

Review

# Global Trends in the Research on Early Childhood Education during the COVID-19 Pandemic: A Bibliometric Analysis

Jiahong Su <sup>1</sup>, Davy Tsz Kit Ng <sup>1</sup>, Weipeng Yang <sup>2,\*</sup> and Hui Li <sup>3</sup>

<sup>1</sup> Faculty of Education, The University of Hong Kong, Hong Kong SAR, China; maggiesu@connect.hku.hk (J.S.); davyngtk@connect.hku.hk (D.T.K.N.)

<sup>2</sup> Department of Early Childhood Education, The Education University of Hong Kong, Hong Kong SAR, China

<sup>3</sup> Shanghai Institute of Early Childhood Education, Shanghai Normal University, Shanghai 201418, China; philip.li@shnu.edu.cn

\* Correspondence: wyang@eduhk.hk

**Abstract:** During the COVID-19 pandemic, schools and preschools worldwide have been suspended, causing many challenges for students, parents, and teachers. Through home-schooling, preschool children struggle to accept new (online) learning modes. Teachers need to acquire digital skills quickly to deliver online teaching, while parents need to take on the role of a tutor at home to facilitate their children's learning. This study aims to gauge the global trends in the research on early childhood education (ECE) during the COVID-19 pandemic, particularly considering the need for a swift response to the impact of the pandemic. We employed the bibliometric approach to studying ECE studies during the pandemic by identifying the countries of most-cited publications, most-cited categories of studies, and research methodologies used in the eligible studies (N = 507). Analysis reveals that technology integration in ECE has grown fast to timely facilitate online teaching and resolve varied challenges such as parental stress, a lack of resources, and the quality of education in this field. Based on the bibliometric approach, we highlighted research focusing on key themes such as online learning and teaching, physical activity, stress and mental health, and families in early childhood. This study offers a global perspective on ECE research during the pandemic and provides researchers, policymakers, and practitioners with future directions.

**Keywords:** COVID-19; early childhood education; online learning; bibliometric analysis; global perspective



**Citation:** Su, J.; Ng, D.T.K.; Yang, W.; Li, H. Global Trends in the Research on Early Childhood Education during the COVID-19 Pandemic: A Bibliometric Analysis. *Educ. Sci.* **2022**, *12*, 331. <https://doi.org/10.3390/educsci12050331>

Academic Editor: Mathias Urban

Received: 12 April 2022

Accepted: 5 May 2022

Published: 9 May 2022

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

The World Health Organization (WHO) declared the novel coronavirus outbreak in a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 [1]. Shortly afterwards, the WHO declared the COVID-19 epidemic a global pandemic on 11 March 2020 [1]. Since then, schools and parks (e.g., green areas, playgrounds) have been suspended, causing many challenges for children, parents, and teachers [2]. Over the two years of home-schooling, children struggled to accept new learning modes, such as online/blended learning. Teachers need to enhance their IT skills to transfer their teaching from offline to online, whereas parents must take on the role of a tutor during home-schooling. To investigate the impact of COVID-19 on early childhood education (ECE), there is a considerable amount of timely research produced, covering critical issues related to online learning, mental health, home-schooling, and much more. However, given the need to respond swiftly to the impact of the pandemic, there is still a lack of systematic synthesis of the knowledge generated during this extraordinary period to guide effective change at the policy and practice levels.

To understand the academic output using statistical methods, this study adopted bibliometrics to quantify the academic output to generate research trends and insights [3,4]. The main benefits of bibliometric analysis include evaluating leading scientific researchers or publications [5], identifying major relevant topics [5], and predicting future developments [6]. Therefore, this paper presented a thorough bibliometric analysis from two major

databases of scientific publications, Web of Science (WoS) and Scopus, in order to know how the COVID-19 world health crisis has led to profound implications for the care and education of young children in ECE settings. Specifically, the purpose of the current bibliometric analysis is to (1) identify productive publication sources, authors, affiliations, and countries in the field of ECE regarding COVID-19-related research; (2) assist researchers in finding collaborations; (3) make suggestions for the research agenda in terms of ECE in the COVID-19 pandemic; and (4) assist the WHO and other health or social organizations in summarizing the issues for decision making and policy arrangement concerning the current crisis.

### 1. Bibliometric Analysis

Bibliometric analysis is a useful approach for the assessment and evaluation of academic research outputs to update the progress of early childhood in a variety of ways [7,8], for example, identifying major educational researchers, identifying the important research topics for current developments, realizing the collaboration network, author profiles, developing bibliometric indexes to evaluate academic output, discover emerging research issues, and drawing insights for future research directions [9].

Bibliometric analysis has been widely applied across educational research to provide an overview of a field. For example, bibliometric methods were conducted to examine trends within research on adverse childhood experiences to describe observed publication trends in terms of key characteristics of main outcomes, levels of analysis, and populations of primary focus from 1998 to 2018 [8]. Impactful papers were collected from the field of education, keyword co-occurrence networks were constructed using these papers, and valuable topics and the evolution of education research were examined [7]. A paper aimed to explore ECE research trends by employing bibliometric mapping and bibliometric analysis to explore the major trends across publication years, research areas, and the most-prolific authors [10]. The bibliometric mapping could identify hot research themes such as education, curriculum, health, safety, nutrition, physical activity, gender, and family issues. Other similar research with the adoption of bibliometrics includes foreign language teaching [11], the impact of air pollution on children [12], and picture book research in ECE [13].

### 2. Research Objectives and Questions

Regarding the fast-growing needs during the pandemic, this study conducted a bibliometric analysis to generate insights for valuable research themes, strategies, and policies to best support children's learning and development, using statistical methods. The research questions (RQs) in our bibliometric analysis centered on ECE-related publications during the COVID-19 pandemic from 2020 to 2022, as follows:

RQ1: What was the annual frequency of research on ECE during the COVID-19 pandemic with relations to articles and citations?

RQ2: Which representative journals, countries/regions, and institutions for COVID-19 were related to early childhood research?

RQ3: Who were the most-productive researchers for COVID-19-related early childhood research?

RQ4: What were the most-cited categories, journals, publishers, funding agencies, and research fields of ECE during the COVID-19 pandemic?

RQ5: What were the most-cited keywords of research on ECE during the COVID-19 pandemic?

### 3. Method

A critical review to analyze, evaluate, and synthesize research relevant to the research question. The procedure was based on Galvan and Galvan's study in which three major steps were mentioned to produce a literature review (i.e., searching, scanning, writing) [7].

#### 4. Searching

The search terms include “early childhood education” (or the terms “early childhood” OR “young child\*” OR “preschool\*” OR “kindergarten\*” OR “pre-k\*” OR “childcare” OR “child care” OR “daycare”) AND “COVID-19” OR “COVID 19” OR “COVID-19 pandemic” OR “SARS-CoV-2”. The search was limited to publications written in English. The article search was carried out on 6 March 2022. The search string was used to search from the databases of WoS and Scopus. As a result, these terms were included as titles in the search string.

#### 5. Scanning

Two exclusion criteria (EC) were applied in the corresponding databases to exclude irrelevant literature. The first exclusion criterion (E1) was: other language document (n = 29). The second exclusion criterion (E2) was: other document types (n = 112).

#### 6. Coding and Analysis

We identified 648 relevant records using the search protocol, yielding the final 507 articles for inclusion and further coding, as shown in Figure 1. After narrowing the search to only the English language, 242 and 265 documents were identified from WoS and Scopus, respectively. To investigate the research trends of ECE during the COVID-19 pandemic, the method of content analysis with a combination of title and keywords search was used. The preliminary analysis of articles drew attention to the annual frequency of publications and citations, representative journals, countries/regions, institutions, and the most-frequently investigated topics. The software of VOSviewer was used to perform keyword co-occurrence analysis.

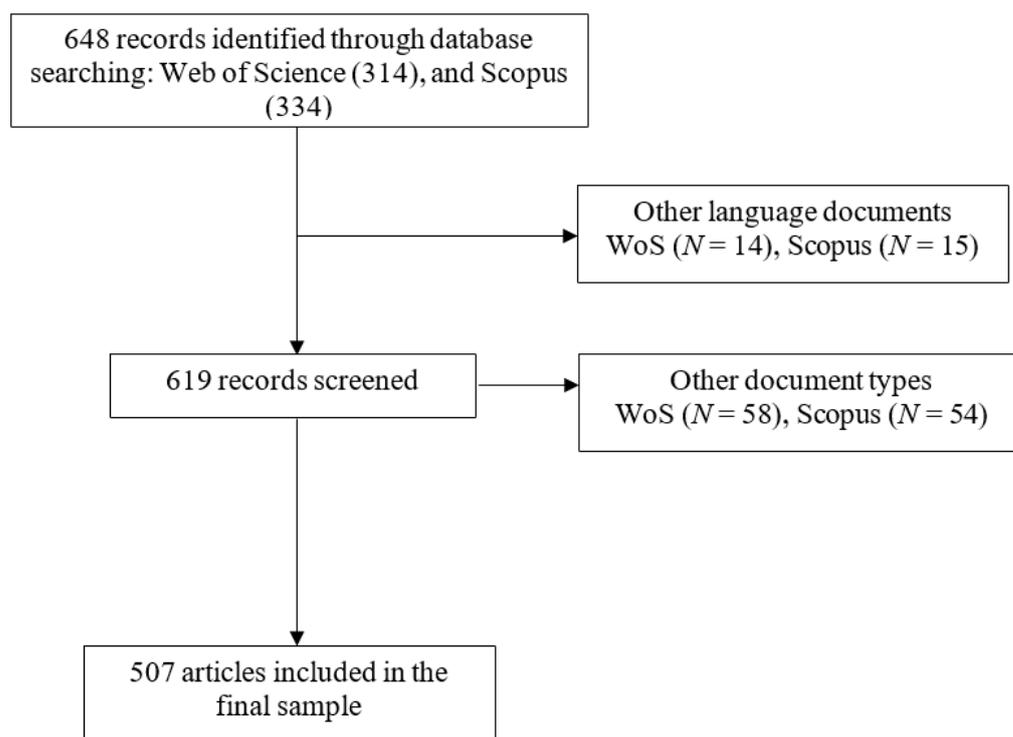


Figure 1. PRISMA diagram of included articles in the review.

