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A Bibliographic Analysis of the Development of a Blended Learning Model Based on LMS to Improve Students' Writing Skills

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ABSTRACT

Blended learning is an instructional model that combines face-to-face learning with e-learning through a Learning Management System (LMS). One of the subjects that can be taught using the blended learning model is writing skills. This study aims to analyze keywords, authors' origins, and sources of references in research journal articles concerning the development of a blended learning model based on LMS to enhance students' writing skills in Indonesia. The research method used is bibliometric analysis with the aid of the Publish or Perish software, focusing on research articles published and indexed by Scopus from 2015 to 2025. Data analysis was conducted using descriptive-analytic methods with the VOSviewer system and MS Excel. The results show that there are 150 research articles indicating that blended learning can improve students' writing skills. Ten top journals were identified as major publishers of research on LMS-based blended learning, along with eight leading authors on the topic. The visualization of relationships revealed seven items with a total link strength of 30. The overlay visualization indicates relationships among authors in articles on instructional models. The conclusion of the study suggests that quantitatively, research on blended learning related to students' writing skills is still limited. Further studies and in-depth analyses are needed to identify specific variables and provide more comprehensive discussions on how blended learning can improve students' writing skills.

Keywords: Bibliographic Analysis, Blended Learning Model, Learning Management System (LMS), Publish or Perish, VOSviewer, Scopus.

INTRODUCTION

Education is an essential aspect that is inseparable from the development of human life. Through education, the quality of human life can be improved. Education plays a role in shaping individuals who are valuable to society and the nation—intellectually, emotionally, and spiritually. This is in line with the Law of the Republic of Indonesia No. 20 of 2003 on the National Education System, which states that national education aims to develop students' potential to become individuals who are faithful and devoted to God Almighty, possess noble character, are healthy, knowledgeable, competent, creative, independent, and responsible democratic citizens.

Currently, education has undergone significant and gradual developments in various aspects of learning, including facilities and infrastructure, media, models, methods, supporting technology, and teaching personnel. The low quality of education in Indonesia today is partly due to the use of inappropriate learning models and methods. This issue remains a central focus. According to Utami et al. (2020), teachers or educators play a crucial

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role in improving the quality of education because they are directly involved in the learning activities at school.

The rapid development of Information and Communication Technology (ICT) in the 21st century has accelerated global competition, which in turn demands specific skills known as 21st-century skills. Anugerahwati (2019) stated that 21st-century soft skills consist of six main aspects known as the 6 Cs: critical thinking, collaboration, communication, creativity, culture, and connectivity.

The **Framework for 21st Century Education** emphasizes the use of ICT literacy (Kay, 2010). Dede (2010) noted that "Students must be able to use technology to learn content and skills so that they know how to learn, think critically, solve problems, use information, communicate, innovate, and collaborate." Anderson, Garrison, and Archer also stated that the efficiency and reliability of electronic-based learning assessments can be the best way to teach and deliver important information by improving learning quality (Garrison & Heather, 2004). Therefore, teachers must prepare themselves for the digital era by adapting to computer-based learning environments (Mishra, Koehler, & Henriksen, 2011). In addition, teachers are also required to master technology in order to enhance their competencies (Abidin, Prihatin, & Yanto, 2015).

The development of computer-based learning marked the beginning of e-learning. E-learning refers to learning that uses electronic communication tools such as email and video conferencing. It serves as an alternative to conventional learning. According to Saavedra & Opfer (2012), access to learning in the 21st century has become easier, faster, and more affordable. The use of Information and Communication Technologies (ICT) has brought about major changes in education. There has been a shift in the role of teachers—from being the sole source of knowledge in conventional settings to becoming facilitators in ICT-supported learning. The use of ICT and the growth of e-learning paved the way for the emergence of blended learning.

Blended learning, according to Garrison and Kanuka, "At its simplest, blended learning is the thoughtful integration of classroom face-to-face learning experiences with online learning experiences" (Garrison & Heather, 2004). Therefore, blended learning is the integration of face-to-face learning with online learning. It is described as a model in which teachers leverage technology—typically in the form of web-based instructions, daily assignments, or as a core instructional guide.

A survey by the Indonesian Internet Service Providers Association (APJII) in 2016 showed that internet usage in Indonesia reached 132.7 million people, with 52.5% male users and 47.5% female users. This number increased further by 2022 compared to the 2019 figures The number of internet users in Indonesia reached 88.1 million people. The highest concentration of internet usage is on the island of Java, with a total of 66.3 million users. The high rate of internet access in Indonesia also affects the number of users who engage in blended learning.

