



# Bibliometric Analysis: Flipped Learning Practices between Indonesia and Bangladesh

Osman Masud <sup>1\*</sup>, Khresna Bayu Sangka <sup>2</sup>, and Feri Setyowibowo <sup>3</sup>

<sup>1</sup> Student, Universitas Sebelas Maret, Surakarta, Indonesia

<sup>2</sup> Faculty, Department of Economics Education, Universitas Sebelas Maret, Surakarta, Indonesia

\*E-mail: osmaneb017@gmail.com

**Abstract.** Flipped learning is an innovative educational method that reverses the conventional teaching paradigm by providing instructional material outside of the classroom and moving homework inside the classroom to enhance active learning and student involvement. As this system evolves and adapts, it plays an important role in improving educational processes by encouraging greater knowledge and collaboration among students. This study conducts a comprehensive bibliometric analysis of flipped learning practices between Indonesia and Bangladesh from 2015 to 2023. Utilizing a dataset of 150 documents sourced from Scopus, this study employed VOS viewer software to visualize and investigate trends, patterns, and contributions within the field focusing on key metrics such as authorship, affiliations, publication trends, and thematic areas within these two countries. This research analysis reveals that Indonesia exhibits a higher number of practices and publications related to flipped learning compared to Bangladesh, with Universitas Negeri Malang emerging as the institution with the highest affiliation to the research outputs. The results revealed that the growth of publications dramatically increased in the last couple of years. The most practices flipped learning research area are from universities followed by school and then vocational. The analysis delineated seven distinct thematic clusters within the scope of the research topic. This study's findings contribute to the understanding of geographical and institutional differences in the implementation of flipped learning and suggest areas for further research and potential collaboration between the two nations.

**Keywords:** Bibliometric analysis, Flipped learning, VOS viewer, Indonesia, Bangladesh.

## 1 Introduction

Flipped learning transforms education by moving from offline to online formats, bringing activities typically done at home into the classroom, and shifting from teacher-centred to student-centred approaches. It replaces traditional methods with innovative ones and preserves class lectures by recording them, ensuring that future generations, as well as older, senior, and emeritus teachers, can stay updated.

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In recent years, flipped learning has emerged as a transformative pedagogical approach, challenging traditional instructional methods by flipping the sequence of content delivery and application. This innovative model shifts the delivery of instructional content outside of the classroom, typically through online platforms, allowing class time to be dedicated to interactive, application-based learning activities. Young people are increasing their connectivity with the internet and social networking. Online education makes more connections with social networking phobia by using electronic devices very easy way. If flipped learning is implemented in educational institutions, it reduces the time of using social media phobia for educational purposes. The potential benefits of flipped learning, including increased student engagement and deeper conceptual understanding, have spurred a surge of research interest worldwide.

This study employs a bibliometric approach, leveraging data extracted from Scopus and analyze using VOSviewer software, to conduct a comprehensive analysis of flipped learning research in Indonesia and Bangladesh. By examining key metrics such as authorship, affiliations, publication trends, and thematic areas, this research aims to elucidate the trends, patterns, and contributions within the field from 2015 to 2023.

On the other hand, to discover the ground of bibliometric analysis of Flipped learning, by searching in Scopus (6<sup>th</sup> June 2024), only 43 documents exist, among these China (9), Malaysia (6), Hong Kong, Indonesia, Peru, and Spain (each country 4), Taiwan and Turkey (3), Ecuador and Portugal (2), Australia, Bangladesh, Colombia, Denmark, Iran, Oman, Pakistan, Palestine, Thailand, United States, and Viet Nam has only one document. Based on specific region analysis for the bibliometric analysis of flipped learning, among these 43 documents, one from Spanish [1], three from China [2], [3], [4]. So this bibliometric analysis is the first innovative idea between two countries (Indonesia & Bangladesh). At the end of this analysis, future researchers will get a roadmap for flipped learning data in educational institutions' research.