#### 7. Results

RQ1: What was the annual frequency of research on ECE during the COVID-19 pandemic with relations to articles and citations?

A total of 242 eligible articles were found from the WoS database, while 265 eligible articles were found from the Scopus database. The annual number of publications on ECE in COVID-19 increased dramatically from 42 in 2020 to 170 in 2021 (WoS) and from

39 in 2020 to 169 in 2021 (Scopus). The citation counts are shown in Table 1. Given that the COVID-19 pandemic began on 31 December 2019 [1], it was common to find articles on this theme beginning in 2020. Each year, the highest citation number of an article usually happens 3–10 years following publication [8]. Therefore, more relevant citations are expected to come in 2022 and even later.

**Table 1.** The annual trend of publications and citations from 2020 to 2022 regarding ECE during the COVID-19 pandemic.

Publication Year	WoS Number	WoS Citation Count	SCOPUS Number	SCOPUS Citation Count
2020	42	1021	39	76
2021	170	629	169	1268
2022 (until 6th March)	30	4	57	490

RQ2: Which representative journals, countries/regions, and institutions for COVID-19 were related to early childhood research?

### 7.1. Representative Journals

The top representative journals are shown in Table 2. In addition, there are four representative journals shown from the WoS database. The main themes of these representative journal publications were centered on online learning during COVID-19, home childcare during COVID-19, housework and childcare before and during COVID-19, and gender-related workload of childcare during COVID-19.

**Table 2.** The most-cited publications for COVID-19-related ECE research.

Rank	The Representative Publications	Authors	WoS Citation Count (n)	SCOPUS Citation Count
1	Women’s and men’s work, housework and childcare, before and during COVID-19	Del Boca Daniela; Oggero Noemi;Profeta Paola; Rossi Mariacristina	96	106
2	Young children’s online learning during COVID-19 pandemic: Chinese parents’ beliefs and attitudes	Dong Chuanmei; Cao Simin; Li Hui	76	102
3	Baby steps: the gender division of childcare during the COVID-19 pandemic	Sevilla Almudena; Smith Sarah	45	56
4	Gender differences in couples’ division of childcare, work and mental health during COVID-19	Zamarro Gema; Prados Maria J	36	46

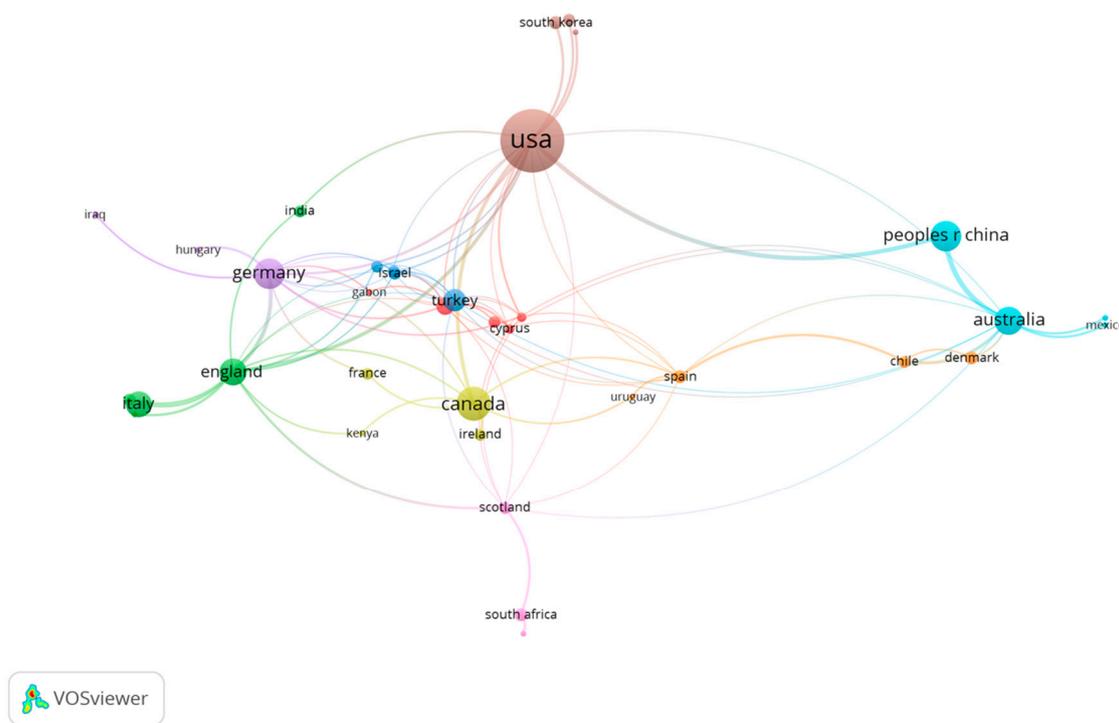
### 7.2. Countries/Regions

In total, 54 and 75 countries/regions, respectively, produced research on ECE during the COVID-19 pandemic from WoS and Scopus databases. However, six countries published more than fifteen articles from WoS and Scopus databases, namely, the USA, Australia, Canada, Germany, UK, and China, as shown in Table 3. The USA and Canada occupied the first two positions in both databases. In WoS, the USA and Canada contributed 85 (35.1%) and 25 (10%) publications, respectively, while in Scopus, they contributed 92 (34.7%) and 24 (9.1%) papers, respectively.

**Table 3.** The countries/regions where COVID-19-related ECE research was conducted.

Rank	Countries/ Regions	WoS Publication (N)	WoS Citation Count (n)	Countries	SCOPUS Publication (N)	SCOPUS Citation Count (n)
1	USA	85	677	USA	92	734
2	Canada	25	231	Canada	24	254
3	Germany	20	122	UK	21	96
4	China	20	191	Germany	18	145
5	Australia	18	149	Australia	17	181
6	UK	16	94	China	15	182

According to both databases, the United States and Canada were the most-important countries that showed collaborations with other countries in ECE during the COVID-19 pandemic research. In WoS, the USA had 19 links and 14 link strength, and Canada had 8 links and 6 link strength (Figure 2). The USA had 12 links and 24 link strength, and Canada had 4 links and 5 link strength in Scopus (Figure 3).



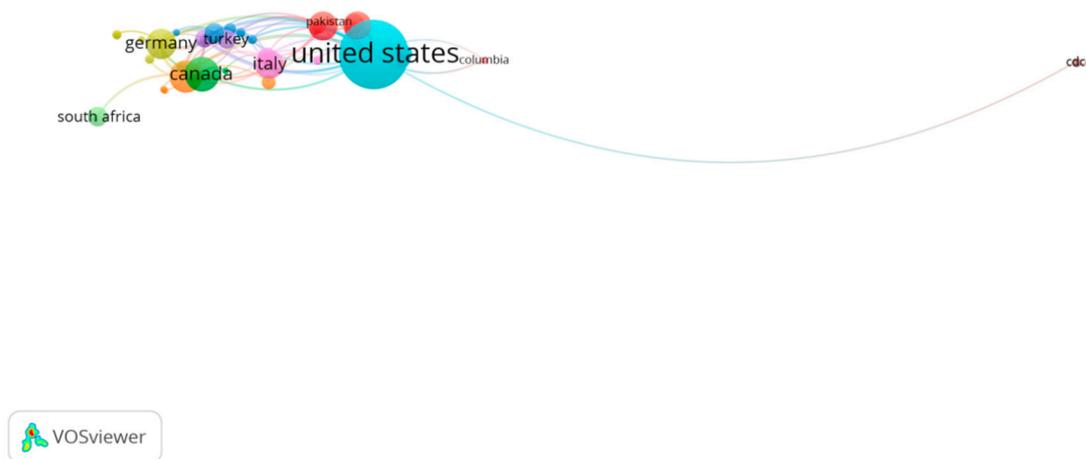
**Figure 2.** Most-collaborating countries (WoS).

