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How did educational institutions respond to students with special needs during COVID-19: considerations for policy?

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This bibliometric study analyzes the scientific production on the educational response of institutions to families with children with special educational needs (SEN) during the COVID-19 pandemic. The research identifies emerging trends and distinctive characteristics, providing a foundation for improving strategies in schools. The analysis reveals an increase in publications from 2020 to 2023, peaking at 24 articles in 2022. A total of 246 researchers participated, with Castro-Kemp S and McIntyre LL standing out for their productivity and citations. Institutions such as UCL and the University of Oregon led in publications, while the University of California, Santa Barbara, topped the citations. In terms of scientific production, the United States had the most articles, followed by the United Kingdom and Spain. However, the United Kingdom led in global citations, indicating a high level of interest in the topic. The main journals in this field include *Frontiers in Education* and *Education Science*. Twelve collaboration networks among authors were identified, with a primary network of seven closely collaborating researchers. The pandemic exacerbated pre-existing difficulties in the education of children with SEN, increasing stress and emotional burden on parents. The transition to home education and the lack of adapted resources presented significant challenges. However, some strategies, such as dialogic literary gatherings and collaboration between schools and families, proved effective in mitigating negative impacts. The study underscores the need for inclusive public policies that address disparities in educational support and prioritize the psychological well-being of children with SEN. It recommends a proactive and equitable approach in school psychology training and educational practice. In conclusion, this analysis provides a solid foundation for future research and improvements in schools, promoting an inclusive and resilient educational environment.

KEYWORDS

COVID-19, pandemic, families, disability, inclusive education, bibliometrics

1 Introduction

The COVID-19 pandemic has had an unprecedented impact on multiple sectors worldwide, with the education sector being one of the most severely affected (Martínez and Bañón, 2020). Government measures to contain its impact, such as closing playgrounds, public parks and schools were crucial in mitigating the spread of the virus (Kim and Asbury, 2020;

Viner et al., 2020). This closure had significant consequences that affected teachers, students and families.

The COVID-19 pandemic therefore marked a turning point in education, as distance learning became essential (Canning and Robinson, 2021). This new situation brought major challenges, particularly for those with special educational needs (Armitage and Nellums, 2020). The change that took place had a significant impact on all levels of education, from primary to higher education, but was particularly challenging for these students and their families (Hodges et al., 2020). Disrupted routines, difficulty adapting to uncertainty, and physical and environmental restrictions significantly affected the physical and mental health of children with SEN (Brooks et al., 2020).

Meanwhile, the need to organize schooling at home left parents feeling overwhelmed by the workload and experience of using an online platform (O'Connor et al., 2021). These families also experienced considerable pressure to support their children's learning (Canning and Robinson, 2021). This was in addition to a perception of unfairness, as they often did not receive institutional support, and the efforts they made to enable their children to follow lessons like their classmates received no recognition (Castro-Kemp and Mahmud, 2021).

Educational inclusion, which seeks to ensure equitable access to education for all students regardless of their individual differences, was subjected to an unprecedented test during the pandemic in this respect (UNESCO, 2020). While technology greatly facilitated the continuation of learning, it also exacerbated pre-existing inequalities, as students who did not have access to adequate technological resources or who lacked additional support when adapting to new teaching formats were left behind (Brown, 2020).

In this context, careful consideration of how the measures taken in response to the pandemic affected the participation, learning, and well-being of students with special educational needs is essential. The scientific evidence points to a number of specific challenges faced by these students during distance education, including a lack of personalized support, limited social interaction, and difficulty in accessing educational materials tailored to their needs (Kartsoni et al., 2023).

Meanwhile, emerging opportunities for improving educational inclusion in a digital environment have also been identified. The use of technological tools to personalize learning can give students with special educational needs the opportunity to progress at their own pace, and access educational resources designed to meet their specific needs (Kalyani, 2024). Cooperation between educators, families and health professionals has also been critical in identifying and addressing the barriers faced by these students in the online environment (Porter et al., 2021).

However, it is important to acknowledge that the transition to online education has not been equally successful for all students with SEN. Those with sensory, cognitive or motor disabilities may find it more difficult to participate in online educational activities, and may require additional tailoring to ensure that they are fully included (Castro-Kemp and Mahmud, 2021). Adopting a learner-centered approach focused on their individual needs when designing and delivering online educational programmes is therefore critical.

In this new scenario, it has become necessary to find educational alternatives that provide continuity in teaching and learning. This has led to a shift towards successful educational actions, including dialogic learning (Ruiz-Eugenio et al., 2020).

The lockdown also had a major psychological impact, creating emotions including fear, anxiety, boredom and frustration among both children and their families (Chafouleas and Iovino, 2021; Soriano-Ferrer et al., 2021). These difficulties can lead to health problems such as cardiovascular disorders and weight gain and are risk factors for mental health and cognitive development issues in the future (Averett, 2021). This impact is even more pronounced among vulnerable students with physical, mental or developmental disorders, and with family-related challenges (Greenway and Eaton-Thomas, 2020; O'Connor Bones et al., 2022). A lack of interaction with peers, financial problems and a lack of personal space in the home can have adverse effects on health (Corral and Fernández, 2021). Despite these challenges, changes in the educational environment have led to the discovery of transformative practices that involve the family and teachers and are supported by institutions and administrations (Cabero, 2020; Carrascal et al., 2020; Sanz and López-Luján, 2022). These practices include dialogic gatherings. Although these gatherings were face-to-face before the lockdown, they were adapted to an online format during the pandemic and provided an important means of social contact during the period of isolation. This had a positive and significant impact on reading, especially among children with SEN, as well as on their instrumental knowledge, vocabulary acquisition, thinking development and oral expression (Gómez-Domínguez et al., 2022). Sharing concerns, feelings and routines with friends and teachers improved communication during the lockdown (Tremmel et al., 2020). Being close to their parents also helped these students to feel more comfortable and supported, which improved their participation, as well as strengthening family ties and facilitating in-depth conversations on various topics (Greenway and Eaton-Thomas, 2020; Ruiz-Eugenio et al., 2020). Implementing these successful practices will not only benefit the well-being of children, but will also improve their family life (Asto et al., 2022; Otero-Mayer et al., 2021; Ruiz-Eugenio et al., 2020).

In short, the COVID-19 pandemic posed significant challenges for educational inclusion, but it also provided a unique opportunity to reflect on how we educate our students, and especially those with special educational needs, and how this affects their families.

The research undertaken in this study seeks to answer the question: What is the current academic production and interest among the global scientific community regarding the satisfaction of families of children with special educational needs in terms of the school system's response during the COVID-19 pandemic? Publications indexed in the Web of Science Core Collection were analysed using a bibliometric approach in order to address this question. Investigating the perception of families of children with special educational needs of the response of education during the pandemic is crucial in order to identify possible supports and consequently improve quality and inclusion in education.

By addressing the gaps in access to education and leveraging the opportunities provided by technology, we can work towards a future in which all students have the opportunity to learn, grow and reach their full potential, regardless of their individual differences.

In the context of research on the response that schools provided for students with SEN and therefore to their families during the COVID-19 pandemic, it is important to consider the relevance of conducting a comprehensive bibliometric analysis. Bibliometric analyses, including bibliometric mapping and thematic analyses, can provide a comprehensive overview of the academic literature related

to this topic. These methods enable the identification of trends, emerging areas of research, and connections between different disciplines and methodological approaches (Glänzel and Schubert, 2005). Furthermore, by displaying the network of collaborations between authors, institutions and countries, they identify key actors in the field of inclusive education during the pandemic. This approach not only helps to understand the current state of the research but may also guide future research and educational policies in the most appropriate direction for addressing the challenges faced by students with special educational needs and their families in times of crisis.

In addition, conducting a bibliometric analysis can provide valuable information on developments in research on the perception of families of children with SEN and the response provided by education during the COVID-19 pandemic, thereby identifying areas requiring further attention and development. It may also enable the identification of gaps in the literature, and underrepresented areas that need further exploration. This is crucial for informing researchers, educators and policymakers about research priorities and the most effective interventions for promoting inclusive and equitable education in emergency situations like the one experienced, and to address the needs of families with children with SEN.