This research analyses 150 document abstracts on flipped learning. The majority of the research area focuses on primary and secondary schools in 32 studies (74 schools as a sample), followed by 52 studies (58 studies as a sample), and 14 vocational colleges (14 studies as a sample). Additionally, there are systematic literature reviews and bibliometric analyses and rest of the document's abstracts do not mention their research area.

The objectives of this research are (a) to find out the trending publication (b) in which tertiary institutions are creating vital roles for flipped learning (c) Does Bangladesh or Indonesia are moving forward for flipped learning (d) in which authors are contributing most (e) which keywords are trending (f) which subjects area are most influencing flipped learning.

In the finding of this research, in 2022 the highest (36) documents published in a year, International Journal of Instruction is the top publication (8), Zainuddin, Zamzami is the apex documents (10) published author, [5] is the top cited documents, Universitas Negeri Malang (12 documents) and Universitas Sebelas Maret (10 documents) are respectively uppermost positon of affiliation, Social Science department contributed top documents about the flipped learning, Flipped classroom use as a key word by authors 101 times.

Finally, future researchers will get a clear direction about flipped learning research.

## 2 Literature Review

Flipped learning is an innovative [6], [7] teaching style in which students study the topics at home and then participate in reinforcement activities in the classroom [8], changing the group space into a dynamic and interactive environment supervised by class instructors [9].

Flipped Learning was founded by Jonathan Bergmann and Aaron Sams, two high school instructors in the United States who were tired of having to repeat courses for missing pupils. After that, they recorded their classes and delivered them to their students. [10]. Flipped Learning is a teaching style that sends topic content to students at home via electronic devices and uses classroom time for practical application exercises [11]. It is described as a teaching method where direct instruction is shifted from the group learning environment to the individual learning space.

After the pandemic (COVID-19), flipped learning became popular and made it urgent in educational institutes. [12], [13], [14]. This method is not only effective [15], [16], [17] but also progresses [18], [19], [20], [7] students' learning.

Most of the research was conducted on a pre-test and post-test [19], [21], [22], [23], [24], [25], [26] basis between traditional and flipped learning.

There are two types of flipped classrooms. The flipped mastery approach is employed in schools to ensure students achieve a certain level of standard proficiency. The other type, the inverted classroom, is used for advanced and high-capacity learning, where students are taught complex subjects to deepen their understanding [27].

Bibliometric is a subfield of scientometrics that uses mathematical and statistical approaches to analyze scientific publications and authors. [10]

## 3 Method

### 3.1 Data Collection

This study utilized a comprehensive bibliometric approach to analyze flipped learning research in Indonesia and Bangladesh. The data was extracted from Scopus, a well-regarded database of peer-reviewed literature, on June 6, 2024. The search criteria focused on documents published between 2015 and 2023, using the following steps:

Initial Search:

- Keywords: TITLE-ABS-KEY ("Flipped learning" OR "Flipped Classroom" OR "Flipped Study" OR "Flipped Education" OR "Inverted Class")
- Time Frame: PUBYEAR > 2014 AND PUBYEAR < 2024
- Results: This initial search yielded 7,703 documents.

Refinement:

- Country Filter: LIMIT-TO (AFFILCOUNTRY, "Indonesia") OR LIMIT-TO (AFFILCOUNTRY, "Bangladesh")

- Exact Keywords: LIMIT-TO (EXACT KEYWORD, "Flipped Classroom" OR "Flipped Learning" OR "Flipped Classrooms" OR "Inverted Classroom" OR "Flipped Classroom Model" OR "Flipped Instruction" OR "Flipped Class" OR "Flipped Teaching")
- Source Types: LIMIT-TO (SOURCE TYPE, "Journal" OR "Conference Proceedings")
- Final Results: After applying these filters, the dataset included 150 documents.

