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**DIGITAL COMPETENCY IN HIGHER EDUCATION: A -TEN
YEAR BIBLIOMETRIC ANALYSIS OF RESEARCH
TRENDS, KEY CONTRIBUTORS, AND INFLUENTIAL
PUBLICATIONS**

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Abstract:

This study presents a bibliometric analysis of research on digital competency in higher education, based on Scopus-indexed publications from 2014 to 2024. This study reports the results using standard bibliometric indicators, which include (1) the current development and publication trends, (2) the most productive contributors in terms of authors, institutions, countries, and source titles, and (3) the most highly cited documents in the field. The data were analyzed using BiblioMagika® and VOSviewer, which facilitated the construction and visualization of bibliometric networks. The findings offer valuable insights into the evolving landscape of digital competency in higher education, highlighting key trends, influential contributors, and areas for future exploration.

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Keywords:

Digital Competency, Higher Education, Bibliometric Analysis

Introduction

Digital Competency in Higher Education

In recent years, digital competency has gained substantial attention as a core requirement for academic success in higher education. Since 2017, there has been a significant and accelerating increase in scholarly output focusing on digital competency among university students, particularly in response to the COVID-19 pandemic (García et al., 2025; Hu et al., 2024). This growing body of research reflects the heightened urgency to address technological disparities and to adapt to the rapid digitization of teaching and learning environments.

Building upon this, digital competence is broadly defined as the set of knowledge, skills, and attitudes required to use digital technologies in educational contexts (Basilotta-Gómez-Pablos et al., 2022). Digital competence has become increasingly important in higher education, with students expected to navigate learning management systems, use word processing software, and search for online information (Chaw & Tang, 2022). Notably Chaw and Tang (2022) emphasized that different types of digital competence are necessary at various stages of the learning journey.

Moreover, technological advancements and the growing availability of diverse digital platforms have reshaped multiple aspects of daily life, particularly within the education sector. The pandemic necessitated a rapid transition to remote learning, which exposed students to new digital challenges and opportunities. In this context, digital competence has evolved from a supplementary skill to a critical enabler of academic engagement and continuity.

As the global education system undergoes transformation, future trends showed the pandemic has permanently altered the educational landscape, with digital technologies expected to remain integral to teaching and learning. The development of digital competence among students and educators will continue to be a priority (Al Husseiny & Abdallah, 2023; Bathula et al., 2023).

Furthermore, research has consistently emphasized the importance of digital literacy and competency, linking them to improved academic performance and employability skills. The integration of digital tools in education has been shown to enhance learning outcomes and student engagement (Aristovnik et al., 2025; Esh & Ghosh, 2024; García Prieto, 2022). Indeed, digital competency is widely recognized as one of the four essential 21st-century skills that students must possess to be successful in the learning process.

Objective

To achieve the aims of this study, three research objectives were formulated:

- Objective 1:** To identify the current development of digital competency in higher education and its distribution (publication by year, language, document types, source types and subject area).
- Objective 2:** To identify the most productive contributors to the study of digital competency in higher education (in terms of authors, institutions, countries, and source titles).
- Objective 3:** To analyze the most highly cited documents in the field of digital competency in higher education.

Research Question

By examining digital competency in higher education, this research focuses on hoping to answer the following research questions (RQs) include:

- RQ1: What is the current development of digital competency in higher education and its distribution?
- RQ2: Who are the most productive contributors to the study of digital competency in higher education in terms of authors, institutions, countries, and source titles?
- RQ3: What are the most highly cited documents in the field of the digital competency in higher education?

This article is structured to address three key research questions through a bibliometric analysis of digital competency in higher education. The introduction presents the background, significance, and objectives of the study, highlighting the need to understand the development and distribution of digital competency research. The literature review outlines previous studies in the field. The methodology section explains the data sources, search strategy, inclusion criteria, and bibliometric tools used.

In the results and discussion, the findings are organized according to the research questions: RQ1 explores the growth and distribution of publications by year, language, document types, source type and subject area; RQ2 identifies the most productive contributors by authors, institutions, countries, and source title; and RQ3 examines the most highly cited documents in the field. Finally, the conclusion summarizes key insights, discusses the implications of the findings, and offers directions for future research.

Literature Review

Bibliometric studies are widely employed to explore the intellectual structure, publication trends, and thematic evolution of a particular field (Sweileh et al., 2017). In recent years, several scholars have conducted bibliometric analyses to assess the development and research productivity related to digital competency in higher education.

Saha et al. (2024) and Velasco et al. (2024) reported a significant growth in scientific output on digital competence since 2016, particularly focusing on areas such as digital citizenship, digital literacy, and the integration of digital tools in educational practices. Research in this domain has been predominantly concentrated in European countries and the United States, with Spain emerging as a notable contributor (Marín Suelves et al., 2021; Palacios-Nunez et al., 2022).

Despite widespread assumptions that students born in the digital age are naturally proficient in using technology, studies such as those by Santos et al. (2022) revealed that many still struggle to fully apply digital tools for learning and development. These findings emphasize the need for more targeted interventions, including structured training programs, online tutorials, and integrated digital competency modules within the curriculum. García Prieto (2022) further highlighted the persistent digital divide in higher education and called for inclusive policies to ensure equitable access to digital resources for all students. Addressing digital inequality remains a critical concern as institutions seek to enhance student engagement and digital literacy.

These prior studies collectively highlight the accelerating interest in digital competence as an academic and practical imperative in higher education. However, gaps remain in terms of comprehensive coverage across regions, institutional types, and educational levels. The present study builds on this foundation by offering a decade-long analysis (2014–2024) of global publication patterns in the field, drawing exclusively from the Scopus database, and focusing on the most productive contributors, institutions, countries, and highly cited works.

Bibliometric Analysis

Bibliometrics is a statistical approach used to assess and quantify scholarly output and citation patterns within a specific research domain. It enables researchers to uncover the intellectual structure, publication trends, and potential future directions of a field (Garfield, 1979).

