



DigCompOrg, the SELFIE tool, and digital maturity in educational institutions: a systematic review

DigCompOrg, la herramienta SELFIE y la madurez digital en las instituciones educativas: una revisión sistemática

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Abstract

The advancement of Information and Communication Technologies (ICT) in education has highlighted the importance of Teacher Digital Competence (TDC) and the adoption of institutional strategies for the effective integration of technologies in teaching and learning processes. Considering that investments in technologies do not always result in digital maturity, it becomes relevant to understand how educational institutions use diagnostic and planning tools to support this transformation. Thus, the objective of this article is to analyze the available empirical evidence (from 2020 to 2025) on the application of DigCompOrg and the SELFIE tool; the form, modalities, and educational levels in which they are implemented; as well as the main challenges and limitations reported in the studies. A Systematic Literature Review was conducted using the Scopus and Web of Science databases, resulting in a final sample of 20 articles. The results indicate that DigCompOrg and SELFIE have been used to diagnose institutional digital maturity, support the development of digital competencies of teachers and students, and subsidize planning and continuous improvement processes. The study observed a predominance of studies in primary and secondary education and the adoption of reduced versions of SELFIE for longitudinal monitoring. The discussion highlights that digital transformation depends on a favorable institutional ecosystem, articulating infrastructure, teacher training, and strategic management. It concludes that these tools contribute to strengthening digital maturity and to the formulation of training actions. As future work, it is recommended to expand investigations in contexts that are still little explored and to conduct longitudinal studies on the impacts of improvement processes.

Keywords: DigCompOrg, SELFIE, education, technology, competence, digitization.

Resumen

El avance de las Tecnologías de la Información y la Comunicación (TIC) en la educación ha puesto de relieve la importancia de la Competencia Digital Docente (CDD), y la adopción de estrategias institucionales para la integración efectiva de las tecnologías en los procesos de enseñanza y aprendizaje. Dado que las inversiones en tecnologías no siempre se traducen en madurez digital, resulta relevante comprender cómo las instituciones educativas utilizan herramientas de diagnóstico y planificación para apoyar esta transformación. Por lo tanto, el objetivo de este artículo es analizar la evidencia empírica disponible (de 2020 a 2025) sobre la aplicación de DigCompOrg y la herramienta SELFIE; la forma, las modalidades y los niveles educativos en los que se implementan; así como los principales retos y limitaciones reportados en los estudios. Se realizó una revisión sistemática de la literatura utilizando las bases de datos Scopus y Web of Science, lo que resultó en una muestra final de 20 artículos. Los resultados indican que DigCompOrg y SELFIE se han utilizado para diagnosticar la madurez digital institucional, apoyar el desarrollo de competencias digitales de docentes y estudiantes, y apoyar los procesos de planificación y mejora continua. La investigación observó un predominio de estudios en educación primaria y secundaria y la adopción de versiones reducidas de SELFIE para el seguimiento longitudinal. El análisis subraya que la transformación digital depende de un ecosistema institucional favorable que articule infraestructura, formación docente y gestión estratégica. Se concluye que estas herramientas contribuyen a fortalecer la madurez digital y a la formulación de acciones formativas. Como trabajo futuro, se recomienda ampliar las investigaciones a contextos aún poco explorados y realizar estudios longitudinales sobre el impacto de los procesos de mejora.

Palabras clave: DigCompOrg, SELFIE, educación, tecnología, competencia, digitalización.

1. Introduction

The transformative role of Information and Communication Technologies (ICT) in educational processes requires continuous professional development (Rzońca, 2024) and it demonstrates that the quality of teaching is intrinsically linked to Teachers' Digital Competence (TDC), which, according to López Bueno et al. (2023), plays an essential role in this process. Limited mastery of these competencies negatively impacts the educational use of technologies, which in turn affects students' holistic development; therefore, alongside the digitization of education, these competencies must be addressed in depth (Gaeta González, 2024; Bacus et al., 2022).

According to Santos, Nóbrega, and Benite (2026), in the context of contemporary educational debates, teacher training has taken on a central role in discussions about education due to social, political, and technological transformations that demand professionals prepared to work in increasingly diverse school settings. However, the development of Teachers' Digital Competence (TDCs) should not be understood solely as an individual effort but rather as the driving force behind the transformation of educational organizations.

In this context, the importance of digital competence (DC) stands out; it is recognized as one of the eight essential competencies for lifelong learning, in accordance with the Recommendation of the European Parliament and the Council of the European Union (2006), updated by the Council of the European Union (2018).

According to the Council of the European Union (2018, p. 9), digital competences “involve the safe, critical, and responsible use of digital technologies in learning, at work, and in participating in society.” This concept, applicable to both children and adults, remains highly relevant and has even guided more recent versions of reference frameworks adapted to today's digital reality (Tenberga and Daniela, 2024; Cosgrove and Cachia, 2025).

There is also TDC defined as:

Knowledge, skills, and attitudes related to technological, informational, and communicative aspects used in professional and educational contexts, incorporating sound pedagogical and didactic criteria for the effective integration of these elements into the teaching-learning process, with an aware-

ness of the implications for students' digital education. (C. Santos, 2023, p. 40)

Digital Competencies (DCs) have been gaining prominence in contemporary society, driven by international organizations and institutions that promote their development and highlight their importance for education and performance in contemporary society (Pedro et al., 2023; C. Santos et al., 2026).

With the aim of guiding educational policies and practices in the digital age, the European Union has developed a series of reference frameworks that define, describe, and support the development of digital competencies across different dimensions of education. The development of these frameworks, as well as action plans related to digital transformation, seeks to “support a sustainable and effective adaptation of education and training systems” (Cachia et al., 2024, p. 2) and responds to the need to build a common language capable of guiding educational policies and strategies in a context marked by significant linguistic, cultural, and institutional diversity.

In line with this, the Update to the Digital Education Action Plan (2021–2027) (Comisión Europea, 2020; Paz Díez-Arcón and Martín-Monje, 2024) defines the European strategy around two central priorities: one regarding the promotion of a highly effective digital education ecosystem, and the other regarding the development of the digital skills and competencies necessary for digital transformation.

Among the frameworks developed by the European Union, the Digital Competence Framework for Citizens (DigComp) stands out; it is aimed at understanding and developing citizens' digital competences, and its first edition was launched in 2013. Since then, new versions have been released over the years—in 2025, the fifth edition was launched: DigComp 3.0: European Framework for Digital Competences for Everyday Life, Employment, and Education (Cosgrove and Cachia, 2025).

Based on DigComp, more specific, education-oriented frameworks were developed, such as the Digital Competence Framework for Educators (DigCompEdu), which aims to develop teachers' digital competencies and consists of six areas: Professional Commitment, Digital Resources, Teaching and Learning, Assessment, Empowering Learners, and Facilitating Learners' Digital Competence (Redecker, 2017). DigCompOrg extends this scope to the insti-

