



## A Bibliometric Analysis of Bibliometric Studies in the Field of Educational Sciences

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### Abstract

This study aims to reveal the current state and examine the development of bibliometric analysis research conducted in the field of educational sciences based on data from the Web of Science (WoS). Using metadata retrieved from WoS between 1985 and 2025, a bibliometric analysis was conducted to map the literature on bibliometric studies within the educational sciences domain. An initial search using the keywords "bibliometric" and "bibliometric analysis" yielded 22,679 documents. The dataset was then refined by applying the filters "Education & Educational Research" under WoS categories and "article" as the document type, resulting in a final dataset of 522 articles published between 1985 and 2024. The data were analyzed using Biblioshiny, the web interface of the bibliometrix package in RStudio. The analysis included annual scientific production, the most relevant journals in the field, leading researchers, scientific productivity by country, frequently used keywords, corresponding authors' countries and publications, citation networks by journal, international collaboration patterns, and the most cited articles in WoS. The results indicate a linear increase in bibliometric studies in educational sciences since 2014, with the highest number of publications in 2024. The countries with the most contributions were Spain, China, Brazil, and Türkiye. The most prolific journals were Education and Information Technologies, Education Sciences, Cogent Education, Movimento, and Frontiers in Education. The most frequently used keywords were "bibliometric analysis," "bibliometrics," "education," and "bibliometric." This study provides a comprehensive evaluation of bibliometric research in educational sciences and offers valuable insights into the field's development for future research.

### Key Words

Bibliometric analysis  
Bibliometric  
Bibliometrics  
Education  
Educational sciences  
Web of science

### About Article

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## Introduction

Bibliometric analysis is a method that quantitatively examines publications and citations in scientific literature to reveal developmental trends, research topics, and influential works within a specific field (Donthu et al., 2021). In the context of educational sciences, bibliometric analysis serves as a valuable tool for understanding how the discipline has evolved, which topics have garnered the most attention, and how research directions have shifted over time. Such analyses provide researchers with critical insights into trends and gaps within the field (Aria & Cuccurullo, 2017).

The emergence of databases such as Web of Science, Scopus, Google Scholar, and PubMed has enabled the comprehensive evaluation of the ever-growing body of scientific knowledge, thereby enhancing the scope and value of bibliometric studies. Consequently, bibliometric analyses are frequently conducted using various databases to assess the overall scientific publication performance of countries (Bayrak & Aslanç, 2022). By quantitatively examining features such as the number of studies, publication frequency, and citation counts related to specific topics or authors, bibliometric analysis provides insights into the effectiveness and productivity of research (Cahit Arf Information Center, 2024).

Bibliometric studies are widespread across various disciplines, including finance, culture, tourism, literature, technology, engineering, chemistry, biology, pharmacology, education, and health (Bozdoğan, 2020). Based on bibliometric data, the scientific communication processes within different disciplines can be examined to reveal general structures and understand the communication dynamics specific to each field (Al, 2008; Al & Doğan, 2012; Tonta & Al, 2004; Zan, 2012).

In educational sciences, bibliometric studies help identify how specific topics have evolved and which research areas have gained prominence. Numerous bibliometric analyses have been conducted globally in this field, covering topics such as mathematics education, geometry education, science education, Turkish language education, social studies education, environmental education, assessment and evaluation, misconceptions, and scientific literacy (Arici et al., 2019; Aydemir, 2021; Drijvers et al., 2019; Kurtuluş & Tatar, 2021). These studies contribute to a better understanding of trends, developmental areas, and academic orientations in educational research. They also reveal the scope and depth of research conducted in various subfields, identify popular research topics and methodologies, and highlight the journals that contribute most significantly to the field.

Previous bibliometric studies have played a crucial role in identifying research gaps and future directions in educational sciences, thereby influencing educational policies and practices. For instance, Sobral (2021) demonstrated a rapid increase in research on e-learning, with a focus on digital learning, online education, and e-learning platforms. Kuzu and Kuzu (2022) analyzed studies on educational games, revealing growing interest and future research opportunities in this area. Another significant study by Bacca-Acosta et al. (2021) systematically examined the use of augmented reality in education, identifying research trends and future directions. Jamali et al. (2023) conducted a bibliometric study on STEM (Science, Technology, Engineering, and Mathematics) education, highlighting its role in enhancing educational quality, problem-solving skills, and innovative thinking. The study also emphasized the increasing number of publications and the growing importance of STEM in educational policies.

Despite the abundance of bibliometric studies in educational sciences, it is still unclear what the trends, areas of development, and academic orientations of these studies are. The chronological distribution of bibliometric studies, the most cited works, the top researchers and nations, the most important research topics, and the journals that publish the most in this field must all be examined through a thorough bibliometric study.

The purpose of this study is to perform a bibliometric analysis of bibliometric research that has been published in the educational sciences. In order to do this, journal articles indexed under the Web of Science database's "Education & Educational Research" category were analyzed in order to answer the following research questions:

- What is the annual distribution of the articles?