### 3.2 Data Analysis

The analysis was conducted using VOSviewer software, a powerful tool for constructing and visualizing bibliometric networks. The following steps were undertaken:

1. Preparation of the Dataset: The 150 documents were exported from Scopus in a format compatible with VOSviewer. The dataset included metadata such as authorship, affiliations, publication year, document type, and keywords.
2. Authorship and Affiliation Analysis: The data was analyzed to identify the most prolific authors and their institutional affiliations. This included counting the number of publications per author and per institution, and identifying collaborative networks among researchers.
3. Publication Trends: The publication trends were examined over the specified period to identify growth patterns and significant milestones in flipped learning research within the two countries. The analysis also included identifying the most influential journals and the frequency of documents published per year.
4. Thematic Areas and Keyword Analysis: Thematic clusters were identified using co-word analysis, which groups keywords based on their co-occurrence in the documents. This helped in mapping the research focus areas within flipped learning. The frequency of specific keywords was also analyzed to understand the trending topics in the field.
5. Citation Analysis: Citation metrics were used to determine the impact of individual documents and authors. The most cited papers and the overall citation count for each author and institution were identified.

### 3.3 Abstract Analysis

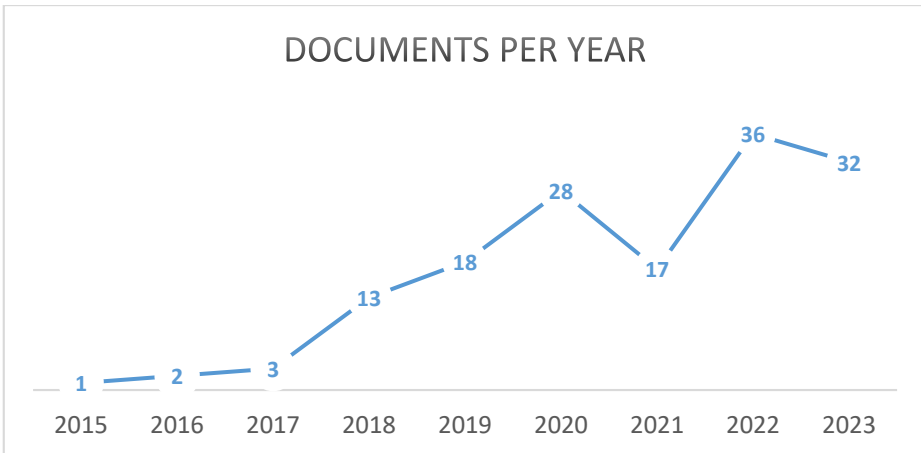
Among 150 documents of flipped learning, the research area are four distinct way. There are School, Vocational or College, University and the rest of content analysis, systematic literature review, and bibliometric analysis. In table 1, 32 documents from school, 15 documents from vocational/college, and 52 documents from university. For further research study, anyone can easily find out there literature from this research specially Indonesia and Bangladesh region. The limitation of this analysis is only evaluation process from Scopus

abstract. More than 100 documents abstract clearly mention about their research area and sample.

**Table 1:** Flipped implemented from different institutions

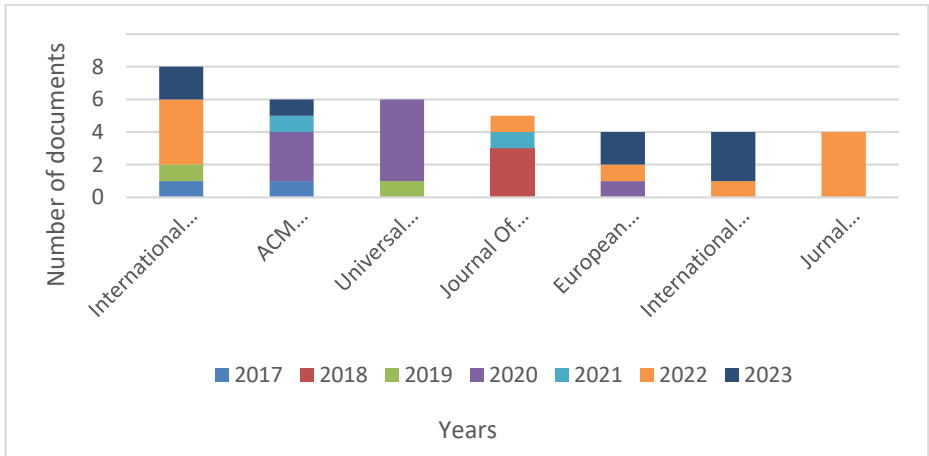
School	Vocational/College	University
[28], [29], [30], [19], [31], [13], [32], [33]. [34], [35], [36], [37], [38], [39], [40]. [41]	[42], [43], [16], [44], [45]. [46], [17], [47], [48]. [15], [49], [25], [50], [51].	[29], [52], [53], [54] [55], [53], [56], [57], [58]. [12], [59], [60], [61], [35], [62], [20], [24], [63], [26], [64], [65], [66], [67], [68], [69]. [23], [22], [70], [71], [72], [73].
[74], [75], [76], [7], [77], [78], [79] [80] [81], [82], [83], [84] [11] [85], [86], [87]	[88]	[89], [90] [91] [92], [93], [94], [95], [96] [97], [98] [99] [100], [101], [102], [103] [104] [105], [106], [107], [108] [109]

