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Update on the Development of Educational Research in Vietnam until 2023: A Bibliometrics Analysis using Web of Science Database

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Abstract. Scientific research in education is the process of investigating and exploring issues about educational management, teaching, and learning activities within educational institutions. It plays a crucial role in generating new solutions for educational activities, thereby enhancing the quality of education. This esearch aims to analyze the development trends and update new trends in scientific research in education in Vietnam from 1991 to 2023. This research utilized quantitative analysis methods through databases published in the field of educational science, collecting a dataset of 636 original articles from the Web of Science (WOS). The research results indicate that the number of publications related to educational research on WOS by Vietnamese authors was limited before 2018. However, the number in the last 5 years has increased significantly, accounting for approximately 88.68% of the total articles. This increase is a direct result of significant changes in the Vietnam national primary education in 2018 and the establishment of the Education Law in 2019. Vietnamese researchers collaborated with 10 common partner countries, with Australia being the most frequent research collaborator. The Journal

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for Education Teacher and Trainers (JETT) is the journal that published the most educational scientific works by Vietnamese authors. The topics published on educational science in Vietnam are diverse, with some highly focused keywords, such as ‘higher education’, followed by ‘online education’, ‘high school education’, and 'covid-19’.

Keywords: Education; Educational Sciences; Bibliometrics Analysis; Web of Science Database; Vietnam

1. Introduction

Research in education science typically focuses on examining and exploring the current state of education. It delves into areas such as the impact of pedagogical methods, new teaching tools, and their effects on both educators and learners. It also involves the investigation of new educational policies and models, as well as various stakeholders in the educational process, including educational administrators, teachers, students, support staff, and parents (Tong. D.T, 2005). Educational research can be categorized into four main types: (1) Basic research (focused on forming fundamental knowledge); (2) Applied research (concerned with practical questions and applications); (3) Evaluation research (centered on determining the value, outcomes, or quality of intervention processes); (4) Action research (focused on solving issues that participants must confront); (5) Orientation research (concentrating on individuals within the disadvantaged groups in education) (Adey, 1995).

Educational research began in the 1930s. During the period from the 1930s to the 1950s, education was considered an exploratory research process using knowledge and experience related to practical teaching activities, with limited attention to teaching and educational management models(Hasan & Abdulkarim, 2022). In the 1960s to 1970s, educational research expanded as many researchers started to investigate the impact of education on students' psychology and behavior (Rosenthal & Jacobson, 1968). In the 1980s to 1990s, research on education gained significant attention, particularly in developing effective teaching methods, especially in mathematics and science education. Notably, there was a focus on teaching methods that could enhance teachers' ability to foster creative thinking and problem-solving skills in students (White, 1997).

In educational science research, researchers often consider the publication of their research results in reputable academic journals as a crucial aspect of their profession. Sharing research findings in journals serves to disseminate academic contributions in the field of educational science to a broader global scientific community. Therefore, systematically analyzing articles published in scientific journals can assist educational scientists in understanding the current status and future trends of research within the field of educational science (Tsai & Wen, 2005). Certainly, worldwide, an increasing number of research projects are being conducted through collaboration among scientists from various countries. This collaborative approach leads to multidimensional educational science research, constructed from diverse perspectives contributed by researchers from various cultural backgrounds globally. Collaborative research endeavors facilitate the

gradual internationalization and integration of a nation's education system, allowing it to access and align with international standards(Cardoso, 2002).

The field of educational science is influenced by the cultural, social context, and economic conditions of various regions and nations. Besides the territorial and national differences, educational science researchers also experience cultural variations. However, to facilitate international integration in education across nations, researchers have employed research methods, updated their research trends from international journals, and engaged in collaborative research with both domestic and foreign researchers. These efforts provide additional insights into the increasingly global aspects of scientific educational research results. Therefore, the analysis of various research types and topics currently published in journals within the WoS system helps researchers understand emerging trends in educational scientific research, the collaborative networks among scientists, and the landscape of publications in the field of educational science (Edgar W. Jenkins, 2000).

Systematic analysis of articles in academic journals provides educational science researchers with a clearer perspective on the educational landscape during the specific periods within this research field (Lin et al., 2014). An exemplary case of systematic analysis of works in academic journals to construct a comprehensive overview is illustrated by Eybe and Schmidt (2001). They selected 81 chemistry education articles published in the International Journal of Science Education (IJSE) and the Journal of Research in Science Teaching (JRST) from 1991 to 1997. The chosen articles were examined under six categories and their corresponding criteria: (1) relevance to theoretical properties; (2) research question quality; (3) methodology; (4) presentation and explanation of results; (5) practical significance; and (6) chemistry proficiency. This study provided a preliminary framework for analyzing educational science literature, offering an updated and more general perspective on research documents in this field that can provide valuable insights into the current status and research trends (Holger Eybe & Hans-Jürgen Schmidt, 2001). Chang, Chang, and Tseng (2010) applied bibliometric methods to investigate articles published in IJSE, JRST, Science Education, and SE from 1990 to 2007. They conducted an automated survey that categorized articles based on citation pattern similarity. The analysis revealed nine emerging research directions in science education: (1) scientific concepts; (2) teaching practices; (3) conceptual change and concept mapping; (4) professional development; (5) conceptual change and similarity; (6) the nature of science and socioscientific issues; (7) theoretical and problem-solving skills; (8) urban and design-based education; and (9) attitudes and gender. Notably, after analyzing the publication patterns, they found that 'conceptual change and concept mapping' was the most frequently published research theme but exhibited a declining trend of interest among researchers. Conversely, research topics seemingly less related, such as 'urban education,' attracted increasing attention from scientists. This highlights that analyzing the publication patterns can reveal the research trends in educational science during this period, which extend beyond pure theoretical research to practical applications in education(Chang et al., 2010). Analyzing 869 articles published on emerging trends in science education research within the same journal, with the bibliometric approach, presented a different area of interest for educators in the period from 2003 to 2007: 'Classroom, classroom context, and

learner characteristics.' This research theme became the most published topic during the 2003-2007 period. This additional insight can provide valuable information for science educators to identify influential factors in studying cognitive activities of students during that time(Min-Hsien Lee, 2009) .

Educational research in Vietnam has a relatively short history compared to other fields. Although the origins of educational research can be traced back to the early 20th century, significant progress in this field was only achieved after Vietnam implemented policy reforms in the late 1980s. This period marked the beginning of educational reform in Vietnam, focusing on modernization and the adoption of international standards in education. In the subsequent decades, educational research in Vietnam has been updated and aligned with the development of global educational practices (Phan Van Kha, 2017). Research areas in educational science in Vietnam encompass the following domains: (1) Educational policy and reforms; (2) Pedagogical methods and teaching; (3) Educational technology; (4) Multicultural education; (5) Lifelong learning. Within these domains, educational research work primarily focuses on two main research directions: (1) Fundamental educational science research, which includes educational psychology, educational science, educational management, educational economics, social education, and educational philosophy; (2) Applied educational science research, which covers areas like policy and educational strategy, educational systems, school management and administration, teaching (educational models, educational programs, teaching methods, and teaching organization), assessment and quality assurance in education, teacher development, learner development and counseling, culture, ethics, and the educational environment, ensuring conditions (textbooks, materials, infrastructure, etc.), and educational planning and forecasting (Nguyen Duc Minh, 2023). By 2013, Vietnam initiated comprehensive educational reforms. However, after several years of educational restructuring, as of 2018, scientific research in Vietnamese education still lags behind. Studies focusing on vocational and early childhood education receive limited attention, while researchers predominantly concentrate on secondary and higher education. The research primarily centers around proposing implications for policymakers, educational leaders, educational researchers, and teachers in Vietnam to adjust their policies and/or action plans. Consequently, the global impact of scientific research remains modest, with most publications appearing in low-ranking journals (Quan-Hoang Vuong, 2020)