Among Asian countries, China was the top contributor, with 20 (8.3%) papers in WoS and 17 (5.7%) in Scopus. The majority of the research was conducted in developed countries, demonstrating that developed countries are more concerned with the topic. However, this finding is subject to publication bias towards authors from less developed countries.

7.3. Institutions

In total, 536 and 833 institutions contributed to 507 eligible publications during the COVID-19 pandemic, as recorded in WoS and Scopus databases, respectively. The most-productive institutions from the WoS database were Harvard University, Centres for Disease Control & Prevention, University of London, University of Toronto, and the University of Wollongong. According to Scopus, the University of Melbourne, the University of Wollongong, Columbia University, Yale University, and The University of British Columbia were the most-influential institutions (Table 4). Furthermore, Harvard University was

the most prolific, with 10 publications and 144 citations. All of the high-level publishing institutions were located in developed countries/regions.



**Figure 3.** Most-collaborating countries (Scopus).

**Table 4.** The top-ranked institutions which produced the COVID-19-related ECE research.

Rank	Institutions	WoS Publication (N)	WoS Citation Count (n)	Rank	Institutions	SCOPUS Publication (N)	SCOPUS Citation Count (n)
1	Harvard University	10	144	1	University of Melbourne	6	17
2	Centres for Disease Control & Prevention	7	158	2	University of Wollongong	5	60
3	University of London	5	60	3	Columbia University	5	24
4	University of Toronto	5	4	4	Yale University	4	30
5	University of Wollongong	5	53	5	The University of British Columbia	4	63

RQ3: Who were the most-productive researchers for COVID-19-related early childhood research?

A total of 1232 and 1293 authors contributed to the 507 publications on ECE during the COVID-19 pandemic from WoS (Figure 4) and Scopus (Figure 5), respectively. Table 5 shows the most-productive authors with their affiliated institutions and countries. This can help researchers find suitable collaborators and institutions for their research.

RQ4: What were the most-cited categories, journals, publishers, funding agencies, and research fields of ECE during the COVID-19 pandemic?

#### 7.4. Categories in the WoS

There are 53 categories of research on ECE during the COVID-19 pandemic from the WoS database. However, four categories published more than 13 articles, including (1) education and educational research, (2) public, environmental, and occupational health, (3) economics, and (4) pediatrics. Moreover, educational research was the most prolific, with 66 publications, a citation value of 90, and the highest H-index value of 5. Furthermore, in educational research, the most citations come from the countries most affected by the pandemic, such as Sweden, Norway, and the United States [14,15].

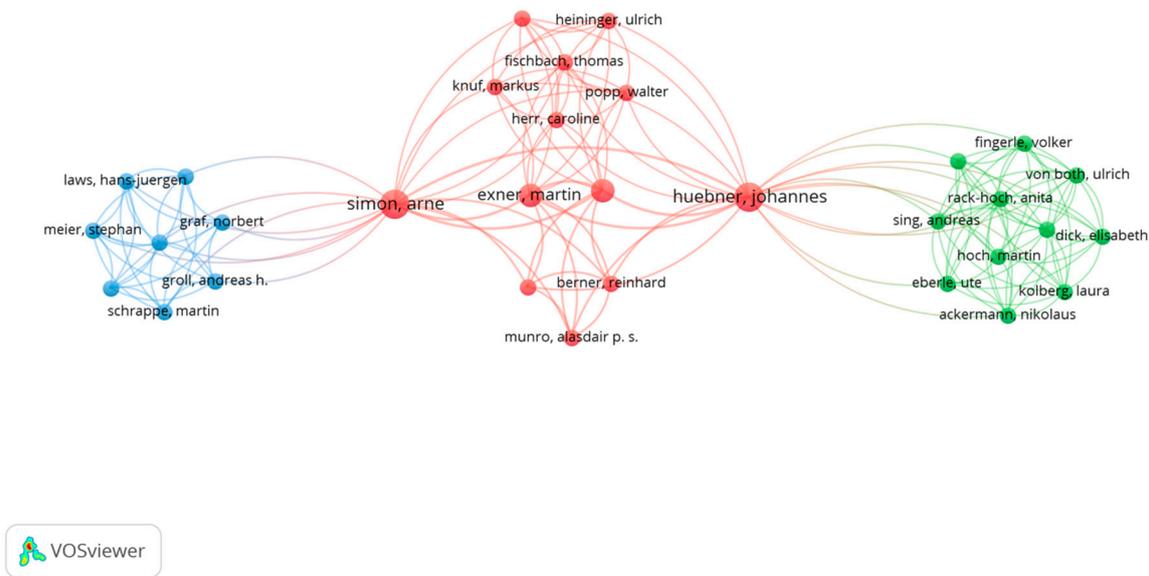


Figure 4. The authors who have the most contribution to this topic (WoS).

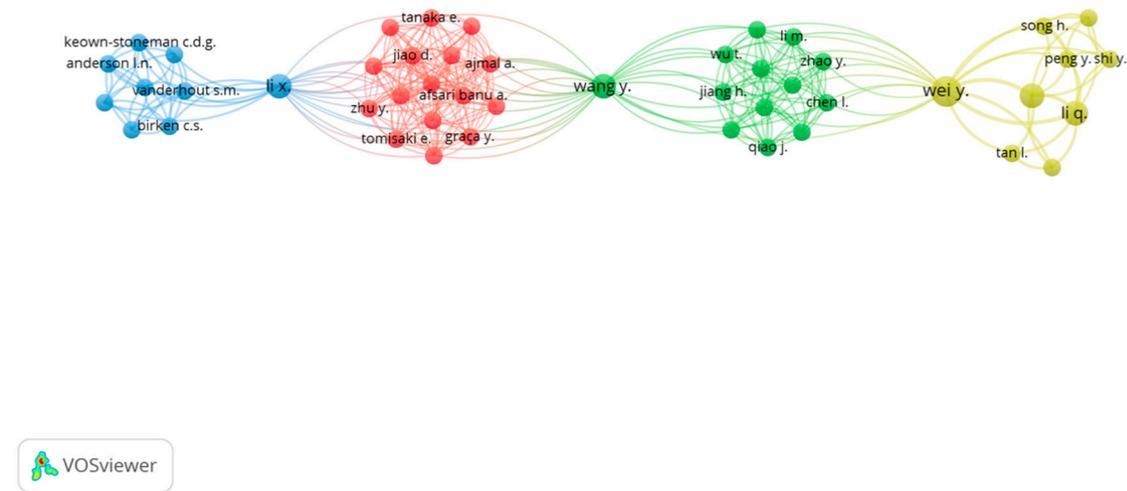


Figure 5. The authors who have the most contribution to this topic (Scopus).

Table 5. The authors who contributed most to the publications on ECE during the COVID-19 pandemic (WoS and Scopus).

Author	Institutions	Country	Number of Publications
Anthony Okely	University of Wollongong	Australia	4
Arne Simon	University Klinikum Saarlandes	Germany	4
Jad A. Elharake	Yale University	USA	3
Walter Gilliam	Yale University	USA	3
John Eric Humphries	Yale University	USA	3
Madeline Klotz	Yale Child Study Center	USA	3
Amyr Malik	Yale University	USA	3
Saad B. Omer	Yale University	USA	3
Chin Reyes	Yale Child Study Center	USA	3

Table 5. Cont.

Author	Institutions	Country	Number of Publications
Mehr Shafiq	Yale Institute for Global Health; Columbia University	USA	3
David Wilkinson	Yale University	USA	3
Hui Li	Shanghai Normal University	Mainland China	2
Wenwei Luo	Shanghai Normal University	Mainland China	2
Zhijun Liu	Zunyi Medical College	Mainland China	2
Guanghai Wang	Shanghai Jiao Tong University	Mainland China	2
Yi Hung Lau	The Education University of Hong Kong	Hong Kong	2
Jianbin Li	The Education University of Hong Kong	Hong Kong	2
ILENE R. BERSON	University of South Florida	USA	2
MICHAEL J. BERSON	University of South Florida	USA	2
Aiden Lee	Yale University	USA	2
Vesna Žegarac Leskovar	University of Maribor	Slovenia	2
Vesna Lovec	University of Maribor	Slovenia	2
Miroslav Premrov	University of Maribor	Slovenia	2
Ceilidh McConnell	University of Calgary	Canada	2
Alexis Webster	University of Calgary	Canada	2
Yue Qian	University of British Columbia	Canada	2
Chuanmei Dong	Macquarie University	Australia	2
Karleen Gribble	Western Sydney University	Australia	2
Mira Vasileva	The University of Melbourne	Australia	2
Yvonne Anders	University of Bamberg	Germany	2
Janice Heejin Kim	University of Cambridge	UK	2
C. Katharina Spiess	Free University	Berlin	2
Roger Mathisen	FH 360 (NGO)	Vietnam	2
In Young Cho	Chonnam National University	Korea	2

### 7.5. Journals

A total of 144 and 172 journals published research on ECE during the COVID-19 pandemic from WoS and Scopus databases, respectively. Seven journals published more than five articles on this topic, such as *the Early Childhood Education Journal*, *International Journal of Environmental Research and Public Health*, *MMWR Morbidity and Mortality Weekly Report*, *BMJ open*, *Jama network open*, *European Early Childhood Education Research Journal*, and *Frontiers in Psychology*. *The Early Childhood Education Journal* was the most prolific, with 23 publications and a citation value of 48 in the WoS database. In Scopus, it has 22 publications and 58 citations.