2 Materials and method

2.1 Data collection

This study, based on descriptive bibliometrics, analyses the scientific production related to the satisfaction of families with children with special educational needs with the educational response from schools during the pandemic. To that end, a search was performed in the Main Collection of Web of Science (WoS). The chosen database is a dependable source that encompasses major bibliometric indicators and a wide array of specialized indexes organized by subject or content indexing (Pranckutė, 2021). Utilizing a bibliometric approach for analysis aids in structuring the information, selecting the most pertinent items, and creating categories to evaluate the information both quantitatively and qualitatively (Gallegos et al., 2014).

The data was collected in January 2024 and covered the previous 5 years (since the onset of the COVID-19 pandemic). In order to meet the objective, the quality indicators established by the PRISMA 2020 approach were followed in order to obtain relevant and systematized information on the field of study (Page et al., 2021).

To that end, an advanced search was performed by subject, using the title, abstract and keywords of the articles. The search string used in the subject field was as follows:

("Famil") (All Fields) and ("Intellectual* Disabilit*") or (disabilit*) or (special* need*) or ("Intellectual* Disabilit*" children*) (All Fields) and ("School") (All Fields) and (pandemic OR COVID 19 OR COVID-19 OR Coronavirus OR "Health Crisis" OR "sanitary crisis" OR "healthcare crisis" OR "health emergency" OR "SARS-CoV-2") (All Fields).*

A total of 316 articles were obtained. Some were subsequently eliminated due to overlap ($n=4$) and based on automation tools such as open access and/or different databases ($n=15$), leaving a total of

297 articles to which the various inclusion and exclusion criteria were applied. The criteria for inclusion were as follows: (1) literature reviews and empirical studies (qualitative and quantitative); (2) scientific journal articles; (3) published in any language in the last 5 years; (4) in the main collection of Web of Science and (5) families with children with special educational needs, assessing their satisfaction with the educational system's response during COVID-19. A total of 145 articles were selected.

After reviewing the content of these articles, the following exclusion criteria were subsequently applied: (1) not formal education; (2) inconsistency or inaccuracy in the study, with the categories excluded: Rehabilitation or Psychiatry or Pediatric or Public Environmental Occupational Health. This led to the exclusion of 73 articles, and consequently to the selection of a total of 72 articles (Figure 1).

2.2 Bibliometric analysis

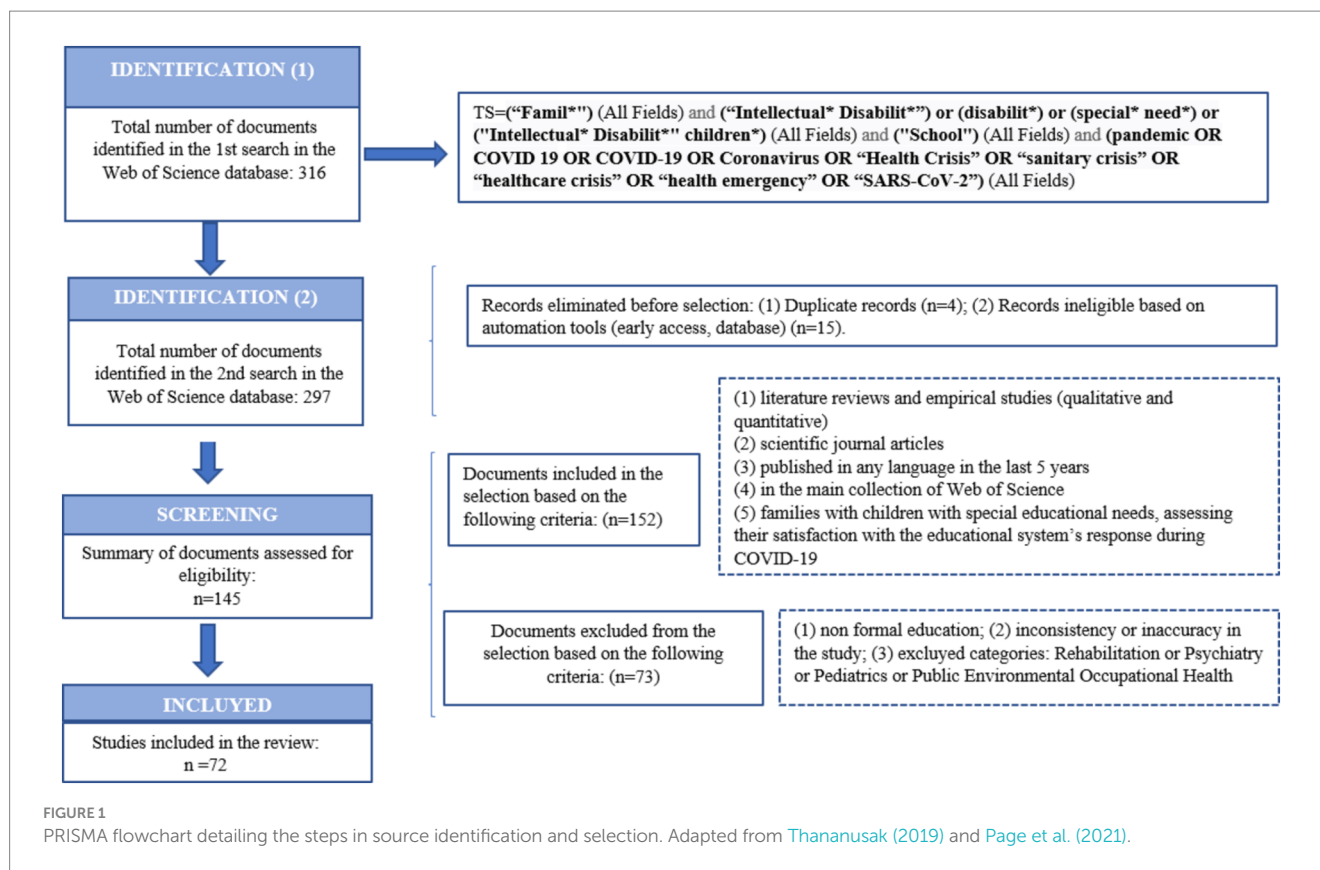
This study used three different statistical programs to analyse the scientific production and its impact on the field of study. The programs used and the analyses carried out with each one are listed below:

HistCite software (version 2010.12.6; HistCite Software LLC, New York, NY, U.S.A.) (Padrón and Pirela, 2017).

HistCite was used to calculate a variety of essential bibliometric indices, covering article counts by year, author, country, institution and journal. In addition to providing a clear presentation of the information, this software provides quality indicators, such as the total global citation score (TGCS) and the total local citation score (TLCS). The TGCS shows the total number of citations received by the articles analysed, while the TLCS shows the number of citations received in the Web of Science (WoS) database, for only the articles selected in the analysis. HistCite not only provides bibliometric indices and quality scores. It also provides a historical analysis of citations, displays citation networks, identifies collaboration patterns and can be customized. These additional features make it a comprehensive and versatile tool for bibliometric analysis (Wulff-Barreiro, 2007). HistCite is also known in the academic community for its robustness and reliability, and has established itself as a leading tool for bibliometric research.

VOSviewer software (van Eck and Waltman, 2017):

VOSviewer is a versatile tool for bibliographic and thematic linkage analysis. Its ability to examine the interconnection between articles and display bibliometric networks makes it a valuable resource for researchers. It is able to produce clusters, thereby highlighting similarities between articles based on the number of references they have in common. In addition to being useful in systematic literature reviews, VOSviewer is not affected by when the analysis is performed, thereby ensuring consistent results regardless of time. Its user-friendly interface and ability to dynamically explore and examine data make it an attractive option for researchers working in a variety of fields (Viner et al., 2020). It is important to note that VOSviewer is renowned for its ability to reveal patterns and trends in the scientific literature, making it a valuable tool for evidence-based decision-making.



R bibliometric software (Aria and Cuccurullo, 2017; Derviş, 2019).

The bibliometric analysis was carried out using the bibliometric package within the R programming environment. This software provided the ability to examine aspects such as co-authorships, collaborations between countries, and the most common keywords in the articles analysed. It also permitted a thematic analysis in order to identify both emerging topics and those that are neglected in the field of study. One of the distinctive advantages of the R software and its bibliometric package is its flexibility when generating a wide range of graphs, such as networks, three-dimensional graphs, word clouds, thematic maps, histograms, strategic diagrams, evolution maps and world maps. These graphs provide a clear and effective visual representation of the results provided by the bibliometric analysis (Moral-Muñoz et al., 2020). It is important to note that R and its bibliometric package have been used increasingly by researchers due to its ability to perform comprehensive analyses and generate dynamic displays that provide a better understanding of the structure and dynamics of scientific literature.

