Digital Competences in European Basic Education Curricula: A Document Analysis[1]

Competencias digitales en los currículos de educación básica europeos: un análisis documental

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Abstract

Despite the recognition of the importance of developing and assessing digital competences in the early years of basic education, there is a significant gap in knowledge regarding the approaches adopted by educational systems to restructure curricula for this purpose. This study aims to analyze and understand the integration of digital competences into official curricula at the European level, especially during the early years of basic education. The research utilized document analysis, systematically and carefully examining curricular documents from six European countries (Estonia, Latvia, Wales, Scotland, Iceland, and Northern Ireland). The results reveal different approaches to the integration of digital competences into the curriculum, with a prevalence of a cross-cutting approach and a predominance of competences associated with online research and communication. Three countries establish progression levels for digital competences, but only one provides detailed guidance for the assessment of these competences. The findings of this study are relevant for educators, researchers, and educational policymakers. They provide a fundamental basis for informed and strategically oriented

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curricular decisions to enhance consistent and intentional teaching of digital competences, especially in the early years of basic education.

Keywords: Digital Skills, Basic Education, Curriculum Research

Resumen

A pesar del reconocimiento de la importancia de desarrollar y evaluar las competencias digitales en los primeros años de la educación básica, existe una brecha significativa en el conocimiento sobre las aproximaciones adoptadas por los sistemas educativos para reestructurar los currículos con este propósito. Este estudio propone analizar y comprender la integración de las competencias digitales en los currículos oficiales a nivel europeo, especialmente durante los primeros años de la educación básica. La investigación recurrió al análisis documental, examinando de manera sistemática y cuidadosa documentos curriculares de seis países europeos (Estonia, Letonia, Gales, Escocia, Islandia e Irlanda del Norte). Los resultados revelan diferentes enfoques en cuanto a la integración de las CD en el currículo, destacando la prevalencia de un enfoque transversal y el predominio de competencias asociadas a la investigación y la comunicación en línea. Tres países establecen niveles de progresión de las competencias digitales, pero solo uno ofrece orientaciones detalladas para la evaluación de estas competencias. Los resultados de este estudio son relevantes para educadores, investigadores y formuladores de políticas educativas. Proporcionan una base fundamental para decisiones curriculares informadas y estratégicamente orientadas para fortalecer la enseñanza consistente e intencional de las competencias digitales, especialmente en los primeros años de la educación básica.

Palabras clave: Tecnología digital, Educación básica, Plan de estudios

I. Introduction

Digital technologies are already part of people's daily lives in the 21st century. Whether directly or indirectly, they have revolutionized how we interact with each other, create content, and access information. Specifically for the new generations, born from 2010

onward and considered the "Alpha Generation" (McCrindle et al., 2014), technology is seen as an extension of how they make sense of the world around them.

Contrary to the notion that this generation is composed of "digital natives" (Prensky, 2001), research has brought evidence that exposure alone to digital technologies does not necessarily equip individuals to use them effectively and safely (Kennedy et al., 2010; ECDL, 2015; Iglesias et al., 2023). A study by Iglesias et al. (2023) illustrates this by showing that a significant number of students in the Spanish basic education context still have insufficient levels of digital competences proficiency, with minor differences between students of different genders or between public and private schools. Similarly, Garcia-Valcarcel et al. (2019) study reinforces the need to promote knowledge, skills, and attitudes in the digital realm, as despite spending a lot of time on the internet, young people still do not do so in a healthy and safe manner.

Faced with the imperative of preparing individuals to deal with new technologies and their inherent challenges, reflections have deepened in recent years in various European Union countries on how to integrate digital technologies into the school curriculum in a cross-cutting and meaningful way. For instance, the Action Plan for Digital Education 2021-2027 (European Commission, 2020) aims to involve Member States in providing students with exposure to a wide range of digital technologies while also "equipping all learners with digital competences (knowledge, skills, and attitudes) to live, work, learn, and thrive in an increasingly technology-mediated world" (European Commission, 2020, p. 2). This implies a curricular renewal regarding "what" and "how" to promote digital competences.