Although the quantity of research papers on educational science in Vietnam has increased rapidly from 2013 to the present, and researchers have collaborated with scholars from developing countries worldwide, the topics of the articles remain relatively narrow. There is a lack of diversity, with a notable absence of studies on emerging trends in education, such as cross-border education, gender equality in education, educational assessment, and particularly research on international evaluation programs (Cuong Huu Nguyen, 2020)

This study focuses on analyzing and evaluating research directories on educational science in Vietnam within the Web of Science (WOS) updated until 2023 to address the following research issues:

(1) Development of number of publications on educational sciences in Vietnam;

(2) Trends in collaboration within scientific research in educational sciences between Vietnamese scholars and scholars from other countries;
(3) Vietnamese universities with highest productivity in publications on educational sciences;
(4) Scholars with highest productivity in publications in educational sciences;
(5) Most popular scientific journals with Vietnamese scholars and the most cited articles published by Vietnamese scholars in educational sciences;
(6) Most popular keywords related to Vietnamese educational sciences.

2. Methodology

The article selection process in this study is summarized in Figure 1. We searched all documents indexed in the Web of Science's (WOS) Education & Educational Research category which have at least one co-author having their affiliation(s) from Vietnam. We did not limit our search based on publication date, but excluded articles written in languages other than English. Our initial search returned 786 documents, from which we excluded 99 documents due to duplicate entries or incomplete metadata. We also excluded 19 documents classified as book reviews, editorial materials, and notes, retaining only original articles and review papers. The remaining 668 articles were manually screened by the research team to identify those not relevant to education sciences. As a results, we excluded 32 articles, most of which focused on mental health rather than education sciences. Ultimately, metadata of the final publication collection of 636 original articles and review papers was utilized for this bibliometrics analysis, using the methods previously described in our published works (Dao et al., 2022; Pham-Duc et al., 2021). Biblioshiny (Aria & Cuccurullo, 2017) and VOSviewer software (van Eck & Waltman, 2010) were used for data processing and network visualizations as these tools are the most popular and effective software for bibliometric analysis. It is important to note that our search was conducted on April 20, 2023.

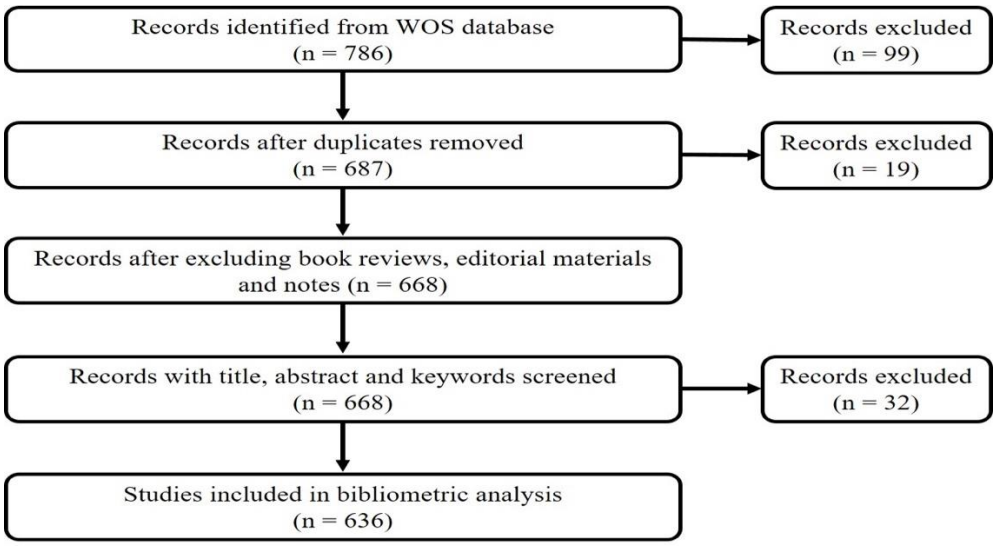

Figure 1. Flowchart of article selection process

3. Results

3.1 General information about the development of publications on educational science in Vietnam

Key information regarding the publication collection during the 1991 – 2023 period is shown in Table 1. Of the 636 articles indexed in the Education & Educational Research category of the WoS database, 618 were original articles, and the remaining 18 were review papers. The first publication in the collection was published in 1991 by Dr. Le Thac Can, discussing higher education reform in Vietnam, Laos, and Cambodia (Le, 1991). Ten year later, Vietnam's second article was published, which was a collaboration with colleagues from the UK, Peru and Sri Lanka discussing multi-grade teaching in these countries (Hargreaves et al., 2001). In total, the publication collection received 4069 citations, indicating an average of 6.4 citations per article. Figure 2 provides a more detailed breakdown of citations counts, revealing that 33.64% of the articles (n = 214) did not receive any citations, while 38.83% (n = 247) received between 1 and 5 citations, 10.69% (n = 68) received between 6 and 10 citations, 7.86% (n = 50) received between 11 and 20 citations, and 8.98% (n = 57) received more than 20 citations. Among the 214 uncited articles, almost 50% (n = 106) were published in 2022, while 22.43% (n = 48) published in 2021, 20.56% (n = 44) published in 2020 and 2023, and 7.47% (n = 16) published in 2018 and 2019. The publication collection had a total of 1495 co-authors, with 1807 author appearances. Among the 636 articles, 165 were single-authored documents (nearly 26%), conducted by 135 single-authors. On average, each author contributed to 0.42 articles, and each article has between 2-3 co-authors. Notably, among the 636 articles, 75% (n = 477) of them had Vietnamese scholars as the corresponding authors, with 25% (n = 119) being result of international collaboration, and the remaining 75% (n = 358) being conducted solely by Vietnamese scholars.

Table 1. Main information of the collection during the 1991 – 2023 period.

