Trends in Scientific Writing Research: A Systematic Literature Review Approach

1st Sigit Arif Bowo[1], 2nd Sarwiji Suwandi[2], 3nd Andayani[3]

{sigit.arifbowo13@student.uns.ac.id[1], sarwijiswan@staff.uns.ac.id[2] , andayani@staff.uns.ac.id[3]}

Sebelas Maret University, Surakarta, Indonesia[1,2,3]

Abstract. Reviewing previous research helps find maps and trends of research already underway and explore potential research in the future. This research aims to identify research maps in the field of scientific writing. This research procedure was carried out through four stages: identification, screening, feasibility testing, and analysis. Data was collected using the scientific article search engine mendeley.com with several criteria such as year of research, article source, and journal ranking. The research results showed that 45 articles met the criteria. (1) Based on Sinta's ranking, there are articles published in Sinta 2 to Sinta 6. (2) Based on the pattern of article writers, there are articles written independently and collaboratively. (3) Based on keyword trends, trends are dominated by scientific works, teaching materials, and scientific writing. The topics of development, writing skills, and learning media still need to be widely published. This allows researchers to conduct research, especially on developing textbooks for scientific writing.

Keywords: article journal, scientific writing, systematic literature review

1 Introduction

Writing is a complex language skill. Writing skills are strongly supported by mastery of other language skills. Writing activities are not just about writing but rather combine components of knowledge and logical thinking, which are processed in written form. Several other conditions and skills are required to produce effective and communicative writing, such as vocabulary selection, language logic, sentence structure, and others [1].

Scientific writing is a skill that students must master. All academic activities are related to writing skills. Scientific writing is a form of interaction between writers and readers in an academic context. Through scientific writing, authors present information based on rational and intellectual activity processes [2]. Scientific writing skills are used to convey arguments, analyze information, and solve problems [3]. Scientific writing can improve high-level thinking, analyzing, evaluating, and creating abilities [4].

Academic writing is taught to students from the beginning of the semester. Various academic activities, both in and outside of lectures, require students to use writing in an academic context. However, it is not uncommon to encounter problems in scientific writing. An obstacle often found is a need for more understanding of the systematics of types of scientific work [5], as well as linguistic factors such as effective sentences and spelling.

These various problems in scientific writing have given rise to research published in journals. From descriptive qualitative analysis, PTK, to Research and Development (RnD) research, which discusses student conditions and the use of media, methods, and learning models. However, more needs to be discussed regarding mapping research trends in scientific writing. Research regarding research trends or publications is essential to determine the pattern of research that has been carried out. This aims to identify, analyze, and view research opportunities that have yet to be widely studied.

An example of research on research trends was conducted by [6] regarding trends in online references in completing scientific writing assignments. The research results showed that scientific journals and online books dominated the online references. Use these references as a basis for the background of the problem to find gaps in the problem. In addition, online references are used as quotations for the theoretical basis of the literature review.

Another research using bibliometry to analyze research trends in writing scientific papers was carried out [7] regarding trends in topics in writing scientific papers in the 2015-2019 Manukrista and Jumantara Journals. This research shows that the trend for research topics in 2015-2019 regarding scientific writing is 50% for each journal and a combination of the two journals. In the same year's study, research on other scientific writing trends was presented by [8] regarding the Indonesian International Scientific Publication Trend, 2015-2019. The results of his research show that Indonesian international publications during the 2015-2019 period experienced a significant increase, namely from 8,373 publications in 2015 to 46,028 publications in 2019, or an increase of 5.5 times from publications in 2015. In addition, The results of the research also show the most productive writers. These institutions produce the most scientific articles, the countries of origin of the writer's collaborators, and others.

Other bibliometric research was carried out [9]. This research discusses articles on keyword trends published in national journals from 2012 to 2021. The results of this research obtained keyword trends that have yet to be widely studied. However, the journal sources for this research still came from all national journals. There needs to be a more profound study regarding taking sources from accredited national journals. This benefits students to be challenged to publish in accredited journals and also for lecturers for career advancement purposes. Based on this, this research aims to describe: (1) research trends carried out from 2019 to 2023 with the object of articles published in accredited national journals; (2) Collaboration patterns among authors of articles published in accredited national journals; (3) Keyword trends in research over the last five years. The hope is that with this research, there will be a clear picture of trends and opportunities for researchers to publish their articles in accredited national journals.

