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Al Ibtida

Analyzing Trends in Blended Learning for Professional Growth: A Scopus Bibliometric Review

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Abstract

This bibliometric review study investigates the current state of research on blended learning models for professional development based on articles indexed in the Scopus database. The study utilized various bibliometric methods to analyze publication trends, influential authors, institutions, journals, and keywords related to the topic. The search resulted in a total of 1,349 articles published from 2001 to March 2023, indicating a noticeable increase in publications in recent years. The analysis revealed that the United Kingdom is the leading country in research output, with Griffith University being the most productive institutions. The BMC Medical Education was identified as the top publishing outlet in the field. The study identified four keywords that represent the most commonly used terms in the literature: blended learning, online learning, assessment, and professional development. This study provides insights into the current research trends and gaps in the field of blended learning for professional development, which can inform future research directions and support the design of effective professional development programs.

Keywords: *bibliometric review, blended learning, professional development, Scopus database, research trends.*

Abstrak

Studi tinjauan bibliometrik ini menyelidiki keadaan penelitian saat ini tentang model pembelajaran campuran untuk pengembangan profesional, berdasarkan artikel yang diindeks di database Scopus. Studi ini menggunakan berbagai metode bibliometrik untuk menganalisis tren publikasi, penulis berpengaruh, institusi, jurnal, dan kata kunci yang terkait dengan topik tersebut. Pencarian menghasilkan total 1.349 artikel yang diterbitkan dari tahun 2001 hingga Maret 2023, dengan peningkatan publikasi yang nyata dalam beberapa tahun terakhir. Analisis mengungkapkan bahwa Inggris adalah negara terdepan dalam hasil penelitian, dengan Universitas Griffith menjadi institusi paling produktif. BMC Medical Education diidentifikasi sebagai outlet penerbitan teratas di lapangan. Studi ini mengidentifikasi empat kata kunci yang mewakili istilah yang paling umum digunakan dalam literatur, termasuk pembelajaran campuran, pembelajaran online, penilaian, dan pengembangan profesional. Studi ini memberikan wawasan tentang tren dan kesenjangan penelitian saat ini di bidang pembelajaran campuran untuk pengembangan profesional, yang dapat menginformasikan arah penelitian di masa depan dan mendukung desain program pengembangan profesional yang efektif.

Kata kunci: *tinjauan bibliometrik, blended learning, pengembangan profesional, database Scopus, tren penelitian.*

INTRODUCTION

Blended learning is a concept that includes a mix of face-to-face teaching and learning supported by ICT (Lalima & Dangwal, 2017). It combines online and face-to-face activities for classroom instruction or other training modalities, facilitating the development of new knowledge and skills transferable to the workplace (Hilliard, 2015). This approach promotes student-centered learning and increased interaction, aiding in the improvement of critical thinking skills by granting students more autonomy in their learning practices (Nuruzzaman, 2016). Blended learning has become an increasingly popular instructional approach for professional development due to its numerous advantages over traditional classroom-based training. It amalgamates Internet and digital media with traditional classroom settings. Our approach utilized this technique to harness benefits from both worlds: traditional practical sessions provided close support and prompt feedback, while digital content and automatic checks expedited the administrative process and enabled students to focus on learning computational thinking (Barreiro & Matos, 2016). However, the rapid growth of blended learning has made it challenging to navigate the plethora of available models and determine the best fit for a particular context. Therefore, this systematic review aims to provide a comprehensive analysis of the blended learning models used in professional development by conducting a study using the Scopus database.

Numerous research articles have been dedicated to bibliometric analysis within the domain of blended learning, with notable contributions such as "Detecting and visualizing research trends of blended learning: A bibliometric analysis of studies from 2013-2022" by Chen et al. (2023), "A Bibliometric and Cluster Analysis of Blended Learning Literature" authored by Ibarra-Vargas et al. (2023), and "Visualizing and Bibliometrically Analyzing Information and Communication Technology-Based Blended Learning" by Yu and Peng (2023). However, it is noteworthy that these seminal studies predominantly center their attention on various facets of blended learning research, but they do not explicitly emphasize the specific dimension of Professional Development. This lacuna in the existing literature

underscores the distinctiveness of our research, which endeavors to address this notable gap in bibliometric analysis research, particularly within the context of blended learning. Our study represents a pivotal contribution aimed at enhancing the comprehensiveness and depth of scholarly inquiry in this domain, thereby fostering a more holistic understanding of blended learning research trends and insights.