Description	Frequency count
Articles	618
Review papers	18
Sources	186
Total citations	4069
Average citations per document	6.4
Authors	1495
Author Appearances	1807
Authors of single-author documents	135
Authors of multi-author documents	1360
Single-authored documents	165
Authors per document	2.35
Co-authors per document	2.85
Documents per author	0.42

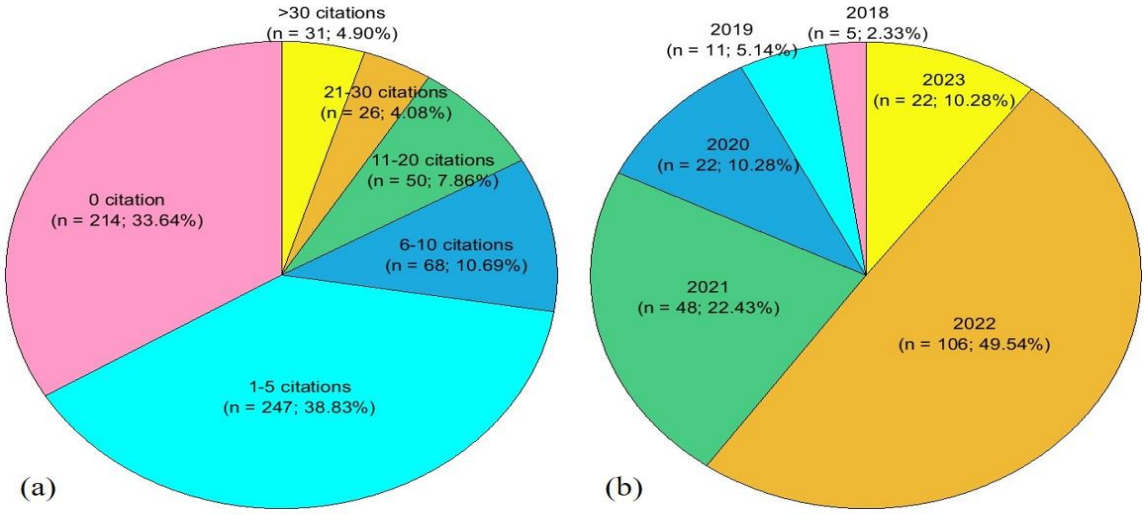

Figure 2. (a) The percentage of articles based on the number of citations. (b) The percentage of uncited articles by year.

The annual number of publications indexed in the WoS Education & Educational Research category by Vietnamese scholars during the 1991-2023 period is shown in Figure 3, divided into two sub-periods. The first sub-period was from 1991 to 2017 and had a very limited number of publications, with a maximum of only 20 articles published per year (in 2017). In total, there were only 72 documents published during this sub-period, representing about 11.32% of the total number of publications. The second sub-period, which began in 2018, saw a significant increase in the number of publications, with 47 articles published in 2018, 74 in 2019, and 88 in 2020. In 2021, the annual publication output exceeded 100 articles for the very first time. In addition, the total number of articles published in 2022 was 181, almost four times higher than that of 2018. This sub-period, which comprises 564 articles, accounts for nearly 88.68% of the total publication collection.

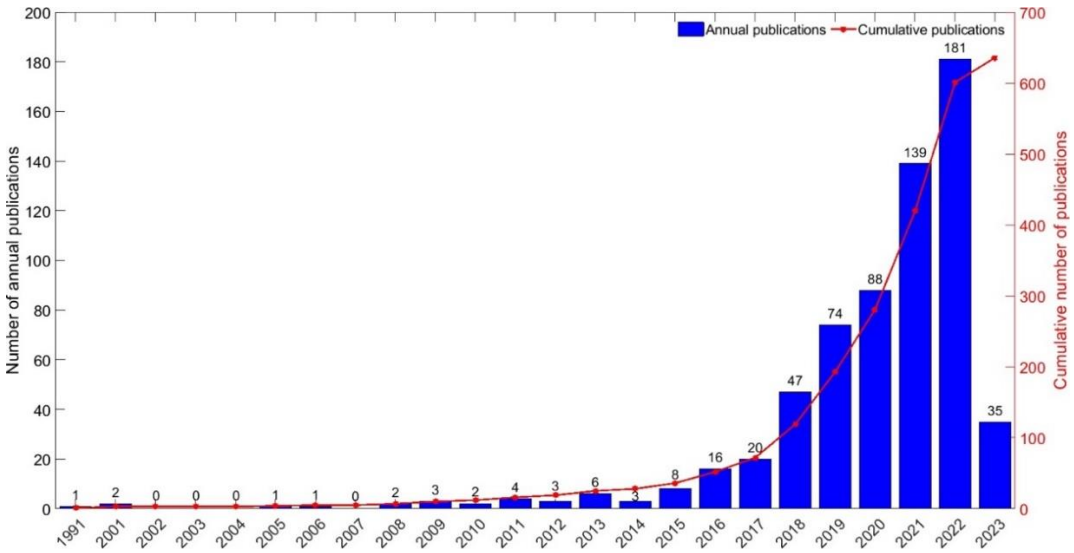

Figure 3. Annual number of publications indexed in the Education & Educational Research category from Vietnam during the 1991-2023 period (bar chart) and its cumulative number (red line). Note that the number of 2023 is incomplete as the search was conducted on April 20, 2023.

3.2 Trend in international collaboration between Vietnamese scholars and scholars from other countries

Based on our retrieval results, Vietnamese scholars in the field of education sciences have established international collaborations with scholars from 51 other countries, as demonstrated in the country cooperation network in Figure 4. Each node in the graph represents a country, with the node's size proportional to the number of articles, and the thickness of the connecting lines indicating the strength of cross-country collaboration. Countries that often publish together are grouped in the same cluster, coded by different colors. The largest cluster (in red) comprises ten countries, primarily Asian countries such as Indonesia, Malaysia, and Iraq. The second-largest cluster (in green) consists of nine countries, including the UK, China, and Japan. However, the most important partner countries for Vietnamese scholars in education sciences were Australia and the US. Table 4 summaries the top ten most popular partner countries for Vietnam in education sciences based on the number of publications and citations. Australia ranked first, with 114 articles and 890 citations, accounting for 17.92% of the publications and 21.87% of the citations, respectively. The US followed in second position, but the number of articles and citations were significantly lower (39 articles and 333 citations). Five partner countries collaborated on 20-25 articles with Vietnam, including the UK, China, New Zealand, and Taiwan. The remaining three countries in Table 4 were Thailand, Japan and Belgium published between 10 and 14 articles with Vietnam.

Table 2. The top ten most productive partner countries based on the number of publications and citations.

Order	Country	Total Papers	%	Total Citations	%
1	Australia	114	17.92	890	21.87
2	US	39	6.13	333	8.18
3	UK	25	3.93	154	3.78
4	China	23	3.61	120	2.95
5	New Zealand	23	3.61	304	7.47
6	Taiwan	22	3.46	98	2.40
7	Malaysia	20	3.14	165	4.05
8	Thailand	14	2.20	176	4.32
9	Japan	13	2.04	134	3.29
10	Belgium	10	1.57	252	6.19