### 7.6. Publishers

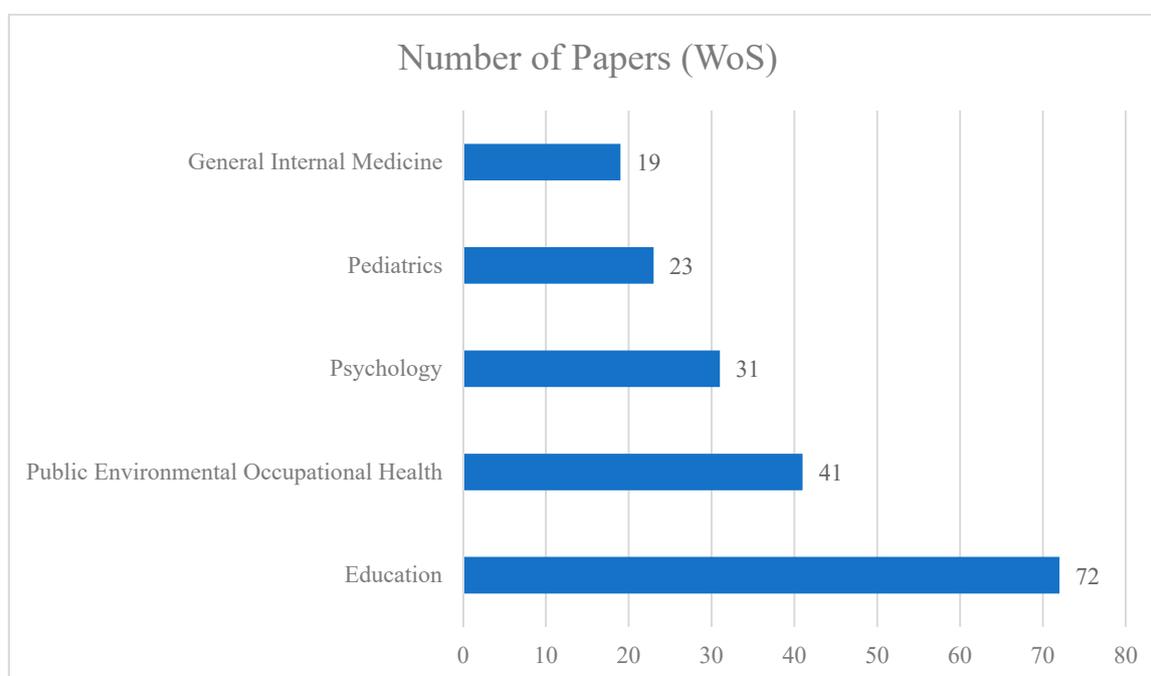
A total of 36 publishers showed interest in publishing research on ECE during the COVID-19 pandemic in WoS. Five publishers published more than 15 articles on this topic, including Springer Nature, Taylor & Francis, Sage, Wiley, and Frontiers Media. Moreover, Springer Nature was the most prolific, with 34 publications, a citation value of 248, and the highest H-index value of 7.

### 7.7. Funding Agencies

A total of 129 and 159 funding agencies showed interest in investing in research on ECE during the COVID-19 pandemic in WoS and Scopus, respectively. Two funding agencies funded the most research projects on this topic, namely, the National Institutes of Health (NIH, USA) and the United States Department of Health Human Service. In this regard, the United States is more concerned about the impact of COVID-19 in the context of early childhood.

### 7.8. Research Fields

According to WoS and Scopus databases, the top five critical fields in ECE during the COVID-19 pandemic research included “Education” (72 articles, 29.8%), “Public Environmental Occupational Health” (41 articles, 17%), “Psychology” (31 articles, 12.8%), “Pediatrics” (23 articles, 9.5%), and “General Internal Medicine” (19 articles, 7.85%) for WoS documents (Figure 6). Moreover, “Medicine” (121 articles, 45.7%), “Social sciences” (111 articles, 41.9%), “Psychology” (87 articles, 32.8%), “Environmental Science” (21 articles, 7.9%), and “Nursing” (14 articles, 5.3%) were the fields in Scopus (Figure 7).



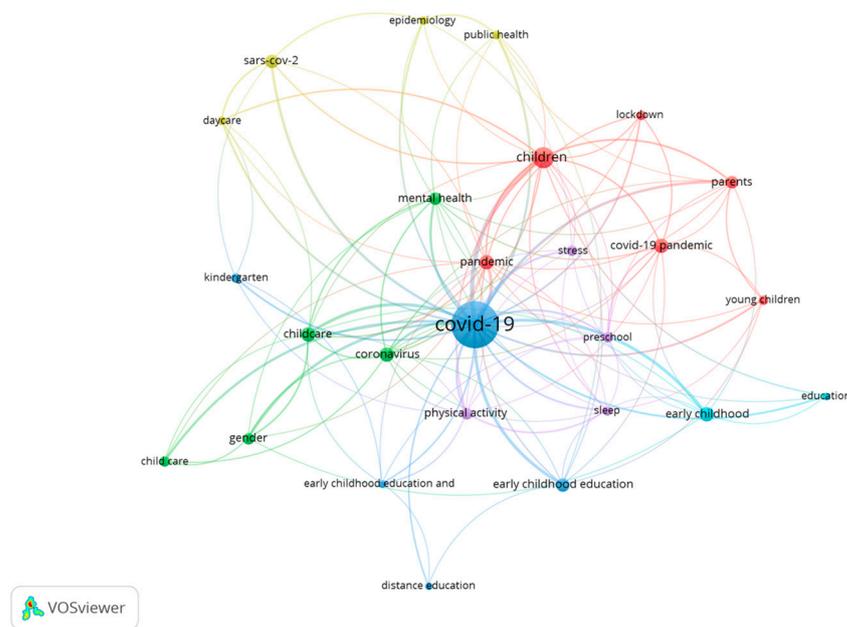
**Figure 6.** Top 5 research fields (WoS).

RQ5: What were the most-cited keywords of research on ECE during the COVID-19 pandemic research?

### 7.9. Keywords

The keywords help identify the most-important information related to the research topics. The co-occurrence analysis of keywords is an effective tool for determining the most-popular topics of publications in a given field [16]. We used the VOSviewer to perform keyword co-occurrence analysis. A total of 831 keywords were investigated in WoS documents. Forty-two keywords were shown more than five times on this topic in the WoS database, as shown in Figure 8. Five keywords were shown more than 20 times in early childhood during the COVID-19 pandemic research, including “COVID-19”, “childcare”, “children”, “early childhood education”, and “COVID-19 pandemic”. Furthermore, stress was relevant in considering ECE during the COVID-19 pandemic, as evidenced by how it was used 12 times as a keyword. “Behaviour” also appeared to be important (eight times as a keyword). Meanwhile, 640 keywords were investigated in Scopus documents. Twenty-





**Figure 9.** The most-used keywords of research on ECE during the COVID-19 pandemic (Scopus).

Numerous studies confirmed the effects of COVID-19 on children’s health [17–19]. As a result, the keywords “health” (seven times) and “mental health” (five times) were used by most researchers. Meanwhile, physical activity was relevant in considering early childhood during the COVID-19 pandemic [20,21], and it was used five times as a keyword in WoS documents.

7.10. Keyword Clustering

To better understand the relevance of various keywords, we next cluster the keywords, as shown in Table 6. Keyword clustering allows us to obtain a detailed understanding of ECE development during the COVID-19 pandemic. The keyword centrality measures revealed that COVID-19 was the most-central keyword, with the greatest influence in terms of degree. Firstly, COVID-19 words impact many surrounding words, including stress, preschool, and families. Moreover, many researchers studied how stress problems among parents in families in COVID-19 will influence children’s emotional and behavioral management [22,23]. The COVID-19 pandemic may put various strains on parents regarding employment and childcare, affecting children’s behaviors indirectly. For example, a study researched children’s behavioral and emotional disorders during the COVID-19 pandemic [24].

**Table 6.** Keyword clustering.

Keywords	Frequency (WoS)	Frequency (Scopus)
<i>Cluster 1 Epidemic</i>		
COVID-19 pandemic	21	15
SARS-CoV-2	5	13
COVID-19	149	154
Pandemic	12	15
Coronavirus	7	15
<i>Cluster 2 Early childhood Education</i>		
Children	20	31
Early childhood education	51	14
Kindergarten	9	7
Pre-schoolers	6	8

Table 6. Cont.

