

Trends in Online Learning Research During the Covid-19 Pandemic in Higher Education: Bibliometric Studies

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ABSTRACT

In order to break the chain of the Covid-19 virus, the government recommends schools lockdown and implementing online learning. The research problem formulation is as follows: (1). How is the trend of online learning studies during the covid-19 pandemic at universities in Indonesia? (2). What topics have developed in studying online learning during the COVID-19 pandemic at universities in Indonesia? The research was carried out as a literature review using bibliometric analysis of several sources of scientific publication data. The data in this study were obtained through literature collection techniques and their references which were obtained directly from the Scopus and Google Scholar databases. The data was extracted using the Publish or Perish tool and then analyzed with the VosViewer tool. From the analysis that has been done, it can be concluded that the distribution of authors who study online learning topics during the pandemic has not yet appeared to form a polarization of authorship networks that explore these topics in depth. Meanwhile, the trends that have formed in online learning during the pandemic seem to condense into several topics.

Keywords:

Education Policy; Online Learning; Research Trend; Higher Education; Bibliometric.

ABSTRAK

Dalam rangka memutus mata rantai penyebaran virus Covid-19, pemerintah Indonesia merekomendasikan agar sekolah ditutup dan

menerapkan pembelajaran online. Rumusan masalah penelitian ini sebagai berikut: (1). Bagaimana tren studi pembelajaran online pada masa pandemi covid-19 di perguruan tinggi di Indonesia?, (2). Topik apa saja yang berkembang dalam kajian pembelajaran online selama pandemi COVID-19 di perguruan tinggi di Indonesia? Penelitian dilakukan dalam bentuk studi pustaka dengan menggunakan analisis bibliometrik dari beberapa sumber data publikasi ilmiah. Data dalam penelitian ini diperoleh melalui teknik pengumpulan literatur dan referensi yang diperoleh langsung dari database Scopus dan Google Scholar. Data diekstraksi menggunakan alat Publish of Perish dan kemudian dianalisis dengan alat VosViewer. Dari analisis yang telah dilakukan, dapat disimpulkan bahwa sebaran penulis yang mempelajari topik pembelajaran online di masa pandemi belum tampak membentuk polarisasi jaringan kepengarangan yang mendalami topik tersebut. Sementara itu, tren yang terbentuk pada topik pembelajaran online di masa pandemi tampak berkelompok menjadi beberapa topik.

Keywords:

Kebijakan Pendidikan; Pembelajaran Online; Trend Riset; Pendidikan Tinggi; Bibliometrik.

1. Introduction

One crucial aspect of learning is how the model is put into practice. If you use a suitable learning model, you can count on a predictable learning process and results. The learning model is a set of guidelines that can be implemented in the classroom or any other setting where instructional activities are carried out (Firman & Rahayu, 2020). Knowledge, attitudes, and abilities are all acquired through a combination of teaching and other activities. Learning, on the other hand, is the receiver of the information. Learning is something that people do forever, as long as they are alive (Adijaya, 2018). Learning will always be inherent in human life, wherever and in any situation, including during a pandemic.

Learning takes place in a dynamic space where students, teachers, and materials all interact. Education is the facilitation of students' learning, which includes the development of their cognitive capacities, affective dispositions, and value systems (Atsani, 2020). In other words, learning is a process to help students learn well. The learning process can also be interpreted as a series of interactions between students and teachers to achieve their goals (Pingol, 2022), or learning is a process of teaching students (Herliandry, Nurhasanah, Suban, & Kuswanto, 2020). Learning can take place in a variety of settings, including the traditional classroom, the workplace, and the learner's own home. The educational process may proceed. Online or in-person instruction, both made possible with the use of information technology, can enrich students' educational experiences (Pakpahan & Fitriani, 2020). So far, teachers only dwell on conventional learning methods, namely learning methods that occur face-to-face in class.

