

# Mapping of Research Output on Blended Learning: A Bibliometric Study

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## Abstract

This paper aims to map the research output on Blended Learning from 2018 to 2022. All articles related to Blended Learning have been retrieved using the largest indexing and abstracting database named Scopus. The paper carried out various parameters of bibliometric such as total output; year wise distribution of research output; top five sources; most prolific author, country, language etc.

The study's key findings were that, 4468 research papers published in 2018-2022. This study found that the most preferred document form is article with 2385 (53.38 %) publications followed by Conference Papers with 1862 (41.67%) publications and the most productive year is 2021 with 1080 (24.17%) publications followed by 2022 with 1059 (23.70%) publications on BL. The study explored that in terms of number of publications among top five authors, Zhu, C. is the most productive author with 17 publications on BL, followed by Pikhart, M. with 13 publications. ACM Int. Conference Proceedings Series (232) is observed as top preferred sources of publications on BL. In the country wise contribution, it is observed that China produced highest 675 (15.10%) articles, followed by Indonesia 383 (8.57). In the language wise contribution, the study found that the maximum articles published in English language with, 4297 (96.17) articles followed by Spanish language with 57(1.27%) publications on BL.

**Keywords:** Blended Learning, BL, Scopus, Bibliometric Study, Research Productivity

## **1. Introduction**

Bibliometrics approaches are some of the most essential metrics for the measurement of scientific publications. These metrics quantitatively analyze and measure the impact, usage, and productivity of scholarly publications, institutions and authors. These studies focus on emerging trends, growth pattern and other perspectives in specific fields of study. These studies provide a quantitative approach to understand the impact and productivity of scholarly publications. This method helps to avoid subjective judgements and provides a more evidence-based perspective, to identify trends and patterns in a specific field of study. In this study, a bibliometric analysis on “Blended Learning” is carried out to evaluate the quantitative measurement of this field, as bibliometric studies are indicators to know the recent trends of that discipline. This study fills the research gap by offering a quantitative and systematic analysis on research output on blended learning. The gap lies in the absence of a consolidated and quantitative study that analyze the trends, identify key contributors and highlights the most influential source in the field. This type of study aids in understanding the current state of research on Blended Learning and provides insights into its development, popularity and global distribution

### **1.1 Bibliometrics**

Bibliometrics is statistical analysis of written publication, such as books or articles. It is a quantitative research method which involves the analysis of patterns and statistics related to published literature. It focuses on evaluating the impact, usage, and structure of academic publications using various metrics. Bibliometrics helps researchers and institutions assess the influence of research, identify trends, and make data-driven decisions about academic publishing.

❖ **According to Pritchard (1969)** “Bibliometrics is concerned with the application of mathematics and statistical methods to books and other media of communication. It involves the measurement of the frequencies of citations or references in journal articles and in the lists of references appended to books and journal articles.”

### **1.2 Blended Learning:**

Blended learning combines traditional in-person instruction with online resources and digital tools. This approach offers flexibility, catering to various learning styles and schedules. It fosters interactive, self-paced learning while maintaining the benefits of face-to-face interaction, making it a versatile and effective educational strategy in today's digital age. This approach provides flexibility in terms of time, location and pace of learning. It allows educators to tailor instructions to individual student needs. This approach has the advantages of both traditional and digital methods, making learning more dynamic and interactive. This approach

not only prepares students for digital age but also help them to develop digital literacy skills. In fact, Blended Learning addresses the limitations of traditional educations methods by combining the strengths of in- person instructions and online resources.

## **2 Objectives:**

**The objectives of the study are as under:-**

- to assess the year wise research output on ‘Blended Learning’ from 2018 to 2022;
- to identify the form-wise research output on ‘Blended Learning’ during 2018-2022;
- to find out the most prolific authors, source, countries, institutions, and language wise publications on ‘Blended Learning’ .

## **3 Data Selection and Methodology**

The publications on ‘Blended Learning’ from 2018 to 2022 have been analyzed. The data has been extracted from the largest indexing and abstracting database named ‘Scopus’. The data was extracted using the search string (KEY(blended learning) AND ( LIMIT-TO ( PUBYEAR,2022) OR LIMIT-TO ( PUBYEAR,2021) OR LIMIT-TO ( PUBYEAR,2020) OR LIMIT-TO ( PUBYEAR,2019) OR LIMIT-TO ( PUBYEAR,2018) ) ) .

As a result, 4468 total publications appeared. The data was shifted to MS-Excel for analysis and presented in tabular form for further interpretations. The study is limited to the Scopus database, covering a five years study period.