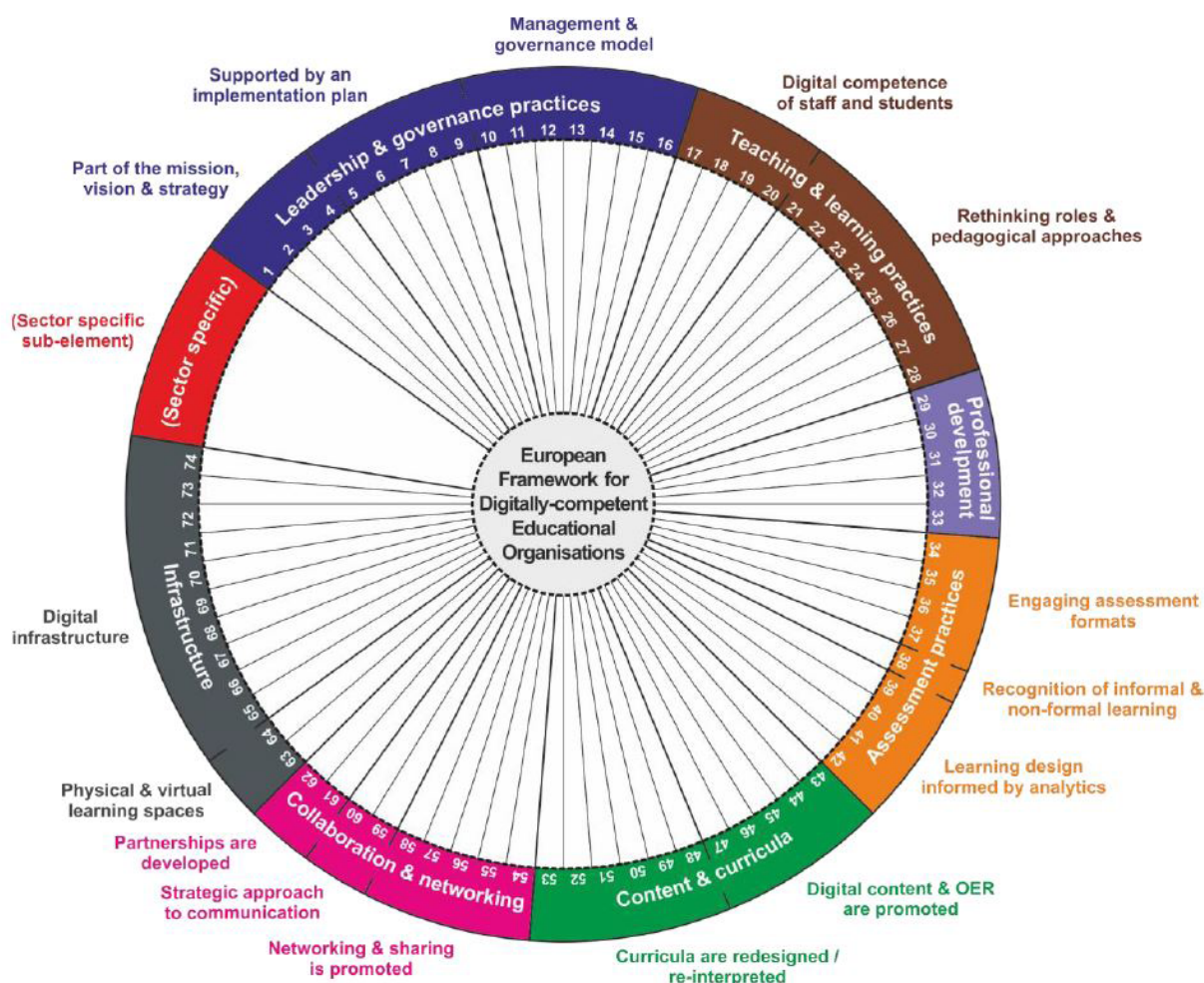
tutional level (Kampylis et al., 2015) and, as it is the focus of this article, will be discussed in greater detail in the following section.

1.1 DigCompOrg

DigCompOrg was developed by the European Commission's Joint Research Centre (JRC) in 2015 in response to the need to modernize education and training systems in Europe. Based on self-assessment and self-reflection by educational organizations, the framework's central purpose is to serve as a reference to support the systemic and effective integration of technologies into education (Kampylis et al., 2015). Thus, this framework was designed to

support the modernization and sustainable integration of digital learning technologies at various levels of education, including Early Childhood Education and Care, Primary / Basic Education (1st, 2nd, and 3rd Cycles), Secondary Education / High School, Vocational Education and Training / Technological Specialization Courses, and Higher Education. The creation of DigCompOrg involved a mixed-methods approach that included literature reviews, expert consultations, and in-depth analyses of existing self-assessment frameworks and tools in various countries. The framework's structure is presented in Figure 1.

Figure 1. Structure of DigCompOrg



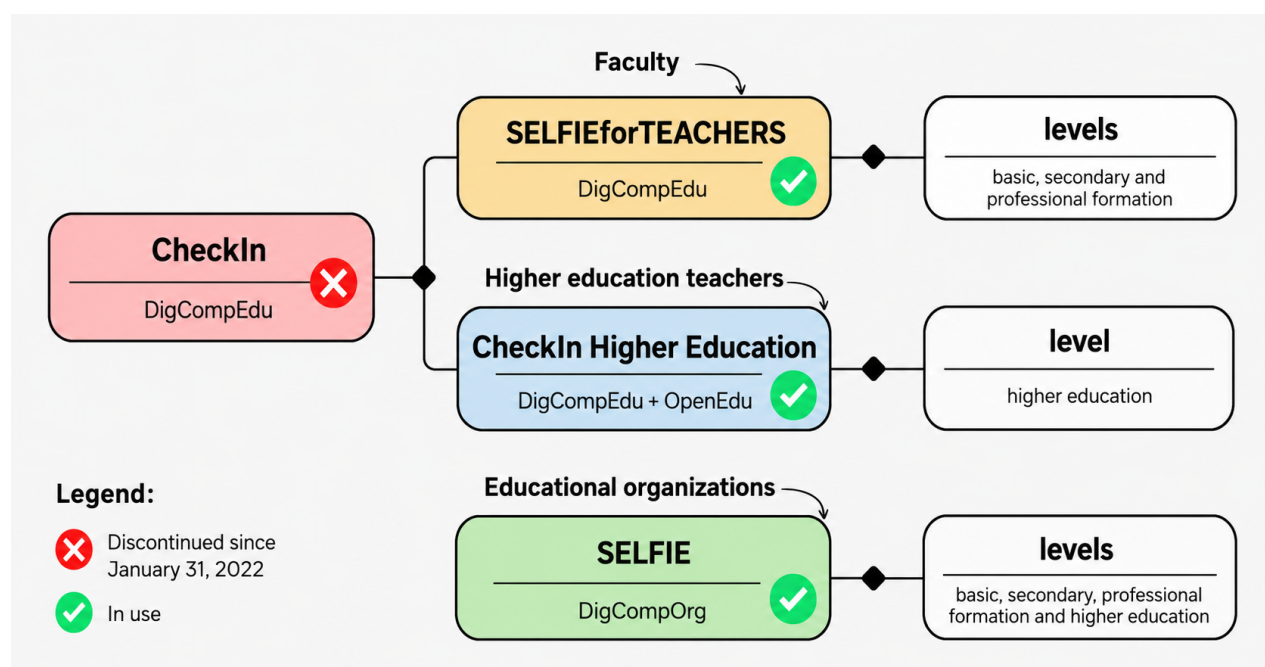
Note. Lopez-Gracia et al. (2022, p. 78), translated from Kampylis et al. (2015)

As shown in Figure 1, DigCompOrg is structured into seven thematic elements, 15 sub-elements, and 74 descriptors, with the option to include specific areas to adapt it to the reality of each institution (Kampylis et al., 2015). It functions as a comprehensive framework for assessing and strengthening the digital maturity of educational institutions, covering organizational, pedagogical, technological, and management dimensions.

1.2 Assessment Tools

Based on the digital competence frameworks for education developed by the European Union and presented above, several self-reflection tools have been created (Figure 2). They are designed to be accessible and inclusive, are available in multiple languages, and can be used free of charge online, allowing both individuals and educational institutions to assess their competencies and practices.

Figure 2. Self-reflection tools and frameworks



1.3 SELFIE

The SELFIE tool (Self-reflection on Effective Learning by Fostering Innovation through Educational Technologies), officially launched in 2018 and developed based on DigCompOrg, was designed to help educational institutions reflect on their own level of digitalization (Cachia et al., 2024; Fernández-Miravete and Prendes-Espinosa, 2022a). SELFIE is organized into three adapted questionnaires, featuring statements and questions that capture the perceptions of school leaders, teachers, and students on a progressive scale (from 1 to 5 points) to measure digital maturity.

In this way, it allows for an analysis of how digital technologies are utilized within educational institutions, with the aim of supporting them in inte-

grating digital tools into their teaching, learning, and assessment practices (Costa et al., 2021; Fernández-Miravete and Prendes-Espinosa, 2022b; European Commission, 2026). It is important to highlight the existence of a module specifically geared toward vocational education and training (VET) institutions and companies, called *SELFIE for Work-Based Learning*, which, in addition to the forms available for school leaders, teachers, and students in training, also offers a dedicated questionnaire for trainers (Herrero et al., 2024).

By providing an institutional assessment, SELFIE supports critical reflection and the planning of digital transformation strategies. However, as Bešić et al. (2025, p. 1192) point out, "Many schools lack a strategy to effectively integrate digital tech-

nologies into their teaching and learning,” which underscores the need to strengthen institutional processes for assessing the level of digitization and for formulating innovation strategies mediated by educational technologies.