The worldwide spread of the Coronavirus, also known as Covid-19 (Corona Virus Diseases-19), shook the global community. Within a matter of months, this virus had become endemic in Wuhan, China, and had spread over the world, including to Indonesia. The economic, social, and educational spheres have all felt the effects of the Covid-19 pandemic (Chang, 2020). The Minister of Education and Culture released Circular Letter No. 4 of 2020 Concerning the Implementation of Education Policies during the Emergency Period for the Spread of Corona Virus Diseases-19 as a direct result of the pandemic's effects on the educational system. The government suggests canceling classes and switching to online education in an effort to stop the spread of the virus. The government has mandated online education in an effort to curb the spread of the COVID-19 virus. This online learning is considered very effective in inhibiting the spread of the Covid-19 virus (Barrot, Llenares, & Del Rosario, 2021). The concept of online media, in its broadest sense, refers to the various forms of media formats that are exclusive to the Internet and that serve as a form of online communication (Hidayat, 2022). These formats may include text, photographs, videos, and audio. On the other hand, the singular comprehension of online media is characterized as a medium within the context of mass communication. This policy must then be obeyed by higher education actors and closely monitored for the duration of the pandemic.

At least three (three) functions of electronic learning impact classroom learning activities (classroom instruction): (1). Supplements (additional) are said to serve as supplements if pupils have the option to use electronic content or not (Pujilestari, 2020). Students are not required to access electronic learning materials in this instance. Despite the fact that it is functional, students who utilize it will gain additional knowledge or insight. (2). If the e-learning material is programmed to complement the learning materials students receive in the classroom, it is said to function as a complement. E-learning content is designed to be supplemental enrichment or remediation for pupils participating in traditional learning activities. As an enrichment, if students can quickly master/understand the subject matter delivered by the teacher face-to-face, they are allowed to access e-learning materials specifically developed for them (Anggrawan, 2019). The objective is to strengthen pupil mastery of the subject matter presented by the teacher in class if students struggle to comprehend the subject matter presented by the teacher in class. (3). The purpose of e-learning as a replacement for traditional classes is to allow students to manage lecture activities according to their schedules and other daily obligations (Sukardi & Rozi, 2019).

Students have the option of following one of the following three alternative models of learning activities: (a). Completely face-to-face interactions (the customary method), b. Some of them take place in person, while others take place online, and still more take place c. One hundred percent via the internet Learning that takes place through the use of electronic media, such as smartphones, computers, or laptops, and that makes use of the Internet network as a method of delivery, interaction, and facilities that contain text, photos, video, and sound as a form of distance learning service facilities, can be defined as "online learning" or "e-learning," according to several explanations about online learning and e-learning that have been provided above by various industry experts.

The process of obtaining an education through the use of the internet has a variety of effects, which can be either favorable or harmful. When using online education, instructors are required to provide students with the necessary resources to foster creative thinking (Arifianto, Mutawali, & Subekti, 2021; Genc, Masalimova, Platonova, Sizova, & Popova, 2019). This online learning process involves teachers and students, but parents are also required to be involved in the online learning process. Parents with a high educational background may be very adaptable to the online learning process (Almusharraf & Khahro, 2020; Keane, Linden, Hernandez-Martinez, & Molnar, 2022; Maqableh & Alia, 2021; Yan et al., 2021). However, parents with a minimum educational background may find it much more challenging to adapt to online learning due to their lack of knowledge about technology (Jensvoll & Lekang, 2018). A weak internet network is also one of the factors that can hinder the online learning process because this online learning process will run smoothly if the quality of the internet network is smooth and stable (Gunawan, Kristiawan, Risdianto, & Monicha, 2021). The online learning process also makes it difficult for teachers to deliver learning materials because not all students are enthusiastic about participating in the online learning process (Alzafari, 2017). Although they are generally very familiar with social media (Boholano & Cajés, 2021). The various initiatives that have been carried out are then recorded in various studies or research that have been carried out. The various study documents on this topic are interesting to analyze and map (Castro & Tumibay, 2021), considering that these known trends and developments can be introduced to other parties or at a more sustainable future.

Considering the foregoing, the author has an abiding curiosity about the state of higher education online courses during the Covid-19 pandemic. A bibliometric analysis of data from several scientific publications served as the basis for this study's literature review methodology. Based on the preceding context, the author presents the issue as follows: (1). How is the trend of online learning during covid-19 pandemic at universities in Indonesia? (2). What topics have developed in studying online learning during the COVID-19 pandemic at universities in Indonesia?

2. Methods

This study uses a descriptive research method with a bibliometric approach. A study emphasizes numerical data or numbers processed using statistical methods carried out in descriptive research to obtain the significance of the picture under study (Cox, Gadd, Petersohn, & Sbaffi, 2019). In this case, the data collected is all the metadata in the article and the literature source contained in the database that is the source of the data. In a study, researchers are required to be able to determine the research sample. The sample is the part that represents the population to be studied (Blaikie, 2018). There are two sampling types in this case: samples to analyze articles and literature samples to determine emerging trends.