3 Results

After all the documents were reviewed, the search in the WoS database retrieved a total of 72 articles published in 47 journals by 246 authors. The mean number of citations per document was 7.2. A total of 123 keywords and 266 author's keywords were found.

Finally, the number of authors per paper is around 4, with an international collaboration rate of 11.1%. This information can be seen in Table 1.

3.1 Basic indicators

This first section of the results presents the main indicators, with details of the papers and citations per year, the number of papers and citations per author, institution and country. The journals that published at least one article, the number of publications, citations and the impact factor are also listed. Finally, the authors' keywords are presented according to the year of publication.

3.1.1 Years

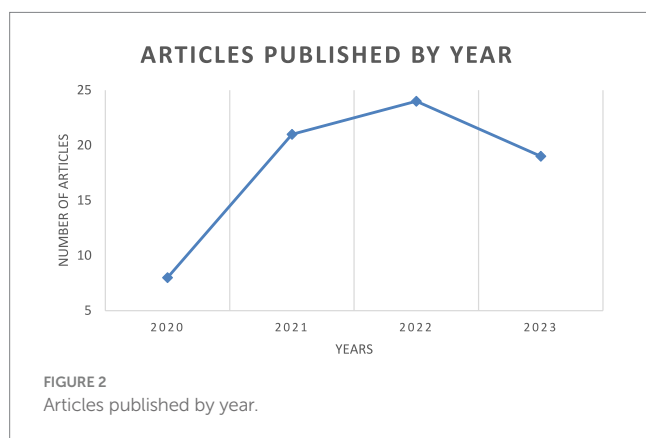
The number of published articles is 72, and they were published between 2020 and 2023. The publications per year range from 8 to 24, with a mean of 18 and a standard deviation of 7 ($n = 72$; range = 8–24; mean = 18; SD = 7). The first article was published in 2020, with six publications ($n = 6$). In the next 2 years, the number of publications increased until 2022, when it peaked ($n = 24$), followed by a decline ($n = 19$). The annual growth rate percentage is positive and is 33.4%, as shown in Figure 2.

3.1.2 Authors

246 researchers published at least one article on the topic of satisfaction with educational inclusion among families of students with disabilities during the pandemic. The number of publications

TABLE 1 Main information.

Main information about the data	
Timespan	2020:2023
Sources (Journals, Books, etc.)	47
Documents	72
Annual Growth Rate %	33,4
Document Average Age	2,25
Average citations per doc	7,2
References	2,886
Document contents	
Keywords Plus (ID)	123
Author's Keywords (DE)	266
Authors	
Authors	246
Authors of single-authored docs	6
Authors collaboration	
Single-authored docs	6
Co-Authors per doc	3,6
International co-authorships %	11,1
Document types	
Article	72



ranged from one to three, with a mean of 1.13 and a standard deviation of 0.42 (range = 1–3; mean = 1.075; SD = 0.3). The researchers with the most publications on this subject were Castro-Kemp S and McIntyre LL, with three papers each, as shown in Table 2.

Lambert R and Schuck RK also had the most overall citations with 46, followed by Benigno V, Giusto M, Parmigiani D, Silvaggio C, and Sperandio S with 43, as shown in Table 3.

These authors work in different research fields. The most common is “Education Educational Research” with 34 authors each, followed by “Special Education,” with 13 authors and “Educational Psychology” with 12 authors.

3.1.3 Institutions

The number of institutions with publications is 141. The number of publications ranges from one to 4, with a mean of 1.13 and a

TABLE 2 Authors with the highest number Recs (≥ 2 Recs).

Author	Recs	TGCS
Castro-Kemp S	3	24
McIntyre LL	3	8
Allard A	2	3
Bates J	2	18
Finlay J	2	18
Gray KM	2	3
Hastings RP	2	3
Heyne D	2	3
Kouroupa A	2	3
Mahmud A	2	19
Melvin GA	2	3
Safer-Lichtenstein J	2	7
Totsika V	2	3

Recs-number of articles; TGCS- Total Global Citation Score.

TABLE 3 Authors with the highest number of TGCS (≥ 43 TGCS).

Author	Recs	TGCS
Lambert R	1	46
Schuck RK	1	46
Benigno V	1	43
Giusto M	1	43
Parmigiani D	1	43
Silvaggio C	1	43
Sperandio S	1	43

Recs-number of articles; TGCS- Total Global Citation Score.

standard deviation of 0.46 (range = 1–4; mean = 1.13; SD = 0.46). One of them has four articles, three of them have three, and the rest have one article. As shown in Figure 3, if three publications are taken as the cut-off point (≥ 3), UCL, the University of Oregon, the University of Roehampton and the University of Valencia are the universities with the most papers published, with three or more papers each.

However, there are a total of 1,178 global citations, ranging from 0 to 371, with a mean of 8 and a standard deviation of 10 (range = 0–46; mean = 8; SD = 10), with 31 citations as the cut-off point (≥ 31) and the University of California, Santa Barbara has the most global citations, with a total of 46, followed by CNR University of Genoa, the University of Edinburgh, the University of Wales Trinity St David and the University of Valencia, as shown in Figure 4.

3.1.4 Countries

Researchers from 25 countries have published at least one article on this Research Topic. The total number of articles is 72. The number of publications ranges from one to 24, with a mean of 3.5 and a standard deviation of 5.75 ($N=72$; range = 1–24; mean = 3.5; SD = 5.75). If four articles (≥ 4) is taken as the cut-off point, the country with the most publications is the USA ($n=24$), followed by

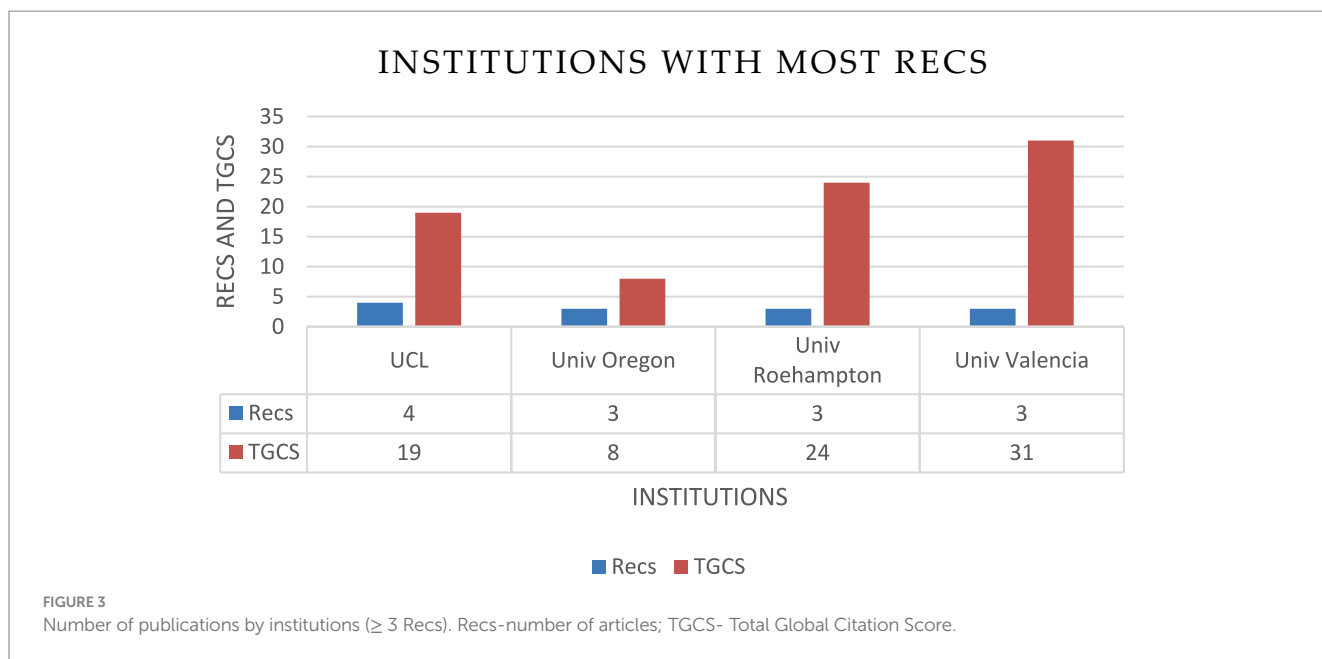


FIGURE 3 Number of publications by institutions (≥ 3 Recs). Recs-number of articles; TGCS- Total Global Citation Score.