In this sense, there is an urgent interest and need to understand how to integrate these new knowledge into the curriculum. However, as noted by Williamson (2013), despite the growing focus on the relationship between media and learning in educational research, there is still limited development regarding the implications of this digital era for the curriculum. This scenario becomes more pronounced when it comes to younger students, as there are even fewer studies and curriculum documents specifically dedicated to the development and assessment of digital competences in younger learners (Martínez-Piñeiro et al., 2019*; [information omitted for blind review purposes]*, 2023; *[information omitted for blind review purposes]* et al., 2022).

Specifically in the context of basic education, what is observed is a scarcity of resources and tools to support the assessment of these competencies during this stage of schooling, as well as a difficulty in measuring learning in the digital domain among younger learners (Baeza-González et al., 2022; Godaert et al., 2022), despite assessment being essential for better learning. In addition, teachers consider the digital domain to be the one in which they need more initiatives and training programs to feel better prepared to develop their students' Digital Competences (Directorate-General for Education, Youth, Sport and Culture, 2020). This scenario reinforces the importance of clear and useful curriculum documents to enhance and support consistent and intentional teaching of digital competences.

In light of the above, this study aims to analyze and understand how digital competences are addressed in the official curriculum at the European level during the first stage of basic education. Specifically, the goal is to identify patterns and trends in terms of curricular approaches to digital competences in the early years of schooling by analyzing similarities

and differences in the curricular documents of various European countries. To achieve this purpose, the study seeks to answer the following research questions: Q1. How are digital competences positioned and integrated into curricular documents in European countries? Q2. Which domains of digital competences are prioritized in these curricular documents? Q3. How are the progression or proficiency levels of targeted digital competences defined? Q4. How is the assessment of digital competences addressed in these curricular documents?

Beyond this introduction, the text presents the adopted methodological approach for the analysis of curricular documents, explaining and justifying the methods used for data collection and processing. Subsequently, we provide a detailed description of the study results, aiming to address the pre-defined research questions. Finally, in the conclusions, we conclude the text with a brief discussion and reflection on trends in terms of curricular approaches to digital competences in the early years of schooling and the limitations of this study, which may serve as starting points for further research on this topic.

II. Method

For the development of this study, we chose techniques and procedures specific to document analysis. This method, whose value for educational research is already recognized, not only facilitates the triangulation of information with data from other sources but also has the potential to reveal nuances and novel aspects regarding a particular topic or problem (Bowen, 2009). It's worth noting that the analysis is not limited to a mere definition of the set of documents to be scrutinized but also involves the selection, evaluation, and synthesis of data contained in the documents.

Once the analytical technique was defined, and aiming to ensure objectivity and rigor in

the process, we established inclusion and exclusion criteria for the selection of documents that would constitute the corpus and also defined specific objectives to guide the analysis stage (Table 1).

Table 1. Objectives and criteria of Document Analysis

Specific objectives	Identify the status attributed to digital competence in the documents; Map the domains of digital competences covered by the documents; Identify the presence of progression levels or proficiency and exemplifying descriptors to compare the progression/development of digital competences; Understand how the documents address the assessment of digital competences of students in the primary education
Inclusion criteria	Curriculum documents that explicitly mention learning outcomes and criteria for assessing digital competences in primary education, mentioned in the Eurydice Report (European Commission/EACEA/Eurydice, 2019).
Exclusion criteria	Curriculum documents that do not address students' digital competences; Curriculum documents not published on the official government websites of the country they are intended for; Curriculum documents not available online.

As indicated in Table 1, one of the criteria for the inclusion of documents was being referenced in the Eurydice Report - "Digital Education at School in Europe" (European Commission/EACEA/Eurydice, 2019) as as a curriculum document that not only outlines learning outcomes but also criteria and/or standards for assessing Digital Competence in primary education. In this report, 8 countries are mentioned whose curriculum documents met these criteria, namely: Estonia, Latvia, Wales, Scotland, Iceland, Northern Ireland, the Republic of Ireland, and Montenegro. However, in this research, curriculum documents from 6 of these 8 countries (Estonia, Latvia, Wales, Scotland, Iceland, and Northern Ireland) were considered because they met all the pre-established inclusion criteria. The documents from the Republic of Ireland and Montenegro were not included because they were not openly available on the internet or published on the official websites of their respective governments. Below, Table 2 presents a brief characterization of the selected curriculum documents to be included in the corpus.