Meanwhile, the data in this study was obtained through documentation techniques, namely the collection of literature and its references which were obtained directly from the Scopus and Google Scholar databases. Regarding data acquisition, it is necessary first to adjust the type of data to be retrieved. The data is extracted using the Publish or Perish tool and then

saved in CSV format to be easier to identify each other's interests and interests in the research. Data analysis is then carried out with the VosViewer tool to determine the cooccurrence visualization in the topic to be analyzed.

3. Results and Discussion

The Publish or Perish tools are used in tracking publications for more controlled searches. In this study, two databases were used, which were considered to represent the reputation criteria for the article's publication. Scopus database is a publication with high reputation criteria, and Google Scholar represents the essential reputation criteria. The search was conducted on the Google Scholar database by entering the keywords "online learning," "pandemic," AND "higher education." In contrast, in the Scopus database, it was conducted by entering the keywords "online learning," "pandemic," AND "Indonesia." It is done to capture articles with reputational backgrounds found in various publications. The results of this search can be seen in the image below:

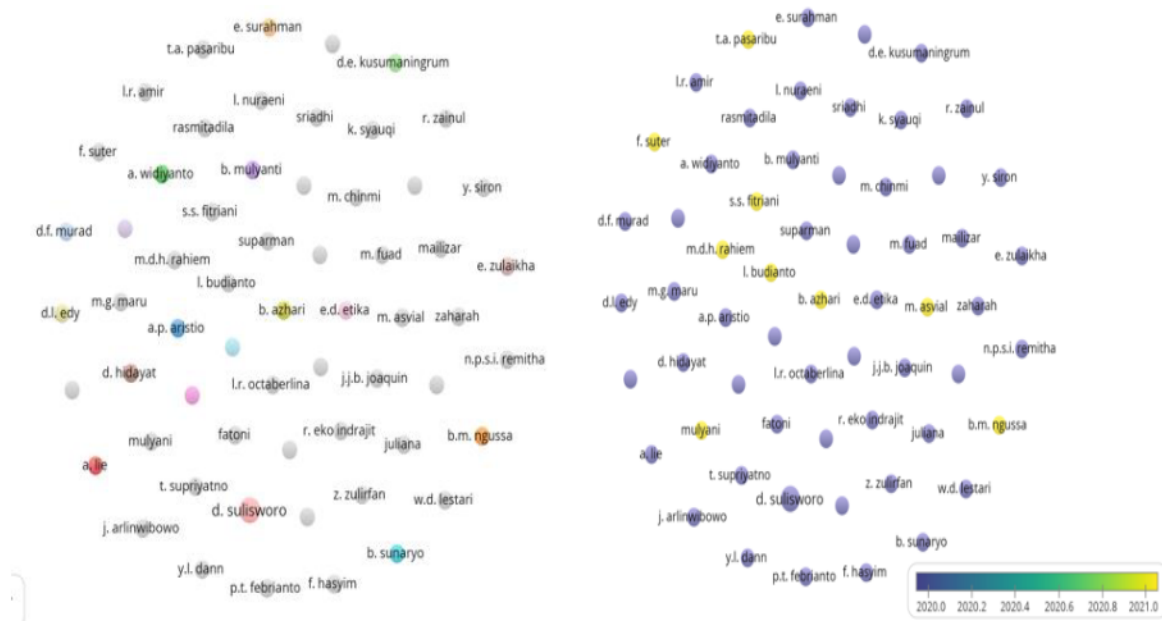
Table 1. Analysis of Papers on the Scopus and Google Scholar Databases

Google Scholar		Scopus	
Publication years:	2020-2021	Publication years:	2020-2021
Citation years:	1 (2020-2021)	Citation years:	1 (2020-2021)
Papers:	999	Papers:	62
Citations:	3913	Citations:	86
Cites/year:	3913.00	Cites/year:	86.00
Cites/paper:	3.92	Cites/paper:	1.39
Authors/paper:	1.97	Authors/paper:	0.98
h-index:	28	h-index:	5
g-index:	57	g-index:	8
hI,norm:	21	hI,norm:	5
hI,annual:	21.00	hI,annual:	5.00
hA-index:	28	hA-index:	5
Papers with ACC >= 1,2,5,10,20:	285,187,98,58,35	Papers with ACC >= 1,2,5,10,20:	15,10,6,3,1