- What are the countries of the corresponding authors, and how are the articles distributed by country?
- How productive are the nations in these articles?
- Which articles have received the highest number of citations?
- What are the most frequently used keywords?
- Which journals publish these articles most frequently?
- What patterns of international collaboration are observed on the world map?
- Who are the most relevant authors contributing to the field?
- What are the co-citation networks of journals?

### Method

This study is a bibliometric analysis of bibliometric studies published in the field of educational sciences. Bibliometric analysis employs quantitative and statistical methods to reveal the general characteristics of publications within a specific topic or field (Pritchard, 1969). It is used to identify the most influential researchers and studies in a given area (Tonta & Al, 2004).

To address the research questions, the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed, which are widely used in the planning, execution, reporting, and evaluation of systematic reviews and meta-analyses. PRISMA aims to enhance the transparency and reproducibility of such studies. A key component of the PRISMA framework is a flow diagram that visually summarizes the review process, including the number of studies identified, screened, included, and excluded at each stage (Page et al., 2021). Based on this framework, decisions were made regarding keywords, publication date range, and inclusion and exclusion criteria.

#### *Data Collection*

To conduct a bibliometric analysis of bibliometric studies in the field of education and educational research, the Web of Science (WoS) database—widely recognized and used by researchers (Meho & Yang, 2007)—was accessed. A search was conducted on May 8, 2025, using the keywords "bibliometrics" and "bibliometric analysis" and 22,679 documents were obtained. The dataset was then refined by applying the filters "Education & Educational Research" under WoS categories and "article" as the document type, resulting in a final dataset of 522 articles published between 1985 and 2024 (Figure 1).

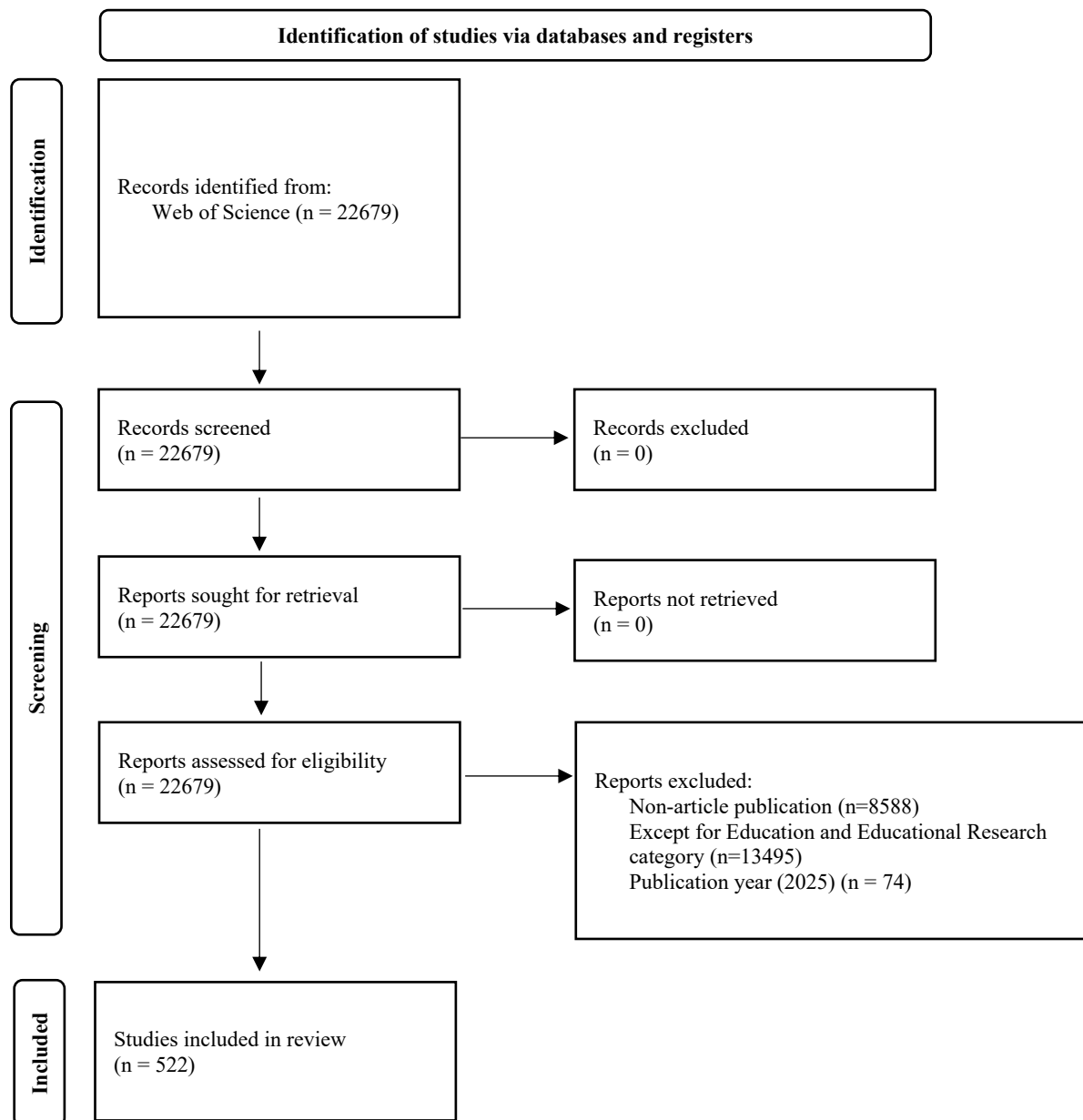
When Figure 1 is examined, it is seen that 22679 scientific studies containing the relevant keywords were published in the years 1985-2025 (all times) within the scope of the detection criteria. After being evaluated in the context of the exclusion criteria, the ones from this year were removed since the year 2025 was ongoing. Only 522 articles containing the relevant keywords were reached in the field of education and educational research.