Tabla 2. Characterization of the corpus

Country	Institution	Document (Title)	Level of education	Additional notes
Estonia	Haridus ja noorteamet (Educational and Youth Council)	Digipädevusmudelid (Student Digital Competence Model)[2]	Compulsory education	For the purpose of analysis, the digital competences and assessment criteria defined for "I Kooliaste" (6-8 years) and "II Kooliaste" (9-11 years) were considered.
Latvia	Ministru kabineta (Council of Ministers)	Noteikumi par valsts pamatizglītības standartu un pamatizglītības programmu paraugiem (Regulation on National Standards for Primary Education and Examples of Primary Education Programs)[3]	Primary Education	For the purpose of analysis, the competences and learning outcomes defined for the first 6 years of compulsory education (6-11 years) were considered, as available in the annexes of this document.
Wales	Welsh Government	Curriculum for Wales[4]	Compulsory education	For the analysis, the part of the document dedicated to cross-cutting competences, precisely the "Digital Competence Framework," competences defined for students at the "First Level" and "Second Level" (5-11 years) was considered.[5]
Scotland	Education Scotland	Education Scotland: Guidance on using Benchmarks for Assessment – Technologies[6]	Compulsory education	For the analysis, the section/part related to the digital competences of students at the First Level (P2-P4, 5 to 8 years) and Second Level (P5-P7, 8 to 11 years) was considered.
Iceland	Ministry of Education, Science and Culture	The Icelandic national curriculum guide for compulsory schools - with Subjects Areas[7]	Compulsory education	For the analysis, the part of the document dedicated to "Information and Communication Technology" was considered.
Northern Ireland	Council for the Curriculum, Examinations & Assessment	The Northern Ireland Curriculum - Primary[8]; Guide to Assessment[9]; Levels of Progression in Using ICT across the	Primary Education	For the analysis, the section "Using Information and Communication Technologies Across the Curriculum" was considered. Additionally, we analyzed two complementary documents indicated in the national curriculum: "Guide to Assessment"

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[2] Document available at: https://digipadevus.ee
[3] Document available at: https://www.vestnesis.lv/op/2018/249.5
[4] Document available at: https://hwb.gov.wales/curriculum-for-wales/
[5] Document available at: https://hwb.gov.wales/curriculum-for-wales/cross-curricular-skills-frameworks/#digital-competence-framework
[6] Document available at: https://education.gov.scot/improvement/documents/technologiesbenchmarkspdf.pdf
[7] Document available at: https://www.government.is/library/01-Ministries/Ministry-of-Education/Curriculum/adalnrsk_greinask_ens_2014.pdf
[8] Document available at: https://ccea.org.uk/learning-resources/northern-ireland-curriculum-primary
[9] Document available at: https://ccea.org.uk/downloads/docs/ccea-asset/Curriculum/Guide%20to%20Assessment%3A%20Supporting%20schools%20in%20meeting%20Statutory%20Requirements%20for%20Assessment%20and%20Reporting.pdf

Country	Institution	Document (Title)	Level of education	Additional notes
		curriculum: Primary (Levels 1–5)[10]		(with a focus on the ICT Use section) and "Progression Levels in ICT Use Across the Curriculum - Primary."

After collecting all the documents that would constitute the corpus, a database was created using Microsoft 365 Excel to systematize the initial set of information extracted from the documents: country, issuing institution, target audience, document location, and additional notes. Subsequently, all 6 documents were read in full, sometimes with the assistance of Google Translate for those documents that did not have an English version. Following this stage and considering the nature of the data, the content analysis technique was chosen, commonly combined with document analysis (Bowen, 2009), as the most suitable approach for systematizing and interpreting the information extracted from the documents. Through a progressive triangulation among the researchers, an inductive process led to a categorization system consisting of 4 main categories and 17 subcategories, as summarized in Figure 1.