#### 4 Result and Analysis



**Figure 1.** Number of total documents per year

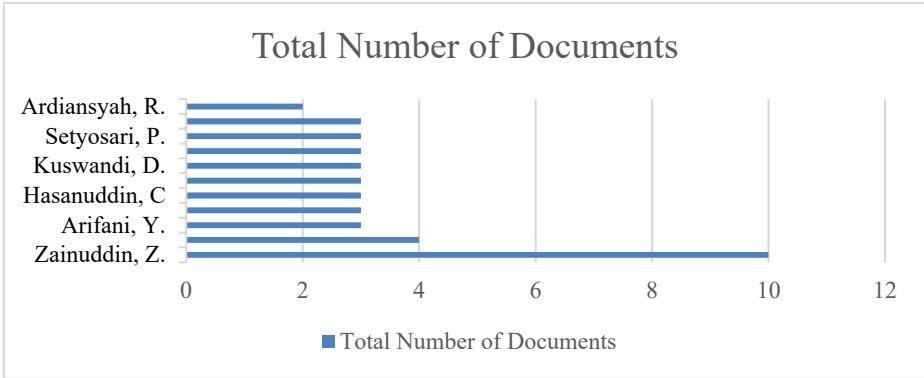
In figure 1. Despite minor oscillations, the statistics show that interest and research production in the field of flipped learning have increased over time. The peak in 2022 indicates a relatively high level of intellectual engagement, which, while somewhat decreasing in 2023, remains robust when compared to previous years. This trend demonstrates an increasing involvement and persistent interest in flipped learning throughout the research community.



**Figure 2.** Sources of Documents

In figure 2. International Journal of Instruction had the highest number of publications, with contributions consistently increasing from 2017 to 2023. Notably, there was a peak in 2020 and a sustained high output in subsequent years. International Conference Proceeding Series was more evenly distributed across the years, with notable contributions in 2018, 2019, and 2021, and a slight decrease in 2022 and 2023. Universal Journal of Educational Research refers to significant publications in 2018 and 2020, with a moderate output in other years, indicating periodic spikes in research activity. Journal of Physics Conference Series showed a varied pattern, with peaks in 2019 and 2022, and fewer contributions in other years, reflecting occasional interest in flipped learning within this context. European Journal of Educational Research had a steady publication rate, with notable contributions in 2018, 2019, and 2022, showing a consistent interest in the topic. International Journal of Information and Education Technology outputs were consistent, with significant contributions in 2018 and 2020, and maintaining a steady number of documents in other years. Jurnal Pendidikan IPA Indonesia had contributions predominantly in 2022, indicating a recent surge of interest in flipped learning within this publication.

In Figure 3 Zainuddin, Z. has the highest number of publications, with a total of 11 documents. This indicates a significant and sustained contribution to the field of flipped learning. Arifani, Y.: has made a notable contribution, a little bit less prolific than Zainuddin. (Hasanuddin, C., Kuswandi, D., Setyosari, P., and Ardiansyah, R.) Each of these researchers has contributed 3 documents. Their output reflects a moderate level of engagement and interest in flipped learning.