#### *Data analysis*

In this research, the R Studio program was used to obtain the findings of the examined articles. The R environment provides various packages for bibliometric analyses through its official repository at <https://cran.r-project.org/>. These package programs used in bibliometric analyses are quite useful for quantitative research (Aria & Cuccurullo, 2017). For data analysis, biblioshiny, the web interface of the bibliometrix package in the R tool, was used. This software combines the functionality of bibliometrix with the ease of use of the Shiny package to offer bibliometric analysis applications (Aria & Cuccurullo, 2017). Therefore, the preference for the R program contributes to the presentation of more detailed and comprehensive bibliometric analyses, thereby increasing the findings obtained.

The articles accessed from the Web of Science database according to the criteria of the research were downloaded in bibtex format via the "Full record and cited references" tab by selecting the "export"

option and the “bibtex” format from the screen that opened. This file was opened in the RStudio software and bibliometric analysis was performed.

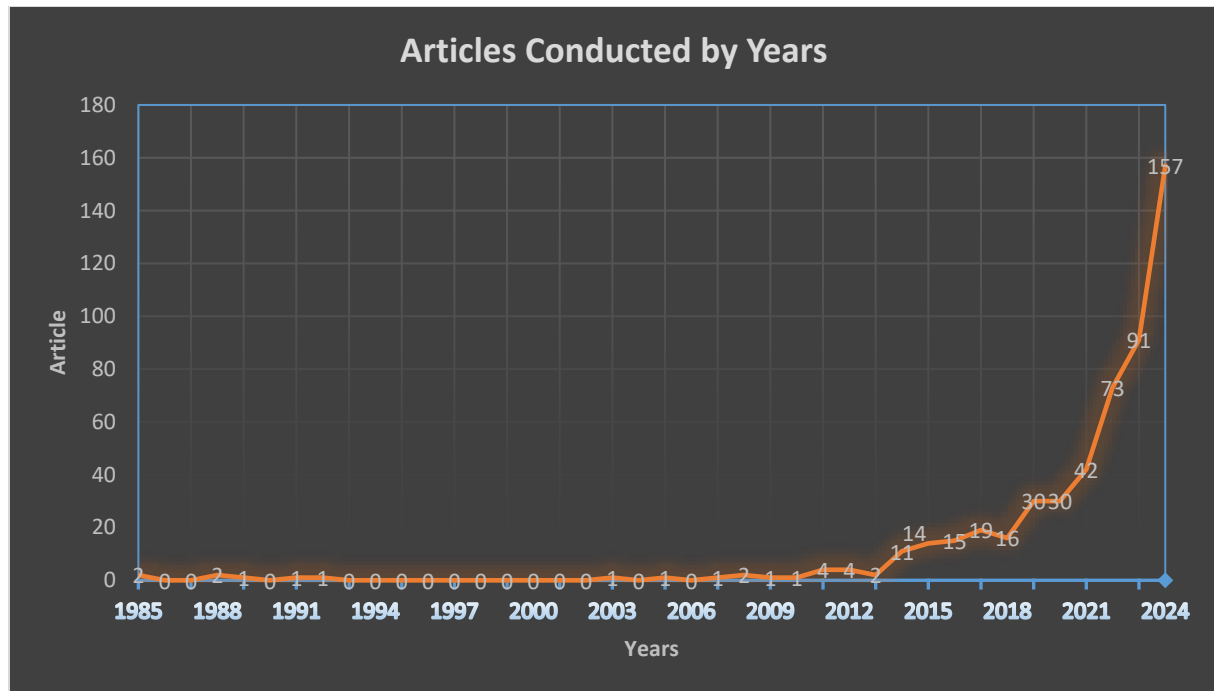


**Figure 1.** PRISMA flow diagram (Page et al., 2021)

## Findings

### *Annual distribution of articles*

Figure 3 illustrates the annual distribution of bibliometric studies published in the field of education and educational research. The data show a significant increase in the number of publications over time, particularly after 2014. In 2014, only 11 articles were published, whereas this number rose sharply to 157 in 2024, marking the highest annual output within the 1985–2024 period. This trend indicates a growing interest in bibliometric research within the educational sciences over the past decade.