The primary objective of this study is to identify the most effective blended learning models for professional development through critical evaluation of the existing literature. The review will examine the definitions, characteristics, and design features of blended learning models utilized in professional development programs. The review will utilize a comprehensive search strategy to identify all relevant studies published in Scopus database up until the end of March 2022. The inclusion criteria will focus on studies pertaining to professional development utilizing a blended learning approach. The exclusion criteria will eliminate studies that do not meet these inclusion criteria or are not published in English. The primary contribution of this study lies in its rigorous bibliometric analysis, employing mathematical and statistical methods to identify significant parameters such as the most productive authors, influential authors, the most frequently cited disciplines, states, and affiliations. We have carefully analyzed the top 10 in each parameter, providing a detailed assessment of the existing literature in the field. In addition, we have utilized VOSviewer, a powerful visualization tool, to identify the most common keywords and topics related to blended learning models for professional development.

METHODS

Data Sources and Search Strategy

In this study, we conducted a bibliometric analysis using Scopus, a widely used repository for peer-reviewed literature. Bibliometric are statistical measure of research impact (Radhakrishna & Ravindran, 2022). Bibliometric methods are used to provide quantitative analysis of written publications. These methods provide quantitative analyses of written publications, identifying the corpus of literature—i.e., publications in their broadest sense—within a given subject area. Statistical tools are employed as part of the analysis process (Ellegaard & Wallin, 2015). Bibliometric analysis is the study of patterns in published literature. It can be used to measure the impact of a particular paper or to understand how different disciplines interact (Ellegaard, 2018). Scopus provides access to abstracts and citations of scientific articles and is part of SkiVers, which is provided by Elsevier (Tober, 2011). We collected data related to publications on the development of blended learning models for professional development, using keywords such as “blended learning”, “training”, and “professional development” with a subject area limitation set to 'Social Sciences.' This search yielded 1,349 documents from Scopus, comprising articles and conference papers.

To conduct the bibliometric analysis, we employed various performance indicators, including the total number of publications, the total number of citations received by the publications, and the number of citations received per publication. The bibliometric approach used in this research involves quantitative analysis of all knowledge carriers, encompassing author's keywords, title keywords, and additional keywords, utilizing mathematical and statistical methods (Chen et al, 2016). This method is widely utilized to assess research trends, orientations, co-authorship, and co-citation patterns across diverse fields (Merigo et al., 2016).

In this paper, we present the top ten most productive and impactful authors, disciplines, states, and affiliations, based on our bibliometric analysis. Additionally, we visualized the most common keywords in this field using VOSviewer software. The bibliometric approach, combined with VOSviewer software, enables us to quantitatively evaluate global scientific research on educational technology, specifically blended learning models for professional development, spanning from 2001 to March 2023. Table 1 provides the information on 1,349 articles published between 2001 and 2023 gathered from the Scopus database.

Table 1. Main information

Main Information	Description	Result
Documents	Total number of documents	1,349
Sources	The frequency distribution of sources as journals	665
Author's keywords (DE)	Total number of keywords	3,098
Keywords plus (ID)	Total number of phrases that frequently appear in the title of an article's references	2,862
Period	Years of publication	2001- 2023
Authors	Total number of authors	3,670
Authors appearances	The authors' frequency distribution	3,275
Authors of single-authored documents	The number of single authors per articles	257
Authors of multi-authored documents	The number of authors of multi-authored articles	277
Co-authors per Documents	The average number of co-authors in each document	2.98
Average citations per documents	The average number of citations in each article	10.07
International co-authorships %		13.86