**Figure 3.** Most Documents by Author

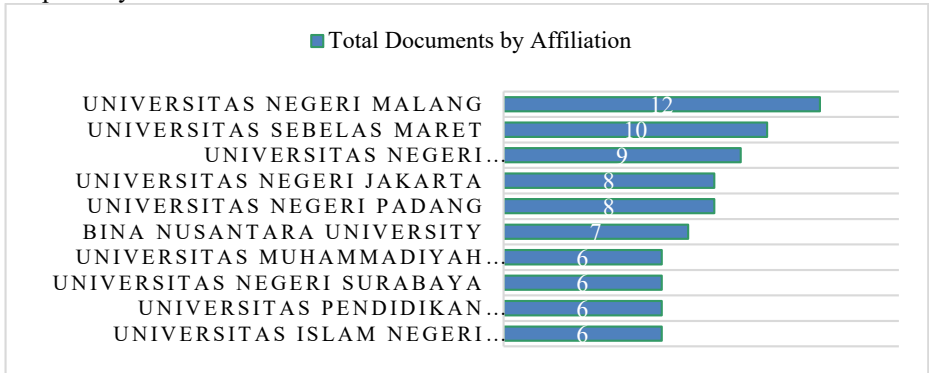
In table 2, [5] Provide a foundational review of flipped classroom research, highlighting its cross-disciplinary applications and growing popularity which is highest citation documents. [110] Explore the impact on students' competence, autonomy, and relatedness, emphasizing psychological benefits.

**Table 2.** Highest Citation by Author of an individual document

Authors	Citation Number	Title of Documents
[5]	234	“Flipped classroom research and trends from different fields of study”
[110]	94	“Exploring Students’ competence, autonomy, and relatedness in the flipped Classroom Pedagogical Model”
[111]	40	“Reverse teaching: Exploring student perceptions of “flip teaching””
[112]	34	“Review of flipped learning in engineering education: Scientific mapping and research horizon”
[109]	28	“First-year college students' experiences in the EFL flipped classroom: A case study in Indonesia”
[113]	26	“Flipped classroom educational model (2010-2019): A bibliometric study”
[86]	26	“Indonesian efl students’ perceptions on the implementation of flipped classroom model”
[114]	23	“Flipped classroom: How higher education institutions (HEIs) of Bangladesh could move forward during COVID-19 pandemic”

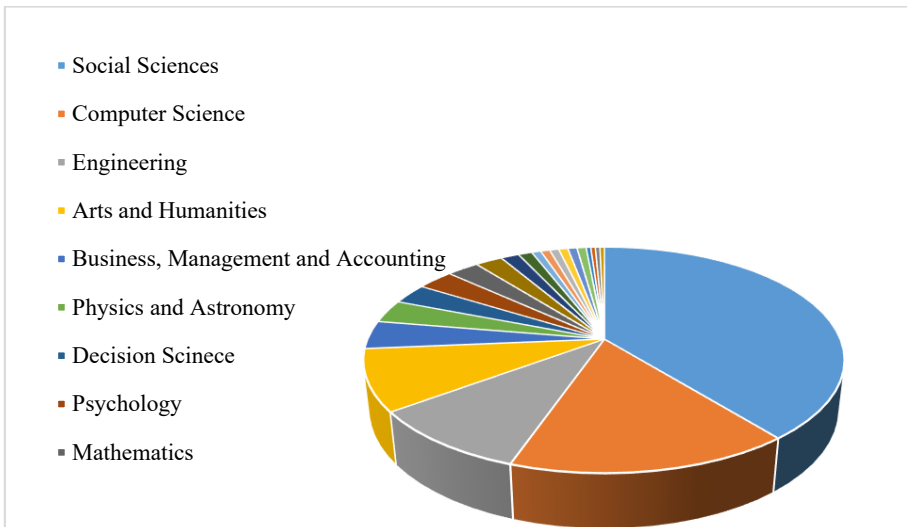
[111] Focus on student perceptions, shedding light on the experiential aspects of flipped learning. [112] Review its application in engineering education, mapping current research and future directions. [109] And [86] offer case studies from Indonesia, detailing

student experiences and perceptions in EFL contexts. [114] Discuss the model's potential in Bangladesh's higher education during the COVID-19 pandemic, highlighting its adaptability in crisis situations.