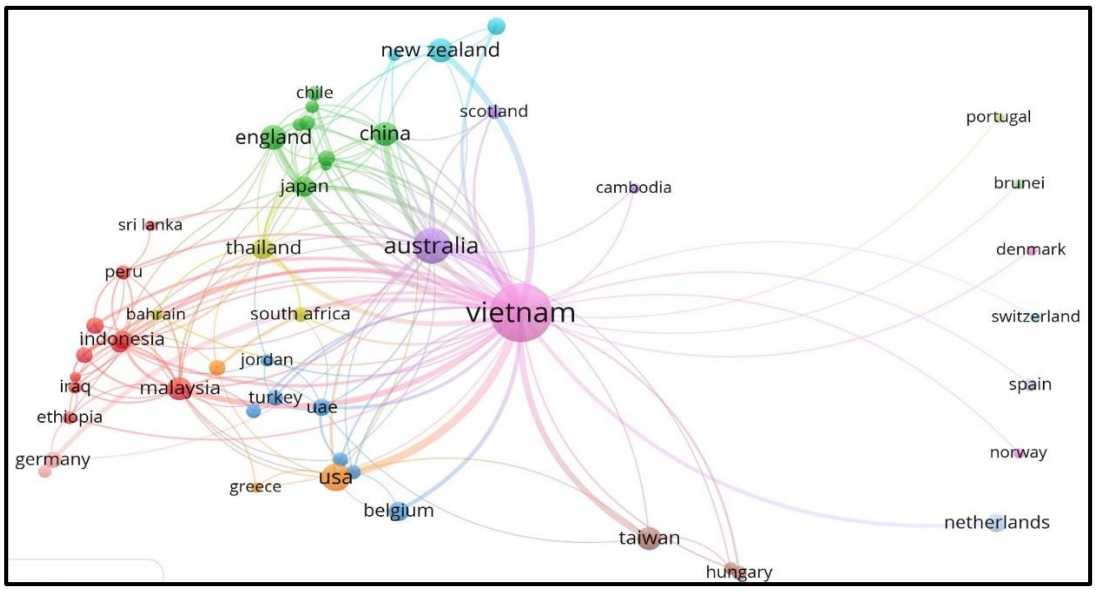

Figure 4. The cooperation network between Vietnam and other partner countries in educational sciences. Each country is presented by a node. The size of nodes indicates the number of publications, while the thickness of lines between nodes is proportional to the strength of cross-country collaboration.

3.3 Most productive Vietnamese universities

The top ten most productive Vietnamese universities publishing in education sciences is shown in Table 3. Vietnam National University (VNU) Hanoi took the lead with 80 articles (12.58%) and 494 citations (12.14%). Ton Duc Thang University (TDTU) was in the second position with 45 articles (7.07%) and 472 citations (11.60%), followed by HCMC University of Education (UE) with 40 articles (6.29%), but only 83 citations (2.03%). Four universities published more than 30 articles in the field of education sciences, namely RMIT University Vietnam (33 articles, 364 citations), Hue University (31 articles, 115 citations), Hanoi National University of Education (HNUE) (31 articles, 66 citations), and FPT University (30 articles, 71 citations). The remaining three universities in Table 3 published between 26 and 29 articles, including University of Danang (29 articles, 159 citations), Can Tho University (26 articles, 195 citations), and Ha Tinh University (26 articles, 125 citations).

The collaboration networks of 50 most productive universities/institutions based on the number of articles and citations are shown in Figure 5 and Figure 6, respectively. Each node represents a university, and the size of nodes is proportional to the number of publications or citations. VNU Hanoi and HCMC UE are the two universities with largest collaboration networks. Some foreign universities having strong collaboration with Vietnam can also be seen, such as Victoria University of Wellington/ New Zealand (17 articles, 252 citations), Monash University/ Australia (13 articles, 51 citations), Macquarie University/ Australia (12 articles, 81 citations), and the University of Queensland/ Australia (12 articles, 107 citations).

Table 3. The top ten most productive Vietnamese universities publishing in educational sciences

Order	Institution	No. of articles	%	No. of citations	%
1	Vietnam National University Hanoi	80	12.58	494	12.14
2	Ton Duc Thang University	45	7.07	472	11.60
3	HCMC University of Education	40	6.29	83	2.03
4	RMIT University Vietnam	33	5.19	364	8.95
5	Hue University	31	4.87	115	2.82
6	Hanoi National University of Education	31	4.87	66	1.62
7	FPT University	30	4.71	71	1.74
8	University of Danang	29	4.56	159	3.90
9	Can Tho University	26	4.08	195	4.80
10	Ha Tinh University	26	4.08	125	3.07

Based on publication history, it is possible to group these universities into different clusters. The first cluster (in red) is formed around Thai Nguyen University and HCMC Open University, with Vietnamese scholars in this cluster collaborating largely with colleagues from Australia and the UK. The second cluster (in green) includes RMIT University Vietnam, University of Danang, Duy Tan University, and Edlab Asia, with scholars in this cluster having international collaborations with colleagues from Monash University and the Education University of Hong Kong. The third cluster (in blue) is formed around Hue University, Ha Tinh University and HCMC UE, with scholars in this cluster collaborating with colleagues from Macquarie University and University of Macau. FPT University, Can Tho University, Van Lang University and Victoria University of Wellington form the fourth cluster (in cyan). Except for VNU Hanoi, TDTU and HNUE who form their own clusters, the contribution of other universities/institutions in Figure 5 is limited. Figure 6 is similar to Figure 5, but the size of nodes reflects the number of citations. It is clear that VNU Hanoi, TDTU, RMIT University Vietnam, Victoria University of Wellington, Can Tho University, Foreign Trade University, and National Economics University received much more citations compared to other institutions.

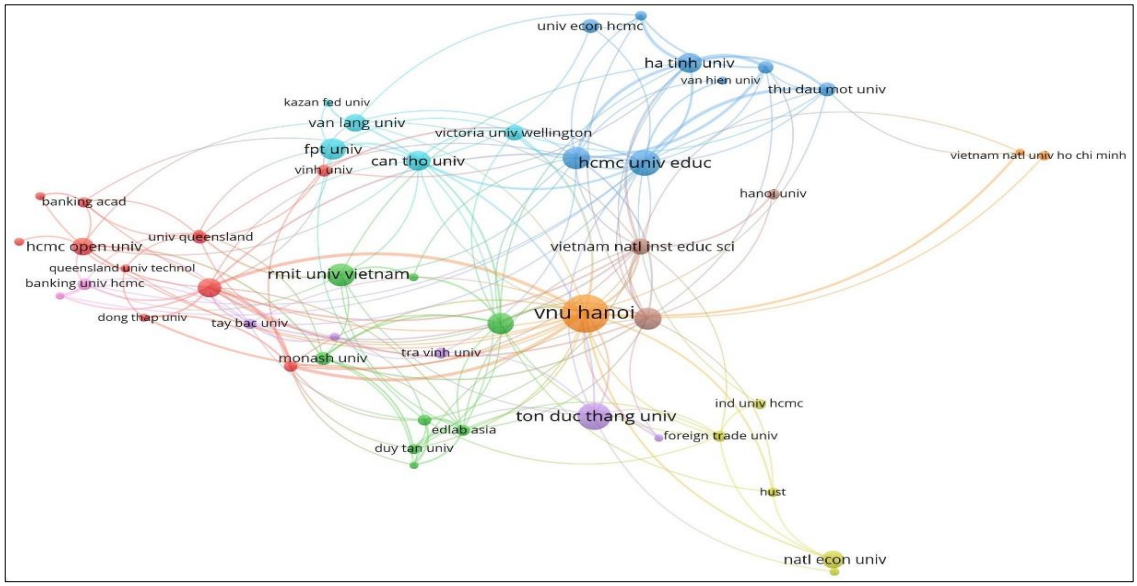

Figure 5. The collaboration networks of the 50 most productive universities/institutions publishing in education science in Vietnam. Each node represents an institution, and the size of the node is proportional to the number of publications.