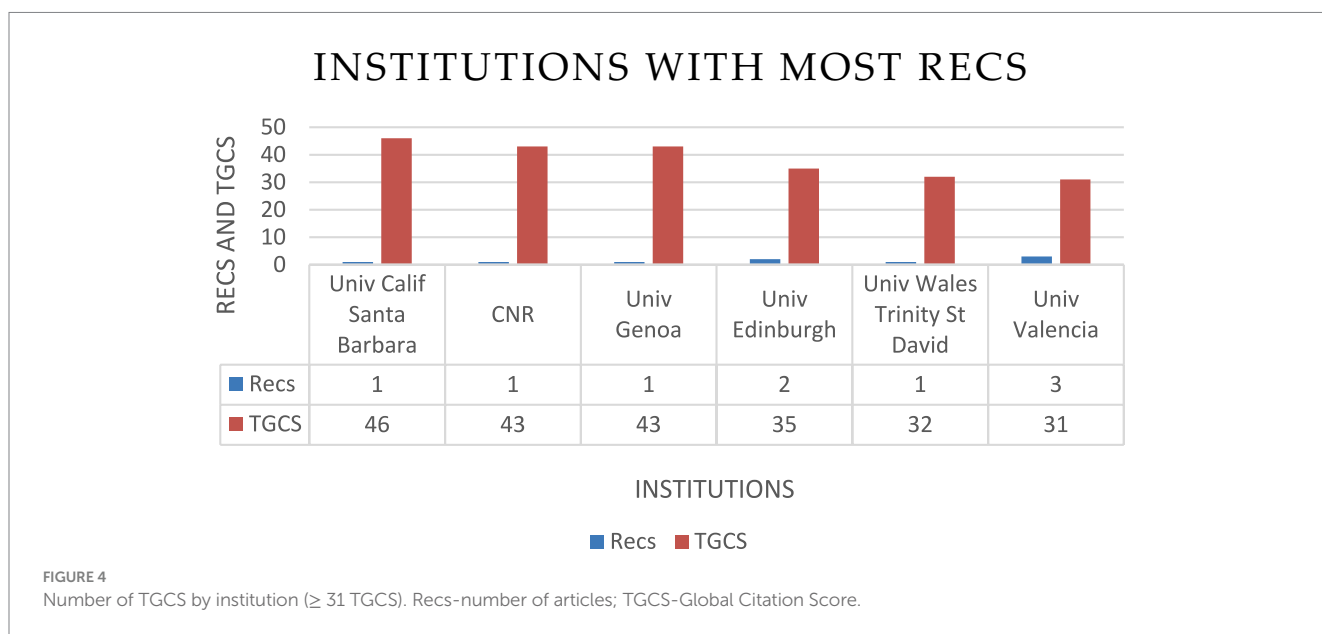


FIGURE 4 Number of TGCS by institution (≥ 31 TGCS). Recs-number of articles; TGCS-Global Citation Score.

the United Kingdom ($n=20$), Spain ($n=9$), Australia ($n=4$) and Germany ($n=4$). This can be seen in Figure 5.

The number of citations ranged from 0 to 204, with a mean of 25 and a standard deviation of 53 (range=0–204; mean = 25; SD = 53). The countries that have the most citations in the WoS as a whole, with a cut-off point of more than 20, are as follows: United Kingdom ($n=204$), USA ($n=184$), Italy ($n=60$), Spain ($n=42$), Iran ($n=20$) and Zambia ($n=20$) (see Figure 6).

3.1.5 Journals

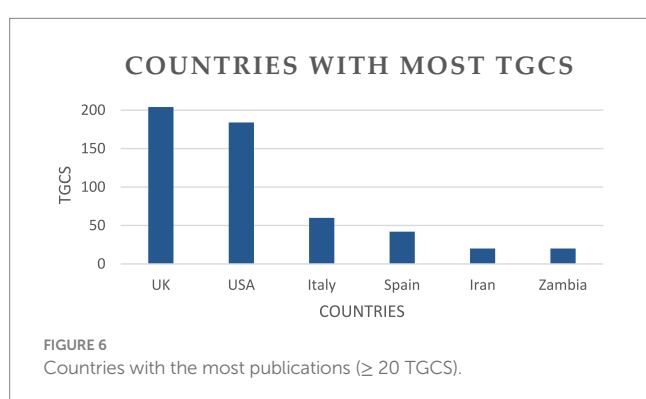
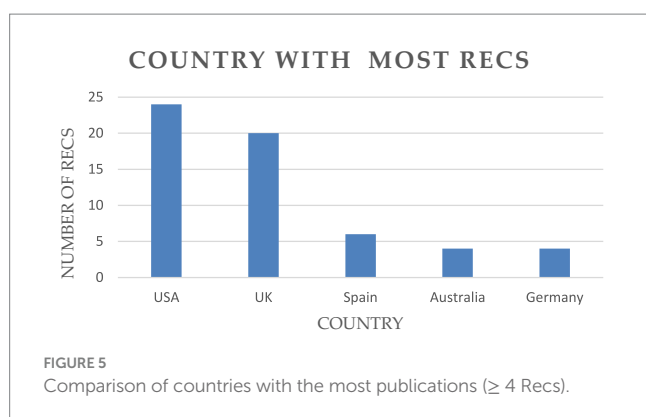
A total of 47 journals have published at least one article on this topic. Taking the cut-off point as three or more publications ($n \geq 3$), we obtain the following information (Table 4). The journals with the most articles published are Frontiers in Education ($n=8$), Education Sciences ($n=4$), European Journal of Special Needs Education ($n=4$), Frontiers in

Psychology ($n=4$), British Journal of Special Education ($n=3$), Psychology In The Schools ($n=3$), and School Psychology Review ($n=3$).

The journals with the most total global citations, ordered from highest to lowest, with a cut-off of TGCS = 34, are European Journal of Special Needs Education ($n=72$), Education Sciences ($n=46$), Technology Pedagogy And Education ($n=43$), Frontiers In Education ($n=41$), Frontiers In Psychology ($n=38$), British Journal Of Special Education ($n=35$), School Psychology Review ($n=34$), as shown in Table 5.

3.2 Co-citation analysis

This section contains an analysis of the co-citations. The co-authorship network will be presented, followed by cross-country



collaboration networks and finally, keyword networks will be shown. These results have been displayed and presented in the maps presented below.

Relationships and collaborations between authors are analysed in the co-authorship map, and the links and patterns of co-authorship identified. This shows the research communities and the links between authors in the field of study.

The collaboration networks between countries are then presented, showing international collaborations and the links between different countries. This provides an understanding of the global dynamics of research and transnational collaborations on the topic studied.

Finally, keyword networks are shown, with an analysis of the relationships and connections between the terms used in the publications. This helps to identify the main topics and areas of focus within the field of study.

3.2.1 Co-authorship

For the 246 authors, only collaborations between authors who have written one or more articles are presented. The 12 co-authorship networks involving 34 researchers who have published a joint article on this topic are presented. There is one network of seven collaborators, two networks of four collaborators, one network of three collaborators, and eight networks of two collaborators. Figure 7 shows the various collaborative networks.

This analysis provides valuable information on collaboration and interaction between researchers in the field of study. These findings suggest the existence of consolidated research groups, and the existence of closer collaborations between some authors in particular.

TABLE 4 Journals by the number of publications and impact factor (JCR) (≥ 3 Recs).

Journal	Recs	IF
Frontiers in Education	8	2.3
Education Sciences	4	3.0
European Journal of Special Needs Education	4	1.93
Frontiers in Psychology	4	4.23
British Journal of Special Education	3	1.24
Psychology in the Schools	3	1.92
School Psychology Review	3	2.136

Recs-number of articles; IF-impact factor.

TABLE 5 Journals by the number of citations received (TGCS) (≥ 34 TGCS).

Journal	TGCS
European Journal of Special Needs Education	72
Education Sciences	46
Technology Pedagogy and Education	43
Frontiers in Education	41
Frontiers in Psychology	38
British Journal of Special Education	35
School Psychology Review	34

TGCS-Global Citation Score.

3.2.2 Collaborations between countries

Figure 8 shows that Spain, the USA, United Kingdom and Australia are the most collaborative countries in terms of cross-country collaborations.