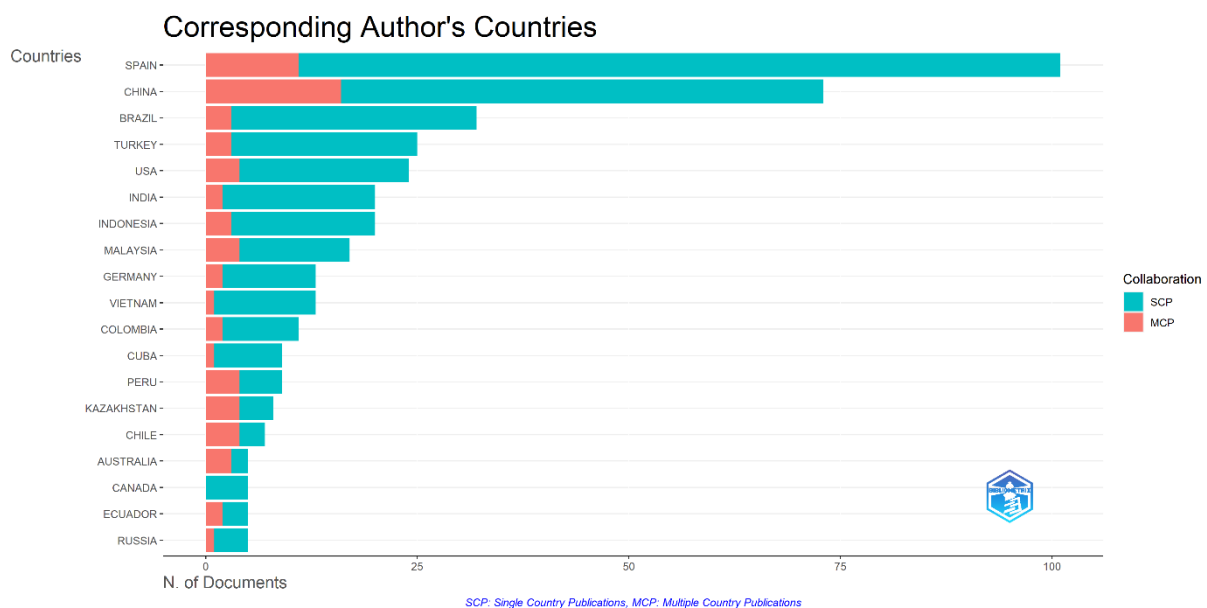


**Figure 3.** Distribution of bibliometric studies by year

#### *Countries of corresponding authors and number of articles*

Figure 4 presents the distribution of articles based on the countries of the corresponding authors. Publications authored by researchers from a single country are categorized as SCP (Single Country Publications), while those co-authored by researchers from multiple countries are classified as MCP (Multiple Country Publications). The sum of SCP and MCP values represents the total number of publications for each country.

Spain emerged as the leading country in terms of corresponding author contributions, with a total of 101 articles (SCP = 90, MCP = 11). It was followed by China (SCP = 57, MCP = 16), Brazil (SCP = 29, MCP = 3), and Türkiye (SCP = 22, MCP = 3).

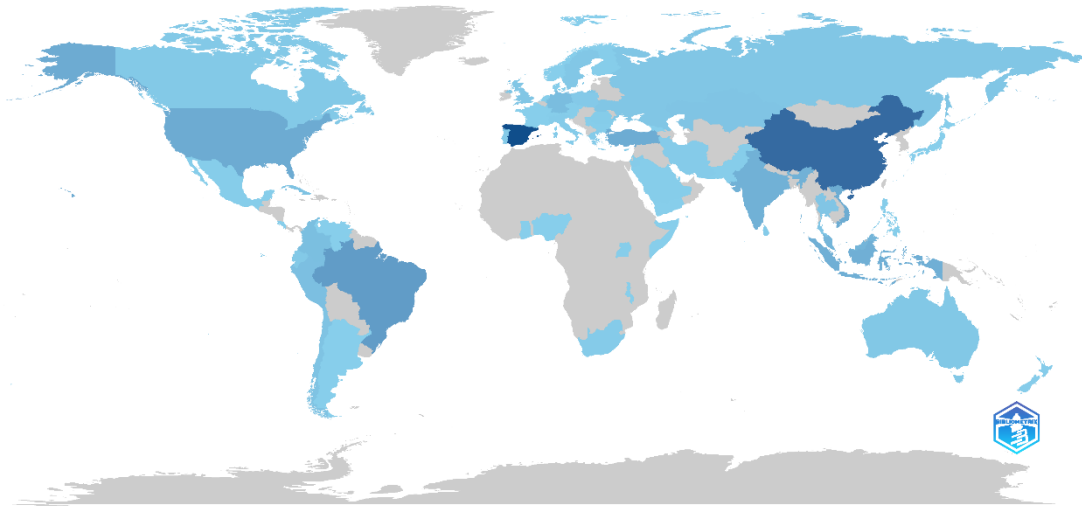


**Figure 4.** Countries of corresponding authors and number of articles

### *Scientific productivity by country*

Figure 5 displays the scientific productivity of countries in the field of bibliometric research in education. In the map, darker shades of blue represent higher levels of productivity, while grey indicates countries with no publications in this area or those whose publications are indexed in other databases.