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[10] Document available at:
https://ccea.org.uk/downloads/docs/cceaasset/Curriculum/The%20Levels%20of%20Progression%20for%20Using%20ICT%20at%20Key%20Stage%201%20and%202.pdf

Figure 1. Category System for analyzing the corpus

1. Status of digital competences	2. Domains of Digital Competence	3. Levels of Progression/Proficiency	4. Assessment of Digital Competence
Cross-cutting Competence	Search, management, and validation of information	Absence of proficiency levels between the years of primary education	Explanation of the need to assess digital competences in early years of primary education
Autonomous curricular area	Creation of digital content	Presence of proficiency levels between the years of primary education	Definition of means/tools for assessing digital competences in early years of primary education
Content integrated into a curricular area	Online communication and collaboration		
	Digital safety		
	Problem-solving		
	Self-assessment		
	Virtual etiquette awareness		
	Technical use of digital devices and software		
	Health and well-being protection		
	Programming		
	Environmental protection		

It should be highlighted that this system was established progressively, involving a deliberation process among the three investigators, stabilized until we reached a consensus version. Then, regarding the coding process itself, each document was analyzed and classified according to the defined categories. At this stage, the first author of this article assumed the encoding of the documents, recording all decisions in an Excel document, including doubts and aspects that raised some questions. Subsequently, a

cross-validation was carried out between the two investigators who took on the role of supervisors and did not participate in the initial encoding. This final check was essential to ensure impartiality and consistency in the application of the previously established categories.

After the analysis and interpretation of categorized excerpts, descriptive summaries were created for each of the cases under study, focusing on the observed aspects, including examples for each of the categories.

III. Results

In this section, the contributions resulting from the analysis of a corpus consisting of curriculum documents from 6 countries (Estonia, Latvia, Wales, Scotland, Iceland, and Northern Ireland) are presented. The results will be presented according to the analytical categories used in the document analysis: 1. Status of Digital Competence; 2. Digital Competence Domains; 3. Levels of Progression/Proficiency; and 4. Assessment of Digital Competence.

3.1. Status of Digital Competence

In the curriculum documents of different countries, digital competence takes on various roles, sometimes serving as a cross-cutting knowledge integrated into different curriculum areas, while in other cases, it is presented as a standalone disciplinary area. It's worth noting that out of the 6 documents analyzed, 4 of them give digital competence a transversal nature, in alignment with the guidelines outlined in the Curriculum Guidelines for ICT in Primary Education (1st Cycle) in Portugal, the context in which this research was conducted. Table 3 presents the status adopted for digital competence in

the various curriculum documents analyzed.

Table 3. Status of digital competences in national curricula

Status of digital competences	National Curriculum Document					
	Estonia	Latvia	Wales	Escócia	Iceland	Northern Ireland
Cross-cutting competence	x	x	x			x
Autonomous curricular area					x	
Content integrated into a curricular area		x		x		

In the Estonian curriculum context, a local Digital Competence Model is in place, based on the European Digital Competence Framework (Carretero et al., 2017). This model serves to guide the development of digital competence for students and teachers in an explicitly cross-cutting manner across different curriculum areas. In this document, considering the plurality of concepts and definitions, the Digital Competence Model is understood as a hierarchical/taxonomic or matrix construct that describes the components of digital competence (Haridus ja noorteamet, 2020).

Similarly, in the curriculum of Wales (Welsh Government, 2020), digital competence is considered mandatory and cross-cutting, with each educator in various curriculum areas responsible for its development and progression. This perspective is also similar to the one presented in the curriculum of Northern Ireland, where the use of information and communication technologies and the development of digital competences throughout the curriculum are advocated through activities that simulate real situations and the search for information that is meaningful for learning (Council for the Curriculum, Examinations & Assessment, 2019).

In the National Curriculum of Latvia, when it comes to specifying the organization, values, and core contents to be taught over the 9 years of education at this level, "Digital Literacy" competences are considered among the envisaged cross-cutting competences. It is

defined as the responsible and effective use of digital technologies to acquire knowledge, create new content, share and communicate content, and critically and constructively evaluate the role of technology and media in society (Ministru kabineta, 2018). Regarding the curriculum of Latvia, "Technology Learning" is defined as mandatory, which also includes digital technology competences as an integral part of the subject area "Technologies." Some digital competences are considered cross-cutting across the curriculum, while others are more specific and confined to a particular subject area.

Similarly, in the Scottish curriculum, digital competences emerge as integrated content in the Technologies area, specifically in the domain of "Digital Literacy," which encompasses 3 competence domains (1. Use of digital products and services in various contexts to achieve a specific purpose; 2. Search, processing, and responsible information management; 3. Digital resilience and internet safety).

Finally, regarding the development of digital competence in the curriculum of Iceland, it was noted that, despite being configured as a standalone subject area, its cross-cutting nature and the need for integration with other curriculum areas are also considered. This is because what is intended to be developed in the digital domain is explicitly specified and can be integrated into most subjects. Additionally, the document emphasizes that "the focus is on introducing children to technology and methods of acquiring, processing, creating, and communicating information in relation to other studies" (Ministry of Education, Science and Culture, 2014, p. 238).