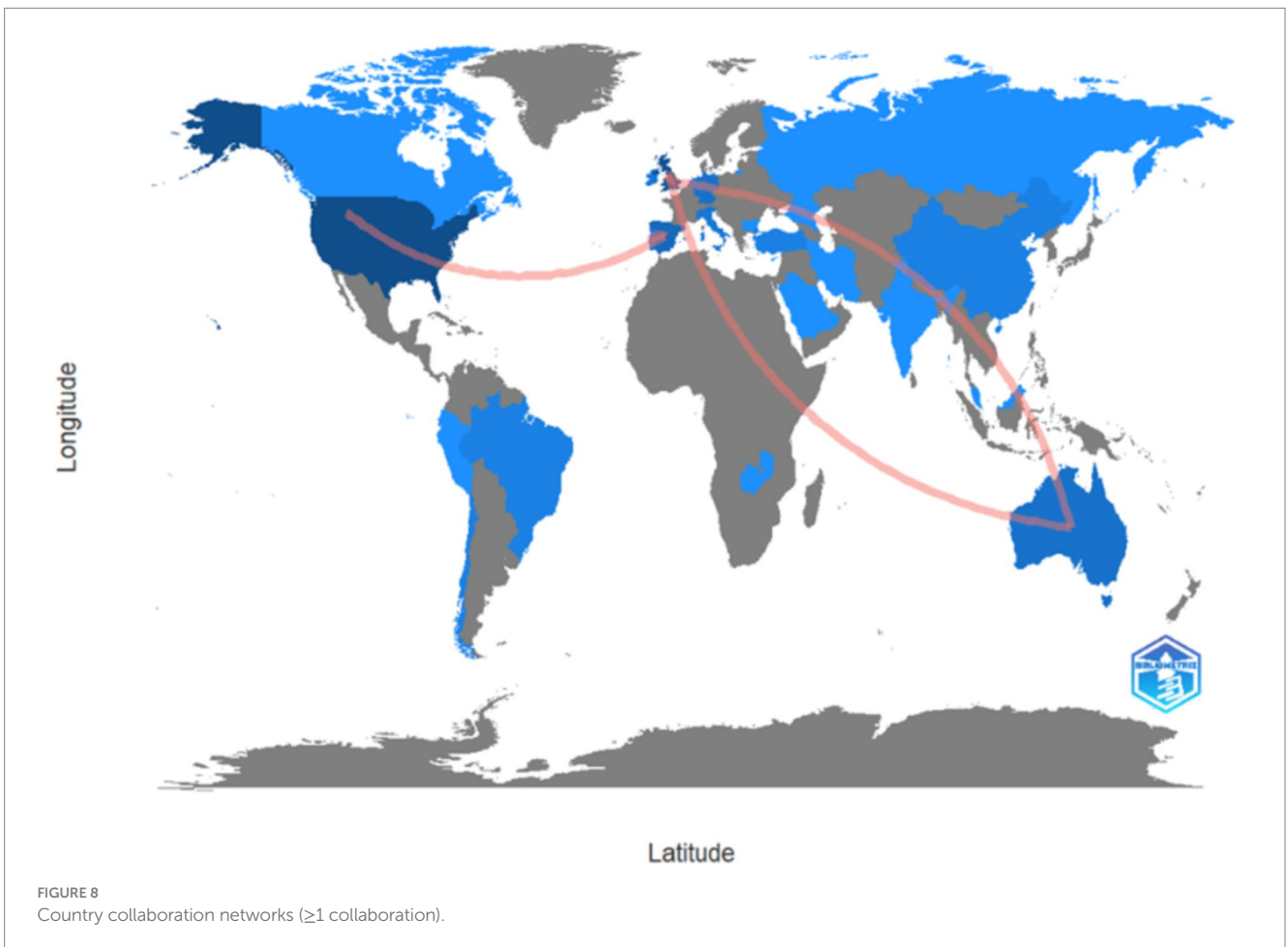
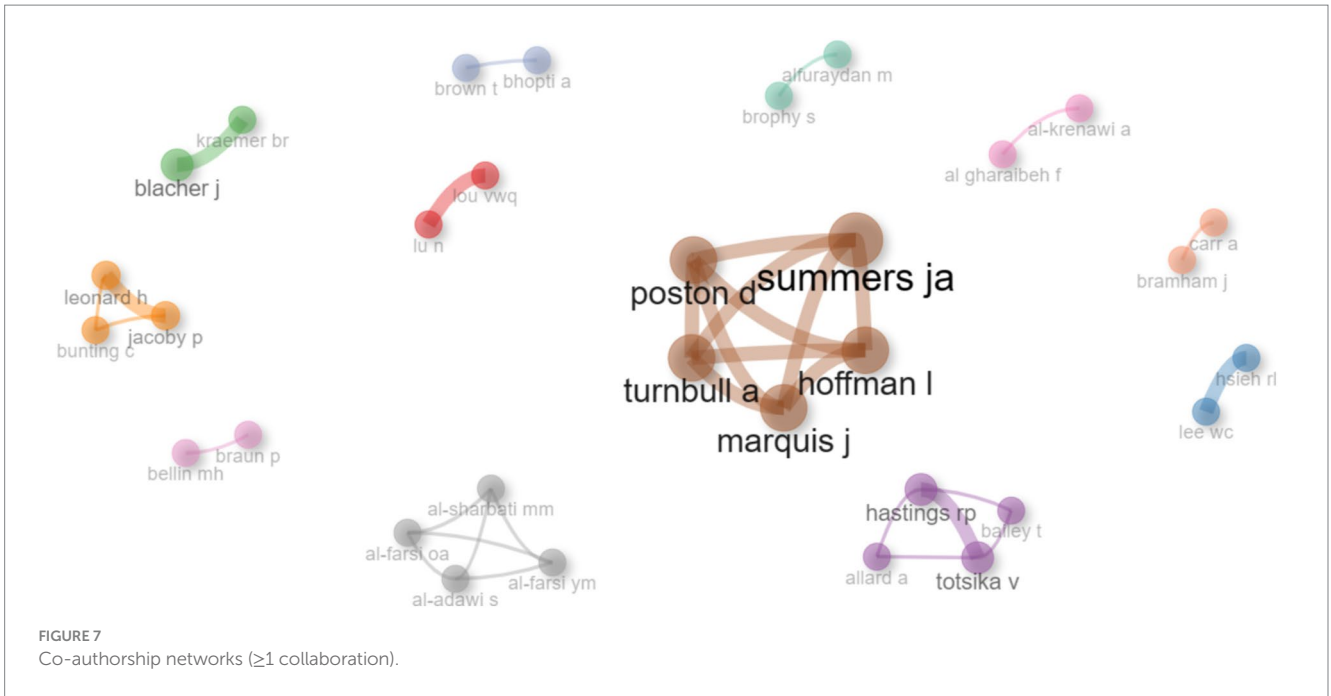
3.3 Thematic analysis

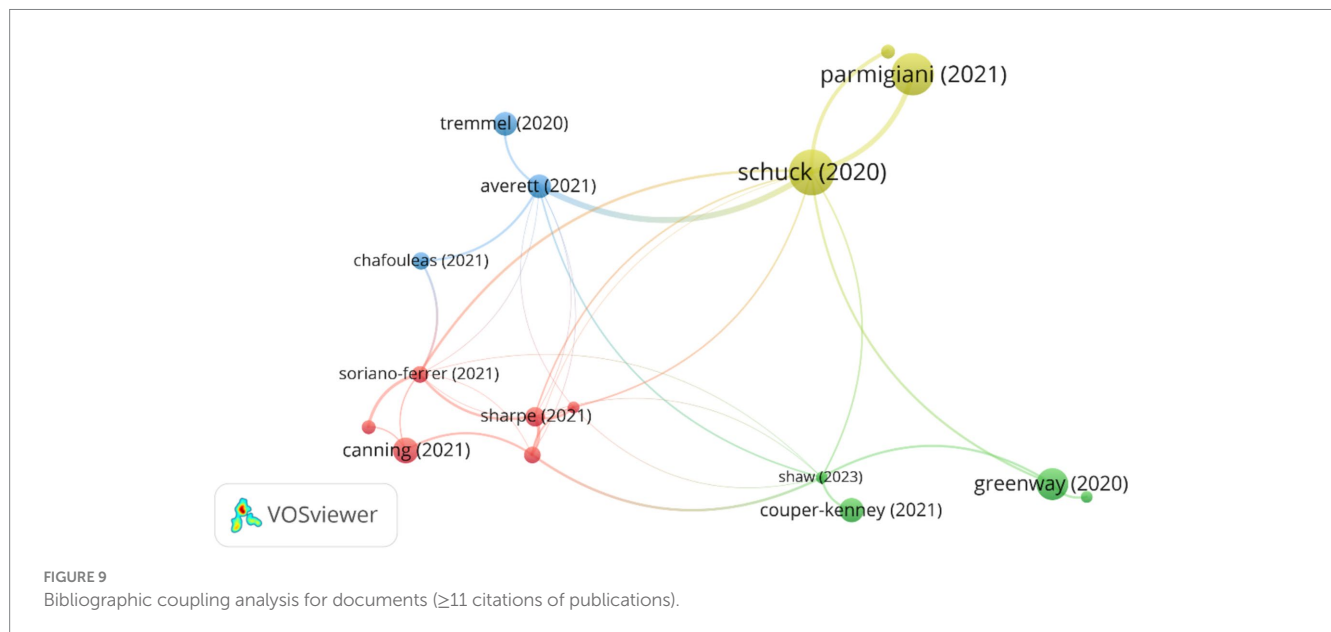
Finally, this third section presents the results of the thematic analysis. First, we show the bibliographic coupling analyses by documents and words, and second, a strategic diagram of the various themes. All these results are presented on maps.