Bibliometric analysis allow researchers to derive new research ideas, identify gaps in a discipline, and make direct contributions to the field (Donthu et al., 2021). Moreover, by examining the social and structural relationships among key research elements such as authors, institutions, countries, and subject areas, bibliometric techniques offer a comprehensive overview of both the bibliographic and intellectual landscapes of a discipline (Donthu et al., 2021).

Through an in-depth examination of the body of literature on digital competency in higher education, this study seeks to offer meaningful insights for researchers, practitioners, and policymakers aiming to strengthen digital skills in educational settings. Addressing a notable gap in the existing literature, this bibliometric investigation aims to present a holistic view of the evolution and current state of research on digital competency, with a particular focus on development within the higher education context over the past decade.

Methodology

This section describes the method used to gather articles related to digital competency in higher education, which involved a bibliometric to systematically map the body of literature on digital competency in higher education, utilizing metadata retrieved from the Scopus database covering a ten-year period (2014–2024).

The bibliometric approach enables the identification of research trends, key contributors, and thematic developments in the field. To ensure a rigorous and transparent selection process, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework was employed. Figure 1 outlines the stages of identification, screening, eligibility, and inclusion of relevant documents for analysis.

To accomplish this, the bibliometric study was conducted through five key stages: (1) defining the research objective and scope, (2) identifying and selecting the appropriate bibliometric techniques, (3) collecting the data for bibliometric analysis, (4) performing the bibliometric analysis, which includes performance analysis and scholarly mapping, and (5) reporting the finding and discussing their implications for future research.

Data Source

This study employs bibliometric analysis, which applies quantitative and statistical techniques to explore patterns of publication distribution across specific topics and timeframes (Martí-Parreño et al., 2016). The data for this study were retrieved in May 2025 from the Scopus database (<https://www.scopus.com>), a leading and widely recognized indexing platform for scholarly literature (Ramírez-Montoya et al., 2022). Alongside Web of Science (WoS), Scopus is one of the most comprehensive bibliographic databases, frequently used in bibliometric and scientometric research due to its extensive coverage of peer-reviewed journals, conference proceedings, and institutional affiliations (Mongeon & Paul-Hus, 2016).

Scopus provides robust citation tracking and metadata for evaluating research output, scholarly impact, and collaboration networks across various academic disciplines. In this study, a total of 817 documents were extracted using a carefully constructed search strategy with specific keywords related to digital competency and higher education. These documents formed the dataset used for bibliometric mapping and analysis to identify trends, contributors, and thematic developments in the field.

Data Collection and Data Cleaning

The data collection and cleaning process in this study followed a structured approach aligned with the research objectives and based on how the data is obtained and filtered until the final data collection. Then, the data is ready for analysis. The Scopus database was selected as the source for data extraction due to its extensive multidisciplinary coverage and its significant source for bibliometric analysis (Alam et al., 2023; Chin & Chew, 2021).

The research process begins by identifying the keyword “digital competency” AND “higher education” in the Scopus database based on the title of the articles. The digital competency in higher education search query was applied to the title in the Scopus database (3rd May 2025) with the (TITLE((digital competence) OR (digital competency) OR (digital skills) OR (digital literacy) OR (ICT skills) OR (21st century skills) AND (higher education) OR (university) OR (tertiary education) OR (college) OR (postsecondary education))) and produced 930 document results. After a screening search within the article title (TITLE((digital competence) OR (digital competency) OR (digital skills) OR (digital literacy) OR (ICT skills) OR (21st century skills) AND (higher education) OR (university) OR (tertiary education) OR (college) OR (postsecondary education)) AND (LIMIT-TO (PUBYEAR,2014) OR LIMIT-TO (PUBYEAR,2015) OR LIMIT-TO (PUBYEAR,2016) OR LIMIT-TO (PUBYEAR,2017) OR LIMIT-TO (PUBYEAR,2018) OR LIMIT-TO (PUBYEAR,2019) OR LIMIT-TO (PUBYEAR,2020) OR LIMIT-TO (PUBYEAR,2021) OR LIMIT-TO (PUBYEAR,2022) OR LIMIT-TO (PUBYEAR,2023) OR LIMIT-TO (PUBYEAR,2024)) AND (LIMIT-TO (LANGUAGE,"English"))) a total of 817 documents published between 2014 and 2024 were included in this bibliometric study following a systematic screening process. Out of the initial 930 documents retrieved, 113 were excluded based on predefined inclusion criteria, specifically publication year and language limitations. As a result, 817 documents were deemed

eligible for analysis. The search strategy and screening process employed in this study are illustrated in Figure 1.

Data Analysis

To address the research questions outlined in the earlier section, the data analysis was strategically structured into several phases. The first phase involved examining publications by year, language, document type, source type, as well as subject area, corresponding to RQ1 on the development and distribution of digital competency research in higher education.

In the second phase, analyses focused on identifying the most prolific authors, contributing institutions, active countries, and source titles, thereby addressing RQ2 concerning the most productive contributors in the field.

Finally, to answer RQ3, the study identified and evaluated the most highly cited documents, offering insights into the intellectual impact and foundational works shaping the discourse on digital competency in higher education.