## **4 Review of Related Literature**

Bibliometrics studies have vast area. A number of bibliometrics studies have been published on various domains. Angadi and others (2012) conducted a bibliometric study on the various academic domains of the University of Madras. This study provides a comprehensive snapshot of the university’s research impact. Baskaran (2013) also conducted a bibliometrics study on Alagappa University’s research contribution and explored the author productivity, collaboration trends and institutional ranking during 1999-2011. Kaur (2012) conducted comparative study of research output of two healthcare institutions of India. The study underscore the importance of quality assessments using citation databases, showcasing the convergence of research impact metrics. This study create awareness among the medical fraternity about the quality check of their research, which is now possible through citation databases. Kumari, D. and others (2019) conducted a bibliometric analysis of “Journal of Documentations” for the period 2007 to 2011 in their research. The examinations of keywords, countries and institutions

enhances the understanding of ‘JDoc’ impact and provides valuable insights into the journal’s scholarly contributions. Mittal, R and others (2007) in their research explore the growth and characteristics of digital library literature from 1998 to 2004 and provides insights into authorship patterns, language distribution, and core journals. The study found the prominence of single-authored articles and the prominence of English language literature in the field of digital library. Siwach (2014) conducted a study on the research productivity of India in the field of ‘Neurotoxicology’ from 2001 to 2010. The study highlights key contributors, preferred journals, and a substantial citation rate.

This literature review collectively paints a comprehensive panorama of research dynamics, encompassing productivity, collaboration trends and scholarly impact across diverse academic domains.

## 5 Data Analysis

The table describes basic information of the data, retrieved from the Scopus database. A total of 4468 documents appeared during the five years time span from 2018 to 2022.

*Table 1: Data -Details*

S.No.	Details about Data	Observed Value
1.	Study-Period	2018-2022
2.	Time-Span	05 years
3.	Total Publications	4468

### 5.1 Data analysis: Yearly distribution of ‘Blended Learning’ publications

Table shows the year-wise distribution of articles on BL from 2018 to 2022. A total of 4468 articles were published during the study period. The table shows that BL has fluctuated in trend in the percentage of growth of publication during the study period. The total output of publications for the study period remained between 13.54 percent to 24.17 percent. However, the most productive year was 2021 with 1080 (24.17%) publications and the least productive year was 2018 with 605 (13.54%) publication.

*Table 2: Yearly Distribution of BL*

<b>Year</b>	<b>Publications</b>	<b>% of TP( 4468)</b>
2018	605	13.54
2019	806	18.04
2020	918	20.55
2021	1080	24.17
2022	1059	23.70
<b>Total</b>	<b>4468</b>	<b>100.00</b>

## 5.2 Data analysis: Types of Publications during 2018-2022

The table shows the type wise publications on Blended Learning during the study period. It is apparent that the majority of literature was published in form of articles (53.38%) followed by conference paper, review (2.42%), book chapter (2.01%) etc.

*Table 3: Types of Publications*

**5.3**

<b>S. No</b>	<b>Document Type</b>	<b>Publications</b>	<b>% of TP (4468)</b>
1	Article	2385	53.38
2	Conference Paper	1862	41.67
3	Review	108	2.42
4	Book Chapter	90	2.01
5	Note	10	0.22
6	Editorial	9	0.20
7	Book	1	0.02
8	Letter	1	0.02
9	Retracted	1	0.02
10	Undefined	1	0.02
	<b>Total</b>	<b>4468</b>	<b>100.00</b>

**Data analysis: Most prolific author based on contribution**

The table shows the most prolific authors in terms of their contribution to BL . The top five authors are ranked according to their publications . Zhu, C is on top with 17 (0.38%) publications followed by Pikhart, M. with 13 (0.29%) publications during study period.

*Table 4: Most Prolific Authors*

S. No	Most Prolific Authors	Publications	% of 4468
1	Zhu, Chang	17	0.38
2	Pikhart, Marcel	13	0.29
3	Han, Fuliang	12	0.27
4	Rienties, Bart	11	0.25
5	Divayana, Dewa Gede Hendra	10	0.22

#### **5.4 Data analysis: Most Productive country in Blended Learning**

The table shows the productivity of the top ten countries based on corresponding address during the study period 2018-2022. This table shows that the China contributed maximum share of total publications 675 (15.11%), followed by the Indonesia 383 (8.57%), United States 379 (8.48%), United Kingdom 232 (5.19%) and rest of the countries are presented in the table.