From the table 1, it can be seen that the composition of articles in each database has a different number. In the Google Scholar database, it appears that the most papers with search keywords have been extracted, which is 999 papers, then the Scopus database only has 62 papers with search keywords. It is understandable that the more reputable the published journal, the less quantity it will be due to the high specification of management quality (Karanatsiou, Misirlis, & Vlachopoulou, 2017). However, it can be stated that in one year, the search range appears to have been very many papers published in the scope of search keywords. It is shown that research related to online learning during this pandemic has various appeals and problem backgrounds. At the same time, the situation becomes interesting for more in-depth analysis and comparison.

Scopus Database Publication Co-Authorship Analysis

Initially, settings are made with a minimum threshold of 1 document related to search keywords from the paper's author. It is due to the quantity of data that only amounts to 60 papers, and no authors have more than one paper. Furthermore, from the 60 authors, a co-authorship analysis was carried out with the following results:



Network Visualization on Scopus Database

Overlay Visualization on Scopus Database

Figure 1. Authorship Distribution on Scopus and Google Scholar Databases

The visualization from figure 1 shows that the author's network has not yet been formed. The authors only have one publication in the searched keyword, not yet identified with two or more publications. It is understood that each author is more motivated by research interests with the background of their experiences during the pandemic (Shah, Lei, Ali, Doronin, & Hussain, 2019). Aspects of interest and interests that occur as part of the role of writers as lecturers or teachers become the driving force for them to carry out research and publications.

Meanwhile, in the overlay visualization image, the distribution of authors within two years of publication shows that most publications were carried out in 2020 and only a few in 2021. It is understandable, considering that 2021 is not over yet, and it is still possible for various publications to appear within the scope of the word search key. In addition, it is also understandable if the problems and interests of research with the theme of online learning have an extreme urgency in the early days of the pandemic (Fleer, 2020). In the early days of the pandemic, education groups became actors who were forced to adapt to alternative learning activities to reduce the risk of expanding the pandemic. Meanwhile, the movement until 2021 will generate more research with the development and deepening of studies in online learning.

Term Analysis on Scopus Database

In the first part, the threshold setting is set with the term criteria having three occurrences, then the results obtained from 198 terms are found 14 terms that meet these criteria. Furthermore, from the 14 terms, arrangements were made based on the relevance score so that 60% of the terms were found to be the most relevant or as many as eight terms. The terms can be observed from the following table 2:

Table 2. Distribution of Terms in Scopus Database Publications

Term	Occurrences	Relevance
Distance learning	5	2.48
Outbreak	4	1.67
Pandemic	34	1.17
Pandemic Covid	6	0.82
Implementation	3	0.53
Impact	5	0.50
Online Learning	9	0.45
Vocational Education	3	0.38

Furthermore, network visualization analysis is conducted to find keywords with important occurrences. Two poles emerge, namely online learning and pandemics. The pandemic then intersects with distance learning and implementation, and this shows that the theme of implementing distance learning during a pandemic is a theme that has been studied quite a lot. While on the other hand, online learning has a relationship with vocational education, pandemics, and impacts, so it can be conveyed if a study on the impact of online learning on vocational education is a publication theme also in great demand. This description can be seen in the following figure 2:

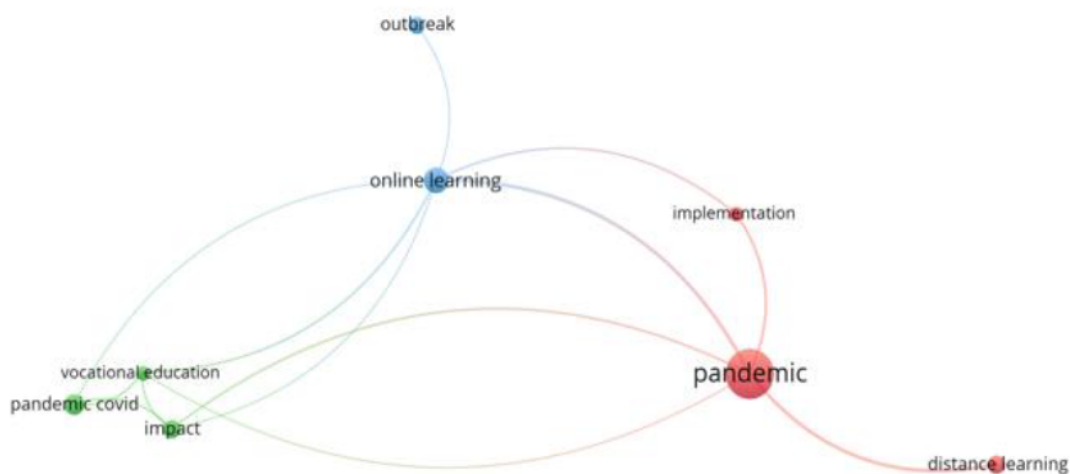


Figure 2. Network Visualisation on Scopus Database

Meanwhile, to analyze the development over time of several keywords in the study, it is necessary to do an overlay visualization analysis. This overlay visualization analysis shows the development of publication keywords in a specific period. The lighter the color, the more recent the publication; the darker it is, the older the publication. The analysis in this scope can be seen in the figure 3:

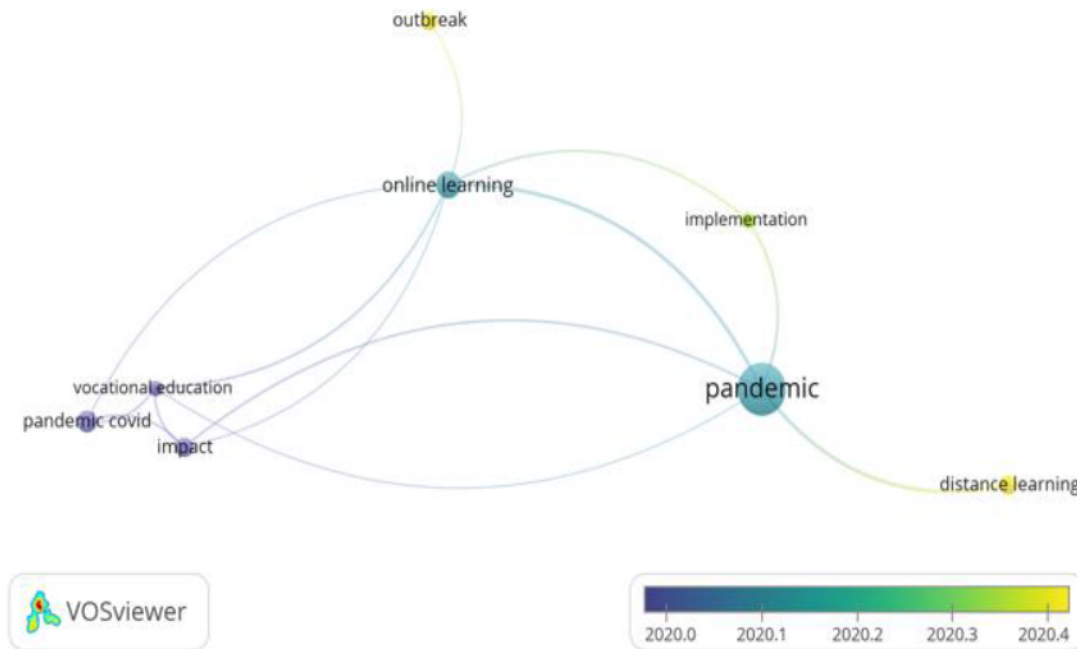


Figure 3. Scopus Database Visualization Overlay

From the figure 3, it can be seen that the two large poles are the same as in the network visualization analysis. If you look at it based on the period, the keywords distance learning and implementation are in a newer timeframe. It is understandable, considering it has been more than a year since the pandemic occurred and has provided rapid and forced changes, including education.

Google Scholar Publication Co-Authorship Analysis

Initially, settings are made with a minimum threshold of 2 documents related to search keywords from the paper's author. Due to the quantity of data that only amounts to 980 authors, it is known that only a few authors have more than one paper, namely 18 authors. So, from the 18 authors, a co-authorship analysis was carried out with the following results figure 4. The network visualization from figure 4 shows that all authors have not formed a collaborative network. The authors still publish their papers. Research trends in online learning studies appear to be spontaneous and carried out against online learning problems at the authors' institutions. The lack of a collaborative network in the research theme can also be understood, considering the period is only one year, so only publications are detected in that year. In the overlay visualization image, it can be seen that publications were distributed in 2020 and 2021. It can be seen that the distribution is comparable in the duration of that time, where the publications in early 2020 to 2021 are in relatively comparable numbers. It is shown that the

trend of publications on this theme is still maintained today, considering that the pandemic is still happening and online learning is still being carried out (Edwards, Chan, & Tan, 2019). It is just that the direction of research topics that are more varied and in-depth is possible.