3.2. Digital Competence Domains

Next, it was important for us to understand which digital competences the selected curriculum documents prioritize for this stage of compulsory education and how these competences were organized in the document. In this regard, Table 4 summarizes the

digital competence domains present in the analyzed documents.

Table 4. Distribution of digital competences in national curricula

Knowledge, skills, and attitudes related to…	National Curriculum Document					
	Estonia	Latvia	Wales	Escócia	Iceland	Northern Ireland
Search, management, and validation of information	x	x	x	x	x	x
Online communication and collaboration	x	x	x	x	x	x
Creation of digital content	x	x	x		x	x
Digital safety	x			x	x	x
Problem-solving	x		x	x		x
Self-assessment	x				x	x
Virtual etiquette awareness ("netiquette")	x		x	x	x	x
Technical use of digital devices and software		x			x	x
Programming	x	x	x			
Health and well-being protection	x	x	x			
Environmental protection	x	x				

From the reading of Table 4, it can be seen that knowledge, skills, and attitudes related to information searching and management on the internet, as well as online communication and collaboration, were prioritized in all the analyzed curriculum documents. In the second place, digital competences associated with digital content creation and procedures, as well as proper etiquette in the online environment, are considered. Learning related to sustainable digital use, including an understanding of the environmental impact of digital technology, only appears in the curriculum documents of Estonia and Latvia, making it the least emphasized digital competence among the documents analyzed.

3.3. Levels of Progression/Proficiency

All the curriculum documents analyzed explicitly define which digital competences they consider essential for students aged 6 to 10. However, only 3 of the analyzed curricula (Wales, Scotland, Northern Ireland) establish levels of progression/proficiency for these competences. More commonly, the documents choose to establish progression levels

only between the compulsory education cycles and not within the individual years of a given cycle.

In the curriculum of Wales, each of the 12 subdomains of digital competence is described in 5 ascending levels of progression. Figure 2, extracted from this curriculum document, illustrates the defined progression levels in the subdomain "Communication" within the domain "Interacting and Collaborating."

Figure 2. Progression of Digital Competence in the Wales Curriculum (Domain "Interacting and Collaborating," Subdomain "Communication")

∨ Interacting and collaborating

Through these elements learners will look at methods of electronic communication and know which are the most effective. Learners will also store data and use collaboration techniques effectively.

Note:

Welsh

Progression step 1	Progression step 2	Progression step 3
Communication		
I can talk about different forms of online communication, *e.g. e-mail, messaging, video call.*	I can exchange simple online communication using one or more types of technology, *e.g. e-mail or video call.*	I can exchange online communications, making use of a growing range of available features, *e.g. add attachments or hyperlinks, change formatting.*

Progression step 4	Progression step 5
I can select and use different online communication tools for specific purposes with higher levels of competence, *e.g. set up and manage an address book, organise contacts, use advanced features of e-mail provider (signature, auto reply, read receipt, widgets).*	I can make use of and reflect on available online communication services for specific purposes, justifying selections made based on their appropriateness for delivery of information.

Government (2020)

Each level of progression represented above corresponds to a specific age (5, 8, 11, 14, and 16 years, respectively). Regarding this approach, the document states that it is based

on 5 principles of progression in learning, namely: i) increasing effectiveness as a learner; ii) expanding the breadth and depth of knowledge; iii) deepening the understanding of ideas/disciplines within the areas of learning and experience; iv) refining and increasing sophistication in the use and application of competences; and v) creating connections and transferring learning to new contexts (Welsh Government, 2020).

Among the curricula that explicitly outlined progression levels within the years of primary education, we have the Scottish curriculum document, where the progression of students' abilities, knowledge, and attitudes is marked by the advancing years within this cycle of education. When analyzing this document, we were particularly interested in the second level of progression (First Level) because it corresponds to students who are, on average, 5 to 8 years old, which covers the age range of students in the 1st Cycle of primary education in the Portuguese context. Additionally, we were interested in the third level of progression (Second Level), as it includes students from P5 to P7, which is equivalent to students between 8 and 11 years old. For each of the domains within the "Digital Literacy" area, the competences to be achieved by students at each of the mentioned levels are specified. In Figure 3 and Figure 4, you can find the digital competences defined for the second level of progression (First Level) and the third level of progression (Second Level).