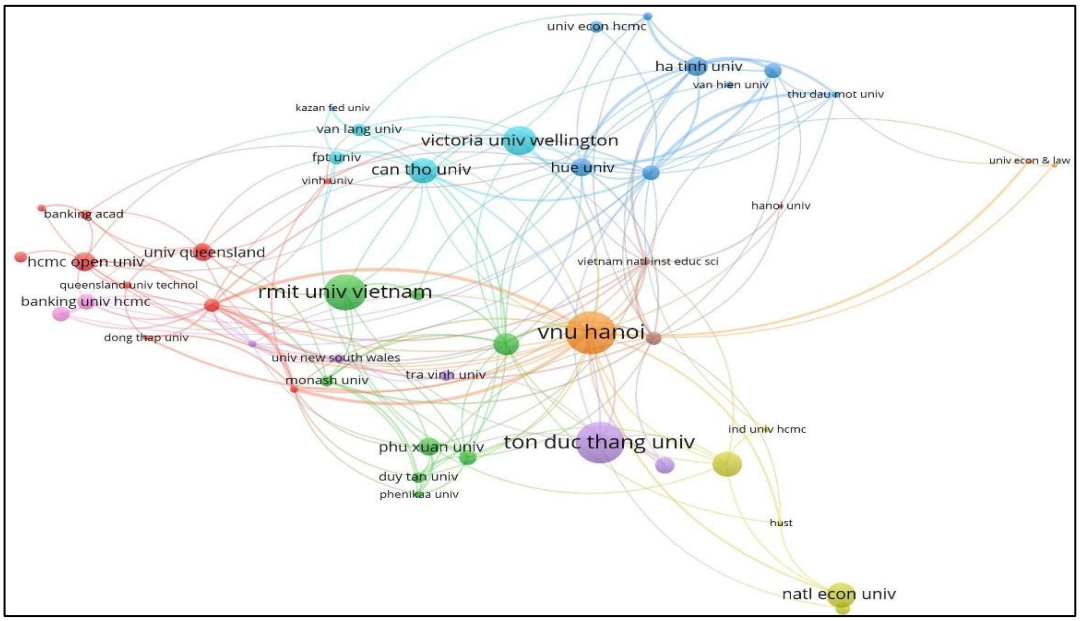

Figure 6. Similar to Figure 5, but the size of the node is proportional to the number of citations.

3.4 Most productive scholars

The top ten Vietnamese scholars publishing the most in the field of education sciences is shown in Table 4. Nguyen Duc Chinh from University of Danang secured the first rank with 15 articles and 108 citations, followed closely by Ha

Van Xuan from Ha Tinh University, with 14 articles and 72 citations, while Pham Hung Hiep from Phu Xuan University took the third position with 12 articles and 140 citations. There were three scholars who published more than 10 articles at the time of this study. HCMC UE had two scholars listed in Table 4, namely Pham Thi Huong in the fourth position (9 articles and 144 citations) and Tran Chi Vinh Long in the sixth position (8 articles, 18 citations). Tran Ngoc Hai, another scholar from Ha Tinh University, held the eighth position with 7 articles and 16 citations. The seventh position was occupied by Tran Trung from VNU University of Education (8 articles and 21 citations), while the last position belongs to Bui Phu Hung from Van Hien University (6 articles and 18 citations).

The collaboration network among highly productive scholars in the field of education sciences in Vietnam is illustrated in Figure 7. Scholars are represented by nodes, and the size of the nodes is proportional to the number of publications. Scholars often publish together were identified and grouped into the same clusters. Several productive research teams with significant publication records emerged, with the core members listed in Table 4. Nguyen Duc Chinh was the core member of the first research team (in yellow), while the second research team centered around Ha Van Xuan (in green). These two groups also have collaboration with the research team of Tran Chi Vinh Long (in cyan). Pham Hung Hiep and Tran Trung formed the fourth research team (in red), which has some collaboration with the team of Tran Le Huu Nghia. Additionally, Pham Thi Huong has established her own research team (in violet) without collaborating with other teams. Notable, foreign scholars working in Vietnam have formed a few research teams, namely Mathews Nkhoma's team from RMIT University Vietnam, and Mostafa Al-Emran's team from Ton Duc Thang University. Similar to Figure 7, in Figure 8, the node size is proportional to the number of citations received by each scholars. It is clear that the work from a few teams have siginificant impact on the research community, namely the team of Mostafa Al-Emran, Stuart Webb's team from Western University/Canada, Philip Hallinger's team from Mahidol University/Thailand, and research teams of scholars listed in Table 4, such as Pham Hung Hiep, Nguyen Duc Chinh and Pham Thi Huong. However, it is important to note that most of these research groups work independently, without collaborating with other teams. Therefore, if these research teams can establish stronger collaborative networks, the publication productivity of Vietnam will growth rapidly in the future.

Table 4. The top ten most productive Vietnamese scholars working in educational sciences.

Order	Author	Institution	No. of articles	No. of citations
1	Nguyen Duc Chinh	University of Danang	15	108
2	Ha Van Xuan	Ha Tinh University	14	72
3	Pham Hung Hiep	Phu Xuan University	12	140
4	Pham Thi Huong	HCM City University of Education	9	144
5	Tran Le Huu Nghia	Ton Duc Thang University	9	118
6	Tran Chi Vinh Long	HCM City University of Education	8	18
7	Tran Trung	VNU – University of Education	8	21
8	Tran Ngoc Hai	Ha Tinh University	7	16
9	Huynh Van Son	HCM City University of Education	6	20
10	Bui Phu Hung	Van Hien University	6	18

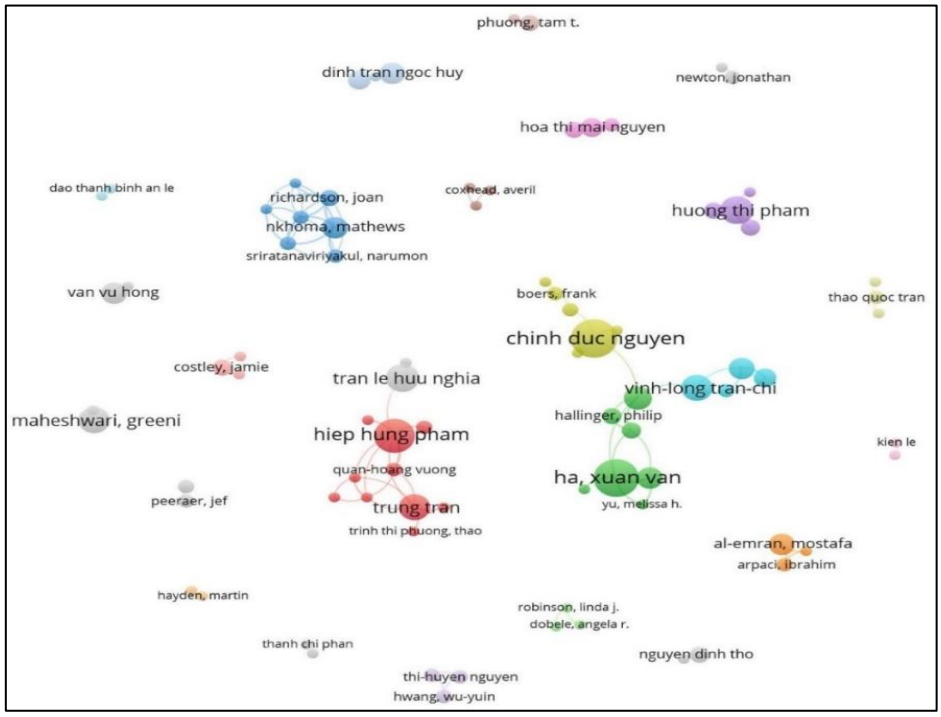

Figure 7. The collaboration network of the most productive scholars working in education sciences in Vietnam. Each note represents one scholar, and the size of the nodes is proportional to the number of publications.