Bibliometric Maps

Bibliometric analysis is a powerful tool that enables researchers to gain insights into the scientific landscape across various fields (Janik et al., 2020). Bibliometric Maps are visual interfaces that allow users to observe relationships between publications (Dattolo & Corbato, 2018). These maps provide visual representations of the scientific landscape by mapping the relationships between different publications, authors, and keywords (Solorzano & Plevris, 2022). These maps can help researchers identify the key contributors, influential papers, and emerging trends in a particular field. The present study collected bibliometric data from Scopus, a widely-used abstract and citation database of peer-reviewed literature. To analyze the collected data, Biblioshiny for Bibliometrix and VOSviewer software were utilized. Biblioshiny, a user-friendly and web-based graphical interface of Bibliometrix, was employed to export information on citations, bibliography, and author keywords of 1,349 documents. Bibliometrix, a program developed in R language, facilitated the interconnection with other R packages and was developed by Massimo Aria and Corrado Cuccurullo from the University of Naples and the University of Campania's Luigi Vanvitelli (Italy) (Moral-Munoz et al., 2020). Bibliometrix is a package that must be utilized within the R software environment. It serves as a comprehensive mapping analysis tool that supporting three phases of the

bibliometric analysis process: (i) data import and conversion to R format; (ii) bibliometric analysis of a dataset and (iii) the construction of matrices (Arruda et al., 2022).

VOSviewer is a bibliometric software that can be used to organize and analyze information in any field of research. It has three main bibliometric methods: mapping, direct citation, co citation, and bibliographic coupling (Saenz Tovar & Alejandro Reta, 2022). On the other hand, VOSviewer software generated a co-occurring keyword network for blended learning and professional development. It extracted data, mapped and grouped articles, and determined the size of circles and product labels by an object's weight, with larger objects indicating higher weights (Xie et al., 2020). The distance between two nodes reflects their influence, with a shorter distance indicating a stronger relationship. The line connecting two keywords signifies their co-occurrence (Liao et al., 2018), while the bond strength between nodes represents the frequency of their co-occurrence, essentially forming a quantitative index (Pinto et al., 2014). In the context of co-authorship analysis, the strength of relationships between countries indicates the number of co-authored publications between their affiliated researchers. Conversely, the combined strength of relationships denotes a country's overall collaboration intensity with others. Similarly, in co-occurrence analysis, the strength of connections between author keywords signifies the number of articles in which those keywords co-occur.

VOSviewer software's features are described in the user manual (Eck and Waltman, 2010), with its development attributed to Ludo Waltman and Nees Jan van Eck from Leiden University. The tool's co-occurring keyword network facilitates the identification of research trends and clusters, offering valuable insights into future development directions. Overall, leveraging Biblioshiny for Bibliometrix and VOSviewer software is expected to yield comprehensive and in-depth bibliometric analyses, leading to innovative and engaging findings in the field of blended learning for professional development.

Research Questions

To ensure a focused analysis, this bibliometric study posed several research questions, aiming to address the following in relation to blended learning for professional development: (1) which scholarly journal is the most productive in publishing research on this topic? (2) What are the top countries and institutions in terms of research productivity of blended learning for professional development? (3) Who are the most prolific researchers in this area of study? and (4) What research topics are commonly explored by researchers in research of blended learning for professional development? Through a comprehensive examination of bibliometric data, this study aims to provide innovative and engaging insights into the current state of the study.

RESULTS AND DISCUSSION

Bibliometric or Scientometric Analysis is a valuable tool that allows researchers to explore and identify emerging trends and patterns in scientific literature, which can inform future research endeavors (Muhuri et al., 2019). This quantitative approach to the study of science, technology, and innovation has gained popularity due to its ability to provide insights into the communication and dissemination of information within interdisciplinary fields (Leydesdorff & Milojević, 2015). The present section provides an overview of the bibliometric analysis conducted, which includes various performance parameters such as

documents by year, author, affiliation, country, source title, and subject area. Additionally, we highlight the most productive and highly cited authors, the most sought-after disciplines, and top journals in the field.

Publication Growth

In this analysis, we examine the trend of articles published in the field of education and blended learning over the past two decades. The data shows a significant increase in the number of articles published from 2001 to 2022, with the highest number of articles published in 2021 (175) and 2022 (156). From 2001 to 2010, the number of articles published remained relatively low, with the highest number of articles being published in 2005 (12). However, from 2011 to 2022, there has been a steady increase in the number of articles published each year, with the number of articles published in 2020 (137) nearly triple the number of articles published in 2011 (54).