Keywords	Frequency (WoS)	Frequency (Scopus)
Preschool	15	8
Children	20	31
Preschool children	7	7
School	6	7
Young children	9	7
Teachers	9	9
<i>Cluster 3 Family</i>		
Care	7	8
Child care	12	8
Childcare	25	8
Parents	7	12
Parenting	6	4
Gender	13	10
Housework	7	5
Woman	5	5
<i>Cluster 4 Learning</i>		
Quality	7	5
Remote learning	6	6
Technology	5	5
<i>Cluster 5 Outcome</i>		
Behaviour	8	6
Stress	12	8
<i>Cluster 6 Others</i>		
Health	7	6
Physical activity	5	10
Play	5	5
Policy	7	5
School closures	7	4
Time	8	5
Lockdown	5	7
Mental Health	5	11

Secondly, “COVID-19” was the most-frequently mentioned pandemic keyword, followed by “COVID-19 pandemic”. Thirdly, sports-related words appear less frequently, such as play and physical activity. However, we also know that children’s sports are very important and that COVID-19 impacts children’s activities. Furthermore, given the school closures, many kindergartens have been using distance education, and researchers are conducting more research on this topic [25–27]. Finally, preschool teachers will face numerous challenges when implementing online learning, such as using and teaching. Many articles pointed out that difficulties faced by early childhood teachers in using ICT may be caused by a mismatch between the e-courses they learn in educational programs and the level of ICT they use in practice [28,29]. More details about these important topics will be discussed in the following section.

## 8. Discussion

This study examined a collection of the latest studies using the WoS and Scopus databases to reveal research trends in ECE related to the COVID-19 pandemic. Descriptive and quantitative statistics were used to examine the included studies. The bibliometric technique analyzed the research articles in terms of article counts, citation counts, prolific countries/regions, institutions, funding agencies, journals, publishers, categories, and keyword distributions. These findings help researchers better understand the educational needs associated with ECE during the COVID-19 pandemic.

## 9. Important Issues to Be Highlighted

The bibliometric analysis revealed critical themes in early childhood research during the COVID-19 pandemic. This section examines the most-representative research works with the following four categories.

### 9.1. Online Learning and Teaching in ECE during the COVID-19 Pandemic

Early childhood online learning encompasses a wide range of topics, such as evaluating the effectiveness of policies for online learning [27], identifying the need for early childhood educators to carry out distance education during the COVID-19 pandemic [30], parents' beliefs and attitudes toward their young children's online learning during the lockdown [31], and other challenges of online learning facing children, teachers, and parents during the lockdown.

ECE educators have faced various challenges during the pandemic, including internet accessibility, lack of teacher training to transit to distance learning, technological challenges for distance teaching and communication with caregivers, resources to learning materials, and quality of early childhood programs [32,33]. Another study surveyed 1434 teachers. It proposed five limitations of online learning: (1) difficulties supporting children's learning and concerns, (2) difficulties with parental involvement, (3) technology issues, (4) social isolation and feeling of being disconnected, and (5) barriers with resources and preparation for online learning [34].

Furthermore, in ECE, it is necessary to take additional care of children's development. Psychologists had pointed out that the development of behavioral self-regulation was between the ages of 3 and 7 years [35], and considerable motivation stability was around 5 years old [36]. Therefore, researchers believed that although online learning has brought creative and communicative activities for children, prolonged online learning can also come with risks [37,38]. Accordingly, researchers need to meet the social and cognitive needs of children to stimulate their self-regulation [39], motivation during online learning [40], and readiness to use digital technology and learning materials [41]. It is important to draw educators' attention to these concerns about offering effective and healthy online environments that are appropriate for children to develop their knowledge and technological skills to tackle online-learning difficulties [42]. Studies proposed the enhancement of digital resources, parental involvement and support, an improved curriculum, communication and guidelines for parents, and more teacher training and collaboration to timely support early childhood educators in reducing their teaching stress and enhancing the quality of online teaching [34].

Due to the challenges of online learning, parents prefer traditional learning and have a negative belief in the benefits of online learning in early childhood [31,43]. Among studies, Dong et al.'s study has received the most citations [31]. In this study, 3275 Chinese parents were polled about their beliefs and attitudes towards their children's online learning during the pandemic. The results showed that the parents prefer traditional learning in early childhood settings due to three major reasons: shortcomings in online learning, insufficient self-regulation ability of young children, and a lack of time and expertise to support children's online learning [31]. Another study identified three issues with online learning during the pandemic in Indonesia through interviewing 12 teachers and 25 parents, including teachers not fully mastering IT teaching skills, children becoming bored easily when they study at home for a long time, and parents being unwilling to change to a tutor's role at home [44].

These studies align with each other and point out a list of challenges and limitations of online learning for young children. Although online teaching brings challenges for young learners, children and teachers can improve their abilities to develop technical knowledge and skills and positive dispositions about online learning and teaching [45]. For example, many educators adopted social media tools (e.g., Twitter) to build and exchange knowledge, as well as access professional development courses promptly [46]. Teachers become more creative and raise their acceptance of new technologies, thus providing opportunities for

developing online learning activities using technological tools/platforms [47]. In addition, teachers and children's families developed a new way to energize their connection with each other, even though the face-to-face connection was missing. In the future, more delivery of teacher-education programs must be considered to update teachers' technological and pedagogical knowledge to adopt new ways of teaching [48].

### *9.2. Physical Activity in ECE during the COVID-19 Pandemic*

Due to COVID-19-induced school and park closures, as well as cancellations of children's sports and activity classes, many children did not meet the recommended levels of physical activity [20]. A study conducted in the United States found a decrease in children's level of physical activity during the pandemic relative to before the pandemic [20]. Another study also found that the pandemic has reduced time spent on physical activity, increased time spent on entertainment screens, and decreased sleeping quality among children [49]. Similarly, Guan et al.'s study demonstrates that children's physical activity decreased across countries (e.g., Australia, South Africa, China, Canada, and South Korea) [50]. Mitra et al. surveyed 1503 children and showed that most children had a longer sedentary screen time, a shorter duration of physical activity, and lower healthy exercise levels during the pandemic [51]. Likewise, Okely conducted a survey across 948 children with a mean age of 4.4 years and showed that students have a longer sedentary screen time and low physical activity [52]. This goes against the Global Exercise Behaviour Guidelines that preschoolers should have at least 180 minutes of daily physical activity [53]. All the above studies showed that young children engaged in less physical activity during the pandemic than before the pandemic, which requires urgent attention from parents and other stakeholders.

In the pandemic, children are found to lose curriculum enrichment opportunities (e.g., sharing healthy eating experiences, developing food literacy among children) via an online learning mode [54]. In addition, the restrictions caused by the pandemic have worsened young children's daily routines and habits. Therefore, it is suggested that although social restriction is an effective method to reduce the pandemic cases, emphasizing the importance of parents promoting active play with their children is essential to maintain their health and well-being. Although children may not be able to spend time as usual at the playground, green areas, and parks, parents and children could still entertain themselves via indoor activities that do not require a lot of equipment and build a playhouse such as blankets, boxes, towels, balls, and dancing to music.

### *9.3. Stress and Mental Health in Early Childhood during the COVID-19 Pandemic*

On top of physical health, many researchers started to worry about students' psychological, emotional, and mental health aspects such as depression, stress, and anxiety in the post-pandemic [55,56]. For example, students have experienced various levels of stress, anxiety, and loneliness due to stressful pandemic situations and remote learning, compounded by various factors such as prolonged periods of isolation, higher rates of school dropouts, disconnections from their peers at schools, and lack of family support during home-schooling [57,58]. Moreover, young children (especially those with special education needs) tend to have more behavior difficulties, such as inattention, hyperactivity, and impulsivity, which need additional support from parents and schools [59].

Family backgrounds seem to moderate the COVID-19 effect on child well-being. According to Mochida et al.'s study with 1030 caregivers, the children whose mothers have lower education levels undergo a significantly higher level of psychological stress than children with higher maternal education levels [55]. Furthermore, children from low-income families have significantly higher psychological stress than children from high-income families [55]. Furthermore, children who cannot attend kindergarten or daycare due to the pandemic have higher levels of psychological stress than those who attend kindergarten or daycare daily [55]. Therefore, the family backgrounds of children and access to kindergarten or daycare greatly impact children's level of stress during the pandemic.

The pandemic may have an impact on children's overall mental health. For example, Imran et al. discovered that children are subjected to various stressful events, including fear, uncertainty, major changes in daily life, physical and social isolation, and high levels of parental stress, which have negative consequences on their mental health [60]. The authors provide some practical advice: First, turn off news channels when children are present. Second, speak less about COVID-related situations in the presence of other adults. Third, play games with the child (hide and seek, running around, and riding a tricycle) [60].

#### *9.4. Families in Early Childhood Research during the COVID-19 Pandemic*

Children are home-schooling due to school closures during the pandemic. Consequently, parental involvement in ECE becomes even more critical. Researchers identified that parents are more engaged in their children's schooling and schoolwork during the COVID-19 pandemic [61]. Active parental involvement could reduce children's negative learning behaviors such as inattention, procrastination, and hyperactivity. Some researchers have investigated how parents provide home education for their children at the kindergarten level during the pandemic [62]. The Guttman Scale questionnaire was used as the research instrument in Hapsari et al.'s study, which shows that parental involvement in ECE during the pandemic is accomplished through the following strategies [63]: nurturing, two-way communication, home learning strategies, and decision making. During the COVID-19 pandemic, parents have been more active in providing home education for their children; however, home environment-related limitations could hinder the possibilities of quality home-schooling, especially in families with lower income [43].