**Figure 4.** Documents by Affiliation

Figure 4 reveals that Universitas Negeri Malang has the most documents (12), showing that it is the top university for research production on the chosen topic. Universitas Sebelas Maret is the second highest affiliated documents (10), Universitas Negeri Yogyakarta indicates the third most documents (9). Universitas Negeri Jakarta and Universitas Negeri Padang are showing also major contribution with 8 documents. Bina Nusantara University also follows with eight papers. The remaining universities each contain six documents, suggesting moderate research effort.



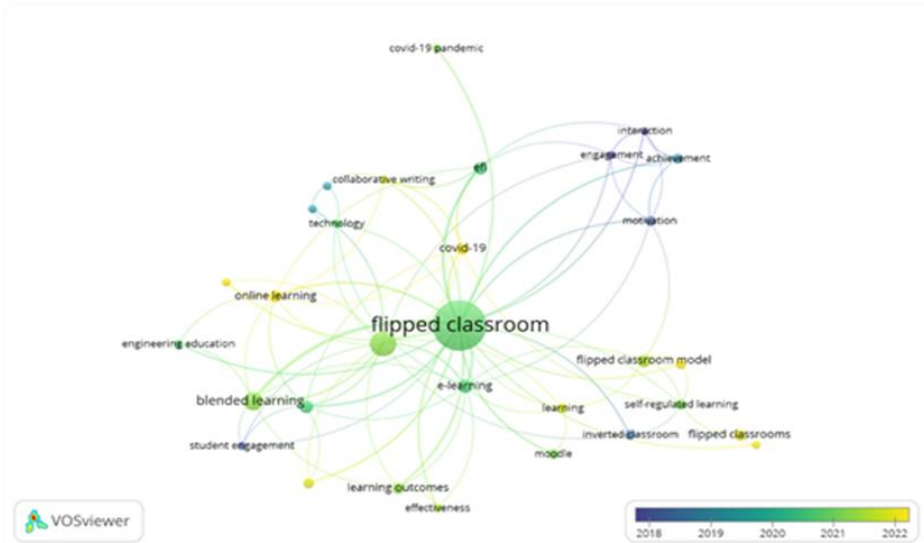
**Figure 5.** Documents by Subject Area

The figure 5 reveals that Social Sciences (39%), Computer Science (16%), Engineering (10%), and Business, Management, and Accounting have the most documents. Other subjects, such as Decision Science, Mathematics, and Environmental Science,



have less documents, indicating lower research output in these areas when compared to the major fields. This distribution demonstrates the diverse degrees of academic effort and emphasis across fields.

### 4.1 VOS-Viewer Analysis



**Figure 6.** Co-occurrences by Author Keywords

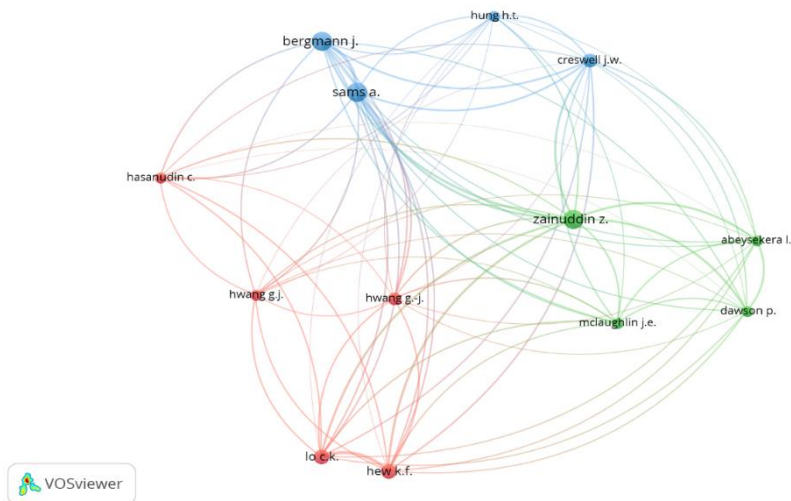
Figure 6 shows a study of the co-occurrence of author keywords. The papers evaluated contained 377 keywords. Among these terms, 31 were used at least thrice (see Table 3), where flipped classroom contains top position (101) by key word co-occurrences, whether flipped learning mention by authors 25 times.