In light of these considerations, and recognizing the importance of a holistic approach to integrating digital technologies into education—with an emphasis on developing digitally competent educational organizations—this study is based on two premises: first, that investment in digital technologies does not, on its own, translate into digital maturity; and second, that teachers’ digital competence (TDC) continues to receive limited attention. In this context, the article is structured around the following guiding question: How have DigCompOrg and the SELFIE tool been used in educational institutions to assess technology adoption and support the development of digital competencies among teachers and students at different levels of education, according to the literature published between 2020 and 2025?

Although the EU has promoted DigCompOrg and the SELFIE tool as important models and instruments for educational institutions to adopt, no systematic literature reviews (SLRs) were identified during the period under consideration that synthesize the scope of their practical use at different levels of education, or the barriers and facilitating factors associated with their implementation. Therefore, the objective of this SLR is to analyze the available empirical evidence (from 2020 to 2025) on the application of DigCompOrg and the SELFIE tool, the methodologies, modalities, and levels of education in which they are implemented, as well as the main challenges and limitations reported in the studies. To achieve the objective of this article, a systematic

literature review was conducted as described below in Section 2.

2. Methodology

The methodology was developed based on a systematic review, structured in accordance with the international recommendations for transparency and traceability set forth in PRISMA 2020 (Page et al., 2021). To ensure greater methodological consistency, data selection and extraction principles described in evidence synthesis manuals, such as the *JBIManual for Evidence Synthesis* (Aromataris et al., 2024), were also considered. This type of review was chosen because of the systematic nature of adopting a structured process capable of ensuring the reproducibility, transparency, and reliability of the evidence synthesis (Ferenhof and Fernandes, 2025).

It should be noted that the protocol for this systematic review was not registered in databases such as the International Prospective Register of Systematic Reviews (PROSPERO) or the Open Science Framework (OSF). Instead, the protocol was developed in advance by the authors during planning meetings and followed international guidelines for conducting systematic reviews. Likewise, the principles of the Systematic Search Flow (SSF) method proposed by Ferenhof and Fernandes (2025, p. 7) were followed to ensure the transparency and reproducibility of the process, which is structured into eight phases: “1. Strategy; 2. Database search; 3. Organization of reference lists; 4. Standardizing article selection; 5. Compiling the collection of articles; 6. Data consolidation; 7. Summary and reporting; 8. Writing.” The databases used were Scopus and Web of Science, accessed via institutional credentials, with the search strings described in Table 1.

Table 1. *Databases and search strings used in the RSL*

Databases		Scopus	Web of Science
Fields		Article Title, Abstract, Keywords	"Tema": Título, resumen, palabra clave plus y palabra clave autor
Search string		(TITLE-ABS-KEY (digcomporg OR "Digitally-Competent Educational Organizations" OR "Digitally Competent Educational" OR "Self-reflection on Effective Learning by Fostering the Use of Innovative Educational Technologies" OR (SELFIE AND ("education system" OR "school system" OR educational organization* OR educational organization* OR educational institution* OR university OR college OR "higher education" OR "primary school" OR "secondary school" OR "digital competence" OR tool)) AND NOT TITLE-ABS-KEY (picture OR postage OR photo OR image OR "social media"))	(TS= (digcomporg OR "Digitally-Competent Educational Organizations" OR "Digitally Competent Educational" OR "Self-reflection on Effective Learning by Fostering the Use of Innovative Educational Technologies" OR (SELFIE AND ("education system" OR "school system" OR educational organization* OR educational organization* OR educational institution* OR university OR college OR "higher education" OR "primary school" OR "secondary school" OR "digital competence" OR tool))) NOT TS= (picture OR postage OR photo OR image OR "social media"))

The search was conducted in both databases on February 2, 2026, and yielded a set of articles, the exact number of which will be presented in the results section. The Inclusion Criteria (IC) were applied directly within the platforms, and after

exporting and organizing the metadata in an Excel spreadsheet, the Exclusion Criteria (EC) defined in the review protocol and summarized in Table 2 were applied.

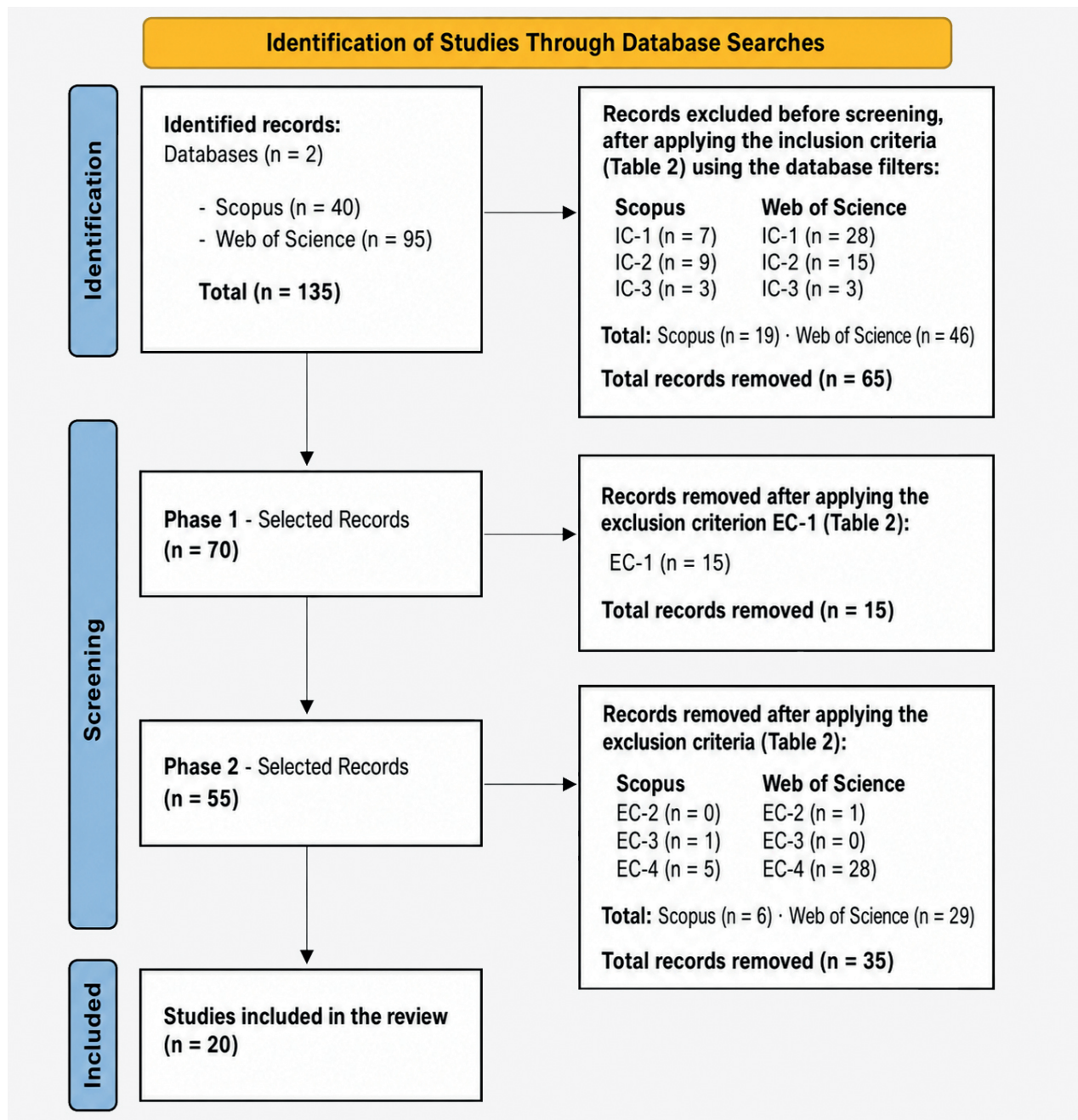
Table 2. *Inclusion and Exclusion Criteria*

Code	Inclusion Criteria	Code	Exclusion Criteria
CI-1	Publication period (2020–2025)	CE-1	Duplicate articles
CI-2	Publication type (article, peer-reviewed)	CE-2	Does not meet inclusion criteria (Re-submission)
CI-3	Language (Portuguese, English, or Spanish)	CE-3	No empirical dimension
		CE-4	Not related to the DigCompOrg and/or SELFIE application

The Excel spreadsheet designed for the selection and analysis process included essential information from each article, such as the educational level under study—categorized according to the United Nations Educational, Scientific and Cultural Organization (UNESCO) classification—as well as the specific manner in which the DigCompOrg framework and the SELFIE tool were utilized. In addition, detailed observations about each study were recorded to facilitate data interpretation. The file was shared among the researchers via Google Drive, ensuring traceability, standardization, and collaborative access throughout the process.