3.3.1 Bibliographic coupling by document and keyword

The bibliographic coupling for documents established a cut-off point of at least 11 citations per document (≥ 11). Only those connected were subsequently selected, leaving the final analysis with 16 documents distributed in four clusters (one color per cluster). The size of the letter is proportional to the number of citations and the frequency of connections between them. These clusters are shown in Figure 9. A thematic review of each cluster with the number of papers, citations and most prominent authors is provided below.

We present below a thematic review of each cluster, together with the number of papers, citations and the most important authors.





Cluster 1 (106 citations, 6 papers) looks at the pandemic's effect on the mental health of children with SEN and their families and the need for community support at times when schools are closed.

This cluster consists of six articles (Canning and Robinson, 2021; Castro-Kemp and Mahmud, 2021; O'Connor Bones et al., 2022; Ruiz-Eugenio et al., 2020; Sharpe et al., 2021; Soriano-Ferrer et al., 2021). It received a total of 106 citations.

The most cited article is by Canning and Robinson (2021), with a total of 26 citations. It addresses the challenges faced by children with special educational needs and their families, and particularly those on the autism spectrum, as a result of the disruption of their routines and online education. The parents were overwhelmed by having to organize schooling at home without sufficient institutional support. The lack of equity and recognition also created an additional emotional burden, with parents requiring extra time and effort to adapt the educational material to their children's needs.

The second article is by Sharpe et al. (2021) with 20 citations. It argues that vulnerable paediatric populations, such as those with developmental disabilities, needed greater support during the pandemic because of their physical and mental multimorbidity. The research highlights the negative impacts of the lockdown on their lives, and the need for community-based strategies to unlock access to mental health and educational services.

The third article is by Castro-Kemp and Mahmud (2021), with 17 citations. It focuses on the impact that the lockdown had on English children with SEN needs and disabilities, as well as their families. The authors note that parents from disadvantaged areas suffered more in terms of mental health due to school closures and the return to school. Caring for children with disabilities during the lockdown increased parents' levels of depression, anxiety, and stress. On the other hand, returning to school was considered positive for the children's mental and physical health, and socialization and established school routines were considered important.

The fourth article, by Soriano-Ferrer et al. (2021) with 17 citations, notes that children with dyslexia experienced higher levels of depression and anxiety during the lockdown, as well as emotional symptoms, hyperactivity and behavioral problems. The parents of

children also reported increased stress during this period. Difficulties in establishing study routines and a lack of support from teachers were common concerns. The study notes the need for additional support during crises such as the COVID-19 pandemic.

The fifth article, with 14 citations, is by Ruiz-Eugenio et al. (2020). The authors look at how the pandemic and lockdown led to new forms of education, especially for vulnerable children. Dialogic literary gatherings (DLGs) proved to be successful, even in an online format, improving reading performance and strengthening family ties, and improving the mental health of children and parents during the pandemic. The paper suggests that it should be adopted as public policy in educational institutions in order to benefit children and families.

In the last article, O'Connor Bones et al. (2022), with a total of 12 citations, consider how school closures due to COVID-19 led parents, and especially parents of children with special educational needs (SEN), to adopt educational roles. This change had a particular impact on those whose children attended special schools, as they lost access to therapies and support in the classroom. The lack of a school routine had a negative effect on students' emotional and social well-being, creating anxiety and frustration. Parents faced practical and emotional challenges in balancing caring for their children with SEN, their work, and educational demands. Cooperation between parents and teachers was crucial, and the commitment of school staff was essential.

Cluster 2 (81 citations, 4 papers) focuses on the challenges faced by children with SEN and their families in the wake of the pandemic, such as the transition to home-based learning, the lack of tailored resources, and inequality in access to them.

This cluster consists of four articles (Couper-Kenney and Riddell, 2021; Greenway and Eaton-Thomas, 2020; Lazarus et al., 2022; Shaw and Shaw, 2023). It received a total of 106 citations.

The most cited article is by Greenway and Eaton-Thomas (2020), with 32 citations. It examines the challenges faced by parents of children with SEN during the period of schooling at home brought about by the pandemic. It highlights inequalities in children's learning and development, as well as concerns about a lack of routine and structure. It also discusses the need for more tailored resources,

structured “catch-up” programmes, and alternative educational approaches to support these children’s diverse needs during schooling at home, and the transition back to school.

The article by Couper-Kenney and Riddell (2021), with 25 citations, assesses the extent to which the rights of children and especially those with SEN were prioritized during the COVID-19 crisis. In particular, it emphasizes the lack of initial attention to these rights due to the abrupt withdrawal of education and care services. It also notes the unequal access to technology and the lack of support and resources which had a negative impact on the educational progress and well-being of children with SEN.

The third article, by Lazarus et al. (2022), which received 12 citations, addresses the importance of promoting a model that addresses disparities in care, especially for children in groups with support needs. This proactive approach prioritizes psychological well-being, equality of care and access for all children, in order to address addressing the young people’s psychological needs. The article also discusses implications for school psychology training, public policy and educational practice.

In the fourth article, Shaw and Shaw (2023) with 12 citations present the challenges faced by parents of children with SEN while the schools were closed. The authors identify three main themes: the infrastructures, the impact on parents and the impact on the child. They propose recommendations for schools, such as working with parents to ensure greater equality and inclusion in the provision of education.

Cluster 3 (66 citations, 3 papers) looks at the need to adapt services, especially in remote learning, and to support vulnerable groups such as students with disabilities during the pandemic.

The cluster consists of 3 articles (Averett, 2021; Tremmel et al., 2020; Chafouleas and Iovino, 2021) and received a total of 66 citations. In the first article, Averett (2021) addresses the challenges faced by parents of children with disabilities during remote learning, and highlights the lack of appropriate and adapted services. The article highlights the vulnerability of these children during the pandemic, and the importance of understanding their experiences and providing ongoing support. It also calls for a more inclusive approach and greater support in the education of these children.

In the second article, Tremmel et al. (2020) argue that the transition to distance education during the COVID-19 pandemic significantly affected special education in rural areas. It highlights the challenges and opportunities and emphasizes the importance of tailoring teaching to these students’ individual needs, and especially those with individualized education programmes.

Finally, Chafouleas and Iovino (2021) examine the impact of the pandemic on family caregivers of children, highlighting the differences in psychological burden and distress between those with and without developmental disabilities. Caregivers of children with developmental disabilities experienced higher levels of psychological distress, reduced self-care, and difficulty performing activities. These findings highlight the importance of addressing this group’s specific needs during the pandemic and underscore the need for targeted support strategies for family caregivers of children with developmental disabilities in order to mitigate the impact on their emotional well-being.

Cluster 4 (103 citations, 3 papers) focuses on the importance of communicating with families and adapting educational strategies to ensure the inclusion and success of students with SEN during the pandemic.