**Table 3.** Co-occurrences of Author Keyword

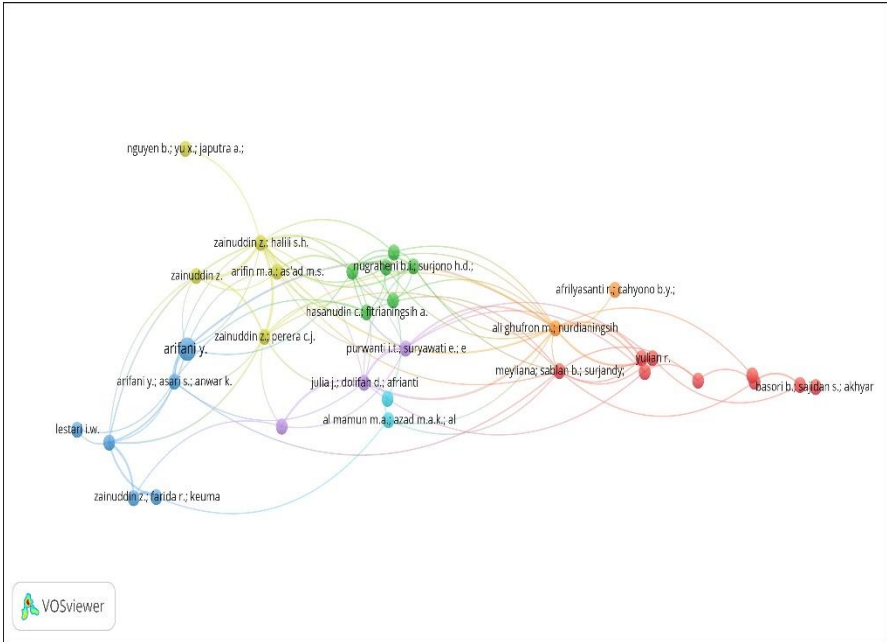
Rank	Keywords	Occurrences	Total Link Strength
1	Flipped Classroom	101	87
2	Flipped Learning	25	24
3	Blended Learning	14	21
4	e-learning	8	15
5	EFL	7	15
6	Higher Education	7	14

7	Flipped Classroom Model	7	6
8	Online Learning	6	14
9	Covid-19	5	13
10	Achievement	4	9

In bibliometric investigations, author co-citation analysis is a valuable method for understanding the intellectual structure of a research field. This technique identifies how often an author's work is co-cited with others in cited publications, revealing relationships and influential contributions. In Figure 7, a total of 9,117 authors were referenced in flipped learning (FL) articles. Setting a minimum citation threshold of 20, 13 authors met this criterion. Key contributors include [5]. (63 citations, link strength 280), Bergmann J. (64 citations, link strength 246), Sams A. (63 citations, link strength 245), Lo C. K. (37 citations, link strength 216), and Hew K. F. (36 citations, link strength 213). Other notable authors are Creswell J. W. (32 citations, link strength 164), Abeysekera I. and Dawson P. (21 citations each, link strength 124 each), Mclaughlin J. E. (29 citations, link strength 120), Hwang G. J. (20 and 29 citations, link strengths 96 and 116), Hasanuddin C. (22 citations, link strength 94), and Hung H. T. (20 citations, link strength 80). The co-citation analysis revealed three primary clusters: Cluster 1 (Red) contains 5 items, including Hasanuddin et al. (2019); Cluster 2 (Green) includes 4 items, with Zainuddin (2017) as a key reference; and Cluster 3 (Blue) comprises 4 items, notably Bergmann and Sams (2012). This analysis highlights the pivotal authors and their interconnectedness, providing a clear map of influential research in the field of flipped learning.