3. Results and Discussion

In the initial search of the Scopus and Web of Science databases, 40 and 95 publications were identified, respectively, for a total of 135. After applying the inclusion criteria, 70 articles were selected. Then, upon applying the exclusion criteria, 20 articles were identified for inclusion in this systematic review. The PRISMA flowchart, showing the sequential order of application of the inclusion and exclusion criteria, is presented in Figure 3.

Figure 3. PRISMA 2020 diagram applied to this systematic review

Note: Adapted from Page et al. (2021).

It should be noted that we chose to divide the screening stage into two phases, as shown in the diagram in Figure 3. In the first phase, exclusion criterion EC-1 was analyzed. In the second phase, the remaining articles were evaluated, and exclusion criteria EC-2, EC-3, and EC-4 were applied. Regarding exclusion criterion EC-2, which applies to articles

that did not meet the inclusion criteria, it was found that one article did not comply with inclusion criterion IC-3. This article appeared in the search results after the inclusion filters were applied, despite being written in a language other than Portuguese, English, or Spanish. The definitive list of articles included in this SLR is provided in Table 3.

Table 3. *Descriptive list of articles included in the final stage of the systematic review*

Código	Título	Autor(es) e ano de publicação
1	Data-driven decision making as a model to improve in primary education	Athanatou et al. (2023)
2	Digital technology use in inclusive schools in four European countries: Within-and between-school differences	Bešić et al. (2025)
3	Fostering the Digital Competence of Schools: Piloting SELFIE in the Italian Education Context	Bocconi et al. (2020)
4	Supporting the monitoring of the digital capacity of schools through optimal shortening of the SELFIE tool	Cachia et al. (2024)
5	Governing digital education in decentralised systems: translating supranational frameworks into regional policy practice	Castañeda et al. (2025a)
6	Educational empowerment and strategic guidance: A critical perspective on regional educational digital transformation	Castañeda et al. (2025b)
7	For to all those who have, will more be given? Evidence from the adoption of the SELFIE tool for the digital capacity of schools in Spain	Castaño-Muñoz et al. (2022)
8	Teacher collaboration and students' digital competence-evidence from the SELFIE tool	Castaño-Muñoz et al. (2023)
9	Capturing schools' digital capacity: Psychometric analyses of the SELFIE self-reflection tool	Costa et al. (2021)
10	Análisis del proceso de digitalización de um centro de Enseñanza Secundaria desde el modelo DigCompOrg	Fernández-Miravete and Prendes-Espinosa (2021a)
11	Evaluación de la competencia digital de un centro de enseñanza secundaria a partir del modelo digcomporg	Fernández-Miravete and Prendes-Espinosa (2021b)
12	Digitalization of Educational Organizations: Evaluation and Improvement Based on DigCompOrg Model	Fernández-Miravete and Prendes-Espinosa (2022a)
13	Evaluación del proceso de digitalización de un centro de enseñanza secundaria con la herramienta SELFIE	Fernández-Miravete and Prendes-Espinosa (2022b)
14	Improving the digital capacity of schools by using the SELFIE tool for collective reflection	Kampylis and Sala (2023)
15	Factores claves en la transformación digital de las organizaciones educativas	Lopez-Gracia et al. (2022)
16	Teachers' personal network analysis reveals two types of pioneers in educational digitalization: Formal and informal intermediaries at schools	Maya-Jariego et al. (2023)
17	Equivalences between SELFIE indicators and DigCompEdu framework based on Delphi technique	Munar-Garau et al. (2024)
18	Quality of school inclusion and digital technologies: A pilot study	Muscella et al. (2024)
19	¿Qué tipo de centros de FP tiene mayor capacidad digital? Un estudio de NCA y QCA	Pagaldai et al. (2025)
20	Promoting Students' Well-Being and Inclusion in Schools Through Digital Technologies: Perceptions of Students, Teachers, and School Leaders in Italy Expressed Through SELFIE Piloting Activities	Panesi et al. (2020)

Note: Alphabetical order based on the last name of the first author.

Table 3 presents the 20 studies included in this systematic review, which comprise the analyzed dataset.

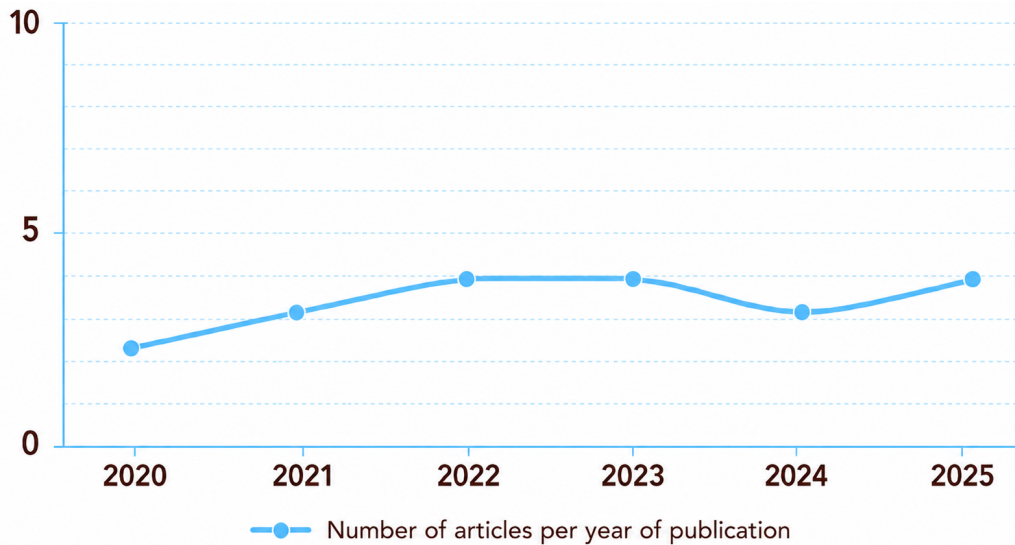
3.1 Bibliometric analysis

3.1.1 Annual Distribution

In terms of timing, the articles included in this systematic review show a balanced distribution throughout the analyzed period.

The years 2022, 2023, and 2025 saw the highest scientific output ($n=4$). In 2021 and 2024, there was a slight decline, with three articles published per year, while 2020 registered the lowest number ($n=2$), as detailed in Figure 4.

Figure 4. Annual distribution of articles



The temporal analysis presented in Figure 4 indicates a consistent pattern in publications, suggesting that scientific interest in the topic remained active throughout the entire period (2020–2025). Although 2020 recorded the lowest number ($n=2$), this finding may be associated with the time required for the academic community to become familiar with and adopt the tool following its launch in 2018, as well as the global pandemic experienced that year. Subsequent years demonstrated the consolidation of research, maintaining a steady output. Thus, the dataset indicates continuity in academic interest in the topic, with a balanced distribution that reflects the stability and relevance of the subject in the field of education.

3.1.2 Countries of Affiliation and Authors

To identify the most prominent authors in this SLR, an authorship analysis was conducted on the 20 selected articles, resulting in the identification of 40 authors. Among these, we highlight those who contributed to two or more articles; their institutional

affiliations were determined based on each author's most recent publication within the analyzed dataset. These data are presented in Table 4, organized first by the authors with the highest number of published articles and then in alphabetical order.

Regarding the authors' countries of affiliation, a significant geographical concentration within the European Union was observed. Spain stands out with 27 affiliated authors, followed by Italy with eight; together, they account for the largest proportion of the authors identified in this SLR (35 authors, or 87.5%). Spain's predominance is evident in the recurring participation of researchers from the JRC and an international network of universities, including those of Murcia, Seville, Cantabria, Jaume I, the Balearic Islands, Mondragón, and Lleida. Italy stands out primarily through the CNR-ITD, the University of Genoa, and the Free University of Bozen-Bolzano. Other affiliations appear more sporadically, with a total of five authors affiliated with institutions in Austria, Germany, Greece, Poland, and Portugal.

