding, network maintenance, equipment acquisition, and digital learning environments [DT7/DT8]. However, its effectiveness is conditional on the existence of DC [DC7/DC8], which represents the ability of

teachers and students to use these resources in an innovative, productive, and pedagogical way. Portugal exemplifies this integration by linking investment programs such as Horizon 2020 to the digital training of teachers via DigCompEdu ([European Commission, 2020a; 2020b](#)). In Brazil, although documents such as E-Digital and the PNEP recognize the importance of infrastructure, the lack of systematization in DC generates inequality in the use and appropriation of technologies ([Brasil, 2022a; Silva & Behar, 2021](#)). Thus, infrastructure without skills results in underutilization, while skills without infrastructure result in institutional frustration ([Savione et al., 2020](#)).

Portugal shows greater detail and funding for connectivity, equipment, and technological maintenance [DT8/DC8 - solid infrastructure supported by strategic funding] ([Council of Ministers, 2020; European Commission, 2020b](#)), while Brazil faces gaps in the operationalization of infrastructure, especially in public institutions [DT7/DC7 - need for connectivity and modernization not yet fully met] ([Silva & Behar, 2021](#)). These findings reinforce the literature linking adequate infrastructure to the quality of digital education and the reduction of educational inequalities ([INCoDE.2030, 2021](#)).

Final Considerations

The analysis shows that DT and DC are mutually dependent categories that can only be fully consolidated when they are articulated in all dimensions. Public policies set directions, but need to be accompanied by teacher training; digital inclusion expands access, but only makes sense when associated with critical skills; and infrastructure, in turn, needs to be at the service of innovative pedagogical practices, at the risk of becoming obsolete. Therefore, the interrelationship between DT and DC configures a digital ecosystem in higher education, in which each dimension is an indispensable link to guarantee innovation, equity, and educational quality ([Lucas & Moreira, 2018; Riedner & Pischetola, 2021; Toledo, 2022](#)).

The comparison between Brazil and Portugal shows convergences and specificities. Brazil has a centralized regulatory approach, favoring comprehensiveness, but with less flexibility. Portugal adopts a decentralized model, allowing for contextualized pedagogical innovation. Both recognize the importance of teacher training, and Portugal has structured assessment and certification systems, albeit focused on basic education based on a single framework, DigCompEdu, while Brazil lacks consolidated models, representing a challenge for the effectiveness of policies.

The Brazilian experience with the expansion of distance education and digital inclusion in peripheral contexts can inspire Portugal, while Portuguese practices of assessment, certification, and participation in international academic collaboration networks can strengthen Brazilian policies. The study indicates that Lusophone cooperation can favor the exchange of good practices, innovative curriculum adaptation, and improved digital equity ([Riedner & Pischetola, 2021](#)).

Future research should empirically investigate the impact of DT and DC policies on pedagogical practices, considering: (1) the availability and quality of technological infrastructure; (2) the level of DC of teachers and students at universities; and (3) the effective integration of ICT into university curricula. Future studies could also assess how policies materialize in the institutional routine, allowing for the improvement of training strategies, pedagogical innovation, and the promotion of digital equity. The inclusion of participatory methodologies and a reflexive approach to emerging technologies (AI, big data) and immersive technologies (augmented and virtual reality) could strengthen the impact of the policies analyzed.

This study was based on documentary analysis, prioritizing normative and institutional sources, which may limit the understanding of the concrete effects of policies on pedagogical practice. The predominance of official documents can introduce perspective bias, restricting dialogue with broader empirical and theoretical studies on DT and DC. Future research could incorporate interviews, observations, and questionnaires, broadening the validity and applicability of the findings.

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Appendix A

Table A1 – Official Documents in Brazil (Period: 2014-2024)

Year	Title	Type	Author	Higher Education	Categorization
2023	National Digital Education Policy - PNED (Law no. 14.533/2023)	Lei	Presidency of the Republic	Yes	TD / CD
2022	Brazilian Strategy for Digital Transformation (E-Digital)	Política pública	Ministry of Science, Technology and Innovation (MCTI)	Yes	TD
	National Curriculum Guidelines (DCNs): Teacher Training (CNE/CES Opinion 273/2022)	Parecer Normativo	CNE	Yes	CD
2020	National Curriculum Guidelines for Professional and Technological Education (CNE/CP 17/2020)	Parecer Normativo	CNE	Yes	TD / CD
2019	Orientation to the National Curriculum Guidelines for Higher Education Courses (CNE/CES Opinion 334/2019)	Parecer Normativo	CNE	Yes	TD / CD
2016	National Strategy for Science, Technology and Innovation (ENCTI) 2016 2022	Estratégia governamental	MCTI	Yes	TD / CD
2014	Civil Rights Framework for the Internet (Law No. 12.965/2014)	Lei	Presidency of the Republic	Yes	TD
	National Education Plan (PNE) 2014-2024 (Law No. 13.005/2014)	Lei	MEC	Yes	TD / CD

Note: DT (Digital Transition) - DC (Digital Competence)

Source: authors (2025)

Tabela A2 – Documentos Oficiais em Portugal (Período: 2014-2024)

Year	Title	Type	Author	Higher Education	Categorization
2021	[EU] Erasmus+ (2021-2027)	Program	European Commission	Yes	DT / DC
	Portuguese Charter on Human Rights in the Digital Age (Law no. 27/2021)	Law	Portuguese Parliament	Yes	DT
	Digital Skills Certificate Program" (Ministerial Order no. 179/2021)	Program	Government of Portugal	Yes	DC
2020	Action Plan for the Digital Transition - PATD (Resolution no. 30/2020)	Action Plan	Council of Ministers	Yes	DT
	[EU] Action Plan for Digital Education - PAED (2021-2027)	Action Plan	European Commission	Yes	DT / DC
	[EU] Horizon 2020 - ICT in Education	Program	European Commission	Yes	DT
2019	Dynamic Reference Framework for Digital Competence in Portugal (QDRCD)	Reference framework	INCoDe.2020	Yes	DC
2018	[EU] European Digital Competence Framework for Educators - DigCompEdu	Reference framework	Lucas and Moreira	Yes	DC
	ICT in Education Strategy (TIC@EDU) 2020	Government strategy	Republic of Portugal	Yes	DT / DC
2017	National Digital Skills Initiative e.2030 - INCoDe.2030	Public policy	Council of Ministers	Yes	DT / DC
	[EU] European Framework of Reference for Digital Competence - DigComp	Frame of Reference	Lucas and Moreira	Yes	DC

Note: DT (Digital Transition) - DC(Digital Competence) - [EU] (European Union reference document)

Source: authors (2025)

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