2 Research Method

This research uses a systematic literature review (SLR) approach. SLR is a systematic review involving sequential identification, synthesis, and assessment activities to produce comprehensive, focused answers [10]. The research steps are (1) identification of topics and development of inclusion and exclusion, (2) filtration and extraction, and (3) analysis and synthesis [11]. Data was collected by tracking articles related to scientific writing on the Mendeley scientific article search page via https://www.mendeley.com/search/. Researchers used the keyword "scientific writing" to focus the search. Relevant articles are available in pdf

format. They are, moreover, synchronized in reference management in the form of a Research Information System (RIS).

Next, to focus the research, researchers carried out several filters. The inclusion and exclusion model reports systematic reviews and meta-analyses, as in Figure 1. There are several inclusion criteria used to obtain scientific writing articles, which include (1) articles published within the last five years (2018-2023); (2) articles about scientific writing in Indonesian and English; (3) the article is a research article; (4) comes from a journal source; (5) articles published in accredited national journals Science and Technology (SINTA) categories 1 to 6. Data analysis was carried out using Microsoft Excel and VOSviewer software version 1.6.20. Bibliographic data analysis uses co-occurrence or keyword analysis with the number of keywords read or at least one keyword. The analysis output is in network visualization (research keyword network) and overlay visualization (research keyword trends).
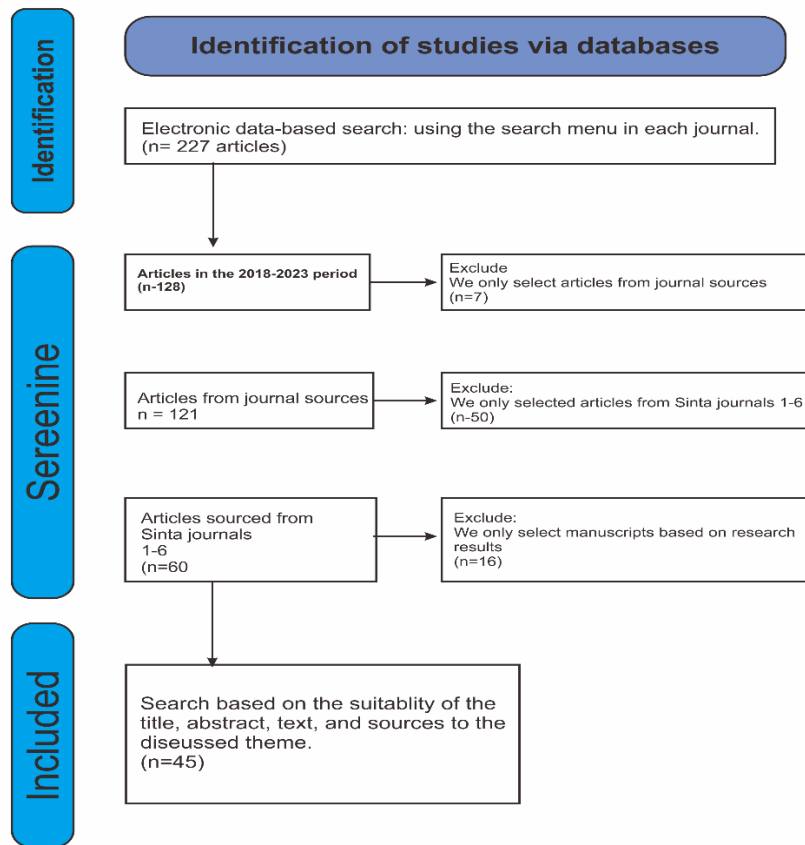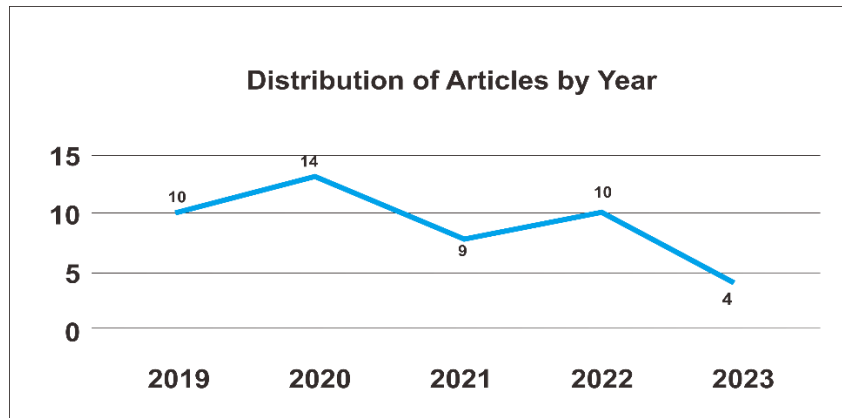