Table 4. *Authors with multiple publications*

Author	Affiliation	Article Code (Table 3)
María Paz Prendes-Espinosa	Universidad de Murcia (España)	1, 10, 11, 12, 13
Ángel David Fernández-Miravete	Universidad de Murcia (España)	10, 11, 12, 13
Panagiotis Kampylis	L'Istituto per le Tecnologie Didattiche, Consiglio Nazionale delle Ricerche CNR-ITD (Italia)	3, 8, 9, 14
Romina Cachia	Centro Común de Investigación, Comisión Europea (España)	4, 5, 6, 16
Cesar Herrero-Ramila	Centro Común de Investigación, Comisión Europea (España)	5, 6, 16
Jonatan Castaño-Muñoz	Centro Común de Investigación, Comisión Europea (España)	7, 8, 9
Ana Yara Postigo-Fuentes	Institut für Romanistik, Heinrich Heine Universität (Alemania)	5, 6
Artur Pokropek	Instituto de Filosofía y Sociología de la Academia Polaca de Ciencias (Polonia)	4, 7
Linda Castañeda	Universidad de Murcia (España)	5, 6
Nikoleta Giannoutsou	Centro Común de Investigación, Comisión Europea (España)	4, 16
Patrícia Costa	Centro Común de Investigación, Comisión Europea (España); Centro de Matemática Aplicada à Previsão e Decisão Económica (Portugal)	8, 9
Sabrina Panesi	L'Istituto per le Tecnologie Didattiche, Consiglio Nazionale delle Ricerche (CNR-ITD) (Italia)	3 y 20
Stefania Bocconi	L'Istituto per le Tecnologie Didattiche, Consiglio Nazionale delle Ricerche (CNR-ITD) (Italia)	3 y 20
Virginia Viñoles-Cosentino	Universitat Jaume I (España)	5 a 6

Among the authors with the highest number of published articles listed in Table 4, it was found that the scientific output analyzed is led by María Paz Prendes-Espinosa (five articles) and Fernández-Miravete (four articles), who collaborate on a series of longitudinal studies focused on the practical application of DigCompOrg in the Spanish context (Fernández-Miravete and Prendes-Espinosa, 2021a; 2021b; 2022a; 2022b). In addition, Prendes-Espinosa also contributed to the article on data-driven decision-making in Greece (Athanatou et al., 2023).

Another notable author is Panagiotis Kampylis (four articles), whose work ranges from piloting the SELFIE tool in Italy and analyzing teacher collaboration to conducting psychometric analyses related to institutional digital competence and utilizing the tool for collective reflection (Bocconi et al., 2020; Castaño-Muñoz et al., 2023; Costa et al., 2021; Kampylis and Sala, 2023). This author has also contributed to four publications focused on optimizing school instruments and networks, as well as on the

governance of digital education (Cachia et al., 2024; Castañeda et al., 2025a; Castañeda et al., 2025b; Maya-Jariego et al., 2023).

Next, Jonatan Castaño-Muñoz has published three articles dedicated to the psychometric validation of the SELFIE tool (Costa et al., 2021), the analysis of the impact of teacher collaboration using big data (Castaño-Muñoz et al., 2023), and the investigation of equity in technology adoption (Castaño-Muñoz et al., 2022). For his part, Cesar Herrero-Ramila is the author of three studies focusing primarily on the governance of digital education in decentralized systems and the dynamics of social networks in schools (Castañeda et al., 2025a; Castañeda et al., 2025b; Maya-Jariego et al., 2023).

Finally, several authors with two contributions stand out: Stefania Bocconi and Sabrina Panesi focus on the impact of technologies on social well-being—encompassing psychological, physical, cognitive, and social dimensions—as well as on student inclusion and the piloting of the SELFIE tool (Bocconi et al.,

2020; Panesi et al., 2020). Patrícia Costa works on psychometric validation, using statistical methods to verify the validity, accuracy, and reliability of the items in the tool's original questionnaire, while simultaneously addressing teacher collaboration (Castaño-Muñoz et al., 2023; Costa et al., 2021). Artur Pokropek contributes statistical analyses regarding institutional digital competence and equity issues in digitization (Cachia et al., 2024; Castaño-Muñoz et al., 2022). Joining them are Nikoleta Giannoutsou, who addresses the monitoring of digital capacity through the optimization of the SELFIE tool and the analysis of networks of innovative and pioneering teachers (Cachia et al., 2024; Maya-Jariego et al., 2023), and Ana Yara Postigo-Fuentes, Linda Castañeda, and Virginia Viñoles-Cosentino, who examine the governance of digital education in decentralized systems, focusing on the adoption of supranational frameworks in regional policies and leadership strategies for teacher empowerment (Castañeda et al., 2025a; Castañeda et al., 2025b).

Identifying these authors also made it possible to verify the predominance of two major research clusters on digitally competent educational organizations—particularly regarding DigCompOrg and the SELFIE tool—as well as the existence of established collaborative networks centered on this topic. Specifically, the following was confirmed:

- 1) Eight articles are linked to key institutions in education and technology research and development within the European context, specifically the European Commission's JRC and the CNR-ITD in Italy. Recurring authors in this cluster include Panagiotis Kampylis, Romina Cachia, Cesar Herrero-Ramila, Jonatan Castaño-Muñoz, Nikoleta Giannoutsou, Patrícia Costa, Sabrina Panesi,

and Stefania Bocconi. Among them, Kampylis stands out as one of the original co-creators of DigCompOrg, having contributed directly to the development of the framework.

- 2) Seven articles focus on the Spanish context, specifically originating from the University of Murcia, featuring research by Prendes-Espinosa and Fernández-Miravete. Castañeda is part of this core group and has established a direct collaborative network with authors from the first cluster, specifically Cachia and Herrero-Ramila, both of whom are affiliated with the JRC. This interconnection highlights a convergence in current research literature, bringing together the perspectives of the creators of key theoretical frameworks with research groups dedicated to their empirical application and the analysis of digital governance policies.

3.1.3 Levels of Application

To classify the educational levels examined in the articles, the International Standard Classification of Education (ISCED) was utilized, based on the following correspondence: Level 0 – Early Childhood Education; Level 1 – Primary Education (1st and 2nd cycles); Level 2 – Lower Secondary Education (3rd cycle); Level 3 – Upper Secondary Education; Level 4 – Post-secondary Non-tertiary Education; Level 5 – Short-cycle Tertiary Education; Level 6 – Bachelor's Degree or equivalent; Level 7 – Master's Degree or equivalent; and Level 8 – Doctoral Degree or equivalent (UNESCO, 2012). The scope matrix, which details the specific educational levels considered in the empirical dimension of each article in this SLR, is presented in Table 5.

Table 5. *Classification of Educational Levels*

Level of Education (ISCED UNESCO (2012))	Article codes (Table 3)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Level 0																		•			1
Levels 1 and 2	•	•	•	•			•	•	•					•		•		•		•	11
Levels 3 and 4		•	•	•			•	•	•	•	•	•	•	•	•	•			•	•	15
Levels 5, 6, 7, and 8																					0

For the scope analysis, educational levels were categorized into four groups based on the ISCED classification: Level 0; Levels 1 and 2; Levels 3 and 4; and Levels 5, 6, 7, and 8. A clear predominance of research focused on compulsory schooling (Primary and Secondary Education) was observed.

Early Childhood Education was the subject of only one article, which was a specific pilot study, while Higher Education was not the subject of any empirical studies within this body of literature. Secondary education was the most frequently studied level, represented in 15 of the analyzed articles (75%), whereas Primary Education was represented in 11 (55%). A combined approach addressing both Primary and Secondary Education was adopted in eight of the articles.

It should be noted that for the articles coded 5, 6, and 17—unlike the others, which conducted assessments within school settings—the ISCED classification does not apply. In articles 5 and 6, the sample consisted of policy decision-makers, representatives of the Autonomous Communities, and

representatives of Spain's Ministry of Education and Vocational Training. Although the analyzed policies impact ISCED levels 1, 2, and 3, the focus of those studies remains on governance rather than school practice. In Article 17, the research consisted of content validation of the SELFIE indicators by university experts, without direct application to a specific school cycle.