Search Strategies

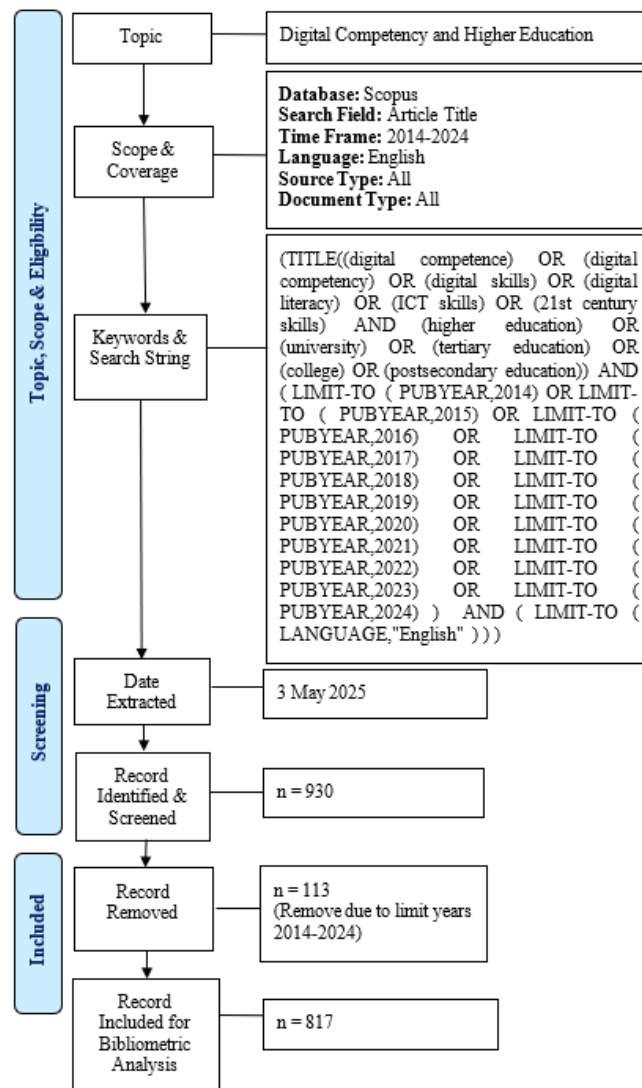


Figure 1: Flow Diagram of the Search Strategy

Source: (Moher et al., 2009; Zakaria et al., 2021)

As demonstrated in Figure 1, the data retrieval process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines to ensure the quality of the review (Haddaway et al., 2022; Page et al., 2021). A total of 817 relevant publications were identified in the database.

Tools

The dataset for this study was extracted from the Scopus database in both comma-separated values (.csv) and Research Information Systems (.ris) formats. These files contained essential bibliographic metadata, including publication year, publication by language, document type, source type, subject area, author information, affiliation, countries, keywords, citation count, and source title. To ensure accurate and efficient analysis, several specialized tools were employed to manage, clean, analyze, and visualize the data.

Microsoft Excel was used to perform preliminary calculations and to generate descriptive statistics and visual representations such as bar charts and frequency graphs. BiblioMagika by Ahmi (2025) was employed to extract citation metrics and evaluate publication impact, including h-index, g-index, total citations, and average citations per document.

OpenRefine was utilized as a robust data cleaning and transformation tool. In academic bibliometric research, OpenRefine is particularly effective for managing inconsistencies in textual data, such as variations in author names, affiliations, and keyword spellings. This tool facilitated the standardization and harmonization of bibliographic entries to ensure reliable and valid analysis (Ahmi, 2023). Its interactive interface and powerful clustering functions allowed the researcher to reconcile data errors and prepare the dataset for deeper bibliometric mapping.

For visualizing bibliometric networks, VOSviewer developed by Van Eck and Waltman (2019) was used to construct and visualize bibliometric networks. This software is well-suited for creating co-authorship, co-citation, and keyword co-occurrence maps. VOSviewer's powerful text mining capabilities allowed for the extraction of noun phrases from titles and abstracts, enabling the creation of detailed visual maps. The software displays network structures in the form of nodes and links, with item size reflecting citation weight and colors representing thematic clusters. Overall, the integration of these tools allowed for a comprehensive and multidimensional understanding of the development, distribution, and influence of research on digital competency in higher education from 2014 to 2024.

Results

This section presents the findings based on the research questions outlined in the introductory part of this study. The analysis focuses on key bibliometric indicators, including the number of cited publications (NCP), total citations (TC), average citations per publication (C/P), and average citations per cited publication (C/CP), which have been systematically examined across selected studies. These metrics provide valuable insights into the research productivity, scholarly impact, and citation dynamics within the domain of digital competency in higher education over the past decade.

Current Development of Digital Competency in Higher Education

To address RQ1 (*What is the current development of digital competency in higher education and its distribution?*), this study examines publication trends in the field by analyzing total publications based on various indicators, including publication by year, type of document, publication by source title, type of source, publication by country, institution, and document language.

Publication by Year

Figure 2 and Table 1 describe the development of publication trend on digital competency in higher education between 2014 and 2024. The analysis reveals a substantial upward trajectory in research output over this period, reflecting the increasing significance of digital competency in educational research and practice. In 2014, the field recorded a relatively low output with only nine publications. This number remained modest in the following years, with 18 publications in both 2015 and 2016, and a slight increase to 20 publications in 2017. A more notable growth occurred in 2018, which saw 31 publications.

A significant rise began in 2019, with the number of publications more than doubling from the previous year to 51. This upward trend continued with a considerable increase in 2020, reaching 90 publications. The growth in publication activity during this period can be attributed to the global shift toward online and digital education in response to the COVID-19 pandemic. This growth continued in 2021 and 2022, reaching 111 and 122 publications, and highest publication output was recorded in 2024, with a total of 190 publications.

Overall, the data indicate a significant growth in research activity and academic engagement with digital competency in higher education over the past decade, highlighting its emergence as a central theme in educational discourse.