Figure 1.
Systematic Review Flow Chart (PRISMA Flow Chart for Systematic Literature Review)

3 Results and Discussion

3.1 Sinta's Ranking

Based on the screening results according to the inclusion criteria, 45 scientific articles were obtained. Furthermore, if mapped according to the year, we can get an idea of the number of publications each year over the last five years, as in Figure 2.

Figure 2. Year of Article Publication

Figure 2 shows the trend of scientific writing publications from 2019 to 2023. In 2019 and 2022, the number of publications on scientific writing is the same. The highest number of publications occurred in 2020. Meanwhile, a decline occurred in 2021. As for the articles tracked in 2023, there were four scientific articles. The distribution of these publications is then classified based on the ranking of the journal that published them. The results of these categorizations can be seen in Figure 3 in detail.
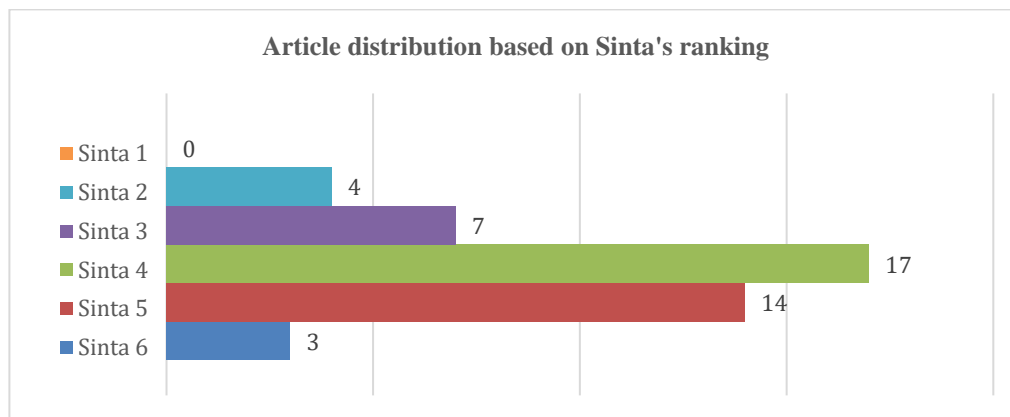
Figure 3. Article distribution based on Sinta's ranking

Based on Figure 3, the most articles published were on Sinta 4 with 17 articles. Then followed by articles published in Sinta 5 with 14 articles and Sinta 3 with 7 articles. There are

4 articles published in Sinta 2, and 3 articles in Sinta 6. No published articles were found in Sinta 1. Articles published in Sinta 2 consist of articles [12]; [13]; [14]; and [15].

Based on initial screening, there are hundreds of articles published in national journals. However, only 45 articles were identified as indexed in accredited national journals. Not infrequently, many articles are rejected by journal managers because their systematics do not match the article template or journal environment style. Apart from that, motivational factors, busy work schedules, and publication costs influence interest in writing articles. In fact, another classic factor related to the low number of lecturer publications is due to the limited competence of research personnel [16]. Another factor is the disproportionate ratio of journals to authors. In addition, the publication period and published articles are limited, meaning that many articles have not been published [17].