3.1.4 Use of the SELFIE Tool

An analysis of the use of the SELFIE tool in the articles in this SLR identified two distinct modalities: full use, which corresponds to the application of the tool as originally conceived, including the predefined options for modifying fields to adapt it to institutional specificities, and adapted use, a scenario in which SELFIE is not applied directly but is instead used as a basis for developing a new assessment instrument, as well as for creating interviews and other research forms associated with a digitally competent institution. These patterns of use are summarized in Table 6.

Table 6. *Use of the SELFIE Tool*

SELFIE	Article codes (Table 2)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Unabridged Version		•	•	•			•	•	•	•	•	•	•	•		•			•	•	14
Adapted Version	•			•							•				•			•			5

Table 6 shows that the full version of the SELFIE tool was used in 14 of the 20 articles, confirming its robustness for large-scale institutional assessments. At the same time, the tool demonstrates flexibility by being adapted in interviews to explore local perceptions in greater depth, or in hybrid approaches to psychometrically validate shorter versions based on the complete data.

It is worth noting that articles 4 and 11 were classified simultaneously as both full and adapted. In Article 4, data extracted from the SELFIE tool were analyzed, which in turn served as a comparative basis for the creation of two new instruments: the Midi-SELFIE, consisting of 16 items, and the Mini-SELFIE, with eight items, both of which serve as abbreviated alternatives for monitoring the development of digital competence (Cachia et al., 2024).

Article 11 employs a mixed-methods approach, applying quantitative techniques using the official version of the tool, as well as qualitative techniques within a focus group through a guide organized around open-ended questions based on the thematic areas that structure SELFIE (Fernández-Miravete and Prendes-Espinosa, 2021b).

Articles 5, 6, and 17 were not included in Table 6 because they focus on analyzing the design or governance of the SELFIE tool rather than its direct application to obtain data on when a given educational institution is considered digitally competent. Therefore, in these studies, SELFIE is addressed as the subject of study itself rather than as an instrument or method for data collection within an educational context.

3.2 Descriptive Thematic Synthesis

Based on the articles included in this RSL and to fulfill the objective of this research, this chapter presents a descriptive thematic synthesis of the main common themes addressed in the articles identified.

3.2.1 *Application Across Multiple Levels of Education*

The SELFIE tool was developed to be flexible and applicable across various educational contexts. The literature analyzed in this SLR confirms this broad utility, as several levels of implementation were identified. In the context of primary and secondary education, the tool has been validated in diverse educational settings, enabling comparisons between schools with varying levels of digital maturity (Bešić et al., 2025; Fernández-Miravete y Prendes-Espinosa, 2022b; Panesi et al., 2020). Furthermore, its application in vocational education stands out, with findings indicating that infrastructure is essential for successful digital implementation in schools. Likewise, to ensure the effective use of technology, digital competencies—among both students and teachers—remain crucial (Pagaldai et al., 2025). In an innovative approach, a pilot study in Italy adapted the SELFIE tool into a guided interview format to capture teachers' perceptions of technology use with young children in early childhood education (Muscella et al., 2024), thereby demonstrating the tool's applicability at this educational level as well.

3.2.2 *Collective Self-Reflection, Assessment, and Strategic Planning*

Given the goal of obtaining a 360-degree view of an educational institution's digital capacity, the SELFIE tool involves school leaders, teachers, and students in the assessment process (Bocconi et al., 2020; Costa et al., 2021). Collective self-reflection is considered a necessary approach for identifying convergences and divergences in the perceptions of these groups. Some articles present contrasting viewpoints, such as the divergence in students' perspectives, as they tend to be more positive about the use of technology for teaching and learning compared to teachers and school administrators (Kampylis and Sala, 2023). Similarly, school leaders tend to

hold a more optimistic view of their schools' digital potential than teachers do (Bešić et al., 2025).

To mitigate these differences and promote school improvement, the literature emphasizes the utilization of the SELFIE tool to support Data-Driven Decision-Making (DDDM). Athanatou et al. (2023) demonstrate how data extracted from the tool can be integrated into improvement cycles, enabling schools to translate self-assessment into strategic action plans. Furthermore, longitudinal studies have used the ADDIE instructional design model (Analyze, Design, Develop, Implement, and Evaluate) alongside the SELFIE tool to develop digital plans, enabling annual comparisons and adjustments to institutional strategies (Fernández-Miravete and Prendes-Espinosa, 2021a; 2021b). These reflection processes are viewed not merely as a bureaucratic exercise but as a means of empowerment that returns data to school stakeholders so they can act as agents of change (Cachia et al., 2024).

3.2.3 *SELFIE: Assessment, Over-Time Monitoring, and Flexibility of Use*

The articles analyzed reveal various ways in which the SELFIE tool is used, ranging from statistical assessments to dynamic governance processes. Its application for diagnostic and reflective purposes predominates, both across the board and on an *ad hoc* basis, aimed at identifying schools' level of digital maturity at a given point (Bešić et al., 2025; López-Gracia et al., 2022). However, the tool is also utilized longitudinally, focusing on monitoring progress over time. Such longitudinal studies have used the SELFIE tool to track progress in the digitization process and to assess areas with room for improvement, with the ultimate goal of adjusting pedagogical and organizational strategies (Fernández-Miravete and Prendes-Espinosa, 2022a).

Furthermore, the articles highlight the flexibility of the SELFIE tool, which allows schools to use it in its full version, adapted to institutional specificities, or to develop new instruments based on its conceptual framework. In response to the need for continuous monitoring of digital technology use in educational institutions, Cachia et al. (2024) developed and validated abbreviated instruments (Mini-SELFIE and Midi-SELFIE) derived from SELFIE.

Another way the SELFIE tool has been used is by adapting it to investigate specific topics, such as inclusion and school well-being (Panasi et al., 2020); additionally, in conjunction with DigCompEdu, it has been used to infer teacher competencies based on institutional data (Munar-Garau et al., 2024).

3.2.4 *Systemic Framework for Digital Transformation in Education*

The literature shows that the success of digital transformation is intrinsically linked to the adoption of a systemic approach, as suggested by DigCompOrg. This perspective holds that digitization cannot be limited to individual efforts or the mere acquisition of equipment; rather, it must be understood as an organizational endeavor that involves the institution's culture, policies, and infrastructure (Athanatou et al., 2023; Bešić et al., 2025; Castañeda et al., 2025b; Maya-Jariego et al., 2023). Institutional responsibility is, therefore, a necessary condition for promoting safe and effective changes, which requires a holistic vision that integrates pedagogical, technological, and organizational aspects (Fernández-Miravete and Prendes-Espinosa, 2022; López-Gracia et al., 2022).

In this context, leadership and governance emerge as key areas, given that administrators must act as agents driving the transformation process by providing resources and a strategic vision. Furthermore, in certain contexts, the lack of a clear digital strategy or insufficient specific knowledge regarding educational technology management hinders the effective implementation of digital plans (López-Gracia et al., 2022; Pagaldai et al., 2025).

3.2.5 *Challenges in Technology Integration and Training for Teachers' Digital Competence*

Despite advances in public policy, the digital infrastructure of educational institutions remains a significant obstacle to the effective integration of educational technologies. A qualitative analysis of the open-ended responses from the SELFIE tool across various European countries reveals that infrastructure still constitutes a central barrier perceived by the school community (Kampylis and Sala, 2023). Among the main challenges reported are the critical need for access to fast, efficient, and secure Wi-Fi networks, as well as the inadequacy or obsolescence of the access devices used by students

and teachers (Kampylis and Sala, 2023; López-Gracia et al., 2022). According to Pagaldai et al. (2025), a robust infrastructure is a necessary, though not sufficient, condition for success and must be accompanied by pedagogical competence.

The lack of technical support is also cited as a substantial operational obstacle. School leaders and teachers indicate that institutions do not always allocate sufficient time for maintenance and the prompt resolution of technical problems, which can lead to the abandonment of technology use in the classroom (Kampylis and Sala, 2023; López-Gracia et al., 2022). Likewise, teachers' lack of time constitutes another limiting factor for the integration of digital technologies into teaching practice. Many teachers report a heavy workload that restricts opportunities for exploration, resource creation, and experimentation with new digital methodologies in the classroom (Fernández-Miravete and Prendes-Espinosa, 2022b; Kampylis and Sala, 2023). Compounding this situation is the urgent need to establish institutional professional development initiatives—integrated into the regular workday—to mitigate the constraints that directly affect teachers' professional growth and, consequently, students' enriching learning experiences (López-Gracia et al., 2022; Maya-Jariego et al., 2023).