Figure 3. Progression of digital competences established for students at "First Level" (Wales)

Figure 4. Progression of digital competences established for students at "Second Level" (Wales)


Note: Welsh Government (2020)

The third curriculum document analyzed, which also specified progression levels within the years that constitute the primary education, is the curriculum of Northern Ireland. The area titled "Using ICT" is divided into 5 domains, and the document outlines what a student should be capable of doing in each of these domains, subdividing it into 7

progression levels related to the school years. Keeping the focus of this research in mind, we concentrated on the levels defined for Key Stage 1 (6-8 years), where competences are operationalized from Level 1 to 3, and it is expected that students, by the end of Key Stage 1, should be at least at Level 2.

Additionally, we observed Key Stage 2 (8-11 years), which encompasses the 3 levels previously integrated into the earlier Key Stage and adds two more levels, resulting in a total of 5 levels (from 1 to 5). It is expected that by the end of this stage, students should be at least at Level 4. In Figure 5, you can find the 5 progression levels (the first three defined for Key Stage 1 and all defined for Key Stage 2) within the domain "Explore."

Figure 5. Digital competences established for students at the "Key Stage 1" and "Key Stage 2" progression levels.
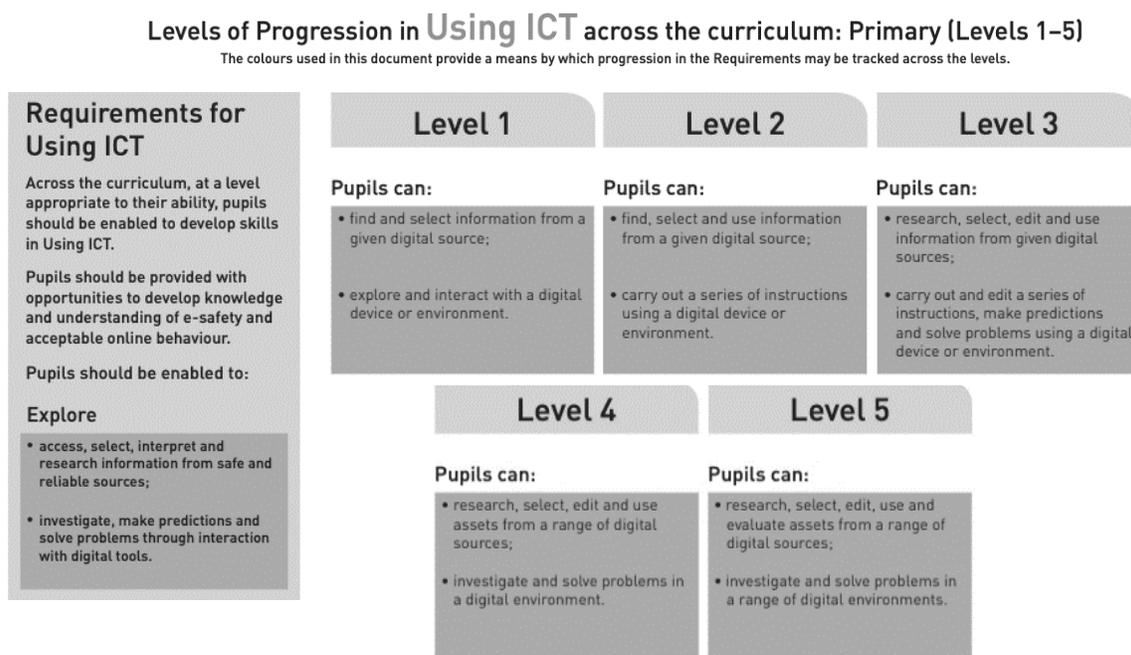
Note: Council for the Curriculum, Examinations & Assessment (2019)

It is evident that in none of the analyzed curriculum documents mentioned above, a reference framework with year-to-year progression levels was established. Instead, the approach taken was to define learning outcomes to be achieved within a time range. In

some cases, this led to the inclusion of two proficiency stages to be considered even within the early years of primary education.