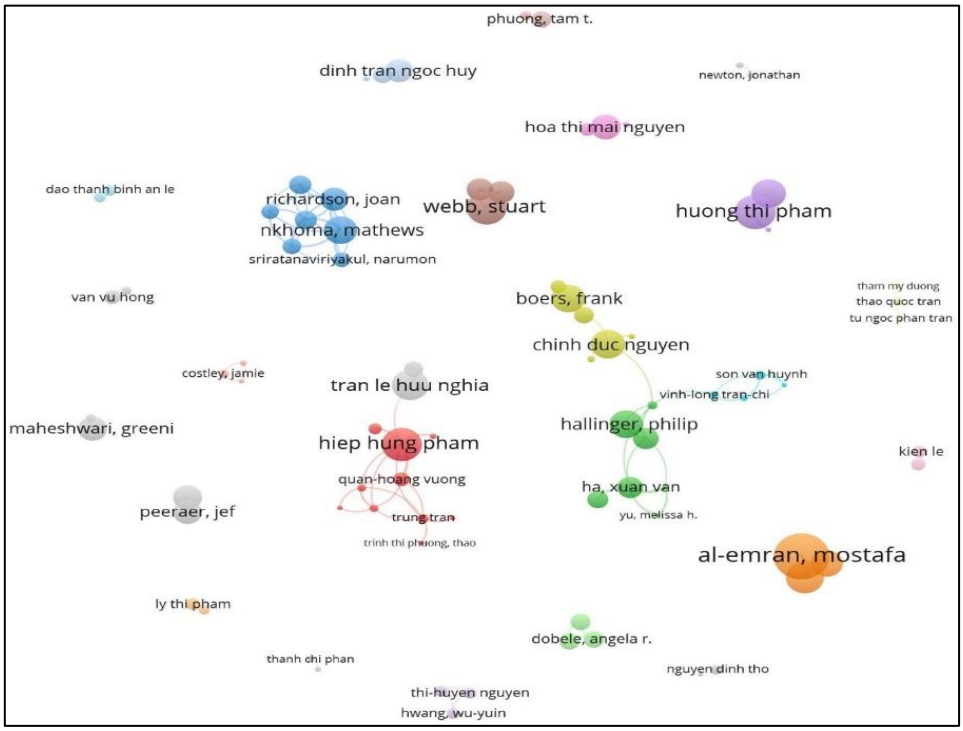

Figure 8. Similar to Figure 7, but the size of the nodes is proportional to the number of citations.

3.5 Most popular journals

The top ten journals that have published the most research in the field of education sciences from Vietnamese scholars is shown in Table 5, along with information about the publishing house, Scopus's quartile and WoS core collection. Journal for Educators Teachers and Trainers (JETT) from Granada University/Spain led the league with 40 articles and 82 citations. International Journal of Education Sciences (IJES) from Kamla-Raj Enterprises/India followed with 22 articles, and only 9 citations. Three journals, namely the International Journal of Instruction from Turkey, the Journal of Asian TEFL from South Korea, and the Online Journal of Educational Policy and Management (OJEPM) from Brazil, each published 18 articles. The remaining five journals published between 13 and 15 articles. Among the top ten journals, seven belong to the Emerging Sources Citation Index (ESCI) collection, while only three belong to the Social Sciences Citation Index (SSCI) collection. It is worth noting that three journals in the top five, namely JETT, IJES, and OJEPM, are not indexed in the Scopus database. In total, the top ten journals published 185 articles and received 954 citations, which accounts for about 29.08% of the total number of publications and 23.45% of the total number of citations, respectively. However, only one journal received more than 200 citations, while two journals received more than 100 citations, but five journals received fewer than 50 citations. Consequently, the journals' h-index, calculated based on the publication collection, remains very low, mostly ranging between 2 and 4.

Table 5. The top ten most active journals publishing research in the field of education sciences, conducted by Vietnamese scholars.

Order	Journals	Publishing house/ Country	No. of articles	No. of citations	h-index	Scopus Quartile	WOS core Collection
1	Journal for Educators Teachers and Trainers	Granada University/ **Spain**	40	82	3	N/A	ESCI
2	International Journal of Educational Sciences	Kamla-Raj Enterprises/ **India**	22	9	2	N/A	ESCI
3	International Journal of Instruction	Gate Association for Teaching and Education/ **Turkey**	18	57	4	Q2	ESCI
4	Journal of Asia TEFL	Asian Association of TEFL/ **South Korea**	18	26	3	Q2	ESCI
5	Revista On Line de Politica e Gestao Educacional (Online Journal of Educational Policy and Management)	Sao Paulo State University/ **Brazil**	18	22	2	N/A	ESCI
6	Education and Information Technologies	Kluwer Academic/ **USA**	15	206	7	Q1	SSCI
7	Education Sciences	MDPI/ **Switzerland**	14	25	3	Q2	ESCI

8	European Journal of Contemporary Education	Cherkas Global University Press/ **USA**	14	19	2	Q2	ESCI
9	Education and Training	Emerald Group Publishing/ **UK**	13	156	8	Q2	SSCI
10	International Journal of Educational Development	Elsevier/ **UK**	13	136	7	Q1	SSCI

3.6 Most cited articles

The most cited papers in the publication collections are shown in Table 6 as well as other information about research area, first author's institution, publication year, and yearly average citations. In the first position, having a total of 118 citations is a meta-analysis examining the effect of blended learning on student performance, conducted by the team from Can Tho University (Vo et al., 2017). In the second position, having 112 citations, is an paper investigating the influence of e-learning service quality on student satisfaction in Vietnam (L. Pham et al., 2019). These two articles stand out as the only ones to have received over 100 citations at the time of this study. The article securing the third position, with 92 citations, focuses on examining teacher professional identify formation, and authored by (T. K. A. Dang, 2013) from VNU Hanoi. Among the top ten, scholars from VNU Hanoi published two more articles, focusing on EFL (T. N. Y. Dang et al., 2017) and skills in higher education (Tran, 2013). The remaining five articles, representing various institution, investigates on different research directions within education sciences, such as EFL (Nguyen & Webb, 2016), m-learning (Al-Emran et al., 2020), educational leadership (Truong et al., 2016), e-learning during post Covid-19 pandemic (H.-H. Pham & Ho, 2020), and scientific research capability of East Asian countries (Hien, 2010). It is important to note that all articles in the top ten were published in reputable journals belonging to both the SSCI collection and the first Scopus's quartile (Q1) category. Collectively, these articles received 756 citations, representing approximately 18.58% of the total citations of the collection. Notably, Higher Education is the only journal to have published two articles in the top ten.

Table 6. The top ten most cited articles in the publication collection.