It consists of 3 articles (Schuck and Lambert, 2020; Parmigiani et al., 2021; Crane et al., 2021). The article with the most citations was by Schuck and Lambert (2020) with 46 citations. In this article, the authors explore the problems encountered by special education teachers during the transition to remote teaching during the pandemic. The process was carried out in three stages: establishing contact with families, prioritizing social-emotional support, and transitioning to more structured academic activities. Teachers faced difficulties such as students having unequal resources, and the need to adapt teaching strategies to the home environment. Despite the challenges, it emphasizes the importance of communication with parents and the need for cooperation and support for teachers in order to address the changes involved in distance learning.

The second article, by Parmigiani et al. (2021), with 43 citations, describes the integration of students with SEN into regular classes and the problems encountered during school closures. Teachers had to organize inclusive online activities in order to deal with this situation. The effectiveness of this “e-inclusion” depended on several factors, including technology, relationships with families, collaboration from teachers, and online teaching strategies. Teachers adapted both synchronous and asynchronous personalized activities to encourage students to participate, preferably in small groups or individually.

Finally, Crane et al. (2021) discuss the impact of the pandemic on special schools in England, and especially those dealing with children with autism. The article highlights the challenges these schools experienced. The exacerbated educational inequalities during this period and the lack of attention from the government to their specific needs were particularly salient issues. However, other aspects included the creative solutions that these schools implemented, such as holistic approaches to support and effective communication with families. The authors call for special schools to be given priority, specific guidance provided, and the adoption of a comprehensive approach to addressing the needs of children with SEN.

A bibliographic coupling for co-word networks was then performed, and a group of six clusters of different colors is shown in Figure 10. The size of the letter is proportional to the frequency of occurrence of the keyword and the number of connections between them in both cases. The most common keywords used in the publications studied total 367. If the cut-off point is set at a frequency of five or more (≥ 5), there are 22.

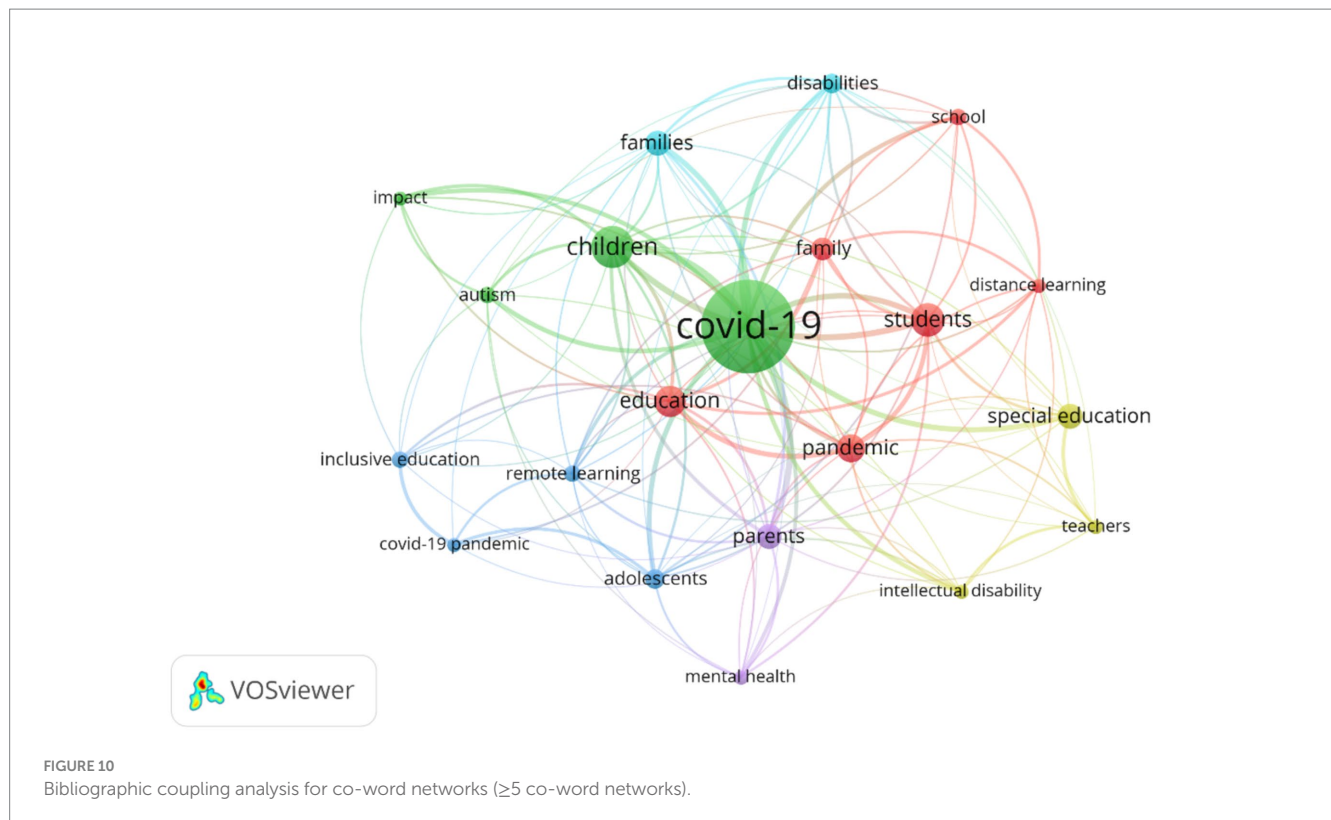
The first group is composed of 6 keywords, with “students” and “education” as the core terms. It also includes related and connected concepts such as “distance learning,” “pandemic,” “family” and “school.”

The second group consists of a network composed of 4 words with “COVID-19” as the central point and “children,” “impact” and “autism” as the most important connected concepts.

The third network is composed of 4 interconnected keywords, which are: “adolescents,” “COVID-19 pandemic,” “inclusive education” and “remote learning.”

The fourth cluster contains three keywords among which “special education” as the core term, followed by “teachers” and “intellectual disability.”

The last groups of words are composed of two terms each - one with “parents” and “mental health” and the other with “families” and “disabilities.”



3.3.2 Strategic thematic analysis

The study was based on an analysis performed using the R bibliometric software package, which is renowned for its efficiency in the evaluation and display of this type of data. This software provides statistical tools and algorithms for identifying relevant patterns and trends in the academic literature. Its most important features include the ability to generate strategic diagrams, which provide a clear visual representation of the thematic structure of the research field. These diagrams, divided into quadrants, enabled the issues to be classified according to their relevance and degree of development, providing a more accurate interpretation of the data.

Figure 11 summarizes the issues addressed in this study. The size of the spheres in the diagram is directly related to the frequency of occurrence of the keywords. The areas of the diagram are divided into quadrants to facilitate understanding: the top right quadrant presents the main or driving topics; the top left quadrant presents highly specialized or niche topics; the bottom right quadrant presents fundamental or basic topics; and the bottom left quadrant presents emerging and disappearing topics. This visual presentation provides a clear understanding of the distribution and relative importance of the various topics identified in the bibliometric analysis. Likewise, the proximity to the horizontal axis measures the importance or relevance of a topic within the field of study, and the proximity to the vertical axis measures the density or internal development of a topic.