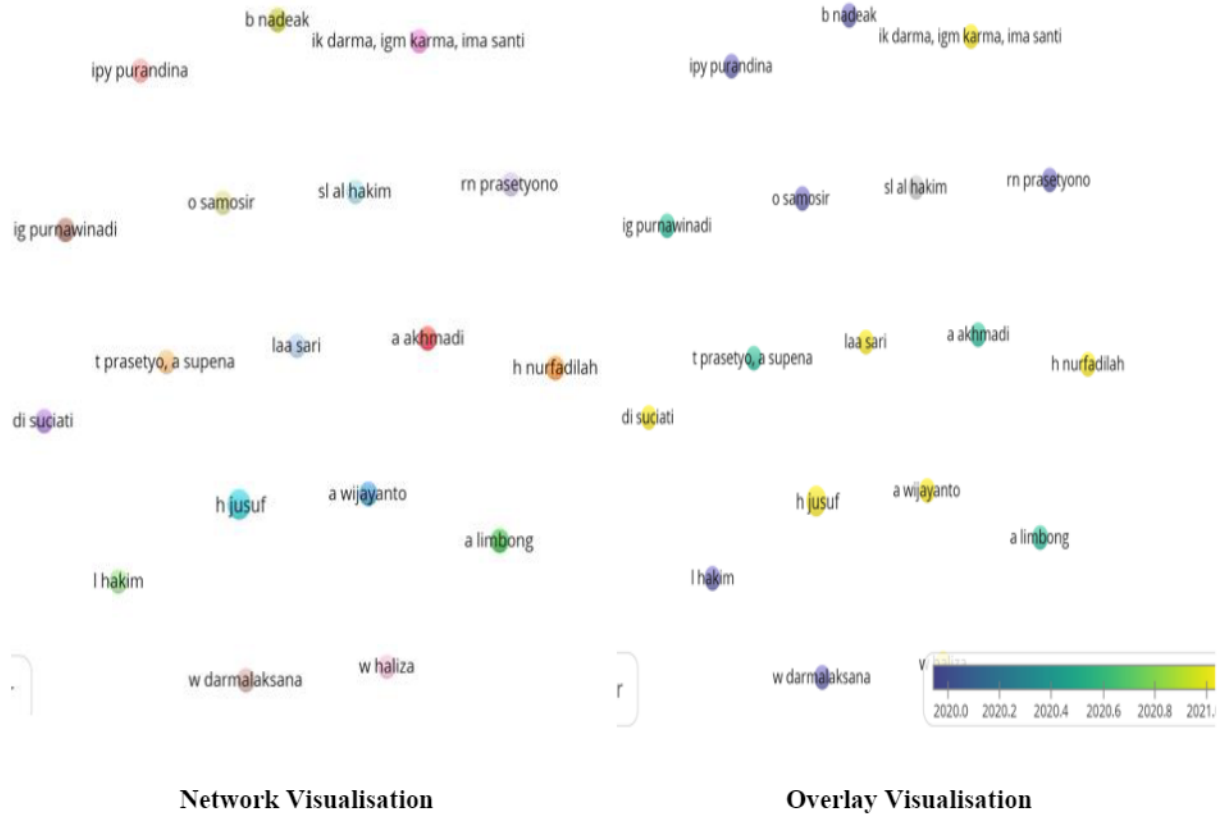


Figure 4. Authorship Distribution on Google Scholar Databases

Term Analysis Database Google Scholar

Considering the relatively large number of identified publications, in the first part, the threshold setting is set with the term criteria having ten occurrences, then 75 terms are found from 6419 terms that meet these criteria. Furthermore, from the 75 terms, arrangements were made based on the relevance score so that 60% of the terms were found to be the most relevant, or 45 terms. The terms can be observed from the following table 3.