This can be observed through the global use of Learning Management Systems (LMS), where Edmodo ranks among the top five most widely used LMS platforms, followed by other systems such as Moodle, Blackboard, SuccessFactors, and Skillsoft. Edmodo, as an LMS used in blended learning environments, recorded a total of 58 million users (Medved, 2016).

Research by Keogh et al. (2017) indicates that the potential benefits of blended learning include the flexibility for learners to access and complete learning tasks at their own pace and time; increased learner independence; a stronger motivation to learn; development of relevant skills; and the ability to access learning materials even when not physically present in a traditional classroom setting.

Findings from Lee and Hung (2015) show that there is no significant gender difference in the implementation of blended learning. Their study categorized instruction into three types: traditional learning, blended learning, and fully online learning. The results revealed that students participating in blended learning achieved better learning outcomes compared to those in traditional or fully online formats.

A study by Bibi (2015) found that students who participated in blended learning demonstrated greater understanding than those who received conventional instruction. Blended learning combines face-to-face interaction with e-learning in a complementary manner. Several prior studies have shown that blended learning can be used to supplement instructional materials, foster student independence, and improve students' knowledge of writing skills as well as their overall learning engagement.

This study is a literature review that aims to explore the efforts toward digital transformation in education over the past decade, particularly following the technological leap brought about by the COVID-19 pandemic. The objective of this study is to review various research studies discussing blended learning models that aim to improve students' writing skills by leveraging technology and supporting the ongoing digital transformation in the education sector.

METHOD

This research is a descriptive-analytical study adopting a bibliographic literature review design. The research data were collected from articles published in journals indexed by Google Scholar, as Google Scholar provides open-access academic resources. The data search process was conducted using the **Publish or Perish** application (Hayudi et al., 2023). The keywords used were *blended learning to improve students' writing skills* with a focus on journal publications. The search results were exported and processed using RIS/RefManager software.

The data obtained from RIS/RefManager were then imported into the VOSviewer_1.6.18 software to analyze author activity and the use of the term *blended learning* in article titles. The data were subsequently presented in network graphs and overlay visualizations.

VOSviewer was used to generate three types of publication visualizations: network visualization, density visualization, and overlay visualization, based on the relationships between items in the data.

RESULTS AND DISCUSSION

Learning is referred to as *blended learning* when it combines two elements: face-to-face instruction and online learning. Digital transformation is a form of change or development across various sectors influenced by technological advancements. The transformation refers to the digitization present in each sector. Digital transformation is not only applicable to the economic and business sectors but can also be implemented in the field of education (Andronic, 2023; Santa Soriano & Torres Valdés, 2021; Tamer & Knidiri, 2023).

Below are the results of the literature search conducted using Publish or Perish:

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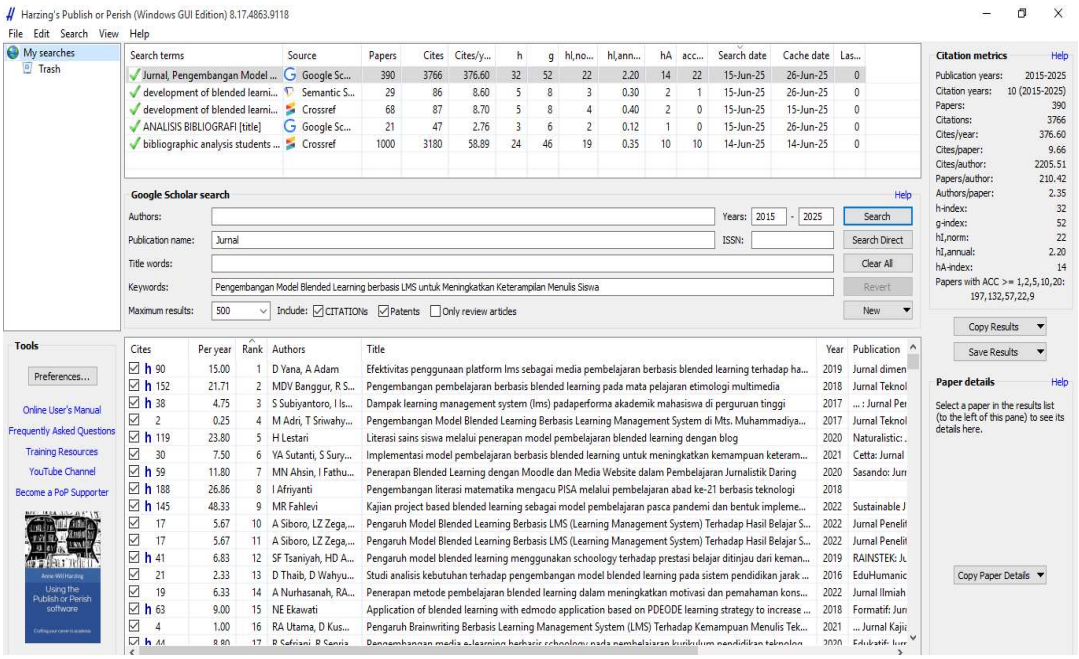