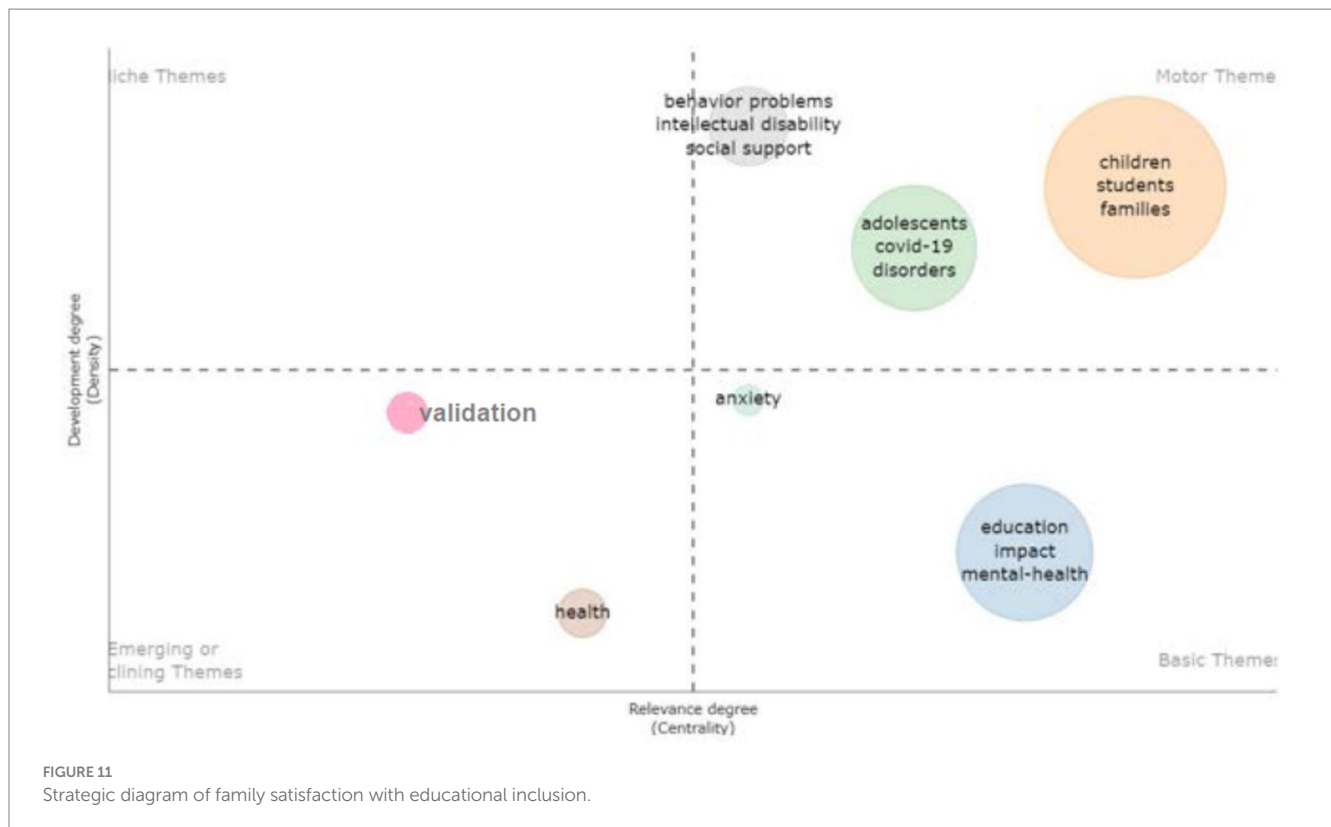
For all these reasons, the topics “Children, Students, Families” and “Behavior Problems, Intellectual Disability, Social Support” are shown in the top right quadrant in the strategy map shown in Figure 11, indicating that they are well developed and crucial areas for current research. The topic “Adolescents, COVID-19, Disorders” is also in the right quadrant, showing its relevance and development in the context

of the recent pandemic. In the bottom right quadrant, the themes “Education, Impact, Mental-Health” are presented as fundamental, but require further internal development. The topics in the bottom left quadrant, such as “Validation” and “Health,” are identified as emerging or declining, suggesting that they are areas that could benefit from additional research to determine their relevance in the future. Interestingly, no topics were identified in the top left quadrant, suggesting the absence of highly specialized research areas in the field studied. These findings provide a clear picture of the most developed and fundamental areas, as well as emerging issues, showing opportunities for future research in the field.

4 Discussion

This article presents a comprehensive bibliometric study examining the scientific output related to the educational response offered by institutions to families with children with intellectual disabilities during the COVID-19 pandemic. The analysis helps identify emerging trends and distinctive characteristics of research in this field, providing a solid foundation for implementing improvement strategies in schools, benefiting both students and their families.

One of the most notable findings is the increase in publications in 2022, particularly around the topic of the pandemic’s impact on children with special educational needs (SEN). This increase reflects the urgency and relevance of addressing the consequences of the health crisis for vulnerable populations. According to Canning and Robinson (2021), the pandemic exacerbated pre-existing inequalities in education and support systems, leading to an increase in research focused on the most affected groups, such as children with SEN and their families. Researchers have prioritized this topic due to the need



to highlight the challenges faced by both children and their caregivers, especially during school closures and the transition to remote learning (Canning and Robinson, 2021; Sharpe et al., 2021; Castro-Kemp and Mahmud, 2021).

The lack of adapted resources, social isolation, and the additional emotional burden experienced by families spurred greater academic output, focusing not only on documenting the challenges but also on offering solutions and policy recommendations to mitigate long-term effects. Sharpe et al. (2021) emphasize the need for community support for these families, while Castro-Kemp and Mahmud (2021) noted that parents of children with SEN, particularly in disadvantaged areas, experienced high levels of depression, anxiety, and stress during the lockdown.

The return to classrooms and the need to implement educational recovery strategies and psychosocial support have also fueled the academic debate on the importance of strengthening community support networks and inclusive practices, especially during times of crisis (Sharpe et al., 2021; O'Connor Bones et al., 2022). Ruiz-Eugenio et al. (2020) suggest that the adoption of practices such as dialogic literary gatherings (DLG) could benefit children's reading performance and strengthen family bonds, even in times of crisis.

The thematic analysis of the most cited articles confirms that the pandemic exacerbated pre-existing difficulties in the education of children with SEN, significantly impacting their mental health and that of their families. Canning and Robinson (2021) highlight that school closures and remote education increased the stress and emotional burden on parents, especially those with children on the autism spectrum. Consistent with these findings, Soriano-Ferrer et al. (2021) report that children with dyslexia also experienced higher

levels of depression and anxiety, while parents reported increased stress due to the difficulty in establishing study routines at home.

O'Connor Bones et al. (2022) highlight how parents assumed educational roles, facing emotional and practical challenges in balancing the care of their children with SEN and the educational and work demands. The lack of access to therapies and in-classroom support exacerbated these issues, negatively affecting students' emotional and social well-being (O'Connor Bones et al., 2022). Greenway and Eaton-Thomas (2020) underscore the inequalities in learning and the lack of structure during home-based education, while Couper-Kenney and Riddell (2021) point out the initial lack of attention to the rights of children with SEN, highlighting unequal access to technology and inadequate support.

Despite these challenges, some studies have identified effective strategies to mitigate the pandemic's negative impacts. Ruiz-Eugenio et al. (2020) highlight dialogic literary gatherings (DLG) as a successful practice that improved reading performance and strengthened family bonds, suggesting its adoption as public policy. Parmigiani et al. (2021) and Schuck and Lambert (2020) emphasize the importance of communication and collaboration between schools and families, as well as adapting educational strategies to ensure the inclusion and success of students with SEN during the crisis. The creative solutions implemented in special schools in England, as mentioned by Crane et al. (2021), also demonstrated how prioritizing effective communication and holistic support could benefit these students, emphasizing comprehensive approaches to addressing the needs of students with autism.

Moreover, the literature highlights the urgent need for inclusive public policies that address inequalities in care and prioritize the psychological well-being of children with SEN. Lazarus et al. (2022) advocate for a proactive model that promotes equity in care and access

to services, emphasizing the implications for school psychology training and educational practice. Tremmel et al. (2020) highlight the importance of adapting teaching to meet the individual needs of students, especially in rural areas and during remote education, while Chafouleas and Iovino (2021) stress the need for support strategies aimed at family caregivers to mitigate the emotional and psychological impact on them.

5 Conclusion

The bibliometric and thematic analysis conducted in this study provides a detailed overview of the educational response offered to families with children with special educational needs (SEN) during the COVID-19 pandemic. The literature review shows a significant increase in the number of publications since the start of the pandemic, with a particular surge in 2022, reflecting the urgency of studying the difficulties experienced by these families in a global health crisis and its impact on the mental health and emotional well-being of children and their caregivers.

The research highlights the involvement of researchers and institutions from various countries, underscoring the global nature of the challenges faced by families and the international collaboration in the search for solutions. Institutions such as UCL, University of Oregon, and University of Valencia have been key in developing more inclusive educational practices, while authors like Lambert and Schuck, the most cited, have demonstrated significant influence in this field.

Finally, the study highlights the urgent need for inclusive public policies that address disparities in educational access and prioritize the psychological well-being of children with SEN. A proactive and equitable approach to school psychology training and educational practice is essential to ensure that educational systems are resilient and better prepared for future emergencies. In summary, this analysis provides a solid foundation for future research and the implementation of improvements in schools, emphasizing the importance of maintaining and strengthening support for families of children with SEN.

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Author contributions

VG-D: Writing – original draft, Writing – review & editing. MG-D: Writing – original draft, Writing – review & editing. DN-M: Writing – original draft, Writing – review & editing. ST-Y: Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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