The table 3 highlights the prevalence of two key concepts: the evaluation of online students' motivation to learn and the favorable effects of e-learning on Indonesia's educational system in the wake of the COVID-19 pandemic (Hutagalung & Sulistio, 2020). According to Google Scholar, the vast majority of articles cover these two topics. This implies that most studies examining the effects of online education focus on how motivated students are to study and how different demographic groups respond to online education, while other studies examine themes like the role of leadership and technology in online education. The following images can be shown as network visualizations or as overlay visualizations to aid in the viewing process:

Table 3. Distribution of Publication Keyword Terms in Google Scholar Database

No	Term	Occurrences	Relevance score
1	Analysis of student learning interests during online learning	26	5.3096
2	The Positive Impact of Online Learning on Indonesia's Education System After the Covid Pandemic	11	1.3883
3	Higher education	27	0.4868
4	e-learning	23	0.5
5	effectivity	13	0.5528
6	VUCA Characterized Leadership Character in the Covid Pandemic Situation	26	5.3096
7	online learning	23	0.4263
8	Long distance education	13	1.522
9	Exploratory Study of the Impact of the COVID Pandemic	53	0.7903
10	Higher Education Challenges and Opportunities During and After the COVID Pandemic	13	0.3856
11	Higher Education Challenges Facing the Development of Digital Technology	26	5.3096
12	Technology	50	0.64

The figure 5 shows a very thick pole where online learning creates a network along with several other topics, including pandemics, e-learning, effectiveness, challenges and opportunities for educators and distance education (PJJ), and the positive impact of learning. The network formed shows that the mentioned themes have become a trend that is very often studied and published, while studies related to the impact of online learning are still rarely carried out. However, the picture above does not reflect aspects of the development of research topics in the past two years. In order to obtain material for analysis on this matter, it is necessary to look at the term overlay analysis. The data that has been generated from VosViewer can be seen in the image figure 6.

From the figure 6, it can be seen that the development of research topics was carried out in 2020 and 2021. It can be seen that the topic of challenges and opportunities for educators is the most recent in Google Scholar-indexed publications. It is shown that the topic chosen in the second year of the pandemic has shifted to the future aspect of implementing online learning—no more discussion around student effectiveness or interest. When examined comparatively, several essential things can be explained as follows: (1). The composition of the authors on the topic of online learning during the pandemic has not created a polarisation of the author's network that explores various issues in depth in the topic. Both publications of international reputations or publications still in national scope, both show conditions in which

authors publish spontaneously based on their surrounding conditions. (2). Trends in online learning during the pandemic seem to be polarised on several topics. In international publications, distance learning, implementation, impact, online learning, and vocational education are the favorites that various authors have chosen. Meanwhile, in national publications, it appears that the topics of interest in learning, the impact of learning, effectiveness, leadership, and the challenges and opportunities of post-pandemic education are the topics most often chosen by authors and researchers (Baber, 2021; Bhattacharya, Murthy, & Bhattacharya, 2022; Dong, Cao, & Li, 2020).