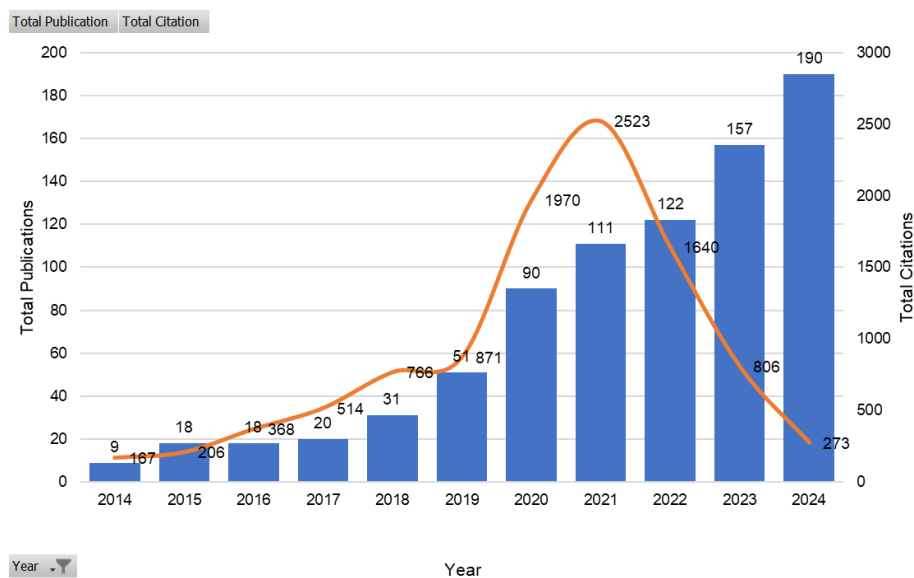


Figure 2: Total Publications and Citations by Year

Table 1: Year of Publication of Digital Competency in Higher Education

Year	TP	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>
2014	9	18	167	18.56	33.40	4	9
2015	18	46	206	11.44	15.85	5	14
2016	18	42	368	20.44	24.53	10	18
2017	20	45	514	25.70	32.13	10	20
2018	31	76	766	24.71	28.37	11	27
2019	51	132	871	17.08	19.80	12	29
2020	90	263	1970	21.89	24.02	23	42
2021	111	384	2523	22.73	24.98	29	47
2022	122	445	1640	13.44	15.19	20	36
2023	157	582	806	5.13	7.13	15	20
2024	190	696	273	1.44	3.00	7	10
Total	817						

Source: Generated by the author (s) using biblioMagika® (Ahmi, 2025)

TP: Total number of publications, NCP: Number of cited publications, TC: Total citations, C/P: Average citations per publication, C/CP: Average citations per cited publication, *h*: *h*-index, *g*: *g*-index

Publication by Language

From the data presented in Table 2, it is observed that this bibliometric analysis focused exclusively on publications on digital competency in higher education written in English, which accounted for 817 documents, representing 100% of the total dataset analyzed. The selection of English-only documents was based on the objective to ensure consistency in data interpretation and to align with the dominant language of international academic discourse.

However, an extended overview of publication output between 2014 and 2024 indicates the presence of documents published in other languages, although in very limited numbers. These include publications in Spanish (24: 2.94%), Portuguese (4: 0.49%), Arabic (1: 0.12%), Chinese (1: 0.12%), and Turkish (1: 0.12%). Despite their inclusion in the broader database, these non-English documents were excluded from the final bibliometric dataset used for analysis in this study.

Table 2: Languages

Language	Total Publications (TP)	Percentage (%)
*English	817	100.00%
Spanish	24	2.94%
Portuguese	4	0.49%
Arabic	1	0.12%
Chinese	1	0.12%
Turkish	1	0.12%
Total	848	100.00

*Dataset only for English language. Source: Generated by the author (s) using biblioMagika® (Ahmi, 2025)

Publication by Document Types

Table 3 and Figure 3 shows the distribution of the number of publications on digital competency in higher education by type of document. Among the total publications observed, journal articles dominated with 547 publications, accounting for 66.95% of the total. This indicates that scholarly communication on digital competency in higher education publish in the form of journal articles.

Conference papers represent the second most common document type, with 179 publications or 21.91% of the total, highlighting the active presentation and discussion of research findings in academic and professional gatherings. Book chapters accounted for 59 publications (7.22%), suggesting that this topic is also addressed within broader academic compilations and edited volumes.

Meanwhile, review articles comprised 24 publications (2.94%), reflecting a moderate level of synthesis work that contributes to theory-building and critical reflection in the field. Erratum and books represent the least frequent document types, with 5 (0.61%) and 3 (0.37%) publications, respectively. The low proportion of books may indicate that comprehensive treatments of digital competency in higher education remain relatively limited.

Table 3: Document Types of Digital Competency in Higher Education

Document Type	Total Publications (TP)	Percentage (%)
Article	547	66.95%
Conference Paper	179	21.91%
Book Chapter	59	7.22%
Review	24	2.94%
Erratum	5	0.61%
Book	3	0.37%
Total	817	100.00

Source: Generated by the author (s) using biblioMagika® (Ahmi, 2025)

Documents by type

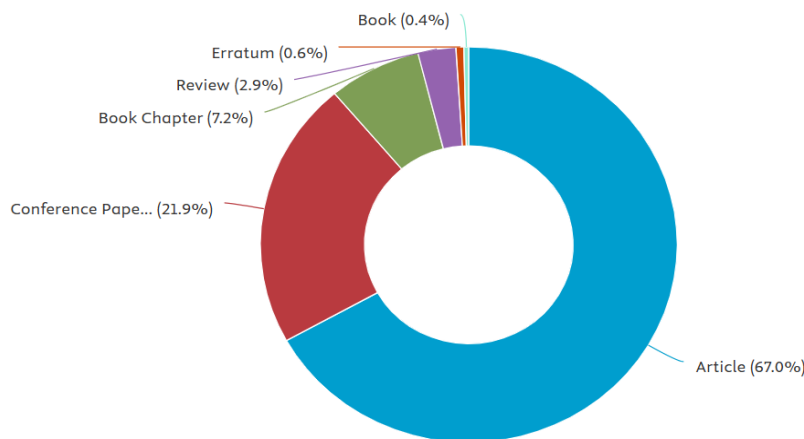


Figure 3: Document Types of Digital Competency in Higher Education

Publication by Source Types

Table 4 shows the distribution of publications on digital competency in higher education by source type. Of the total publications analyzed, journal sources dominated with 577 publications, accounting for 70.62% of the total. This indicates that most of the research in this field is published in scholarly journals.

Conference proceedings were the second most common source type, with 132 publications or 16.16% of the total. This shows that many researchers also share their findings at academic conferences. Book series contributed 66 publications (8.08%), followed by books with 42 publications (5.14%), making them the least common source type in this study.

Table 4: Source Type of Digital Competency in Higher Education.