3.2.6 *Institutional and Policy Limitations in the Adoption of Educational Technologies*

A recurring methodological limitation in the literature concerns the inherent nature of the SELFIE tool, which is based on self-reflection questionnaires. The data collected represent the subjective perceptions of school leaders, teachers, and students, which may be influenced by social desirability bias or a lack of knowledge regarding the actual state of technology in the school, and do not necessarily reflect objective reality (Bešić et al., 2025; Fernández-Miravete and Prendes-Espinosa, 2022b; Panasi et al., 2020).

Despite this subjectivity, psychometric analyses have confirmed the construct validity and reliability of the SELFIE tool's items, considering it a robust instrument for identifying schools at different stages of digital transformation and for promoting internal debate (Cachia et al., 2024; Costa et al., 2021; Panasi et al., 2020).

However, as Castaño-Muñoz et al. (2022) point out, a critical challenge has been identified

from a public policy perspective: the Matthew Effect. According to these authors, this effect becomes evident when SELFIE adoption is voluntary and integrated into government incentive programs, as it tends to attract schools that already possess greater digital capacity, while schools facing greater difficulties often choose not to participate. Consequently, this poses the risk that public interventions may not be effectively designed to reach the most vulnerable institutions, thereby exacerbating existing digital inequalities.

4. Conclusions

In response to the guiding question and the proposed objective, the results demonstrate that DigCompOrg and the SELFIE tool have been utilized in educational institutions not only to assess digital maturity and the integration of digital technologies in education but also to support the development of digital competencies among both teachers and students. It is observed that this implementation occurs in coordination with institutional planning and training processes, allowing the assessments obtained to support the formulation of actions and strategies aimed at the digital transformation of schools.

The literature review (2020–2025) also indicates that the application of the SELFIE tool has been diversified and adapted to different contexts, being utilized in institutional improvement cycles integrated into instructional design models, such as ADDIE, as well as in DDDM processes. In terms of educational levels, studies are predominantly focused on primary and secondary education, with fewer investigations addressing vocational education and early childhood education.

Regarding usage patterns, the period analyzed was characterized by both psychometric validation and the increased flexibility of the instrument, notably through the development of short versions—Mini and Midi—suitable for longitudinal and large-scale monitoring without a significant loss of reliability. These advances indicate that school assessments should not be limited to one-time applications but should instead involve repeated administrations over time.

The SLR also highlighted critical challenges and limitations in the application of these tools, such as the Matthew Effect, wherein voluntary initiatives tend to attract institutions with greater digital maturity, potentially exacerbating existing inequalities if

mitigation measures are not implemented (Castaño-Muñoz et al., 2022). This highlights the need to critically analyze this effect, given that it remains underdiscussed in existing literature reviews. Furthermore, despite infrastructure advances, gaps persist in teachers' pedagogical competence, particularly regarding the use of technologies for assessment and feedback, alongside divergent perceptions between students and teachers regarding the utility of these technologies (Fernández-Miravete and Prendes-Espinoza, 2022; Panesi et al., 2020).

It is concluded that the study of institutional diagnostic models, such as DigCompOrg and SELFIE, is fundamental to the contemporary debate on educational technology, given that digital competence does not develop in isolation but rather within a supportive institutional ecosystem. In this regard, such instruments can help educational policies move beyond a vision focused exclusively on infrastructure, prioritizing instead continuous, strategic training initiatives that are integrated into institutional development. Thus, by assessing the digital maturity of educational institutions, a more consistent foundation is established for teachers to practice with greater methodological confidence, thereby fostering critical thinking among students and contributing to the consolidation of digital education.

Finally, the results of this study reinforce the importance of transparency and reproducibility in research, given that the studies presented in Table 3, the diagram in Figure 3, and the other data and references utilized allow for the verification and further exploration of the analyzes conducted. As a direction for future research, we suggest expanding investigations into less-explored contexts, such as early childhood education, vocational education, and higher education, as well as conducting longitudinal studies to track the long-term effects of diagnostic and improvement processes. Furthermore, we highlight the urgent need to explore strategies that help mitigate potential inequalities associated with the deployment of these tools.

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Bibliographic References

- Aromataris, E., Lockwood, C., Porritt, K., Pilla, B. and Jordan, Z. (eds.). (2024). JBI manual for evidence synthesis. JBI.
<https://doi.org/10.46658/JBIMES-24-01>
- Athanatou, M., Prendes Espinosa, M. P. and Gutierrez Porlan, I. (2023). Data-driven decision making as a model to improve in primary education. *Journal of Education and e-Learning Research*, 10(1), 36-42. <https://doi.org/10.20448/jeelr.v10i1.4337>
- Bacus, R., Dayagbil, F. T., Monacillo, V. F. and Bustos, R. (2022). Higher education institutions' emergency remote teaching amid the pandemic. *International Journal of Information and Education Technology*, 12(8), 762-771.
<https://doi.org/10.18178/ijiet.2022.12.8.1682>
- Bešić, E., Frizzarin, A. and Todorova, K. (2025). Digital technology use in inclusive schools in four European countries: Within- and between-school differences. *Journal of Research on Technology in Education*, 57(5), 1190-1203.
<https://doi.org/10.1080/15391523.2024.2378084>
- Bocconi, S., Panesi, S. and Kamylylis, P. (2020). Fostering the Digital Competence of Schools: Piloting SELFIE in the Italian Education Context. *Revista Iberoamericana de Tecnologías del Aprendizaje*, 15(4), 417-425.
<https://doi.org/10.1109/RITA.2020.3033228>
- Cachia, R., Pokropek, A. and Giannoutsou, N. (2024). Supporting the monitoring of the digital capacity of schools through optimal shortening of the SELFIE tool. *Computers and Education*, 208. <https://doi.org/10.1016/j.compedu.2023.104938>
- Castañeda, L., Postigo-Fuentes, A. and., Viñoles-Cosentino, V., Herrero-Ramila, C. and Cachia, R. (2025a). Governing digital education in decentralised systems: Translating supranational frameworks into regional policy practice. *Journal of Education Policy*.
<https://doi.org/10.1080/02680939.2025.2610833>
- Castañeda, L., Viñoles-Cosentino, V., Postigo-Fuentes, A. Y., Herrero-Ramila, C. and Cachia, R. (2025b). Educational empowerment and strategic guidance: A critical perspective on regional educational digital transformation. *European Educational Research Journal*.
<https://doi.org/10.1177/14749041251398083>
- Castañó-Muñoz, J., Pokropek, A. and Weikert García, L. (2022). For to all those who have, will more be given? Evidence from the adoption of the SELFIE tool for the digital capacity of schools in Spain. *British Journal of Educational Technology*, 53(6), 1937-1955. <https://doi.org/10.1111/bjet.13222>
- Castañó-Muñoz, J., Vuorikari, R., Costa, P., Hippe, R. y Kamylylis, P. (2023). Teacher collaboration and students' digital competence: Evidence from the SELFIE tool. *European Journal of Teacher Education*, 46(3), 476-497.
<https://doi.org/10.1080/02619768.2021.1938535>
- Cosgrove, J. and Cachia, R. (2025). *DigComp 3.0: European digital competence framework – Fifth edition*. Publications Office of the European Union. <https://bit.ly/3QpDoMO>
- Costa, P., Castañó-Muñoz, J. and Kamylylis, P. (2021). Capturing schools' digital capacity: Psychometric analyses of the SELFIE self-reflection tool. *Computers & Education*, 162, Artigo 104080. <https://doi.org/10.1016/j.compedu.2020.104080>
- Comissão Europeia. (2020). Plano de Ação para a Educação Digital (2021-2027). (COM (2020) 624 final; Communication from the Commission). <https://bit.ly/4gFiL9V>
- Comissão Europeia. (2026, 1 de março). Sobre SELFIE. Área Europeia de Educação. <https://bit.ly/4v0stHj>
- Conselho da União Europeia. (2018). Recomendação 2018/C189/01 - Sobre as competências essenciais para a aprendizagem ao longo da vida. *Jornal Oficial Da União Europeia*, L 189, 1-13. <https://bit.ly/3QIIaoG>
- Ferenhof, H. A. and Fernandes, R. F. (2025). Desmistificando a revisão de literatura na era da IA: atualizando o método SSF com suporte de inteligência artificial generativa. *Biblios*, 88. <https://doi.org/10.5195/biblios.2025.1317>
- Fernández-Miravete, Á. D. (2022c). Marco europeo para organizaciones educativas digitalmente competentes: revisión sistemática 2015-2020. *Revista Fuentes*, 24(1), 65-76.
<https://doi.org/10.12795/revistafuentes.2022.18698>
- Fernández-Miravete, Á. D. and Prendes-Espinosa, MP (2021a). Análisis del proceso de digitalización de un centro de Enseñanza Secundaria desde el modelo DigCompOrg. *Revista Latinoamericana*