The most scientifically productive countries were Spain ( $f = 304$ ), China ( $f = 232$ ), Brazil ( $f = 113$ ), and Türkiye ( $f = 78$ ). These were followed by the United States, Vietnam, and India. The data suggest that bibliometric research in educational sciences is gaining traction globally, with notable contributions from both developed and emerging economies.



**Figure 5.** Country scientific production

### *Most cited articles*

Table 1 presents the most cited bibliometric studies in the field of educational sciences. These highly cited works focus on topics such as virtual and remote laboratories, augmented reality, smart learning environments, gamification, classroom dialogue, and artificial intelligence. The citation frequency of these studies indicates that these topics have emerged as trending areas within educational research. The findings suggest that technological integration and innovation in education are central themes attracting significant scholarly attention. These topics not only reflect current research interests but also highlight the evolving nature of educational practices in response to digital transformation.

**Table 1.** Most cited research globally

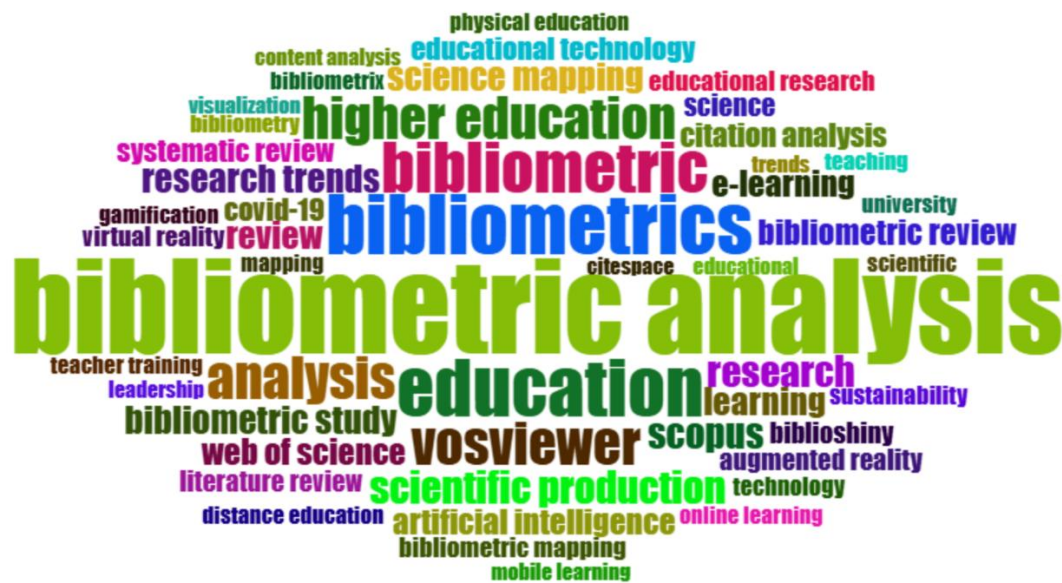
| Research title                                                                                                                           | Journal | Corresponding Author                     | Year | Total number of citations |
|------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------------------------------|------|---------------------------|
| <i>Virtual and remote labs in education: A bibliometric analysis</i>                                                                     | CE      | Ruben Heradio et. al                     | 2016 | 354                       |
| <i>Research trends in the use of augmented reality in science education: Content and bibliometric mapping analysis</i>                   | CE      | Faruk Arıcı et. al                       | 2019 | 199                       |
| <i>Scientific production and thematic breakthroughs in smart learning environments: a bibliometric analysis</i>                          | SLE     | Friday Joseph Agbo et. al                | 2021 | 143                       |
| <i>The use of gamification in education: a bibliometric and text mining analysis</i>                                                     | JCAL    | J. Martí-Parreño et. al                  | 2016 | 141                       |
| <i>Exploring two decades of research on classroom dialogue by using bibliometric analysis</i>                                            | CE      | Yu Song et. al                           | 2019 | 138                       |
| <i>Artificial Intelligence in Higher Education: A Bibliometric Study on its Impact in the Scientific Literature</i>                      | ES      | Francisco-Javier Hinojo-Lucena et. al    | 2019 | 125                       |
| <i>Creativity and education: A bibliometric mapping of the research literature (1975–2019)</i>                                           | TSC     | Daniel Hernández-Torrano & Laura Ibraeva | 2020 | 110                       |
| <i>Fifty years of British Journal of Educational Technology: A topic modeling based bibliometric perspective</i>                         | BJET    | Xieling Chen et. al                      | 2020 | 101                       |
| <i>The Potentials and Trends of Virtual Reality in Education a Bibliometric Analysis on Top Research Studies in the Last Two Decades</i> | VE      | Dejian Liu et. al                        | 2017 | 99                        |
| <i>Research on Teaching Chinese as a Second or Foreign Language in and Outside Mainland China: A Bibliometric Analysis</i>               | TAPER   | Yang Gong et. al                         | 2018 | 92                        |
| <i>Análisis bibliométrico y de redes sociales en tesis doctorales españolas sobre televisión (1976/2007)</i>                             | C       | Rafael Repiso-Caballero et. al           | 2011 | 82                        |