Source Type	Total Publications (TP)	Percentage (%)
Journal	577	70.62%
Conference Proceeding	132	16.16%
Book Series	66	8.08%
Book	42	5.14%
Total	817	100.00

Source: Generated by the author (s) using biblioMagika® (Ahmi, 2025)

Publication by Subject area

From Table 5 and Figure 4, the distribution of the number of publications by subject area in the study of digital competency in higher education. The highest number of publications is Social Sciences with a total of 554 publications, which cover 67.81% of the total publications, followed by Computer Science with 331 publications for 40.51% of the total. Engineering also stood out with 122 publications (14.93%).

Other subject areas include Arts and Humanities with 82 publications (10.04%) and Psychology with 67 publications (8.20%), followed by Business, Management and Accounting contributed 58 publications (7.10%), while Mathematics (6.12%), Medicine (5.63%), and Environmental Science (5.51%) each recorded moderate representation. Fields such as Health Professions (3.79%), Energy (3.43%), and Decision Sciences (2.94%) also featured in the dataset. Economics, Econometrics and Finance, along with Multidisciplinary studies, each contributed 2.33%.

The remaining subject areas including Agricultural and Biological Sciences; Biochemistry, Genetics and Molecular Biology; Earth and Planetary Sciences; Physics and Astronomy; Immunology and Microbiology; Nursing; Pharmacology, Toxicology and Pharmaceutics; Materials Science; Chemical Engineering; Chemistry; and Neuroscience each accounted for less than 1% of the total publications. These findings offer a clearer understanding of how digital competency is represented and prioritized within higher education research.

Table 5: Subject Area of Digital Competency in Higher Education

Subject Area	Total Publications (TP)	Percentage (%)
Social Sciences	554	67.81%
Computer Science	331	40.51%
Engineering	122	14.93%
Arts and Humanities	82	10.04%
Psychology	67	8.20%
Business, Management and Accounting	58	7.10%
Mathematics	50	6.12%
Medicine	46	5.63%
Environmental Science	45	5.51%
Health Professions	31	3.79%
Energy	28	3.43%
Decision Sciences	24	2.94%
Economics, Econometrics and Finance	19	2.33%
Multidisciplinary	19	2.33%
Agricultural and Biological Sciences	7	0.86%
Biochemistry, Genetics and Molecular Biology	7	0.86%
Earth and Planetary Sciences	7	0.86%
Physics and Astronomy	7	0.86%
Immunology and Microbiology	4	0.49%
Nursing	4	0.49%
Pharmacology, Toxicology and Pharmaceutics	4	0.49%
Materials Science	3	0.37%

Chemical Engineering	2	0.24%
Chemistry	1	0.12%
Neuroscience	1	0.12%
Total	817	100.00

Source: Generated by the author (s) using biblioMagika® (Ahmi, 2025)

Documents by subject area

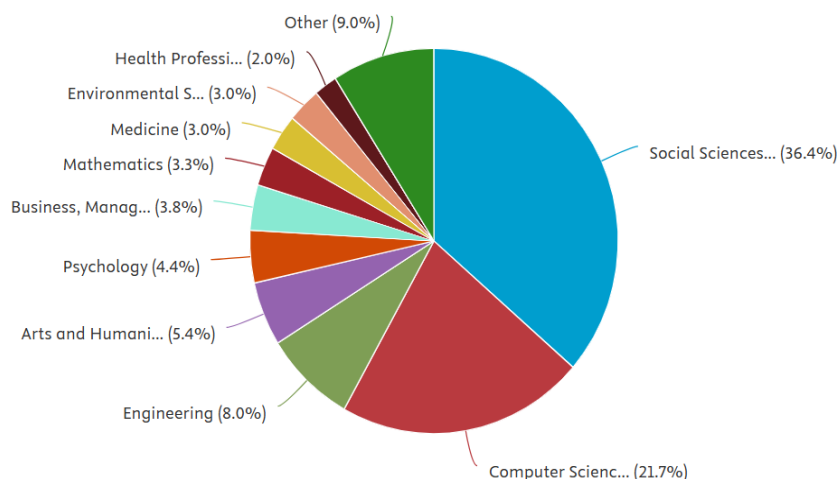


Figure 4: Subject Area of Digital Competency in Higher Education

Productive Contributors

This section addresses RQ2 (*Who are the most productive contributors to the study of digital competency in higher education in terms of authors, institutions, countries, and source titles?*) by presenting publication data categorized by leading authors, institutions, countries, and source titles.

Publications By Authors

Table 6 and Figure 5 presents the ten most prolific authors in the field of digital competency in higher education, along with their institutional affiliations and countries. Leading the list are Dadaczynski, Kevin from Fulda University of Applied Sciences, Germany, and Okan, Orkan from the Technical University of Munich, Germany, each contributing 17 publications to the field.

They are followed by Guillén-Gámez, Francisco D. from University of Málaga, Spain, with 11 publications. Cabero-Almenara, Julio from the University of Seville ranks fourth with 10 publications. Palacios-Rodríguez, Antonio from the University of Seville recorded 8 publications, tied with Esteve-Mon, Francesc M. from Jaume I University, also in Spain.

Sánchez Gómez, María Cruz from University of Salamanca and López-Meneses, Eloy from the University of Pablo de Olavide each contributed 6 publications, along with Gutiérrez-Castillo, Juan Jesús from the University of Seville. Completing the list is Pinto Llorente, Ana María from the University of Salamanca with 5 publications. This distribution reflects the

growth of research activity in the field of digital competency in higher education over the past decade.

Table 6: Top 10 Most Productive Authors of Digital Competency in Higher Education

Author's Name	Affiliation	Country	TP	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>
Dadaczynski, Kevin	Fulda University of Applied Sciences	Germany	17	17	719	42.29	42.29	11	17
Okan, Orkan	Technical University of Munich	Germany	17	17	719	42.29	42.29	11	17
Guillén-Gámez, Francisco D.	University of Málaga	Spain	11	11	272	24.73	24.73	8	11
Cabero-Almenara, Julio	University of Seville	Spain	10	10	368	36.80	36.80	8	10
Palacios-Rodríguez, Antonio	University of Seville	Spain	8	8	334	41.75	41.75	7	8
Esteve-Mon, Francesc M.	Jaume I University	Spain	8	8	240	30.00	30.00	7	8
Sánchez Gómez, María Cruz	University of Salamanca	Spain	6	6	386	64.33	64.33	5	6
López-Meneses, Eloy	University of Pablo de Olavide	Spain	6	6	226	37.67	37.67	4	6
Gutiérrez-Castillo, Juan Jesús	University of Seville	Spain	6	6	206	34.33	34.33	5	6
Pinto Llorente, Ana María	University of Salamanca	Spain	5	5	385	77.00	77.00	5	5

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; *h*=*h*-index; and *g*=*g*-index. Source: Generated by the author (s) using biblioMagika® (Ahmi, 2025)

Documents by author

Compare the document counts for up to 15 authors.