Figure 1. Literature Search Results Using Publish or Perish

Based on the search results above, a total of 390 articles were found using the keyword *Development of LMS-Based Blended Learning Models to Improve Students' Skills* over a 10-year period from 2015 to 2025, with the publication type specified as journals. These articles have been cited a total of 3,766 times.

Research related to blended learning in the field of education has been widely conducted over the years and shows a fluctuating trend. The development of research on this topic over the past decade is as follows:

Table 1. Number of Articles Using the Keyword "Blended Learning"

Tahun	Jumlah	Persentase	Tahun	Jumlah	Persentase
2015	15	3.85	2021	91	23.33
2016	13	3.33	2022	45	11.54
2017	22	5.64	2023	27	6.92
2018	30	7.69	2024	22	5.64
2019	32	8.21	2025	30	7.69
2020	63	16.15			

Based on the table above, it can be observed that research on the topic increased each year. Specifically, in 2015 it accounted for 3.85%, in 2016 for 3.33%, in 2017 for 5.64%, in 2018 for 7.69%, and in 2019 for 8.21%. A significant increase occurred in 2020 during the COVID-19 pandemic, with 16.15% of publications focusing on blended learning. The trend continued in 2021 with a notable increase to 23.33%. However, from 2022 to 2025, the number of publications began to decline, with 11.54% in 2022, 6.92% in 2023, 5.64% in 2024, and a slight rise to 7.69% in 2025.

These findings indicate that research on this topic experienced steady growth over the years, suggesting a rising interest among researchers in exploring technological developments and their impact on education. The following VOSviewer analysis also illustrates the research development trends from 2015 to 2025:

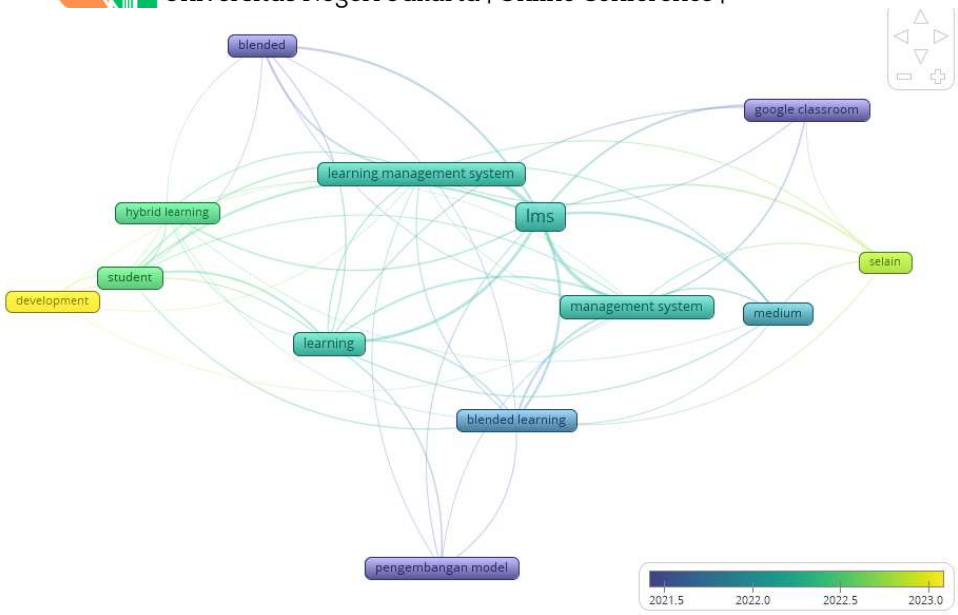

Figure 2. Overlay Visualization Analysis Results

The analysis above shows that, in line with the times, the integration of technology in the education sector has become increasingly necessary. Research on blended learning has continued to grow. In 2022, many studies focused on topics such as blended learning, Learning Management Systems (LMS), hybrid learning, Google Classroom, and model development. Over time, discussions have expanded to include themes like digitalization, accessibility, the education sector, and sustainable development.