*Note.* CE: Computer & Education, SLE: Smart Learning Environments, JCAL: Journal of Computer Assisted Learning, ES: Education Sciences, TSC: Thinking Skills and Creativity, BJET: British Journal of Educational Technology, VE: Virtual, Augmented, and Mixed Realities in Education, TAPER: The Asia-Pacific Education Researcher, C: Comunicar

### ***Most frequently used keywords in articles***

Figure 6 displays a word cloud representing the most frequently used keywords in bibliometric studies. The most prominent terms were: bibliometric analysis ( $f = 222$ ), bibliometrics ( $f = 90$ ), education ( $f = 83$ ), and bibliometric ( $f = 63$ ). These keywords reflect the core focus areas of the analyzed studies and highlight the centrality of bibliometric methods in educational research.





**Figure 6.** Word cloud of the most frequently used keywords in research.

Figure 7 presents a tree map of the most common keywords plus terms—terms that frequently appear in the titles of cited references but not necessarily in the article titles themselves. The most frequent keywords plus were: science ( $f = 107$ , 11%), education ( $f = 61$ , 6%), and students ( $f = 59$ , 6%), impact ( $f = 44$ , 4%). These terms suggest a strong emphasis on scientific inquiry, educational contexts, and the role of students and impact in the literature.



**Figure 7.** Tree map of keywords

### *Journals with the highest number of publications*

Table 2 and Figure 9 highlight the journals that have published the most bibliometric studies in the field of educational sciences. The top four journals are: Education and Information Technologies,



Education Sciences, Cogent Education, and Movimento. These journals have become prominent platforms for disseminating bibliometric research, reflecting their relevance and influence in the academic discourse surrounding educational sciences.

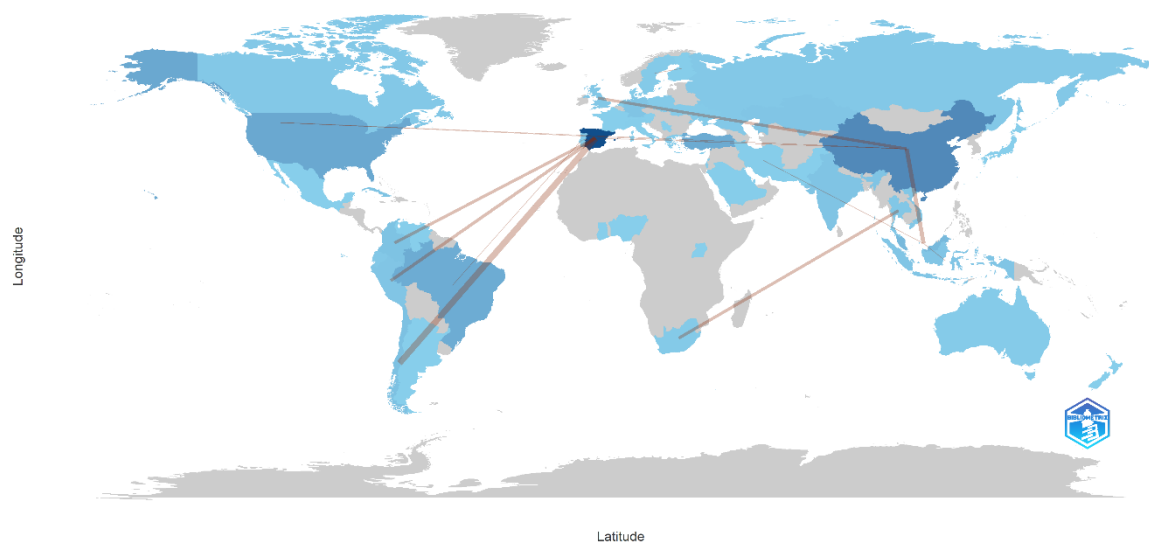
**Table 2.** Journals with the highest number of publications

| Journals                                                    | Number of published research |
|-------------------------------------------------------------|------------------------------|
| Education and Information Technologies                      | 22                           |
| Education Sciences                                          | 13                           |
| Cogent Education                                            | 11                           |
| Movimento                                                   | 11                           |
| Frontiers in Education                                      | 9                            |
| International Journal of Technology in Education            | 9                            |
| Education for Information                                   | 8                            |
| Revista Publicando                                          | 8                            |
| International Journal of Sustainability in Higher Education | 7                            |
| Revista De Educacion                                        | 7                            |

### *International collaboration patterns*

Figure 8 illustrates the global collaboration network among countries based on co-authorship in bibliometric studies. Countries with stronger collaboration ties are represented with thicker connecting lines. The map reveals that international collaboration is particularly strong among European and Asian countries, with Spain, China, and Brazil frequently engaging in cross-border research partnerships.