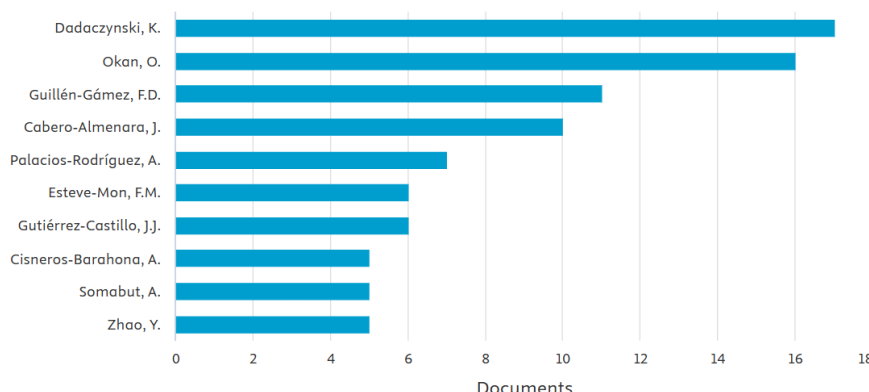
**Figure 5: Productive Authors of Digital Competency in Higher Education*****Publications By Institutions***

Table 7 shows an overview of the distribution of institutional publications in the study of digital competency in higher education. Fulda University of Applied Sciences in Germany and the University of Seville in Spain lead the list with 16 publications each.

They are followed by César Vallejo University in Peru and Rovira I Virgili University in Spain, each with 11 publications. The Technical University of Munich in Germany also contributed 11 publications. The University of Malaga in Spain recorded 10 publications.

Technical University of Manabí in Ecuador and the University of Jaén in El Salvador each produced 9 publications. Meanwhile, Bielefeld University in Germany and National University of Chimborazo in Ecuador each contributed 8 publications to the field. This distribution highlights the active involvement of European and Latin American institutions in advancing research on digital competency in higher education.

Table 7: Most Productive Institutions on Digital Competency in Higher Education

Affiliation	Country	TP	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>
Fulda University of Applied Sciences	Germany	16	16	666	41.63	41.63	10	16
University of Seville	Spain	16	16	478	29.88	29.88	10	16
César Vallejo University	Peru	11	9	37	3.36	4.11	4	6
Rovira I Virgili University	Spain	11	10	112	10.18	11.20	5	10
Technical University of Munich	Germany	11	11	173	15.73	15.73	6	11
University of Malaga	Spain	10	10	191	19.10	19.10	6	10
Technical University of Manabí	Ecuador	9	6	57	6.33	9.50	4	7

University of Manabí								
University of Jaén	El Salvador	9	7	81	9.00	11.57	5	9
Bielefeld	Germany	8	8	554	69.25	69.25	6	8
University National	Ecuador	8	8	47	5.88	5.88	4	6
University of Chimborazo								

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index. Source: Generated by the author (s) using biblioMagika® (Ahmi, 2025)

Publications By Countries

This section answers RQ2: *What are the most active countries in the field of digital competency in higher education?* According to the Scopus database, publications related to digital competency in higher education were extracted from 106 countries. Table 8 presents the top ten most productive countries based on the total number of publications.

Spain leads as the most productive country with 159 publications, accounting for the highest contribution to global research output in this field. It is followed by China with 54 publications, ranking second. The United States and the Russian Federation are tied in third place, each with 37 publications.

Peru follows closely with 34 publications, while Ecuador ranks sixth with 33. Indonesia (32 publications), Nigeria (31 publications), and Germany (31 publications) also show active research engagement in this domain.

Table 8. Top 10 Most Productive Countries Contributed to the Publications on Digital Competency in Higher Education

Country	TP	NCP	TC	C/P	C/CP	h	g
Spain	159	145	3496	21.99	24.11	31	59
China	54	31	394	7.30	12.71	12	19
United States	37	29	517	13.97	17.83	10	22
Russian Federation	37	22	132	3.57	6.00	7	11
Peru	34	24	78	2.29	3.25	5	8
Ecuador	33	25	421	12.76	16.84	10	20
Indonesia	32	23	109	3.41	4.74	6	10
Nigeria	31	19	223	7.19	11.74	8	14
Germany	31	26	899	29.00	34.58	14	29

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index. Source: Generated by the author (s) using biblioMagika® (Ahmi, 2025)

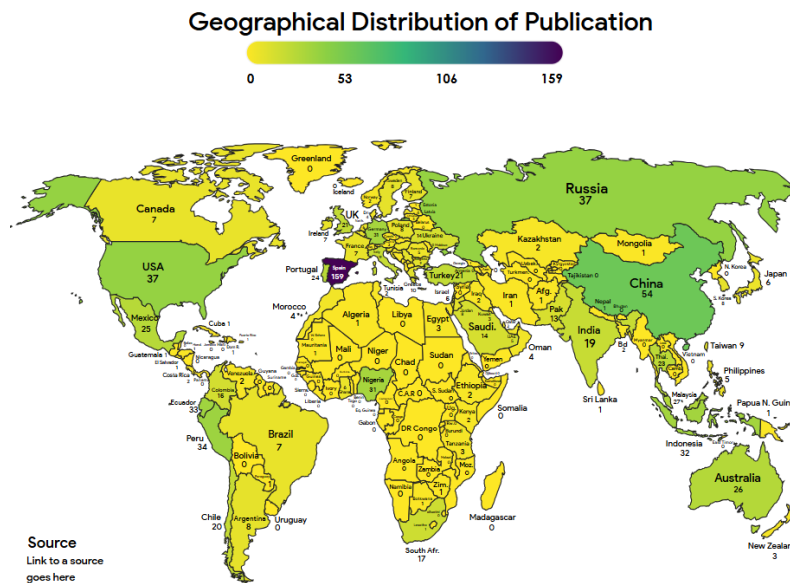


Figure 6. Geographical Distribution of Digital Competency in Higher Education.
iipmaps.com/view/h6iU3mQNQKYv7dLHsCzL

Publications by Source Titles

Table 9 and Figure 7 provide an overview of the distribution of publications on digital competency in higher education based on source titles. The data shows that Library Philosophy and Practice and Education Sciences are the most productive sources, each contributing 25 publications.