Challenges in the pandemic were worsening the inequalities in ECE access and opportunities by other factors such as race, culture, language, technical literacy, family background, and economic status, which would widen the gaps in learning outcomes between privileged and underprivileged children [64,65]. For example, online learning requires consistent internet connectivity even in rural areas, and underprivileged children may lack technical devices [32].

Given that disadvantaged families may have limitations in providing home education during school closures, more interactive online learning opportunities can be helpful to facilitate children's learning at home [43]. However, family members may meet various challenges such as emotional concerns, loss of jobs, economic difficulties, dual job problems, and pregnancy in difficult times [59]. In addition, the pandemic has disrupted parenting practices and family routines and thus affected children's health and development. Therefore, the Organisation for Economic Co-operation and Development has proposed a list of strategies to support families throughout childhood, such as offering additional services (e.g., in-home support, psychosocial assistance, basic material needs, health screenings) [66], financial resources to reduce their burdens, and digital tools to enhance family functioning service delivery. In return, when parents could receive more support from schools and communities, the vulnerable children would suffer less in their online learning. However, it remains to be studied how preschools or other social organizations can provide offline activities to support disadvantaged families in facilitating children's home-schooling during the pandemic.

## **10. Suggestions for Research Agenda**

Based on the bibliometric analysis, we proposed the research agenda to cover emerging research topics (keywords that are just beginning to be explored), developing research topics (keywords that are developing areas), and saturated research topics (research issues that are critical for early childhood). For COVID-19, we used our keyword clusters to propose an early childhood research agenda. We will go over the three groups in greater depth, taking into account the literature supporting the status of each topic.

### 10.1. Emerging Research Topics

Gender and socioeconomic status (SES) have an impact on ECE during COVID-19. Family SES affects young children's learning and development during the COVID-19 pandemic [55,67]. However, compared to men, women cared for children much more during the pandemic [68]. Few studies have been conducted to determine whether SES and gender affect young children's learning and development in the pandemic. Another potential research direction lies in teachers' IT skills required for online instruction. Teachers' unfamiliarity with online platforms/tools and lack of knowledge and skills is particularly notable in developing countries such as India [69]. Limited research has been conducted to compare the quality of online education in developed countries with that in developing countries during COVID-19. These two research topics are very worthy of further research.

### 10.2. Developing Research Topics

The keyword, physical activity, appeared five times in ECE, proving its importance as a research direction in COVID-19. Most studies combine physical activity, sleep, and screen time to conduct research [49,50,70]. Given the benefits of exercise to children's health, physical activity is ultimately classified as a developing research topic. This topic is also closely related to outdoor learning among young children during the COVID-19 pandemic [71]. Besides children's physical health, more attention should be paid to children's mental health and moral development such as anti-bias education in the early years [72].

### 10.3. Saturated Research Topics

The third group of keywords contains saturated research topics and is the most-frequently used group. The keywords we considered, such as children's online learning during the COVID-19 pandemic, have been extensively discussed in previous studies. As a result of class suspension, home-schooling has affected teachers, children, and parents, which is also a source of great concern among scholars. This topic has a very high citation rate, exceeding 200 in Google Scholar [25,31,73].

## 11. Contributions of This Study

Our study makes the following contributions. First, it has provided a summary of relevant topics in early childhood during the COVID-19 pandemic to help researchers identify new areas for future research projects. Second, it has divided keywords into clusters based on the analysis above. Researchers can conduct more specialized analyses, such as meta-analysis, using specific keywords, and discuss using artificial intelligence techniques to improve children's online learning during the pandemic. Third, it has provided an overview of relevant topics that must be addressed in early childhood research during the pandemic, thereby helping researchers better understand the state of ECE research development during the pandemic and how they will be developed in the future. Fourth, we analyzed the authors, institutions, and countries that can assist future researchers in finding suitable collaborators. Fifth, our analysis of top citations may assist researchers in better understanding which topics are most-discussed and cited by researchers. Sixth, we analyzed the top journal indexing, which helps researchers find suitable journals. Finally, this research assists the WHO and other organizations in summarizing the most-concerning research trends and issues in ECE related to the current outbreak, thus improving the resilience of ECE in special circumstances and future crises.

## 12. Conclusions and Limitations

ECE during the COVID-19 has been a hot topic of educational research to document effective teaching practices to sustain teaching as usual since 2020 [74]. This study presents an overview of the state of ECE during the COVID-19 pandemic by examining 507 empirical articles on ECE during COVID-19 published between 2020 and March 2022. By analyzing annual articles, citation counts, journals, funding agencies, publishers, categories, and keywords, this study aims to help researchers gain a deeper and more diverse understanding

of current research hotspots. Furthermore, this review provides researchers with a detailed and comprehensive picture of research centered on ECE during the COVID-19 pandemic, which could help them discover popular topics and future research directions and identify potential collaborative research partners.

Finally, using the WoS and Scopus database, we implement the recommendations suggested by prior research [75]. This study is based on the WoS and Scopus databases due to their being well-maintained, well-quality-controlled, and verified sources of articles [76]. As a result, citation counts and inclusivity are likely lower than in other databases, such as Google Scholar [77]. The bibliometric analysis can only be made within each database rather than combining the two databases. Likewise, many bibliometric analysis studies only used WoS and Scopus databases in their reports [75,78]. Future researchers may consider broadening their searches by including additional databases. With increasingly advanced technology for data analysis, future research can examine combinations of keywords and their associations (the clustering analysis) with countries, journals, and citations.

**Author Contributions:** Conceptualization, J.S. and W.Y.; methodology, J.S.; software, J.S.; validation, J.S., W.Y. and D.T.K.N.; formal analysis, J.S.; investigation, J.S.; resources, D.T.K.N.; data curation, J.S.; writing—original draft preparation, J.S. and D.T.K.N.; writing—review and editing, W.Y. and H.L.; visualization, J.S.; supervision, H.L.; project administration, J.S. and W.Y. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

- World Health Organization. COVID-19 Public Health Emergency of International Concern (PHEIC) Global Research and Innovation Forum. Available online: [https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-\(pheic\)-global-research-and-innovation-forum](https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-(pheic)-global-research-and-innovation-forum) (accessed on 12 February 2020).
- Martin, A.; Partika, A.; Johnson, A.D.; Castle, S.; Horm, D.; Tulsa SEED Study Team. Both Sides of the Screen: Predictors of parents' and teachers' depression and food insecurity during COVID-19-related distance learning. *Early Child. Res. Q.* **2022**, *60*, 237–249. [[CrossRef](#)] [[PubMed](#)]
- Cobo, M.J.; Martínez, M.Á.; Gutiérrez-Salcedo, M.; Fujita, H.; Herrera-Viedma, E. 25 years at knowledge-based systems: A bibliometric analysis. *Knowl.-Based Syst.* **2015**, *80*, 3–13. [[CrossRef](#)]
- Cobo, M.J.; López-Herrera, A.G.; Herrera-Viedma, E.; Herrera, F. An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field. *J. Informetr.* **2011**, *5*, 146–166. [[CrossRef](#)]
- Ellegaard, O.; Wallin, J.A. The bibliometric analysis of scholarly production: How great is the impact? *Scientometrics* **2015**, *105*, 1809–1831. [[CrossRef](#)]
- Boudry, C.; Mouriaux, F. Eye neoplasms research: A bibliometric analysis from 1966 to 2012. *Eur. J. Ophthalmol.* **2015**, *25*, 357–365. [[CrossRef](#)] [[PubMed](#)]
- Huang, C.; Yang, C.; Wang, S.; Wu, W.; Su, J.; Liang, C. Evolution of topics in education research: A systematic review using bibliometric analysis. *Educ. Rev.* **2020**, *72*, 281–297. [[CrossRef](#)]
- Struck, S.; Stewart-Tufescu, A.; Asmundson, A.J.; Asmundson, G.G.; Afifi, T.O. Adverse childhood experiences (ACEs) research: A bibliometric analysis of publication trends over the first 20 years. *Child Abuse. Negl.* **2021**, *112*, 104895. [[CrossRef](#)]
- Chen, X.; Yu, G.; Cheng, G.; Hao, T. Research topics, author profiles, and collaboration networks in the top-ranked journal on educational technology over the past 40 years: A bibliometric analysis. *J. Comput. Educ.* **2019**, *6*, 563–585. [[CrossRef](#)]
- Khodabandelou, R.; Mehran, G.; Nimehchisalem, V. A bibliometric analysis of 21st century research trends in early childhood education. *Rev. Publ.* **2018**, *5*, 137–163.
- Yilmaz, R.M.; Topu, F.B.; Takkaç Tulgar, A. An examination of the studies on foreign language teaching in preschool education: A bibliometric mapping analysis. *Comput. Assist. Lang. Learn.* **2019**, *35*, 270–293. [[CrossRef](#)]
- Sun, J.; Zhou, Z.; Huang, J.; Li, G. A bibliometric analysis of the impacts of air pollution on children. *Int. J. Environ. Res. Public Health* **2020**, *17*, 1277. [[CrossRef](#)] [[PubMed](#)]
- Wu, J.F. A bibliometric analysis of picture book research between 1993 and 2015. *Read. Psychol.* **2018**, *39*, 413–441. [[CrossRef](#)]