The analysis also shows that there was a slight decrease in the number of articles published in 2004 (2), and the number of articles published in 2008 (29) was significantly higher than the number of articles published in the preceding years. However, this can be attributed to the increased focus on blended learning and the widespread availability of technological advancements that facilitated the study of the field. Overall, the data highlights the growing interest and focus on blended learning for professional development, as evidenced by the increasing number of articles published each year. The increase in the number of publications suggests that researchers and practitioners are continuously exploring and developing innovative methods and strategies for blended learning, which can potentially improve the quality of education and professional development.

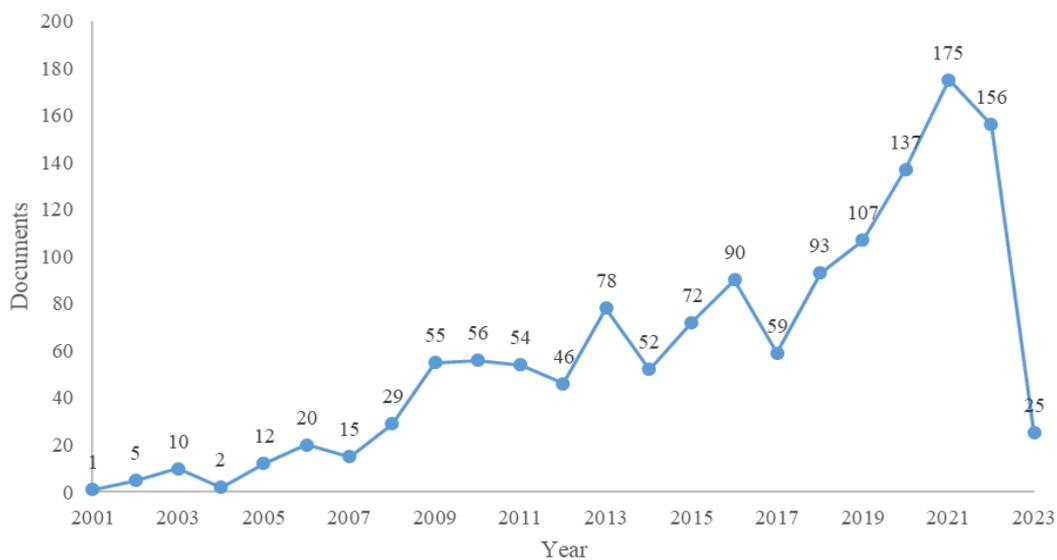


Figure 1. Annual Scientific Production

Top Publication Outlets

In terms of the top publication sources for research on education and blended learning, BMC Medical Education stands out as the most productive source, with a total of 40 articles in our dataset. This is followed by the Proceedings of The European Conference on E-Learning, ECEL, which published 32 articles. The Proceedings of The International Conference on E-Learning, ICEL, is the third most productive source, with 22 articles. It is

interesting to note that the top three publication sources are all related to e-learning and technology in education, indicating a strong focus on this area of research in recent years. GMS Journal for Medical Education is another productive source, with 20 articles, which suggests that there is a significant amount of research being conducted on the intersection of technology and medical education.

The remaining sources in the top 10, Education and Information Technologies, International Journal of Emerging Technologies in Learning, Nurse Education Today, Education Sciences, Proceedings - Frontiers in Education Conference, and Curriculum Design and Classroom Management: Concepts, Methodologies, Tools, and Applications, have published between 12 and 16 articles each in our dataset. Overall, the findings suggest that there is a diverse range of publication sources for research on blended learning for professional development, but a few key sources stand out as particularly productive in this field. The prominence of e-learning and technology-related publications reflects the growing importance of these areas in the field of blended learning for professional development.