The ACM International Conference Proceeding Series follows with 24 publications. Sustainability (Switzerland) recorded 19 publications, while Education and Information Technologies contributed 18. Other notable sources include Communications in Computer and Information Science and Lecture Notes in Networks and Systems, each with 16 publications.

International Journal of Environmental Research and Public Health published 14 documents, followed by Frontiers in Education with 13. Both International Journal of Educational Technology in Higher Education and Pixel-Bit, Revista de Medios y Educación recorded 9 publications.

In addition, Australasian Journal of Educational Technology, Contemporary Educational Technology, and International Journal of Emerging Technologies in Learning each contributed 8 publications. Several other sources—including Heliyon, Advances in Intelligent Systems and Computing, CEUR Workshop Proceedings publish 6 documents, Lecture Notes in Educational Technology, Cogent Education, and Lecture Notes in Computer Science each published 5 documents.

Table 9: Most Active Source Titles on Digital Competency in Higher Education

Source Title	TP	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>
Library Philosophy and Practice	25	15	67	2.68	4.47	5	7
Education Sciences	25	23	370	14.80	16.09	11	19
ACM International Conference Proceeding Series	24	20	96	4.00	4.80	6	8
Sustainability (Switzerland)	19	18	606	31.89	33.67	13	19
Education and Information Technologies	18	18	509	28.28	28.28	9	18
Communications in Computer and Information Science	16	11	43	2.69	3.91	4	5
Lecture Notes in Networks and Systems	16	7	17	1.06	2.43	3	3
International Journal of Environmental Research and Public Health	14	14	561	40.07	40.07	11	14
Frontiers in Education	13	9	27	2.08	3.00	2	4
International Journal of Educational Technology in Higher Education	9	9	528	58.67	58.67	8	9
Pixel-Bit, Revista de Medios y Educacion	9	9	223	24.78	24.78	8	9
Australasian Journal of Educational Technology	8	6	219	27.38	36.50	5	8
Contemporary Educational Technology	8	7	65	8.13	9.29	3	8
International Journal of Emerging Technologies in Learning	8	8	145	18.13	18.13	6	8
Heliyon	6	6	46	7.67	7.67	3	6
Advances in Intelligent Systems and Computing	6	5	13	2.17	2.60	2	3
CEUR Workshop Proceedings	6	4	27	4.50	6.75	2	5
Lecture Notes in Educational Technology	5	4	8	1.60	2.00	2	2
Cogent Education	5	4	405	81.00	101.25	3	5
Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	5	3	26	5.20	8.67	3	5

Notes: TP=total number of publications; NCA=number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index. Source: Generated by the author (s) using biblioMagika® (Ahmi, 2025)

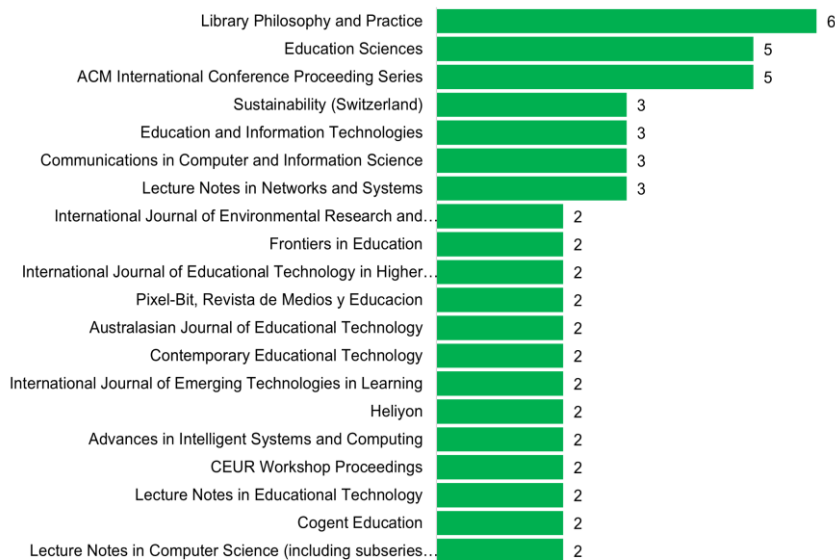


Figure 7: Most Active Source Titles on Digital Competency in Higher Education

Source: Generated by the author (s) using BiblioMagika® (Ahmi, 2025)

Highly Cited Documents

This section answers RQ3: *What is the most highly cited documents in the field of digital competency in higher education?* In bibliometric research, citation per publication assess the relative impact on the overall field (Serenko & Bontis, 2022). Citations indicate how frequently a publication in the databased has been cited by an article (Tian et al., 2008). Citation data were retrieved from the Scopus database and analyzed to determine the most influential publications in the field of digital competency in higher education.

Table 10 lists the 10 most highly cited documents. The most cited publication is by Yu Zhao (2018), titled “Digital competence and digital literacy in higher education research: Systematic review of concept use”, with a total of 392 citations and an annual citation rate of 49.00. The second most cited article is by Lizandro Agustín Cedeño Barcia (2021), “Digital competence in higher education research: A systematic literature review,” which has received 286 citations and citation rate of 57.20 per year.