14. Galvan, J.L.; Galvan, M.C. *Writing Literature Reviews: A Guide for Students of the Social and Behavioral Sciences*; Routledge: New York, NY, USA, 2017.
15. Pramling Samuelsson, I.; Wagner, J.T.; Eriksen Ødegaard, E. The coronavirus pandemic and lessons learned in preschools in Norway, Sweden and the United States: OMEP policy forum. *Int. J. Early Child.* **2020**, *52*, 129–144. [[CrossRef](#)] [[PubMed](#)]
16. Xing, D.; Zhao, Y.; Dong, S.; Lin, J. Global research trends in stem cells for osteoarthritis: A bibliometric and visualized study. *Int. J. Rheum. Dis.* **2018**, *21*, 1372–1384. [[CrossRef](#)] [[PubMed](#)]
17. Ravens-Sieberer, U.; Kaman, A.; Erhart, M.; Devine, J.; Schlack, R.; Otto, C. Impact of the COVID-19 Pandemic on quality of life and mental health in children and adolescents in Germany. *Eur. Child Adolesc. Psychiatry* **2021**, 1–11. [[CrossRef](#)]
18. De Miranda, D.M.; da Silva Athanasio, B.; Oliveira, A.C.S.; Simoes-e-Silva, A.C. How is COVID-19 Pandemic impacting mental health of children and adolescents? *Int. J. Disaster Risk Reduct.* **2020**, *51*, 101845. [[CrossRef](#)]
19. Yeasmin, S.; Banik, R.; Hossain, S.; Hossain, M.N.; Mahumud, R.; Salma, N.; Hossain, M.M. Impact of COVID-19 Pandemic on the mental health of children in Bangladesh: A cross-sectional study. *Child. Youth Serv. Rev.* **2020**, *117*, 105277. [[CrossRef](#)]
20. Dunton, G.F.; Do, B.; Wang, S.D. Early effects of the COVID-19 Pandemic on physical activity and sedentary behavior in children living in the US. *BMC Public Health* **2020**, *20*, 1351. [[CrossRef](#)]
21. Pavlovic, A.; DeFina, L.F.; Natale, B.L.; Thiele, S.E.; Walker, T.J.; Craig, D.W.; Vint, G.R.; Leonard, D.; Haskell, W.L.; Kohl, H.W. Keeping children healthy during and after COVID-19 Pandemic: Meeting youth physical activity needs. *BMC Public Health* **2021**, *21*, 485. [[CrossRef](#)]
22. Spinelli, M.; Lionetti, F.; Pastore, M.; Fasolo, M. Parents' stress and children's psychological problems in families facing the COVID-19 outbreak in Italy. *Front. Psychol.* **2020**, *11*, 1713. [[CrossRef](#)]
23. Spinelli, M.; Lionetti, F.; Setti, A.; Fasolo, M. Parenting stress during the COVID-19 outbreak: Socioeconomic and environmental risk factors and implications for children emotion regulation. *Fam. Process* **2021**, *60*, 639–653. [[CrossRef](#)] [[PubMed](#)]
24. Jiao, W.Y.; Wang, L.N.; Liu, J.; Fang, S.F.; Jiao, F.Y.; Pettoello-Mantovani, M.; Somekh, E. Behavioral and emotional disorders in children during the COVID-19 epidemic. *J. Pediatr.* **2020**, *221*, 264–266. [[CrossRef](#)] [[PubMed](#)]
25. Kim, J. Learning and teaching online during COVID-19: Experiences of student teachers in an early childhood education practicum. *Int. J. Early Child.* **2020**, *52*, 145–158. [[CrossRef](#)] [[PubMed](#)]
26. Solekhah, H. Distance learning of Indonesian early childhood education (PAUD) during the COVID-19 Pandemic. *Int. J. Emerg. Issues Early Child. Educ.* **2020**, *2*, 105–115. [[CrossRef](#)]
27. Yuliejantingsih, Y. The implementation of online learning in early childhood education during the COVID-19 Pandemic. *J. Pendidik. Usia Dini* **2020**, *14*, 247–261.
28. Kalogiannakis, M. Training with ICT for ICT from the trainer's perspective. A local ICT teacher training experience. *Educ. Inf. Technol.* **2010**, *15*, 3–17. [[CrossRef](#)]
29. Wetzel, K.; Wilhelm, L.; Williams, M.K. The introductory technology course: A tool for technology integration. *Contemp. Issues Technol. Teach. Educ.* **2004**, *3*, 453–465.
30. Alan, Ü. Distance education during the COVID-19 Pandemic in Turkey: Identifying the needs of early childhood educators. *Early Child. Educ. J.* **2021**, *49*, 987–994. [[CrossRef](#)]
31. Dong, C.; Cao, S.; Li, H. Young children's online learning during COVID-19 Pandemic: Chinese parents' beliefs and attitudes. *Child. Youth Serv. Rev.* **2020**, *118*, 105440. [[CrossRef](#)]
32. Atilas, J.T.; Almodóvar, M.; Chavarría Vargas, A.; Dias, M.J.; Zúñiga León, I.M. International responses to COVID-19: Challenges faced by early childhood professionals. *Eur. Early Child. Educ. Res. J.* **2021**, *29*, 66–78. [[CrossRef](#)]
33. Andrew, A.; Cattan, S.; Costa Dias, M.; Farquharson, C.; Kraftman, L.; Krutikova, S.; Phimister, A.; Sevilla, A. Inequalities in children's experiences of home learning during the COVID-19 lockdown in England. *Fisc. Stud.* **2020**, *41*, 653–683. [[CrossRef](#)] [[PubMed](#)]
34. Ford, T.G.; Kwon, K.A.; Tsotsoros, J.D. Early childhood distance learning in the US during the COVID pandemic: Challenges and opportunities. *Child. Youth Serv. Rev.* **2021**, *131*, 106297. [[CrossRef](#)]
35. Montroy, J.J.; Bowles, R.P.; Skibbe, L.E.; McClelland, M.M.; Morrison, F.J. The development of self-regulation across early childhood. *Dev. Psychol.* **2016**, *52*, 1744. [[CrossRef](#)]
36. Gilmore, L.; Cuskelly, M. A longitudinal study of motivation and competence in children with Down syndrome: Early childhood to early adolescence. *J. Intellect. Disabil. Res.* **2009**, *53*, 484–492. [[CrossRef](#)] [[PubMed](#)]
37. McPake, J.; Plowman, L.; Stephen, C. Preschool children creating and communicating with digital technologies in the home. *Br. J. Educ. Technol.* **2013**, *44*, 421–431. [[CrossRef](#)]
38. Plowman, L.; Stevenson, O.; McPake, J.; Stephen, C.; Adey, C. Parents, preschoolers and learning with technology at home: Some implications for policy. *J. Comput. Assist. Learn.* **2011**, *27*, 361–371. [[CrossRef](#)]
39. Hautakangas, M.; Kumpulainen, K.; Uusitalo, L. Children developing self-regulation skills in a Kids' Skills intervention programme in Finnish Early Childhood Education and Care. *Early Child Dev. Care* **2021**, *191*, 1–17. [[CrossRef](#)]
40. Nandan, N.V.; Sulaipher, D.M. An Empirical Study on Motivation to School Teachers in the Maldives during the COVID-19 Pandemic. *Int. J. Early Child. Spec. Educ.* **2021**, *13*, 645–653. [[CrossRef](#)]
41. Koran, N.; Berkmen, B.; Adalier, A. Mobile technology usage in early childhood: Pre-COVID-19 and the national lockdown period in North Cyprus. *Educ. Inf. Technol.* **2022**, *27*, 321–346. [[CrossRef](#)]