*Table 5: Most Productive Country*

S. No.	Country	Publications	% of TP (4468)
1	China	675	15.11
2	Indonesia	383	8.57
3	United States	379	8.48
4	United Kingdom	232	5.19
5	Australia	226	5.06
6	Malaysia	209	4.68
7	Spain	202	4.52
8	Germany	194	4.34

9	Russian Federation	186	4.16
10	India	173	3.87

### 5.5 Data analysis: Most Productive institutions in BL

The table shows the top ten institutions that produced 295 (6.60 %) papers in all. The ‘Universitas Negeri Malang’ of Indonesia contributed the highest number of papers (41) which is 0.98 % share of the total contribution, followed by 40 publications with 0.90 % shared by one Czech Republic University. Rests of the institutions are presented in table.

*Table 6: Most Productive Institutions*

S.No.	Affiliations	Publications	% of TP (4468)
1	Universitas Negeri Malang-Indonesia	41	0.92
2	Univerzita Hradec Králová-Czech Republic	40	0.90
3	Huazhong Normal University-China	35	0.78
4	Universidad de Salamanca-Spain	29	0.65
5	Universitas Negeri Yogyakarta-Indonesia	28	0.63
6	Griffith University-Australia	27	0.60
7	Universiti Teknologi MARA-Malaysia	24	0.54
8	The University of Queensland-Australia	24	0.54
9	Universitas Pendidikan Indonesia-Indonesia	24	0.54
10	Universitas Negeri Jakarta-Indonesia	23	0.51
	<b>Total</b>	<b>295</b>	<b>6.60</b>

### 5.6 Data Analysis: Top sources in BL



Most preferred source is ‘ACM Int. Conference proceedings series for BL publications, which contribute 5.19 % share of total output. Journal of physics conf. series is second top preferred source. The rest are presented in table.

*Table 7 : Top sources in BL*

S. No	Source Title	NP	% of 4468
1	ACM International Conference Proceeding Series	232	5.19
2	Journal Of Physics Conference Series	142	3.18
3	Lecture Notes In Computer Science, Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics	120	2.69
4	Advances In Intelligent Systems And Computing	81	1.81
5	International Journal Of Emerging Technologies In Learning	76	1.70
6	Ceur Workshop Proceedings	73	1.63
7	Education And Information Technologies	60	1.34
8	Education Sciences	50	1.12
9	Proceedings Of The European Conference On E Learning Ecel	47	1.05
10	Communications In Computer And Information Science	44	0.98

### **5.7 Data Analysis:Top Languages in BL**

Table shows top ten languages in BL. English language appeared on top with, 4297 (96.17%) publications followed by Spanish with 57 (1.28%) publications. German language appeared as third top language in BL publications with 39 (0.87%) publications. The rest are presented in table.

*Table 8: Top Languages in BL*

S. No	Language	Publications	% of TP (4468)
1	English	4297	96.17
2	Spanish	57	1.28
3	German	39	0.87
4	Russian	29	0.64
5	French	13	0.29
6	Portuguese	12	0.27
7	Chinese	11	0.25
8	Turkish	5	0.11
9	Korean	3	0.07
10	Italian	2	0.04
	<b>Total</b>		<b>100.00</b>

## 6 Findings and Conclusions:

The present study maps the research output of 'BL' publications that appeared from 2018 to 2022. The study demonstrate that a total of 4468 publications appeared on this topic during the study period. The study's key findings were that, 4468 research papers published in 2018-2022. This study found that the most preferred document form is article with 2385 (53.38 %) publications followed by Conference Papers with 1862 (41.67%) publications and the most productive year is 2021 with 1080 (24.17%) publications followed by 2022 with 1059 (23.70%) publications on BL. The study explored that in terms of number of publications among top five authors, Zhu, C. is the most productive author with 17 publications on BL followed by Pikhart, M. with 13 publications. ACM Int. Conference Proceedings Series (232) is observed as top preferred sources of publications on BL. In the country wise contribution, it is observed that China produced highest 675 (15.10%) articles, followed by Indonesia 383 (8.57). In the language wise contribution, the study found that the maximum articles published in English language with, 4297 (96.17) articles followed by Spanish language with 57(1.27%) publications on BL. The findings of this study will helpful to guide curriculum designers in updating and revising course materials, institutions can use the data on prolific authors and top institutions

to identify potential collaborators and expert in the field. Educational policymakers and administrators can allocate resources strategically. Libraries can enhance their collections from the identified top source. The study provides a roadmap for decision-makers to understand the trends, identify key contributors, and allocate resources effectively.

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