3.4. Assessment of Digital Competence

Regarding the assessment of digital competences in the context of primary education, 4 out of 6 documents emphasize the need to assess these competences at this stage of compulsory education. However, only in the curriculum of Northern Ireland, there is a clear specification of the means/instruments for assessment, as can be seen from the results summarized in Table 5.

Table 5. Assessment of digital competences by national curriculum document.

Assessment of digital competences	National Curriculum Document					
	Estonia	Latvia	Wales	Escócia	Iceland	Northern Ireland
Explanation of the need to assess digital competences in primary education	x		x	x		x
Definition of means/tools for assessing digital competences in primary education						x

In the Estonian document analyzed, the Digital Competence Model stands out for specifying each of the 21 digital competences in terms of the corresponding Skills, Knowledge, and Attitudes. For example, in Competence 1.2 (Assessment of digital data, information, and content) within Domain 1: Information and Data Literacy, the document specifies that, in the I kooliaste (automatically translated as "first grade"), the student: 1.2.2. Identifies the author of the source found, and 1.2.3. Understands that information on the web may not be reliable. The document addresses all 21 competences for each cycle of education with the aim that they can serve as criteria to be used and adapted by each teacher to assess the development of students' digital competences, even though it does not explicitly specify how this assessment should occur in concrete terms.

In the curriculum document of Wales, there are no specifications regarding how to assess digital competences. However, it emphasizes their intrinsic nature to the curriculum and their essential role in promoting shared understanding (learners, teachers, parents) of a student's progress in learning across various areas, including the digital domain.

In the contexts of Scotland and Northern Ireland, the curriculum documents of both countries emphasize the importance of assessing digital competences from the early years of schooling. In the Scottish curriculum, for example, it is stressed that assessment is an integral part of teaching and learning and is always an ongoing process. It is mentioned that reaching a level of progression is directly related to teachers' judgments about what they perceive the student is capable of doing. However, these judgments should always be evidence-based. Furthermore, it is emphasized that the "Benchmarks" were developed to support this teacher judgment but without being prescriptive in nature.

In a supplementary volume of the Northern Ireland curriculum document, guidelines are presented to support schools (both teachers and top and middle leadership) in assessing cross-cutting competences, including the area "Using ICT," throughout all stages of compulsory education. In addition to specifying the support materials to be used by teachers, there is a strong encouragement for conducting assessment activities using computers (with the option of complementing them with other strategies) due to their practicality in compiling and reporting results to school leadership and parents. Another important observation is the emphasis on the alignment between formative assessment at certain points during the school year and summative assessment at the end of a semester or academic year.

IV. Discussion and conclusions

Faced with the growing need to prepare younger students to be critical and proficient users of digital technologies (European Council, 2018; ECDL, 2015) and the persistent difficulty, as identified by research (Iglesias et al., 2023; García-Valcárcel et al., 2019), in mobilizing digital competences among young people, this study focused on analyzing and understanding how digital competences are addressed in the official curriculum at the European level during the first stage of basic education. Specifically, the goal was to identify trends in terms of curricular approaches to digital competences, observing similarities and differences in the approaches adopted in curricular documents from various European countries.

Regarding the integration of digital competences into curriculum documents, it was observed that the majority of examined curricula consider digital competences as a cross-curricular area. While some documents present them as an independent curricular area (Ministry of Education, Science and Culture, 2014) or as integrated content in specific subjects (Ministru kabineta, 2018; Education Scotland, 2017), what predominates in the analyzed documents is the cross-curricular integration of digital competences. In these cases, it is believed that promoting digital competences in conjunction with learning in other curriculum areas will be advantageous from a learning perspective. This cross-curricular approach provides a more meaningful context for the development of digital competences, allowing them to be contextualized and applied in a more holistic manner aligned with the demands of the constantly evolving technological world (Departament d'Ensenyament, 2013). Additionally, this interconnection between the digital domain and

various curriculum subjects expands students' understanding of the value and applicability of digital competences in their academic journey.