42. Edwards, S.; Nolan, A.; Henderson, M.; Mantilla, A.; Plowman, L.; Skouteris, H. Young children's everyday concepts of the internet: A platform for cyber-safety education in the early years. *Br. J. Educ. Technol.* **2018**, *49*, 45–55. [CrossRef]
43. Lau, E.Y.H.; Lee, K. Parents' views on young children's distance learning and screen time during COVID-19 class suspension in Hong Kong. *Early Educ. Dev.* **2021**, *32*, 863–880. [CrossRef]
44. Munastiwi, E. Colorful Online Learning Problem of Early Childhood Education during the COVID-19 Pandemic. *Al-Ta Lim J.* **2020**, *27*, 227–235. [CrossRef]
45. Shamir-Inbal, T.; Blau, I. Facilitating emergency remote K-12 teaching in computing-enhanced virtual learning environments during COVID-19 pandemic-blessing or curse? *J. Educ. Comput. Res.* **2021**, *59*, 1243–1271. [CrossRef]
46. Staudt Willet, K.B. Revisiting how and why educators use Twitter: Tweet types and purposes in #Edchat. *J. Res. Technol. Educ.* **2019**, *51*, 273–289.
47. Bubb, S.; Jones, M.A. Learning from the COVID-19 home-schooling experience: Listening to pupils, parents/carers and teachers. *Improv. Sch.* **2020**, *23*, 209–222. [CrossRef]
48. León-Nabal, B.; Zhang-Yu, C.; Lalueza, J.L. Uses of digital mediation in the school-families relationship during the COVID-19 Pandemic. *Front. Psychol.* **2021**, *12*, 687400. [CrossRef]
49. Aguilar-Farias, N.; Toledo-Vargas, M.; Miranda-Marquez, S.; Cortinez-O'Ryan, A.; Cristi-Montero, C.; Rodriguez-Rodriguez, F.; Fuentealba, P.; Okely, A.; del Pozo Cruz, B. Sociodemographic predictors of changes in physical activity, screen time, and sleep among toddlers and preschoolers in Chile during the COVID-19 Pandemic. *Int. J. Environ. Res. Public Health* **2021**, *18*, 176. [CrossRef]
50. Guan, H.; Okely, A.D.; Aguilar-Farias, N.; del Pozo Cruz, B.; Draper, C.E.; El Hamdouchi, A.; Florindo, A.; Jauregui, A.; Katzmarzyk, P.; Kontsevaya, A.; et al. Promoting healthy movement behaviours among children during the COVID-19 Pandemic. *Lancet Child Adolesc. Health* **2020**, *4*, 416–418. [CrossRef]
51. Mitra, R.; Moore, S.A.; Gillespie, M.; Faulkner, G.; Vanderloo, L.M.; Chulak-Bozzer, T.; Rhodes, E.R.; Brussoni, M.; Tremblay, M.S. Healthy movement behaviours in children and youth during the COVID-19 Pandemic: Exploring the role of the neighbourhood environment. *Health Place* **2020**, *65*, 102418. [CrossRef]
52. Okely, A.D.; Kariippanon, K.E.; Guan, H.; Taylor, E.K.; Suesse, T.; Cross, P.L.; Chong, K.; Sukerman, A.; Turab, A.; Staiano, A.; et al. Global effect of COVID-19 Pandemic on physical activity, sedentary behaviour and sleep among 3-to 5-year-old children: A longitudinal study of 14 countries. *BMC Public Health* **2021**, *21*, 940. [CrossRef]
53. World Health Organization. Physical Activity. Available online: <https://www.who.int/news-room/fact-sheets/detail/physical-activity> (accessed on 26 November 2020).
54. Lafave, L.; Webster, A.D.; McConnell, C. Impact of COVID-19 on early childhood educator's perspectives and practices in nutrition and physical activity: A qualitative study. *Early Child. Educ. J.* **2021**, *49*, 935–945. [CrossRef] [PubMed]
55. Mochida, S.; Sanada, M.; Shao, Q.; Lee, J.; Takaoka, J.; Ando, S.; Sakakihara, Y. Factors modifying children's stress during the COVID-19 Pandemic in Japan. *Eur. Early Child. Educ. Res. J.* **2021**, *29*, 51–65. [CrossRef]
56. Newlove-Delgado, T.; McManus, S.; Sadler, K.; Thandi, S.; Vizard, T.; Cartwright, C.; Ford, T. Child mental health in England before and during the COVID-19 lockdown. *Lancet Psychiatry* **2021**, *8*, 353–354. [CrossRef]
57. Jalongo, M.R. The effects of COVID-19 on early childhood education and care: Research and resources for children, families, teachers, and teacher educators. *Early Child. Educ. J.* **2021**, *49*, 763–774. [CrossRef]
58. Spiteri, J. Quality early childhood education for all and the COVID-19 crisis: A viewpoint. *Prospects* **2021**, *51*, 143–148. [CrossRef] [PubMed]
59. Wendel, M.; Ritchie, T.; Rogers, M.A.; Ogg, J.A.; Santuzzi, A.M.; Shelleby, E.C.; Menter, K. The association between child ADHD symptoms and changes in parental involvement in kindergarten children's learning during COVID-19. *Sch. Psychol. Rev.* **2020**, *49*, 466–479. [CrossRef]
60. Imran, N.; Zeshan, M.; Pervaiz, Z. Mental health considerations for children & adolescents in COVID-19 Pandemic. *Pak. J. Med. Sci.* **2020**, *36*, S67–S72.
61. Sabates, R.; Carter, E.; Stern, J.M. Using educational transitions to estimate learning loss due to COVID-19 school closures: The case of Complementary Basic Education in Ghana. *Int. J. Educ. Dev.* **2021**, *82*, 102377. [CrossRef]
62. Daulay, N. Home education for children with autism spectrum disorder during the COVID-19 Pandemic: Indonesian mothers experience. *Res. Dev. Disabil.* **2021**, *114*, 103954. [CrossRef]
63. Hapsari, S.M.; Sugito, S.; Fauziah, P.Y. Parent's involvement in early childhood education during the COVID-19 pandemic period. *J. Pendidik. Prog.* **2020**, *10*, 298–311. [CrossRef]
64. Dias, M.J.; Almodóvar, M.; Atilas, J.T.; Vargas, A.C.; Zúñiga León, I.M. Rising to the Challenge: Innovative early childhood teachers adapt to the COVID-19 era. *Child. Educ.* **2020**, *96*, 38–45. [CrossRef]
65. Steed, E.A.; Leech, N. Shifting to Remote Learning during COVID-19: Differences for Early Childhood and Early Childhood Special Education Teachers. *Early Child. Educ. J.* **2021**, *49*, 789–798. [CrossRef] [PubMed]
66. OECD. *Looking Beyond COVID-19: Strengthening Family Support Services Across the OECD*; Employment, Labour and Social Affairs Policy Briefs; OECD: Paris, France, 2021; Available online: <http://oe.cd/fss2021-brief-covid> (accessed on 1 January 2022).
67. Zhang, L.; Carter, R.A., Jr.; Qian, X.; Yang, S.; Rujimora, J.; Wen, S. Academia's responses to crisis: A bibliometric analysis of literature on online learning in higher education during COVID-19. *Br. J. Educ. Technol.* **2022**, *53*, 620–646. [CrossRef]

68. Power, K. The COVID-19 Pandemic has increased the care burden of women and families. *Sustain. Sci. Pract. Policy* **2020**, *16*, 67–73. [[CrossRef](#)]
69. Hassan, M.M.; Mirza, T.; Hussain, M.W. A critical review by teachers on the online teaching-learning during the COVID-19. *Int. J. Educ. Manag. Eng.* **2020**, *10*, 17–27. [[CrossRef](#)]
70. Abid, R.; Ammar, A.; Maaloul, R.; Souissi, N.; Hammouda, O. Effect of COVID-19-related home confinement on sleep quality, screen time and physical activity in Tunisian boys and girls: A survey. *Int. J. Environ. Res. Public Health* **2021**, *18*, 3065. [[CrossRef](#)]
71. Tan, X.R.; Yang, W. Pedagogical documentation as a curriculum tool: Making children’s outdoor learning visible in a childcare centre in Singapore. *Eur. Early Child. Educ. Res. J.* **2022**, *30*, 281–295. [[CrossRef](#)]
72. Kok, X.W.; Yang, W. ‘Quilting’ a play-based anti-bias curriculum for very young children: The Mosaic Approach. *Eur. Early Child. Educ. Res. J.* **2021**, 1–25. [[CrossRef](#)]
73. Fauzi, I.; Khusuma, I.H.S. Teachers’ elementary school in online learning of COVID-19 pandemic conditions. *J. Iqra’ Kaji. Ilmu Pendidik.* **2020**, *5*, 58–70. [[CrossRef](#)]
74. Ng, T.K.; Reynolds, R.; Chan, M.Y.H.; Li, X.H.; Chu, S.K.W. Business (teaching) as usual amid the COVID-19 pandemic: A case study of online teaching practice in Hong Kong. *J. Inf. Technol. Educ. Res.* **2021**, *19*, 775.
75. Cretu, D.M.; Morandau, F. Initial teacher education for inclusive education: A bibliometric analysis of educational research. *Sustainability* **2020**, *12*, 4923. [[CrossRef](#)]
76. Li, K.; Rollins, J.; Yan, E. Web of Science use in published research and review papers 1997–2017: A selective, dynamic, cross-domain, content-based analysis. *Scientometrics* **2018**, *115*, 1–20. [[CrossRef](#)] [[PubMed](#)]
77. Harzing, A.W.; Alakangas, S. Google Scholar, Scopus and the Web of Science: A longitudinal and cross-disciplinary comparison. *Scientometrics* **2016**, *106*, 787–804. [[CrossRef](#)]
78. Ali, Ā. Bibliometric analysis of the studies in the field of mathematics education. *Educ. Res. Rev.* **2018**, *13*, 723–734. [[CrossRef](#)]