Title	Authors	Source (WoS Collection/ Scopus Quartile)	Research Area	First author's Institution	Year	Citations	Yearly average citations
The effect of blended learning on student performance at course-level in higher education: A meta-analysis (Vo et al., 2017)	Hien M. Vo Chang Zhu Nguyet A. Diep	Studies in Educational Evaluation (**SSCI/Q1**)	Blended learning	Can Tho University	2017	118	16.86
Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam (L. Pham et al., 2019)	Long Pham Yam B. Limbu Trung K. Bui Hien T. Nguyen Huong T. Pham	International Journal of Educational Technology in Higher Education (**SSCI/Q1**)	E-learning	Thuy Loi University	2019	112	22.40
Identity in activity: Examining teacher professional identity formation in the paired-placement of student teachers (T. K. A. Dang, 2013)	Dung Thi Kim Anh	Teaching and Teacher Education (**SSCI/Q1**)	Student Teachers	Vietnam National University Hanoi	2013	92	8.36
Examining second language receptive knowledge of collocation and factors that affect learning (Nguyen & Webb, 2016)	Thi My Hang Nguyen Stuart Webb	Language Teaching Research (**SSCI/Q1**)	EFL	University of Danang	2017	76	10.86
An empirical examination of continuous intention to use m-learning: An integrated model (Al-Emran et al., 2020)	Mostafa Al-Emran Ibrahim Arpaci Said A. Salloum	Education and Information Technologies (**SSCI/Q1**)	M-learning	Ton Duc Thang University	2020	70	17.50
The academic spoken word list (T. N. Y. Dang et al., 2017)	Thi Ngoc Yen Dang Averil Coxhead Stuart Webb	Language Learning (**SSCI/Q1**)	EFL	Vietnam National University Hanoi	2017	62	8.86

Confucian values and school leadership in Vietnam: Exploring the influence of culture on principal decision making (Truong et al., 2016)	Thang Dinh Truong Philip Hallinger Kabini Sanga	Educational Management Administration & Leadership (**SSCI/Q1**)	Educational leadership	Quang Tri Teacher Training College	2017	62	8.86
Toward a 'new normal' with e-learning in Vietnamese higher education during the post COVID-19 pandemic (H.-H. Pham & Ho, 2020)	Hiep-Hung Pham Tien-Thi-Hanh Ho	Higher Education Research & Development (**SSCI/Q1**)	E-learning during post Covid-19	Phu Xuan University	2020	58	14.50
A comparative study of research capabilities of East Asian countries and implications for Vietnam (Hien, 2010)	P. D. Hien	Higher Education (**SSCI/Q1**)	Scientific research capability	Vietnam Atomic Energy Agency	2010	53	3.79
Limitation on the development of skills in higher education in Vietnam (Tran, 2013)	Thi Tuyet Tran	Higher Education (**SSCI/Q1**)	Higher education	Vietnam National University Hanoi	2013	53	2.82

3.7 Analysis of most popular keywords

The word cloud of the 100 most popular keywords related to educational science in Vietnam is shown in Figure 9, in which keywords with higher frequency appear bigger. Similar to findings from previous studies, Vietnamese scholars tend to focus on research related to higher education as it is the biggest keyword. Other popular research directions can be listed, such as research about high school students, online education, ELF, blended learning, and teaching and studying during the Covid-10 pandemic. The co-occurrence network of these 100 keywords is illustrated in Figure 10, showing the relationships between them. Each node shows a keyword, and the distance between nodes is proportion to the frequency they appeared in other publications. Relevant keywords were identified and grouped into clusters, coded by different colors. Based on information from Figure 9 and Figure 10, it is possible to identify research gaps, as well as potential research directions in education sciences in Vietnam for future work.

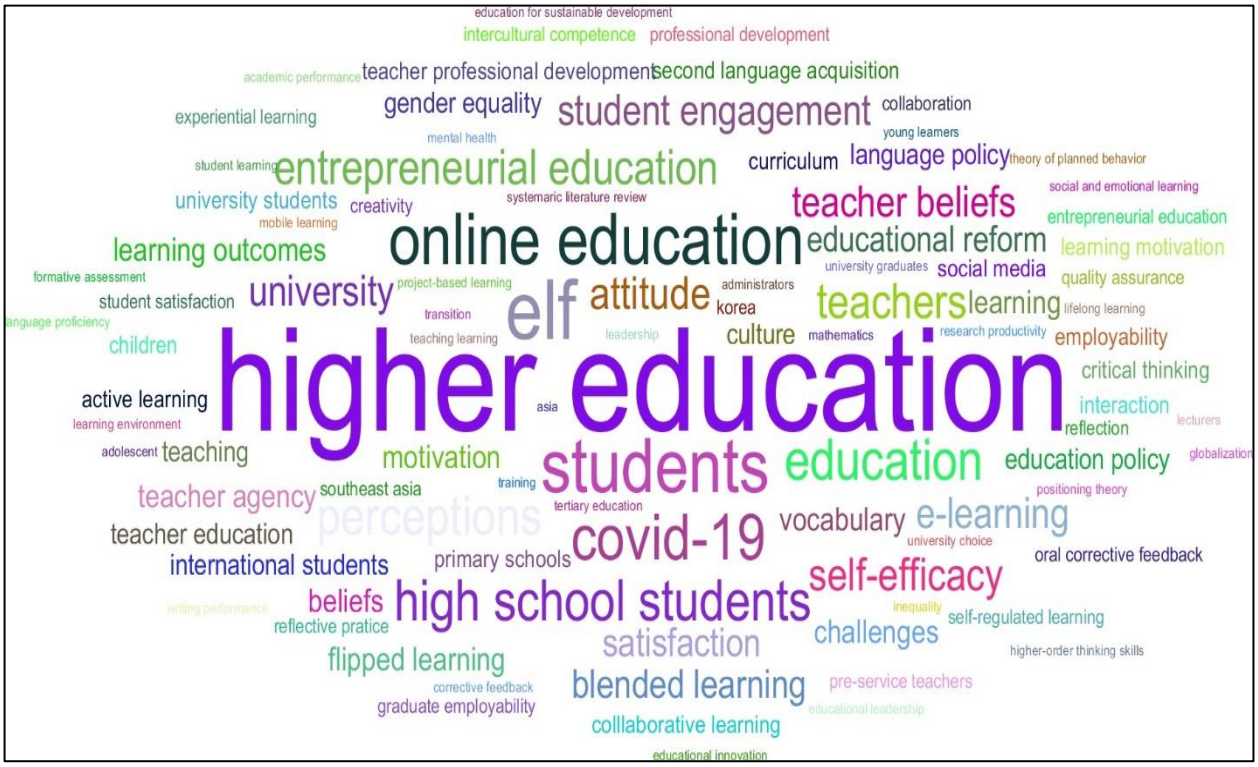

Figure 9. Word cloud of 100 most popular keywords in the publication collections. Keywords with higher appearance frequency appear bigger.