There needs to be an increase in the quality and quantity of scientific article publications in accredited national journals. One of them is that authors need to carefully pay attention to the provisions of each journal. Starting from the article template to the surrounding style, these are things that must be paid attention to. One effort that can be made is to adjust the structure of the article using the Introduction, Methods, Results and Discussion (IMRAD) method. Writers need to focus their writing on this pattern. Usually the IMRAD pattern is used as a reference in writing articles indexed by Sinta to Scopus [18].

Researchers also need to be familiar with various types of research. For example, in articles published in Sinta 2 and 3, the type of research used is RnD, such as the work of [14] with the title Edu Karim Game Application Development: Android-Based Educational Game in Indonesian Courses or other research (Primandhika et al., 2023) with the title *Pengembangan Cekata: Aplikasi Pemeriksaan Kesalahan Berbahasa Indonesia*. Development research with technology studies is an exciting trend to observe.

Apart from that, writers also need to pay attention to language factors. Many Sinta 2 and 3 journals require authors to use English in Figure 4.

Figure 4. Pattern of article writers

Based on Figure 4, it can be seen that there are 13 articles (29%) written individually. As for the remainder, 32 articles (71%) were written in collaboration. Collaboration patterns in

writing articles also vary. Based on the number of authors, there were 13 (29%) articles written by two authors; three authors wrote 11 (24%) articles; 7 (16%) articles written by four authors; and 1 (2%) article written by five authors.

Furthermore, based on the pattern of the author's institution of origin, there are two types: authors from the same institute and cross-institutions. If you look closely, of the 32 articles written collaboratively, 6 (19%) were written by authors from across institutions. Meanwhile, the remaining 26 (81%) articles were written collaboratively by authors from the same institution. Of the six articles written by writers across institutions, five articles were written by writers from across universities, both between domestic universities and within the country and abroad. Collaboration of authors affiliated with domestic and foreign universities, for example, in articles by [19] originating from the State University of Malang and Shandong University, China. Then, 1 article was written by a collaboration of authors from universities and elementary schools [22] from UIN Mataram and SDN Nyurlembang Narmada.

Collaboration in research is essential. Many positive aspects can be gained, such as the opportunity to share knowledge and experience, expertise, and new techniques in scientific studies [23]. Apart from that, collaboration in research can also increase writing productivity. Writers who are productive in producing scientific work are usually writers who collaborate a lot [24]. Apart from that, by collaborating, the authors will further increase the network of the scientific community. This will undoubtedly open up new opportunities for scientific and academic development and the potential to produce scientific work on new topics.

3.2 Keyword Networking

Based on analysis by looking at the minimum number of keyword occurrences from 45 articles, 94 keywords were obtained, divided into 11 clusters. This cluster can be seen in Figure 5.
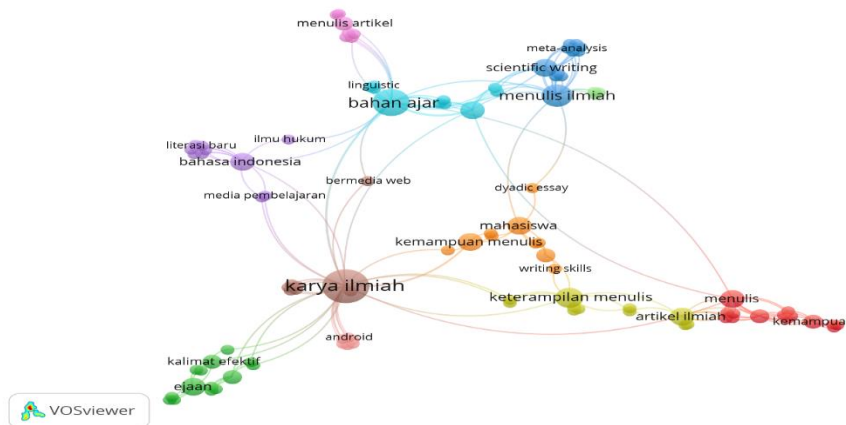
Figure 5. The scientific writing research cluster

Based on Figure 5, there are 11 clusters related to scientific work. These clusters include *bahan ajar, menulis, kemampuan menulis, keterampilan menulis, bahasa Indonesia* and kalimat efektif. The teaching materials cluster consists of the keywords 4C skills, development of teaching materials, learning materials, and scientific papers. The writing cluster includes the keywords *karya tulis ilmiah, makalah ilmiah*, project-based learning, and scientific article. The writing ability cluster consists of the keywords *kesulitan menulis, penelitian,*, and writing skills. Next, the writing skills cluster contains the keywords *kesalahan ejaan, metode pembelajaran, model pembelajaran, dan artikel ilmiah*. The Indonesian language cluster includes *literasi baru, media pembelajaran, dan revolusi industri.* The effective sentence cluster *includes ejaan, puebi, diksi, cekata, kesalahan*, dan scientific manuscripts.