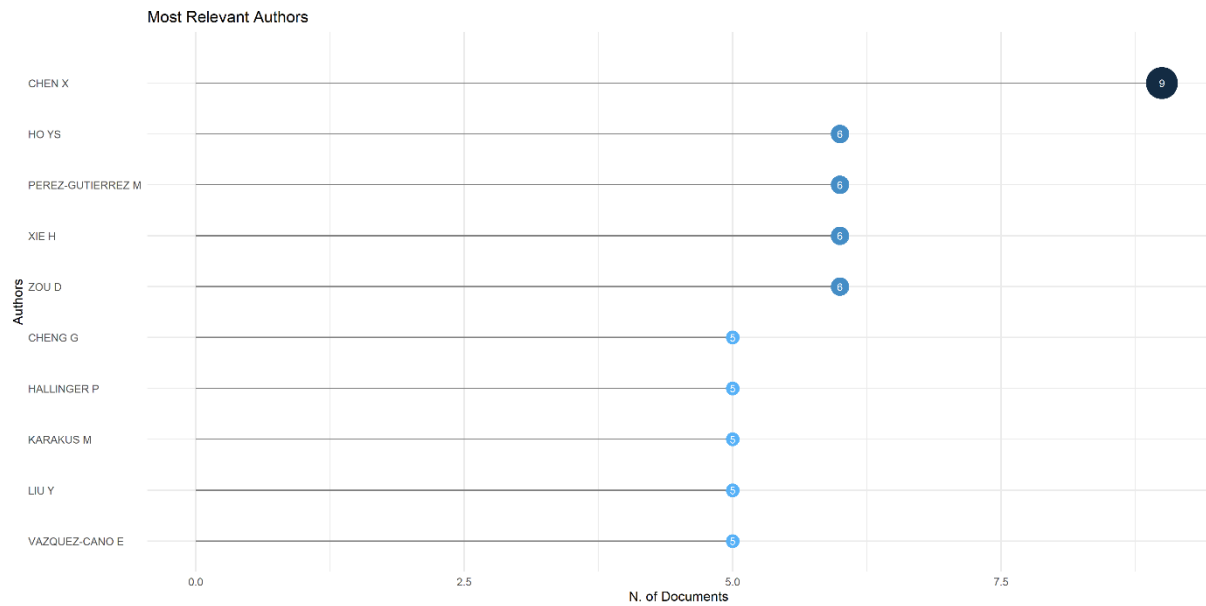
This pattern suggests that bibliometric research in education is not only growing in volume but also becoming increasingly globalized, reflecting the interconnected nature of educational challenges and innovations.



**Figure 8.** Country collaboration map

### *Most relevant authors*

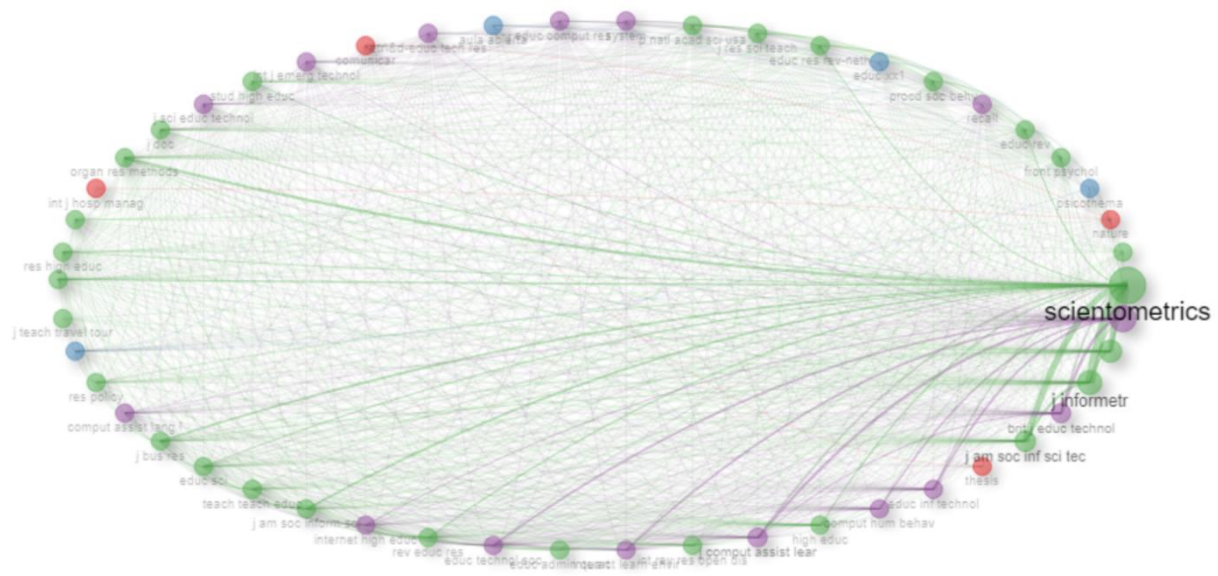
Figure 9 presents the most relevant authors in the field, based on the number of publications and contributions to bibliometric research in education. These authors have significantly shaped the discourse and development of the field through their consistent scholarly output. Identifying these key contributors helps highlight influential voices and potential collaborators for future research.