Table 2. The most relevant publication outlets

Rank	Publication Source	Article*
1	BMC Medical Education	40
2	Proceedings of The European Conference on E-Learning, ECEL	32
3	Proceedings of The International Conference on E-Learning, ICEL	22
4	GMS Journal for Medical Education	20
5	Education and Information Technologies	16
6	International Journal of Emerging Technologies in Learning	15
7	Nurse Education Today	14
8	Education Sciences	13
9	Proceedings - Frontiers in Education Conference, FIE	13
10	Curriculum Design and Classroom Management: Concepts, Methodologies, Tools, and Applications	12

*Ranking by the most relevant sources

Most Impactful Articles

The dataset above provides a list of the top 10 most cited articles related to blended learning and e-learning in the field of education. The articles were ranked based on their global citations, and the total citations and total citations per year were also provided. The article with the highest number of total citations and total citations per year is "The Impact of E-Learning in Medical Education" by Ruiz et al. (2006), with 1,288 total citations and 71.56 citations per year. The article explores the impact of e-learning on medical education, and the authors conclude that e-learning is a valuable tool for enhancing medical education. The second most cited article is "Blended Learning and Sense of Community: A Comparative Analysis with Traditional and Fully Online Graduate Courses" by Rovai and Jordan (2004), with 516 total citations and 25.80 citations per year. The article compares the sense of community in blended learning, traditional, and fully online graduate courses, and the authors suggest that blended learning can provide a better sense of community for students.

The third most cited article is "Challenges in the online component of blended learning: A systematic review" by Rasheed et al. (2020), with 337 total citations and 84.25 citations per year. The article explores the challenges of the online component of blended learning, and the

authors provide recommendations for addressing these challenges. The other articles in the top 10 list also cover various aspects of blended learning, such as its impact on medical education, its effectiveness in higher education, and its role in problem-based learning. These articles provide valuable insights into the benefits and challenges of blended learning and have been cited extensively by other researchers in the field. Overall, the analysis of the top 10 most cited articles on blended learning and e-learning highlights the growing importance and relevance of these topics in the field of education. The findings of these studies can inform the development and implementation of effective blended learning strategies and contribute to the improvement of professional development in various training contexts.

Tabel 3. The most influential articles

Rank	Article*	Total Citations	TC per Year
1	The Impact of E-Learning in Medical Education (Ruiz et al., 2006)	1,288	71.56
2	Blended Learning and Sense of Community: A Comparative Analysis with Traditional and Fully Online Graduate Courses (Rovai & Jordan, 2004)	516	25.80
3	Challenges in the online component of blended learning: A systematic review (Rasheed et al., 2020)	337	84.25
4	E-learning in medical education in resource constrained low- and middle-income countries (Frehywot et al., 2013)	258	23.45
5	Blended Learning in Higher Education: Framework, Principles, and Guidelines (Garrison & Vaughan, 2008)	248	20.67
6	Blended learning positively affects students' satisfaction and the role of the tutor in the problem-based learning process: results of a mixed-method evaluation (Woltering et al., 2009)	159	10.60
7	Performance and Perception in the Flipped Learning Model: An Initial Approach to Evaluate the Effectiveness of a New Teaching Methodology in a General Science Classroom (González-Gómez et al., 2016)	153	19.13
8	An analysis of research trends in dissertations and theses studying blended learning (Drysdale et.al., 2013)	126	11.45
9	Harmonizing technology with interaction in blended problem-based learning (Donnelly, 2010)	126	9.00
10	Institutional drivers and barriers to faculty adoption of blended learning in higher education (Porter & Graham, 2015)	123	15.38

Most Impactful Authors

The dataset provided below presents local impact metrics for several authors in the field of blended learning for professional development. The h-index, g-index, and m-index are used as measures of an author's research output and impact. The h-index represents the number of papers an author has published that have been cited at least h times, while the g-index is the highest number of papers that have received g^2 or more citations each. The m-index is the h-index divided by the number of years since the author's first publication. The dataset also includes the total number of citations (TC), the number of papers (NP), and the year of the author's first publication (PY start). These metrics help to provide a more comprehensive

picture of an author's research output and impact. Among the authors listed, Graham CR has the highest h-index and TC, with 6 papers cited at least 6 times and a total of 438 citations. However, when considering the m-index, Cañada-Cañada F has the highest score of 0.375, indicating a high impact over a relatively short period since their first publication in 2016. The g-index scores range from 3 to 6, with several authors having the same score. It is interesting to note that several authors, including Boulay R and Lehmann R, have a higher g-index than h-index, indicating that they have published a few highly-cited papers. It effectively summarizes how the dataset offers insights into the research output and impact of various authors in the education and blended learning field. It also highlights the different metrics used to measure their impact and how the results can vary based on the metric employed.