Almost every cluster is related to one another except the scientific writing and article writing clusters. However, some clusters are outside of scientific work. The two clusters are connected through another cluster intermediary. Based on this, scientific writing studies have a relationship with each other. The clusters of scientific work, Indonesian, teaching materials, writing, writing abilities, writing skills, and effective sentences are closely related.

Several keywords used based on the analysis results appear most often: *karya ilmiah, bahan ajar, menulis ilmiah, keterampilan menulis*, scientific writing, and menulis. The tabulation can be seen in table 1.

Table 1. Dominant keywords

| No.	Keywords	Total
1	*Karya Ilmiah*	11
2	*Bahan ajar*	7
3	*Menulis ilmiah*	5
4	*Keterampilan menulis*	4
5	Scientific writing	3
6	*Menulis*	3

The dominant keyword is related to the strength of the keyword relationship. The five keywords in Table 1 strongly relate to other keywords except for the keyword *keterampilan menulis*. This can be seen in Table 2.

Table 2. Strength of Keyword Relationships

No.	Keywords	Total
1	*Karya Ilmiah*	31
2	*Bahan ajar*	24
3	*Menulis ilmiah*	21
4	*Scientific* writing	16
5	*Menulis*	15
6	Bahasa Indonesia	12

3.3 Latest Trends in Scientific Writing Keywords

The VOSviewer output from the overlay visualization shows the latest keyword trends. These trends are marked with light and dark colors accompanied by an explanation of the year. This trend can be seen in Figure 6.
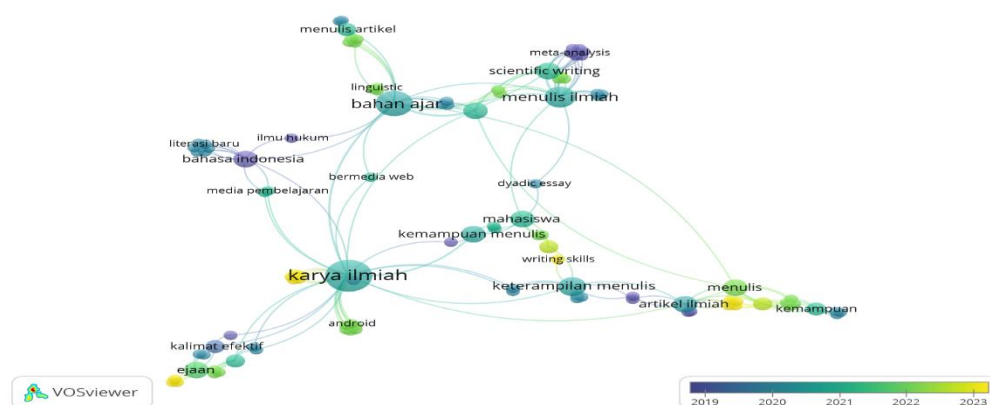
Figure 6. Latest Trends in Scientific Writing Keywords

Some keywords trending for the 2019-2020 period are *kemampuan mahasiswa, kesalahan ejaan, kalimat efektif, metode pembelajaran, dan kesulitan menulis*. This can be seen in research results [25]; [26]; and [22]. The keywords *menulis artikel, menulis ilmiah, bahan ajar, kemampuan menulis, ejaan*, and android are trending in 2021 to 2022. This can be seen in research results [27]; [28]; and [29]. The latest trend in 2023 is research with the keywords scientific works, oral corrective feedback, online reference, writing skills, and cekata.