Shakeel Ahmad Khan (2019) ranks third with 238 citations for his study on Teacher Educators' Use of Digital Tools and Needs for Digital Competence in Higher Education. Following closely is Nataliia Morze (2021), whose research on digital health literacy and information-seeking behaviors among German university students during the COVID-19 pandemic has received 224 citations. Fanlei Kong (2022) holds the fifth position with 222 citations for the article “Teachers’ digital competencies in higher education: a systematic literature review,” with 44.80 citation per year.

Other highly cited works include those by Matteo Sacchet (2020) with 177 citations, Julio Ruiz-Palmero (2022) 168 citation, Roberto Carballedo Morillo (2019) with 162 citation, and Natalia Usmanova (2020) 160 citation, which collectively address topics ranging from digital transformation during the COVID-19 pandemic to competency frameworks and institutional challenges. Finally, Marina Marchisio. (2020) with 150 citations for the articles Self-regulated

learning strategies in higher education: Fostering digital literacy for sustainable lifelong learning

Table 10: Top 10 Highly Cited Documents

No.	Authors	Title	Cites	Cites per Year
1	Yu Zhao. (2018)	Digital competence and digital literacy in higher education research: Systematic review of concept use.	392	49.00
2	Lizandro Agustín Cedeño Barcia (2021)	Digital competence in higher education research: A systematic literature review.	286	57.20
3	Shakeel Ahmad Khan. (2019)	Teacher Educators' Use of Digital Tools and Needs for Digital Competence in Higher Education.	238	34.00
4	Nataliia Morze. (2021)	Digital Health Literacy and Web-Based Information-Seeking Behaviors of University Students in Germany during the COVID-19 Pandemic: Cross-sectional Survey Study.	224	44.80
5	Fanlei Kong. (2022)	Teachers' digital competencies in higher education: a systematic literature review.	222	55.50
6	Matteo Sacchet. (2020)	The COVID-19: The enzyme of the digital transformation of teaching or the reflection of a methodological and competence crisis in higher education?	177	29.50
7	Julio Ruiz-Palmero. (2022)	New challenges in higher education: A study of the digital competence of educators in COVID times.	168	42.00
8	Roberto Carballido Morillo. (2019)	Managing for competency with innovation change in higher education: Examining the pitfalls and pivots of digital transformation.	162	23.14
9	Natalia Usmanova. (2020)	Digital literacy and higher education during COVID-19 lockdown: Spain, Italy, and Ecuador.	160	26.67
10	Marina Marchisio. (2020)	Self-regulated learning strategies in higher education: Fostering digital literacy for sustainable lifelong learning.	150	25.00

Conclusion

This bibliometric study offers an in-depth analysis of the research landscape surrounding digital competency in higher education from 2014 to 2024. The study reveals a marked increase in scholarly attention, especially during the pandemic years, highlighting the pivotal role of digital skills in educational continuity and innovation. The analysis of 817 English-language documents from the Scopus database showed a steady upward trend in publication output, peaking in 2024. This upward trajectory underscores the growing recognition of digital competency as a foundational element of modern pedagogy.

Journal articles emerged as the most dominant document type, and journals served as the primary publication source, affirming the field's alignment with rigorous academic standards. Social Sciences, Computer Science, and Engineering were the leading subject areas, suggesting that digital competency research spans interdisciplinary domains.

In terms of geographic and institutional contributions, Spain was the most prolific country, while the Fulda University of Applied Sciences and the University of Seville were among the most active institutions. Prominent scholars such as Kevin Dadaczynski and Orkan Okan, both contributing significantly to the discourse. Journals such as *Library Philosophy and Practice* and *Education Sciences* stood out as the leading sources of publication.

Furthermore, the identification of highly cited documents provided insights into influential works that have shaped the field's intellectual foundation. These include systematic reviews, empirical studies on digital competence frameworks, and analyses of digital skills integration in teaching and learning particularly in the context of remote and hybrid education during the pandemic.

In conclusion, this bibliometric analysis offers a valuable overview of research activity, thematic focus, and intellectual influence in the domain of digital competency in higher education. It serves as a resource for scholars, educators, and policymakers seeking to understand trends, identify research gaps, and guide future investigations in fostering digital skills in tertiary education contexts.

Limitation

This study relied exclusively on the Scopus database as the primary source of bibliographic data. Scopus is recognized as one of the most comprehensive and reputable indexing platforms for scholarly literature, as supported by previous research (Ahmi & Mohamad, 2019; Sweileh et al., 2017). While this choice ensures a high standard of publication quality and citation accuracy, it also introduces certain limitations. Specifically, reliance on a single database may have excluded relevant studies indexed in other platforms such as Web of Science (WoS), Google Scholar, or PubMed.

Moreover, bibliometric search queries are inherently limited by the specificity of keywords, indexing practices, and database algorithms. As a result, not all pertinent publications on digital competency in higher education may have been captured, and some influential works might have been inadvertently omitted. This limitation is a common challenge in bibliometric reviews, as no single analysis can comprehensively reflect the full breadth and evolution of a research field.

Although this study included all source types and document types available in the Scopus database, the analysis was restricted to publications written in English. As a result, relevant research published in other languages may have been excluded, potentially limiting the cultural and regional diversity of perspectives represented in the findings.

To address these limitations, future research is encouraged to incorporate multiple databases and diverse publication types to develop a more holistic understanding of the research landscape. Furthermore, future bibliometric mappings should aim to explore deeper knowledge

structures, including thematic evolution, citation contexts, and interdisciplinary linkages that were beyond the scope of the present study.

Despite these constraints, this study provides a robust and insightful overview of the development and current trends in digital competency research within higher education. It contributes meaningfully to the growing body of literature and highlights key areas for further exploration in educational contexts.

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Authors' Contribution

All authors offered valuable contributions to the development of research, data analysis, and preparation of the manuscript.

Conflict Of Interest Declaration

I/We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This research/manuscript has not been submitted for publication, nor has it been published in whole or in part elsewhere. We testify to the fact that all Authors have contributed significantly to the work, validity and legitimacy of the data and its interpretation for submission to IJMOE.

The Author's also declare that there is no conflict of interest related to the subject matter or materials discussed in this manuscript.

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