Tabel 4. Authors' local impact

Author	h_index	g_index	m_index	TC	NP	PY_start
Graham C. R.	6	6	0.375	438	6	2008
Huwendiek S.	4	4	0.286	50	4	2010
Bosse H. M.	3	3	0.214	45	3	2010
Boulay R.	3	3	0.2	15	5	2009
Cañada-Cañada F.	3	3	0.375	259	3	2016
Donnelly R.	3	4	0.2	135	4	2009
Engelbrecht J.	3	3	0.375	174	3	2016
González-Gómez D.	3	3	0.375	259	3	2016
Jeong J. S.	3	3	0.375	259	3	2016
Lehmann R.	3	4	0.214	47	4	2010

Paired Samples Statistics						
	Mean		N	Std. Deviation	Std. Error Mean	
Pair 1	PreTest_Numeration		61.88	43	9.696	1.479
	PostTest_Numeration		91.47	43	3.869	0.590

Most Productive Affiliations

The affiliation data provides insight into the institutions that have contributed the most to research on education and blended learning. The top institution, with 26 articles published, is Griffith University, followed by Vrije Universiteit Brussel with 20 articles. Purdue University and University College Dublin both tie for third with 18 articles each. It is interesting to note that institutions from various regions of the world are represented in the top 10. For example, the National University of Singapore, Universidad de Salamanca, and East China Normal University are all represented in the list, along with institutions from Australia, the United States, and Europe. This suggests that research on education and blended learning is a global effort, with scholars and institutions from various regions contributing to the body of knowledge.

It effectively conveys that the absence of a single dominant institution in the list indicates the diverse and multidisciplinary nature of the field of education and blended learning. Additionally, it notes that research in this area is not exclusive to large, renowned institutions but spans across various academic settings, both large and small. Overall, it aptly

emphasizes the diversity and global representation within research on education and blended learning across institutions worldwide.