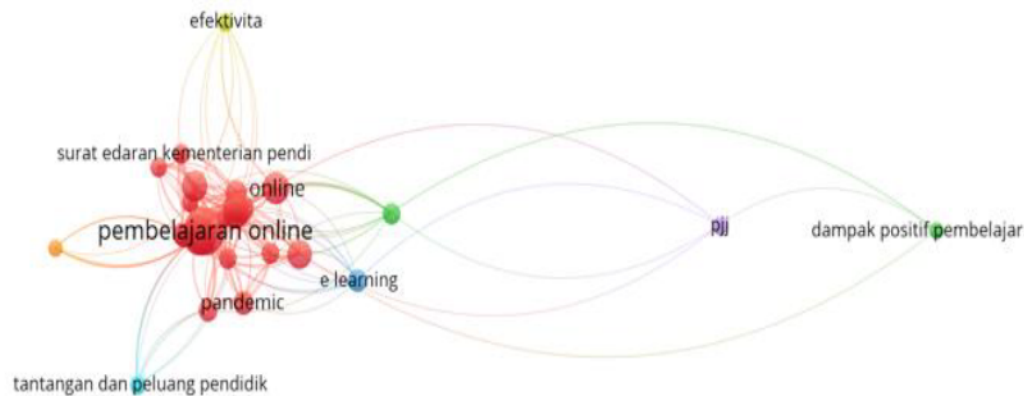


Figure 5. Terms Network Visualization on Google Scholar Database

Prospects for future research are exploring other topics related to online learning during the pandemic, especially regarding the challenges and potential for sustainability of online learning as an alternative to the learning process in the future (Isaac, Aldholay, Abdullah, & Ramayah, 2019). In addition, developing technology that can better accommodate emotional and character aspects is an opportunity to be studied (Larionova, Brown, Bystrova, & Sinitsyn, 2018), considering that education is not only on the cognitive aspect but it also involves other dimensions such as curriculum (Babalola & Kolawole, 2021; Galang, 2021), budget and quality (Phuthi & Mpofu, 2021). The limitation of this study is the period of data mining that has not yet been thoroughly covered in 2021, so the research conducted has not completely covered the entire year of 2021. In addition, the publication database used only includes two publication databases, while several other databases have the potential to be explored. Referring to the data that has been described, it can be interpreted that publication trends that occur in the topic of learning in universities during the pandemic tend to be carried out spontaneously by various authors, and tend to respond to the circumstances they experience. Publications made on the topic are still incidental in nature and have not shown expertise on the topic consistently.

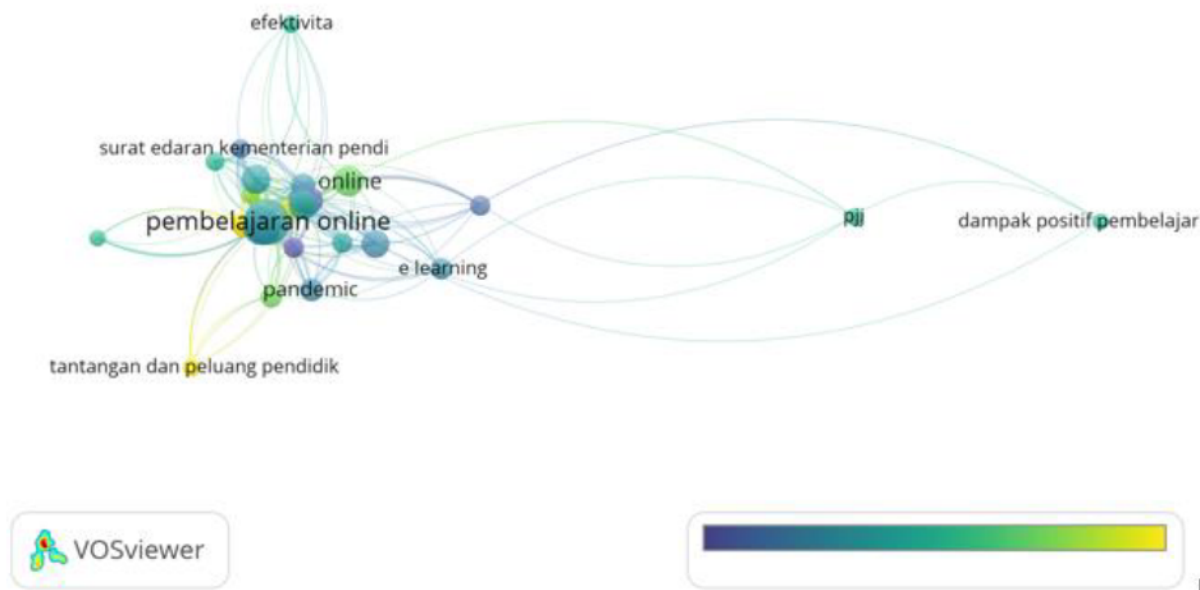


Figure 6. Terms Overlay Visualization on Google Scholar Database

4. Conclusion

From the previous analysis, it can be concluded that the distribution of authors who study online learning topics during the pandemic has not yet appeared to form a polarization of authorship networks that explore these topics in depth. The authors in international and national publications show a condition where the authors still publish spontaneously and only produce one or two publications. Meanwhile, the trends that have formed in online learning during the pandemic seem to condense into several topics. In international publications, more general topics such as distance learning, implementation, impact, online learning, and vocational education appear. In national publications, more specific ones are identified, such as topics of interest in learning, the impact of learning, effectiveness, leadership, and educational challenges and opportunities after the pandemic, which the authors most often choose. The authors' trends and distribution on these topics show that there are still various problems in online learning during the pandemic that can be explored. In the international context, this research describes the phenomenon of changing learning patterns in universities during the pandemic, which is dominant in the search for challenges, obstacles, and appropriate formats. However, no one has tried to enter serious issues, such as learning process innovation, continuous learning, and variations of other topics that can build long-term learning values.

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