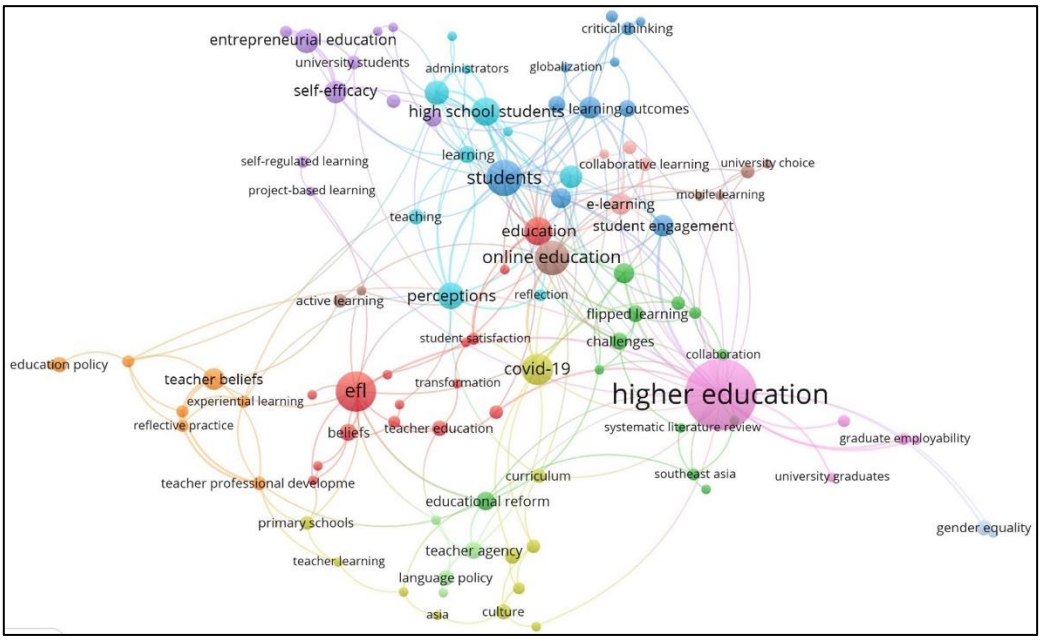

Figure 10. The co-occurrence network of 100 most popular keywords related to educational science in Vietnam.

The results of the keyword analysis carry particular significance for researchers, serving two primary purposes: (1) Frequently appearing keywords signify the research areas garnering substantial attention. In this study, keywords such as "higher education," "online education," "high school education," and "covid-19" specifically highlight the paramount research interests in Vietnam. Simultaneously, they identify overlooked areas, recommending researchers to focus on exploring these gaps. This aligns perfectly with the observation made by the authors, Vuong Quan Hoang (Quan-Hoang Vuong, 2020) and Nguyen Huu Cuong (Cuong Huu Nguyen, 2020), that scientific research in Vietnamese education has concentrated on specific themes, leaving other areas unexplored. (2) Keywords also convey a message to researchers about newly emerging fields, emphasizing the need to delve deeper into the intrinsic aspects of these newly prominent research topics. Among the various keywords, "covid-19" and "online education" appear more frequently, reflecting the educational landscape in Vietnam and globally amidst the COVID-19 pandemic.

4. Discussion

The number of publications related to educational research by Vietnamese authors on WOS was limited prior to 2018. However, in the past five years, there has been a significant increase in the number of publications, accounting for approximately 88.68% of the total articles (as shown in Figure 3). This surge in the quantity of educational research by Vietnamese authors can be attributed to significant changes in the national primary education program in Vietnam, which commenced in 2018, and the introduction of the Education Law in 2019. With these changes, educational researchers in Vietnam were compelled to establish theoretical foundations, analyze the current situation, and find ways to improve education in the country.

To keep pace with the rapid development of educational science worldwide and prevent future lagging, Vietnamese researchers have collaborated with scholars from other countries (as depicted in Figure 4). Among these collaborations, the data in Table 2 illustrates the ten most common partner countries. This collaboration with these ten countries is relatively substantial, with their contribution to 47.61% of the total publications and 64.5% of the citations. Australia is notably the leading partner due to collaborative initiatives between Vietnamese universities and Australian institutions in the field of educational science.

Despite the recent increase in the number of publications, educational research among universities in Vietnam is not evenly distributed (as shown in Figure 5). The National University of Hanoi has the highest number of published articles, followed by Ton Duc Thang University and the Ho Chi Minh City University of Education. However, out of the top 10 efficient educational researchers in Vietnam, only one is affiliated with the National University of Hanoi, one with Ton Duc Thang University, and two with the Ho Chi Minh City University of Education. Thus, the network of collaboration among educational researchers is somewhat limited. When research groups operate independently with a limited number of members, it tends to result in fewer publications and citations. Therefore, it is necessary for educational researchers in Vietnam to (1) enhance domestic and international collaboration networks to increase the quantity of educational publications and (2) improve the quality of their research to produce high-quality publications.

Analysis in Figure 5 reveals that among the 10 most popular journals utilized by Vietnamese researchers, 7 journals are part of the Emerging Sources Citation Index (ESCI), while only 3 journals are included in the Social Sciences Citation Index (SSCI). The SSCI journals are all categorized as Scopus Q1 or Q2 journals. The most frequently used journal by Vietnamese researchers is the 'Journal for Education Teacher and Trainers (JETT),' though this journal is not indexed in the Scopus database. Therefore, researchers need to strive for improved research quality to meet the standards of high-quality scientific journals.

The keyword analysis in Figure 9 indicates a wide diversity of research topics. Nevertheless, some keywords receive significant attention, such as 'higher education,' followed by 'online education,' 'high school education,' 'covid-19,' and 'ELF.' Consequently, the two most-cited articles in the publication list are related to 'higher education' and 'e-learning' or 'blended learning.' Some important keywords have not been extensively studied or are still lacking in research, such as 'computer education,' 'information technology,' 'preschool education,' and 'pedagogical competence.' These research gaps suggest potential areas for future study that educational researchers in Vietnam can focus on to enhance teaching effectiveness. These research gaps suggest potential areas for future study that educational researchers in Vietnam can focus on to enhance teaching effectiveness.

Vietnam has intensified international collaboration, stemming from the 2013 education reforms with a trend towards internationalizing education and promoting global perspectives in all research directions (Quan-Hoang Vuong, 2020). Furthermore, since 2018, Vietnam has implemented a policy requiring

scientists seeking professorial and associate professorial ranks to have publications in journals indexed in the SSCI and SCOPUS databases. This has motivated Vietnamese scientists to actively engage in global collaborations, resulting in a significant surge in the number of international publications on educational science from Vietnam in the past five years.

This study has some limitations. First, all findings were extracted from only the WOS database, which does not fully cover all publications in the field of education sciences from Vietnam. However, the WOS database includes the Education & Educational Research category, which makes the data selection and filtering being more accurate than other bibliometric databases. In addition, the authors could not run similar analyses with publications written in Vietnamese due to the lack of a national bibliometric database of Vietnam. Second, the number of publications in education sciences in Vietnam is expected increase quickly in the future; therefore, results presented in this study were only correct at the time of this research. As a consequence, similar analyses should be done on a regular basic to better observe the development of this research direction in Vietnam in years to come.

5. Conclusion

Research on Vietnamese educartional science began to be published in international journals in 1991, and by 2023, there were 618 research works on Vietnamese educational science published in journals within the WOS system. Quantitative analysis results show that Vietnamese scholars in the field of educational science have established international collaboration with scholars from 51 different countries, with strong collaboration, particularly with Asian countries such as Indonesia, Malaysia, and Iraq. Furthermore, significant collaborators in this field are from Australia and the United States. The universities in Vietnam with the highest scientific publication productivity in educational science are Hanoi National University, Ton Duc Thang University, and Ho Chi Minh City University of Education. As for international collaboration, the University of Victoria Wellington/New Zealand, Monash University/Australia, and the University of Queensland/Australia are the most substantial partners collaborating with Vietnam in this fieldThe top journals that publish the most research in the field of educational science by Vietnamese scholars are the Journal for Educators, Teachers, and Trainers (JETT) from Granada University/Spain, the International Journal of Education Sciences (IJES) from Kamla-Raj Enterprises/India, and the International Journal of Instruction from Turkey.Other prevalent research areas include studies on high school students, online education, ELF (English as a Lingua Franca), and blended learning.

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