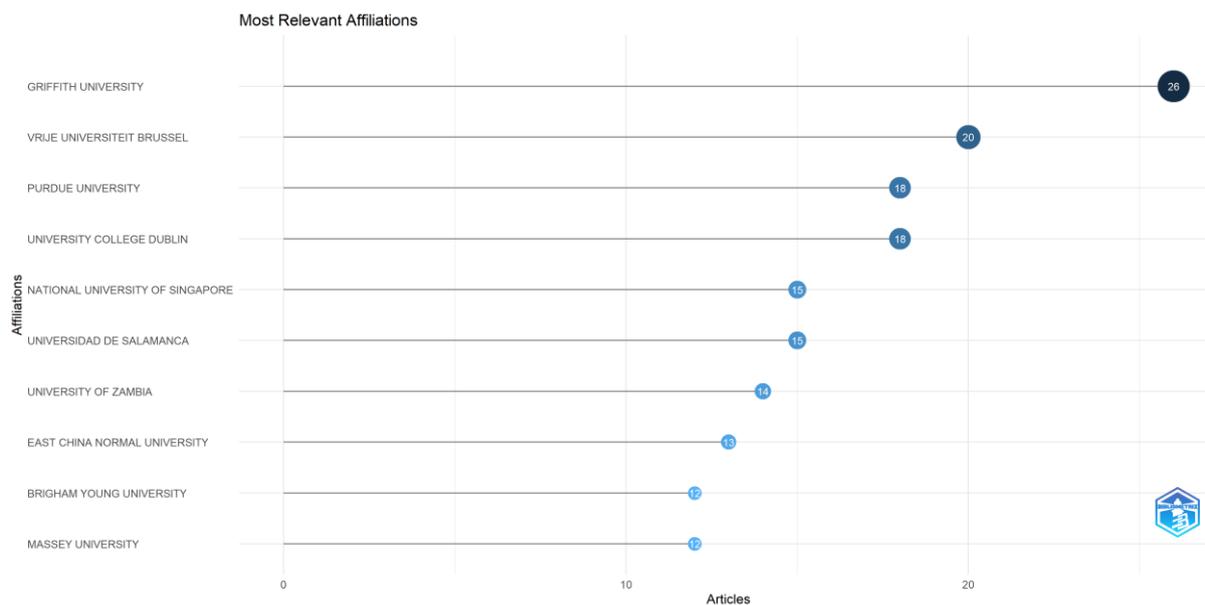


Figure 2. The Most Productive Affiliations

The bibliometric analysis presented in the data below offers valuable insights into the citation patterns of articles on blended learning for professional development. The Most Cited Papers (MCP) ratio of 0.118 indicates that only a small fraction of the sample articles are responsible for a large portion of the citations. This finding highlights the importance of identifying highly cited papers for understanding the most impactful research in the field. The Self-Citation Percentage (SCP) provides information on the extent to which authors are citing their own previous work in the current sample. The range of SCP values among different countries suggests variations in self-citation practices. The low SCP of 0.045 for South Africa indicates that authors in that country tend to cite external sources more frequently than their own work, while the higher SCP values for other countries suggest a greater reliance on self-citation. By identifying these patterns, researchers can gain a better understanding of the citation practices and publishing behaviors in different countries, which can inform their own research strategies and publication decisions.

The table further reveals that the United Kingdom and the USA are the top two countries in terms of the number of articles published in the sample, with 68 articles each. However, the MCP ratio for the UK is relatively high at 0.176, indicating that a small number of articles account for a significant proportion of the citations received. The MCP ratio for the USA is lower at 0.132. Germany and Spain follow the UK and the USA, with 56 articles each. The MCP ratio for Germany is 0.161, while for Spain, it is 0.107. Australia is next with 50 articles and an MCP ratio of 0.200, indicating that a small number of articles are highly cited in the country. China, South Africa, Ireland, and India follow with 38, 22, 19, and 17 articles respectively. China has an MCP ratio of 0.132, South Africa has an MCP ratio of 0.045, Ireland has an MCP ratio of 0.105, and India has an MCP ratio of 0.118. Overall, this data provides insight into the distribution of citations and self-citations in different countries. It can inform researchers about the most influential articles in their field and the extent to which self-citation is prevalent in their country of origin.

Blended learning has emerged as a popular instructional model, with 675 occurrences and a total link strength of 927. The popularity of blended learning can be attributed to its ability to combine the benefits of traditional face-to-face classroom teaching with the advantages of online learning activities. Blended learning has been found to be effective in improving student learning outcomes, engagement, and satisfaction. Online learning is another popular instructional model, with 77 occurrences and a total link strength of 175. The Covid-19 pandemic has further accelerated the adoption of online learning, with 44 occurrences and a total link strength of 103 for the keyword “Covid-19”. Online learning has been found to be effective in providing flexible and accessible learning opportunities to students. Assessment is a critical component of both blended and online learning, with 20 occurrences and a total link strength of 46. Assessment plays a crucial role in evaluating student learning outcomes and providing feedback to students and teachers. Effective assessment practices are essential for ensuring the success of blended and online learning. Professional development is critical for the success of blended and online learning, with 70 occurrences and a total link strength of 144. The importance of continuous skill and knowledge updating for teachers and educators to adeptly utilize technology and instructional strategies in their teaching. Additionally, it emphasizes how effective professional development programs play a crucial role in equipping them with the necessary skills and knowledge to design and deliver impactful blended and online learning experiences.

Collaboration World Map

The analysis of collaborative efforts in research on blended learning for professional development provided in the given data highlights the significant role of international collaboration in this area. The United States emerges as the most active collaborator, having partnered with China and Germany the most frequently, each with a frequency of 10. Canada, France, Korea, and Turkey also exhibited significant collaboration frequencies with the US, with 9, 7, 6, and 6 respectively. It is worth noting that France's top partner in this domain is Algeria, whereas Canada is China's most frequent collaborator. The findings underscore the importance of international collaboration in research on blended learning for professional development, with the United States leading the way. Collaborative research promotes the sharing of knowledge, resources, and perspectives, enabling the development of more innovative and effective blended learning approaches. Hence, countries yet to establish collaborative partnerships in this area should strongly consider doing so to improve the quality and relevance of their research output.