**Figure 9.** Most relevant authors

### Journal co-citation network

Figure 10 displays the co-citation network of journals, showing how often journals are cited together in bibliometric studies. Each colored circle represents a journal, the circle size represents the citation weight of the relevant journal, and the lines connecting the circles represent the co-links. According to the figure, the largest circle is Scientometrics in green, which has the highest number of citations and the widest network. This network reveals clusters of journals that are frequently referenced in tandem, indicating thematic or methodological similarities. Such networks help map the intellectual structure of the field and identify core journals that serve as hubs of knowledge dissemination.



**Figure 9.** Co-citation network by journals

## Discussion, Conclusion and Suggestions

This research investigates the current landscape and evolution of bibliometric studies within the field of educational sciences, utilizing data sourced from the Web of Science (WoS). The study focuses on several key indicators, including annual publication trends, prominent journals, influential authors, country-level research productivity, commonly used keywords, and patterns of international collaboration. Additionally, it explores citation networks and identifies the most frequently cited works in the field.

Findings indicate a steady upward trend in bibliometric publications since 2014, with a notable surge in 2024. This increase may be attributed to the broader accessibility of digital research tools and databases. As scholarly interest in bibliometric methods continues to grow, it is likely that new approaches and perspectives will emerge, contributing to the methodological and thematic diversification of the field. The interdisciplinary nature of educational sciences has also played a role in enriching bibliometric research, as scholars from various domains contribute to its development.

Among the most prolific contributors are *Chen X.*, *Ho Y.S.*, *Perez-Gutierrez M.*, *Xie H.*, and *Zou D.*, whose work has significantly shaped the field's trajectory. Recognizing these researchers not only highlights their impact but also points to potential collaborators for future studies. The international collaboration map reveals moderate global engagement, particularly among European, Asian, and Latin American countries. However, the relatively low proportion of multi-country publications suggests that there is still potential for expanding cross-border research initiatives.

The most cited studies in the dataset tend to focus on emerging educational technologies, such as virtual laboratories, augmented reality, smart learning environments, gamification, and artificial intelligence. These themes reflect the dynamic nature of the field and its responsiveness to technological advancements. The frequent use of keywords like "bibliometric analysis," "education," "science," and "impact" further underscores the field's relevance and its potential for interdisciplinary integration.

Citation analysis shows that *Scientometrics* stands out as the most cited journal, indicating its central role in the dissemination of bibliometric research. Other frequently used publication venues include *Education and Information Technologies*, *Education Sciences*, *Cogent Education*, *Movimento*, *Frontiers in Education*, and the *International Journal of Technology in Education*. These journals reflect the strong connection between bibliometric research and themes such as digital transformation and personalized learning in education. The prominence of these themes in citation metrics underscores their relevance and impact in shaping contemporary educational discourse. Moreover, the close relationship of bibliometric analysis research with education and technology disciplines can strengthen connections regarding technology integration in education and support the potential for application and integration in these fields.

Spain emerges as a leading country in terms of both publication volume and citation impact. This finding highlights the significant contribution of Spanish researchers to the advancement of bibliometric research and the country's leadership in shaping the direction of bibliometric research. Spain is pioneering further developments in bibliometric research and fostering international collaboration, providing knowledge to a global audience. This leadership may be linked to the country's robust academic infrastructure and its emphasis on educational innovation. Spain's active collaboration with other nations further strengthens its position. Following Spain, China, Brazil, Türkiye, and the United States also play significant roles in advancing bibliometric research.

Despite its contributions, this study has certain limitations. The analysis is confined to the WoS database, excluding other major sources such as Scopus, ERIC, PsycINFO, and PubMed. Including these databases in future research could provide a more comprehensive view of the field. Moreover, the current study focuses solely on journal articles, omitting other scholarly outputs like books, book chapters, and conference proceedings. Expanding the scope to include these formats would offer a broader understanding of the research landscape.

In summary, this study provides a detailed overview of bibliometric research in educational sciences, highlighting its growth, diversity, and potential. Future investigations should continue to monitor evolving trends and explore cross-disciplinary comparisons to deepen our understanding of how educational research is shaped by bibliometric approaches.

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