Concerning the prioritized domains of digital competences in these curriculum documents, it was possible to observe a consistent emphasis on competences associated with domains related to "searching, managing, and validating information" and "online communication and collaboration" in all examined documents. These findings align with others studies that analyzed international frameworks (Mattar et al., 2022), most documents included domains of digital competences related to "information and data", "communication", "collaboration" and "technical". In contrast, there was not a prominent focus on digital competences related to "programming," "health and well-being," and "environmental protection." The limited focus on these domains of digital competences highlights a gap between the official curriculum and the needs of the social context and what has been defined in main theoretical frameworks (Baeza-González et al., 2022), depriving students of developing competences in areas considered fundamental for a holistic understanding of technological changes, self-care, and environmental awareness. In this sense, this observation also signals an opportunity and a necessity for a more agile and dynamic update of school curricula, aiming to include emerging domains deemed essential for the comprehensive education of students.

From the analysis undertaken in this investigation, it is evident that only half of the examined curriculum documents established progression levels between the years of the primary education. However, none of these documents set specific digital competences to be achieved year by year. In some cases, the learning objectives in this domain were outlined to be accomplished over a broader time frame, specifically considering two

proficiency stages in the digital domain. The absence of precise definitions regarding what to achieve year by year, in terms of digital competences, highlights the presence of a highly flexible curricular approach in the primary education, with the potential to accommodate variations in students' learning pace in a holistic and integrated manner. However, this lack of specificity could also impact the consistency in teaching these competences, a challenge that was also identified in the study conducted by Mattar et al. (2022). Therefore, it will be interesting to explore in future research the possibility, albeit tentatively suggested in the examined curriculum documents, of defining two proficiency stages in the digital domain within the years of the primary education, making the monitoring and assessment of individual progress less complex and challenging for teachers,. A more in-depth analysis of this strategy could focus on evaluating its effectiveness in the intentional and progressive development of digital competences over the first 4 years of basic education, considering its adaptability to individual variations in the learning process.

Finally, concerning the assessment of digital competences, a critical aspect already emphasized by research (Amante et al., 2021, Godaert et al., 2022, Martínez-Piñeiro et al., 2019; Siarova et al., 2017), the majority of documents highlight the need to assess digital competences in the context of the primary education. However, only one of the examined documents provides a clear definition of means or instruments for this assessment. Therefore, these findings suggest the need for heightened attention from those responsible for drafting curriculum documents that specify the expected digital competences in the primary education. Since specific indications for the operationalization and assessment of these competences in the school context are still

scarce, it is essential to develop more detailed guidelines to ensure that all students in primary education can consistently and meaningfully develop socially relevant digital competences and, simultaneously, track their progress in this considered fundamental learning domain.

However, as is naturally the case in research, the present study was not without limitations. Due to time and human resource constraints, it was necessary to limit the corpus of documents to those mentioned in the Eurydice Report - "Digital Education at School in Europe" (European Commission/EACEA/Eurydice, 2019), which represents a sampling limitation. For future research, we recommend expanding the corpus of documents by including more curriculum documents from other European countries and even incorporating documents from non-European countries. This would contribute to a more comprehensive and diversified perspective on the topic. Another relevant point to consider is the temporal limitations, as the analyzed documents may have been updated after the conclusion of the selection and compilation of the document corpus, and consequently, they may not reflect the most recent educational and curricular policies or changes introduced subsequently. Additionally, the methodological approach strictly based on document analysis, while suitable and valuable for achieving the objectives outlined in this study, offers only a limited glimpse into curricular practices, confined to the realm of official curriculum. For a more comprehensive and in-depth understanding of the interaction between curriculum policies and their practical implementation, future studies may favor a mixed-methods approach. The inclusion of complementary techniques, such as interviews with teachers and analyses based on the observation of real learning dynamics, will allow capturing not only what is formally established in

documents but also how these guidelines are interpreted, adapted, and applied in classrooms.

Despite the acknowledged limitations, this study provides significant contributions to research and curricular practices related to preparing students to face the challenges of the constantly evolving digital world. In this regard, the uniqueness of the study lies primarily in expanding the available knowledge about the vision and strategies defined in the political-curricular framework at the European level regarding the development of digital competences in the early years of compulsory education. The detailed approach to this topic, based on the analysis of curriculum documents from various European countries, provides a comprehensive overview of the subject, highlighting patterns and trends in relation to four core aspects: the positioning and integration of digital competences in curriculum documents, the prioritized domains in the examined contexts, the defined progression or proficiency levels, and the advocated approach for the assessment of digital competences. These findings are relevant not only for the educational community and researchers but also for policymakers, offering a set of evidence that can inform adjustments to existing strategies, aiming for the intentional and consistent teaching of digital competences in the early years of basic education.

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