This data also highlights the need for more diverse collaborative partnerships across regions to promote the exchange of knowledge and ideas. The frequency of collaborative efforts between Australia and Spain, for instance, suggests the potential for future collaborations among other countries within and beyond these regions. Such partnerships can lead to the exploration of new and innovative approaches to blended learning for professional development, thus advancing the field and enhancing the quality of research output. In summary, the data emphasizes the importance of international collaboration in research on blended learning for professional development. The United States has established the most partnerships in this area, while other countries have also shown promising collaborative efforts. Encouraging more diverse and inclusive partnerships in this domain can lead to innovative research, promoting the development of effective blended learning approaches.

Country Collaboration Map

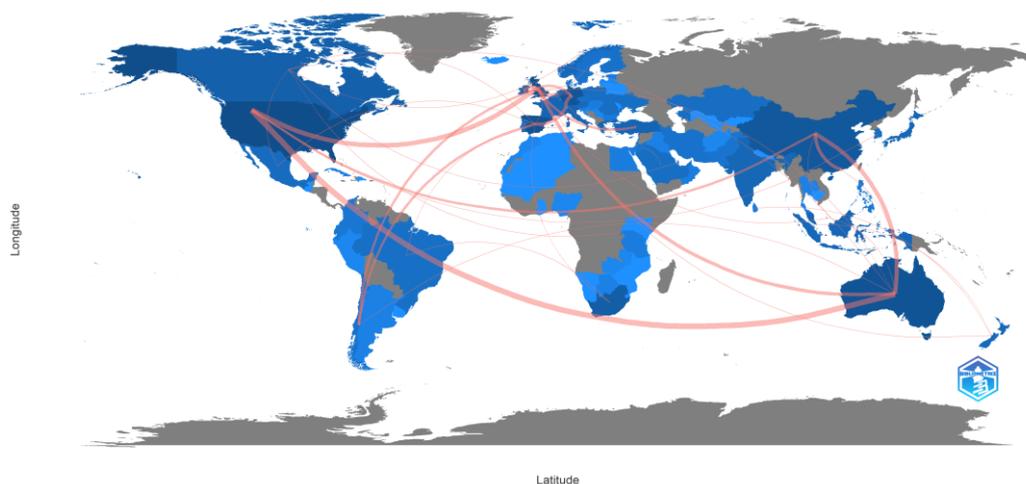


Figure 4. Countries' Collaboration World Maps

Tabel 6. The top 10 country colla

Rank	From	To	Frequency
1	United States	China	10
2	United States	Germany	10
3	United States	Canada	9
4	France	Algeria	7
5	United States	Korea	6
6	United States	Turkey	6
7	China	Canada	5
8	United States	Australia	4
9	Australia	Spain	3
10	Canada	France	3

CONCLUSION

Blended learning has become a favorable method for enhancing professional growth in the education sector. A bibliometric analysis was performed using the Scopus database to enhance comprehension of the present research status in blended learning models for professional development. Comprehensive research revealed a grand number of 1,349 papers on blended learning approaches for professional development that were published from 2001 to March 2023. The findings indicated that the United Kingdom had the highest level of productivity in terms of publications, while Griffith University emerged as the most active institution. The most commonly utilized terms were "blended learning," "online learning," "assessment," and "professional development." The paper that received the greatest number of citations is "The Impact of E-Learning in Medical Education" by Ruiz et al., with a total of 1,288 citations. The study emphasizes the growing fascination with blended learning methods for professional development among scholars and practitioners. The bibliometric analysis findings indicate that blended learning has been extensively examined in the realm of teacher education and professional development. The study emphasizes the necessity for additional investigation into the efficacy of various blended learning models in professional development settings, specifically with the enhancement of teaching and learning outcomes.

In summary, the study offers significant insights into the present condition of research in blended learning models for professional development and serves as a valuable resource for scholars and practitioners in the field.

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