In 2021, problem-based learning was a dominant topic of interest. The reference articles used in this study were collected using the **Publish or Perish** software. The initial search through Publish or Perish yielded 390 articles, which were then filtered based on the theme of blended learning in the field of education, resulting in 46 selected articles. These 46 articles were further narrowed down to determine the main reference articles. The key reference articles used in this study are as follows:

- **Journal 1:**
  Oktarina, S., Indrawati, S., & Slamet, A. (2021). *Needs Analysis for Blended Learning Models and Project-Based Learning to Increase Student Creativity and Productivity in Writing Scientific Papers.* AL-ISHLAH: Jurnal Pendidikan, 15(4), 4537–4545.
  Objective: This study aimed to gather information on students' needs in designing a blended learning model combined with project-based learning to enhance their creativity and productivity in writing scientific papers.
- **Journal 2:**
  Hasna, H. R., Fajriyah, K., & Saputra, H. J. (2021). *The Effect of Blended Learning Based on The Problem-Based Learning Model Assisted by Puzzle Media on The Critical Thinking Skills of Fifth Grade Students on Ecosystem Themes.* Journal of Education Technology, 5(1), 14–22.
  Objective: This study aimed to analyze the effect of blended learning based on a problem-based learning model supported by puzzle media on the critical thinking skills of fifth-grade students on the ecosystem theme.
- **Journal 3:**
  Zulhamdi, Z., Rahmatan, H., Artika, W., Pada, A. U. T., & Huda, I. (2022). *The Effect of Applying Blended Learning Strategies Flipped Classroom Model on*

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Students' Critical Thinking Skills. Jurnal Penelitian Pendidikan IPA, 8(1), 86–93. **Objective:** This study aimed to examine the impact of applying the flipped classroom model based on blended learning on students' critical thinking skills in the respiratory system topic.

- **Journal 4:**
  Islam, M. N., Sumarmi, S., Putra, A. K., Sugiyati, P., & Salsabilah, S. (2021). *The Effect of Interactive Blended-Problem Based Learning Assisted Virtual Classroom on Critical Thinking Skills of Students of the Society Era 5.0.*Jurnal Geografi Gea, 21(2), 135–146.
  Objective: This study aimed to determine the effect of the Interactive Blended Problem-Based Learning (IBPBL) model assisted by a virtual classroom on students' critical thinking skills in the Society 5.0 era.
- **Journal 5:**
  Marsiti, C. I. R., Santyasa, I. W., Sudatha, I. G. W., & Sudarma, I. K. (2022). *The Effect of Project-Based Blended Learning and Students' Creativity on Eleventh-Grade Students' Learning Achievement.* International Journal of Instruction, 16(4), 805–822.
  Objective: This study aimed to investigate the effect of project-based learning using a blended learning model and students' creativity on the learning achievement of eleventh-grade students.

The analysis of blended learning in the field of education in this study was supported by the VOSviewer software to explore the bibliometric networks of previous studies that have discussed blended learning in the education sector more broadly. The results of the VOSviewer analysis are as follows:

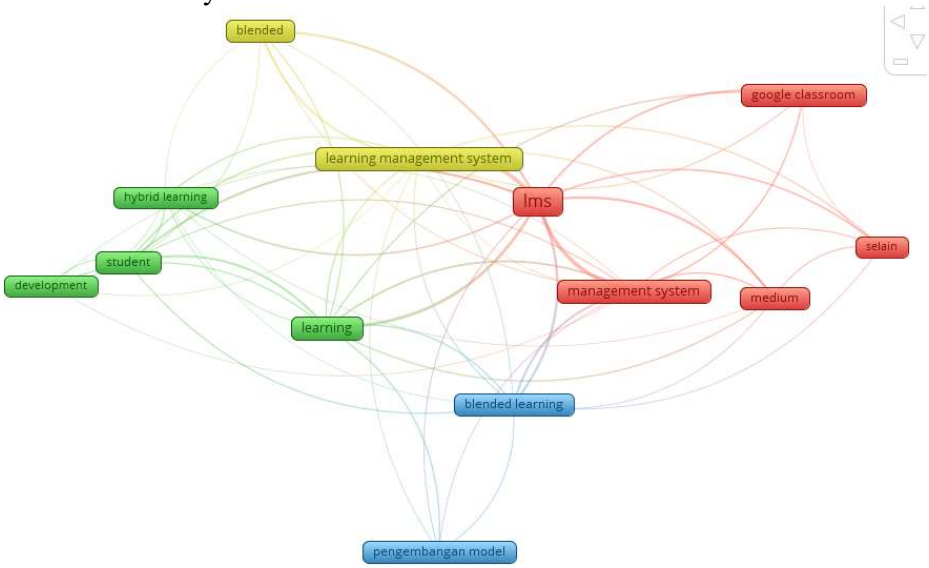

Figure 3. Network Visualization Analysis Results

The network visualization illustrates the bibliographic relationships among previous studies, based on the keywords used in each publication. From the bibliographic analysis above, it is possible to identify how extensively each topic has been studied within its respective cluster. Network visualization analysis can also be used to determine correlations between clusters, indicated by lines connecting one node to another (Andronic, 2023; Özdemir et al., 2023; Serim & Bilgili, 2023).

Based on the results of the analysis, research on blended learning in the field of education can be categorized into four clusters as follows:

1. **Cluster 1** consists of 2 items: *blended* and *learning management system*
2. **Cluster 2** consists of 4 items: *hybrid learning*, *student*, *development*, and *learning*
3. **Cluster 3** consists of 2 items: *blended learning* and *model development*
4. **Cluster 4** consists of 5 items: *LMS*, *management system*, *medium*, and *Google Classroom*

In addition, the analysis conducted using VOSviewer also produced data related to **density visualization**. Density analysis indicates how extensively a particular sub-topic has been studied by researchers. The closer a sub-topic appears to red in the visualization, the more frequently it has been researched. Conversely, if a sub-topic appears green, it means fewer studies have focused on that area (Furstenau et al., 2021).

The results of the density visualization analysis in this study are presented as follows:

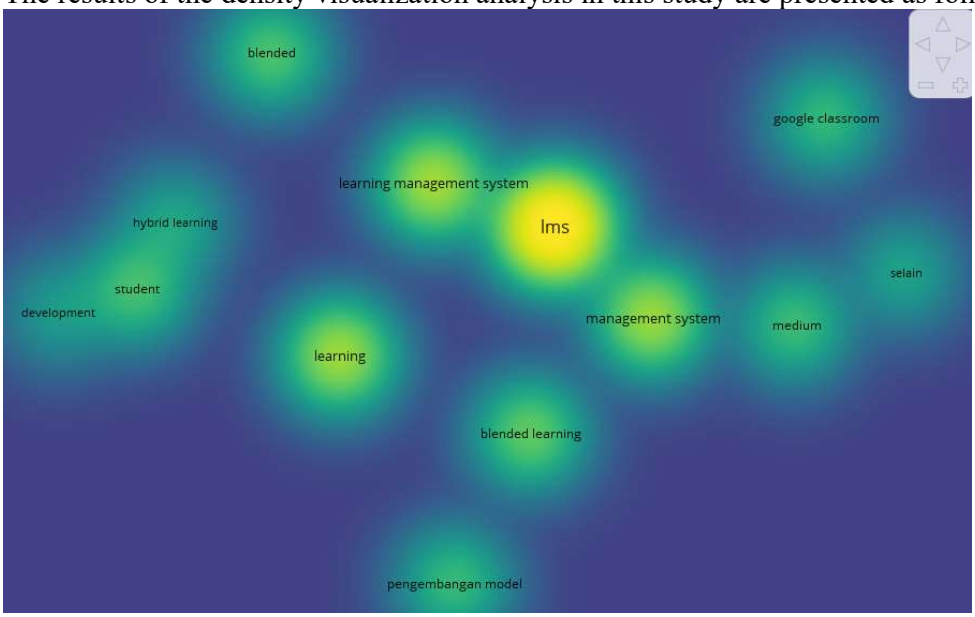

Figure 4. Density Visualization Analysis Results

Based on the density analysis shown in Figure 4, it can be observed that research on blended learning has been extensively conducted, as indicated by the yellow color of the related items. In addition, topics such as LMS and learning management systems have also been widely studied. These topics are among the key elements that underscore the necessity of implementing blended learning in the field of education.

CONCLUSION

As part of efforts to meet the demands of technology-based education, research findings indicate that between 2020 and 2022, there was a significant focus on blended learning methods, Learning Management Systems (LMS), and problem-based learning. In 2023, Learning Management Systems (LMS) continued to be a dominant topic.

Based on the density analysis, it is evident that research on blended learning has been widely conducted, as seen in the yellow-colored items. Other frequently studied topics include LMS, learning management systems, learning, and students. These areas have been particularly emphasized in the context of post-COVID-19 education (the new normal), where the rapid advancement of technology has made its integration into education increasingly necessary and relevant.

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