- de Tecnología Educativa - RELATEC*, 20(1), 9-25.
<https://doi.org/10.17398/1695-288X.20.1.9>
- Fernández-Miravete, Á. D. and Prendes-Espinosa, MP (2021b). Evaluación de la competencia digital de un centro de enseñanza secundaria a partir del modelo digcomporg. *Revista Complutense de Educación*, 32(4), 651-661.
<https://doi.org/10.5209/rced.70953>
- Fernández-Miravete, Á. D. and Prendes-Espinosa, MP. (2022a). Digitalization of Educational Organizations: Evaluation and Improvement Based on DigCompOrg Model. *Sociedades*, 12(6), 193. <https://doi.org/10.3390/soc12060193>
- Fernández-Miravete, Á. D. and Prendes-Espinosa, MP (2022b). Evaluación del proceso de digitalización de un centro de enseñanza secundaria con la herramienta SELFIE. *Contextos Educativos*, (30), 99-116. <https://doi.org/10.18172/con.5357>
- Gaeta González, M. L. (2024). Competências digitais e emocionais dos professores em formação contínua para a equidade social. *HOLOS*, 40(4). <https://doi.org/10.15628/holos.2024.17412>
- Herrero, C., Weikert Garcia, L., Horgan, M. and Tasiovasilis, M. (2024). *SELFIE for work-based learning: Guidelines*. Publications Office of the European Union. <https://doi.org/10.2760/3856294>
- Kampylis, P. and Sala, A. (2023). Improving the digital capacity of schools by using the SELFIE tool for collective reflection. *European Journal of Education*, 58(2), 331-346.
<https://doi.org/10.1111/ejed.12561>
- Kampylis, P., Punie, Y. and Devine, J. (2015). *A European Framework for Digitally-Competent Educational Organisations*. <https://doi.org/10.2791/54070>
- López Bueno, H., Val, S. and Gaeta González, M. L. (2023). Importancia de la digitalización docente para una educación inclusiva, crítica y equitativa. *Revista Internacional de Educación para la Justicia Social*, 12(1), 211-227.
<https://doi.org/10.15366/riejs2023.12.1.012>
- López-Gracia, A., González-Ramírez, T. and de Pablos-Pons, J. (2022). Factores claves en la transformación digital de las organizaciones educativas. *Profesorado, Revista de Currículo y Formación del Profesorado*, 26(2), 75-101.
<https://doi.org/10.30827/profesorado.v26i2.21222>
- Maya-Jariego, I., Holgado-Ramos, D., Santolaya, F., Villar-Onrubia, D., Cachia, R., Herrero, C. and Giannoutsou, N. (2023). Teachers' personal network analysis reveals two types of pioneers in educational digitalization: Formal and informal intermediaries at schools. *Computers and Education Open*, 4, 100137.
<https://doi.org/10.1016/j.caeo.2023.100137>
- Munar-Garau, J., Ocea, J. and Salinas-Ibáñez, J. (2024). Equivalences between SELFIE indicators and DigCompEdu framework based on Delphi technique. *Pixel-Bit. Revista de Medios y Educación*, 69, 131-168.
<https://doi.org/10.12795/pixelbit.101775>
- Muscella, L., Papotti, N. e Zanobini, M. (2024). Quality of school inclusion and digital technologies: A pilot study. *Pesquisa de Psicologia*, 46.
<https://doi.org/10.3280/rip2023oa18217>
- Pagaldai, A. Z., Marín, V. I. and Imaz Agirre, A. (2025). ¿Qué tipo de centros de FP tiene mayor capacidad digital? Un estudio de NCA y QCA. *Pixel-Bit, Revista de Medios y Educación*, 74, 1-10.
<https://doi.org/10.12795/pixelbit.116036>
- Parlamento Europeu y Conselho da União Europeia. (2006). Recomendação 2006/962/CE - Sobre as competências essenciais para a aprendizagem ao longo da vida. *Jornal Oficial Da União Europeia, L 394*, 10-18. <https://bit.ly/4oN432w>
- Panesi, S., Bocconi, S. and Ferlino, L. (2020). Promoting Students' Well-Being and Inclusion in Schools Through Digital Technologies: Perceptions of Students, Teachers, and School Leaders in Italy Expressed Through SELFIE Piloting Activities. *Frontiers in Psychology*, 11, Artigo 1563.
<https://doi.org/10.3389/fpsyg.2020.01563>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., ... Moher, D. (2021). *The PRISMA 2020 statement: An updated guideline for reporting systematic reviews*. *BMJ*, 372, n71.
<https://doi.org/10.1136/bmj.n71>
- Paz Díez-Arcón, E. and Martín-Monje, E. (2024). Training in digital and didactic competences for future foreign language teachers: Reflecting on the learning process. *Research in Education and Learning Innovation Archives*, 33, 35-52.
<https://doi.org/10.7203/realia.33.27750>
- Pedro, N., Santos, C. and Mattar, J. (2023). Introdução: Competências digitais na educação: Uma visão global. In N. Pedro, C. Santos y J. Mattar (coords.), *Competências digitais: Desenvolvimento e impacto na educação atual* (pp. 10-19). Instituto de Educação, Universidade de Lisboa.
- Redecker, C. (2017). *European Framework for the Digital Competence of Educators: DigCompEdu* (Y. Punie Ed.). Publications Office of the European Union.
<https://doi.org/10.2760/159770>

- Rzońca, E. (2024). Comparative analysis of the level of digital competences of future teachers in Poland and Ukraine. *Information Technologies and Learning Tools*, 104(6), 81-95. <https://doi.org/10.33407/itlt.v104i6.5826>
- Santos, C. (2023). *Desenvolvimento do e-DigCompEdu: Quadro de referência das competências digitais docentes do ensino superior online*. [Tese, Universidade de Lisboa]. <https://bit.ly/4wdvCow>
- Santos, C., Pedro, N. and Cabero-Almenara, J. (2026). *e-DigCompEdu: Quadro de Competências Digitais para o Ensino Superior Online*. <https://doi.org/10.5281/zenodo.17839386>
- Santos, L. A., Nóbrega, L. N. and Benite, C. R. M. (2026). Revisión sistemática de la formación docente en ciencias y superdotación. *Alteridad*, 21(1), 51-65. <https://doi.org/10.17163/alt.v21n1.2026.04>
- Tenberga, I. and Daniela, L. (2024). Artificial intelligence literacy competencies for teachers through self-assessment tools. *Sustainability*, 16(23), 10386. <https://doi.org/10.3390/su162310386>
- UNESCO Institute for Statistics. (2012). *Classificação Internacional Tipo da Educação (CITE 2011)*. <https://bit.ly/3SteEDZ>

Authorship Statement – CRediT Taxonomy

Authors	Contributions
Danielle Santos	Conceptualization, research, methodology, formal analysis, writing—original draft.
Dr. Cassio Santos	Supervision, project management, conceptualization, writing—revision and editing.
Dr. Neuza Pedro	Validation, writing – review and editing.
Dr. Márcia Grossi	Validation, writing, proofreading, and editing

Statement on the Use of Artificial Intelligence

The authors state that, during the preparation of the article “*DigCompOrg, the SELFIE Tool, and Digital Maturity in Educational Institutions: A Systematic Review*,” they used NotebookLM exclusively as a support tool for specific language and writing tasks. It was not used to generate, fabricate, or modify research data, analyses, results, or conclusions, nor to create references or citations without independent verification of the original sources. All AI-assisted content was reviewed, edited, and validated by the authors, who assume full responsibility for the final version of the manuscript and the integrity of its content.