**Figure 7.** Co-citation by Cited Authors



**Figure 8.** Bibliographic Coupling Authors

Figure 8 shows, Zainuddin N. and Halili S.H.: These authors are part of a significant cluster, indicating frequent collaboration. Their connections span from 2017 to 2020 (blue to green shades), showing continuous contributions. Nguyen B.: Connected with Zainuddin N., forming part of the same network, reflecting international collaboration. Arifin M.A.: Central in another major cluster, indicating extensive collaboration with multiple authors. Afrilyasanti R. and Kahyono B.Y.: Form another significant node, collaborating consistently over the years.

Table 5, first cluster analysis about implementation of flipped learning by pre-test and post test method, where post-test results show that, flipped learning is more effective than traditional. Second cluster defines about experimental analysis of flipped learning. Cluster 3 indicates about gamified and technological research. Cluster 4 specifies about flipped classroom and a non-flipped classroom and its perception. Cluster 5 reflects about online and video flipped classroom analysis. Cluster 6 depicts about flipped learning necessity after pandemic COVID-19. Cluster 7 refers about flipped learning analysis for an English as a Foreign Language.

**Table 4.** Cluster Analysis

<b>Cluster 1 (Red)</b>	<b>Cluster 2 (Green)</b>	<b>Cluster 3 (Blue)</b>	<b>Cluster 4 (Yellow)</b>	<b>Cluster 5 (Purple)</b>	<b>Cluster 6 (Sky-Blue)</b>	<b>Cluster 7 (Orange)</b>
[42], [24], [71], [68], [17], [26], [22],	[83], [51], [107], [91],	[73], [48],	[111], [109], [110], [5]	[18], [113], [61]	[112], [114]	[86], [72]

## 5 Conclusion

Indonesia has a substantially larger volume of research and publications on flipped learning than Bangladesh. This is clear from the amount of documents and the variety of associations that contribute to this research. Universitas Negeri Malang in Indonesia has the greatest connection to research outputs in flipped learning, demonstrating a significant institutional commitment to furthering this teaching style. Prominent writers, such as Zainuddin Zamzami, have made significant contributions to the area through multiple publications and frequent collaborations, demonstrating their critical significance in the scientific community.

The number of publications on flipped learning has increased significantly, especially in recent years. This indicates a rising interest in and acknowledgment of the advantages of flipped learning in educational contexts. The analysis discovered seven separate theme clusters, which reflect the many research subjects and approaches used to examine flipped learning. These clusters give a detailed overview of the numerous features and dimensions of flipped learning under investigation by scholars.

Flipped learning research covers a wide range of topics, with a strong emphasis on primary and secondary education, higher education, and vocational training. Key trending keywords include 'flipped classroom,' 'blended learning,' 'e-learning,' and 'higher education,' demonstrating flipped learning's broad application and multidisciplinary character.

The co-authorship analysis indicates extensive research networks, including considerable partnerships within and between Indonesia and Bangladesh. The picture depicts how collaborative efforts have grown over time, emphasizing major researchers and their interconnectivity. The bibliographic coupling analysis emphasizes the importance and reach of major academics, particularly Zainuddin Zamzami. And Halili S.H., who are central actors in the flipped learning research landscape.

## 5.1 Recommendations

The findings illustrate the discrepancies in flipped learning acceptance and implementation across regions and institutions. While Indonesia leads in research output, Bangladesh can expand its research efforts and cooperation in this field. The detected theme clusters and trending keywords point to numerous areas for further research, including the efficacy of flipped learning in various educational contexts, the incorporation of technology into flipped classrooms, and the effects on student engagement and learning outcomes.

The study's findings indicate the potential for expanded collaboration between scholars and institutions in Indonesia and Bangladesh. Joint research endeavors and cross-country investigations might improve our knowledge and use of flipped learning.

Educational policymakers and practitioners may use these findings to encourage and support flipped learning techniques. Evidence that flipped learning increases student engagement and improves learning outcomes may be used to drive policy decisions and instructional practices.

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