After further analysis, the trending keywords came from articles published in the ranking journals Sinta 3 and Sinta 2. These articles were published in Indonesian and English. For example, an article by [15] about the influence of the Project-based Learning (PjBL) learning model, integrated with oral corrective feedback, was published in Sinta 2. Research on the use of PjBL has become a trend because it is a learning model recommended in the independent curriculum [30]. Apart from that, PjBL has also been proven effective in improving critical thinking skills [31].

Other keywords that are trending are online reference and cekkata. Both are related to the use of technology and digital literacy. This shows that the trend in scientific writing research is that the topic of digital literacy remains the main study. Considering that the use of online references and application development is closely related to digital literacy [9]. If their articles want to be published in high-ranking journals, this provides an opportunity for writers to develop issues with these keywords into research topics.

4 Conclusion

SLR research provides information about publications indexed in accredited national journals within the last five years that discuss scientific writing. The most publications on scientific writing occurred in 2020, with 12 articles. Meanwhile, the most articles published were on Sinta 4, with 17 articles. Four types of research are used: dominated by qualitative research, followed by RnD, CAR, and qualitative research. Based on the author's pattern, articles are written

independently and collaboratively. Researchers from fellow institutions mainly carry out collaboration. Domestic institutions dominate cross-institutional collaboration. The remainder results from the collaboration between domestic and foreign higher education institutions, universities, and schools. Based on trends, the most dominant keywords are scientific works, teaching materials, scientific writing, writing skills, and writing. Meanwhile, based on the latest trends, keywords that appear to relate to learning models and the use of technology. This provides information to researchers as an opportunity to write articles with these keywords.

References

[1] V. Darmayanto, A. Manurung, and S. Deliani, "Pengembangan Bahan Ajar Menulis Karya Ilmiah dalam Pengajaran Bahasa Indonesia Pada Siswa Kelas Xi Mas Al-Jamiyatul Washliyah Sei Kepayang Tahun Pembelajaran 2019-2020," *LNGUISTIK J. Bhs. Sastra*, vol. 6, no. 1, pp. 35–42, 2021, [Online]. Available: http://jurnal.um-tapsel.ac.id/index.php/Linguistik/article/view/3719/1925

[2] Djatmika, L. A. Prihandoko, and J. Nurkamto, "Students' Profiles in the Perspectives of Academic Writing Growth Mindsets, Self-Efficacy, and Metacognition," *Int. J. Instr.*, vol. 15, no. 3, pp. 117–136, 2022, doi: 10.29333/iji.2022.1537a.

[3] Yuliarti, S. Suwandi, Andayani, and Sumarwati, "Learning Model Inquiry-Based Local Wisdom Dilemmas Stories and Their Effects on Critical Thinking and Scientific Writing Abilities," *Int. J. Learn. Teach. Educ. Res.*, vol. 22, no. 5, pp. 538–557, 2023, doi: 10.26803/ijlter.22.5.27.

[4] S. Kim, J. W. Yang, J. Lim, S. Lee, J. Ihm, and J. Park, "The impact of writing on academic performance for medical students," *BMC Med. Educ.*, vol. 21, no. 1, pp. 1–8, 2021, doi: 10.1186/s12909-021-02485-2.

[5] G. Tutpai and E. Er Unja, "Hambatan Dalam Penyusunan Proposal Penelitian Oleh Mahasiswa Keperawatan Stikes Suaka Insan Banjarmasin," *J. Keperawatan Suaka Insa.*, vol. 7, no. 1, pp. 18–23, 2022, doi: 10.51143/jksi.v7i1.322.

[6] S. Hamzah, Hadiwinarto, R. Kurniawan, and N. D. Lestari, "The Trends of Online Reference Choice in Postgraduate Students of FKIP UNIB as a Source of Reference in Writing Scientific Works," *JMKSP (Jurnal Manajemen, Kepemimpinan, dan Supervisi Pendidikan)*, vol. 8, no. 1, pp. 416–426, 2023, doi: 10.31851/jmksp.v8i1.12186.

[7] Suryadi, "Tren Topik Penulisan Karya Ilmiah Pada Jurnal Manuskripta dan Jumantara Tahun 2015-2019," *J. Humanit. Soc. Sci.*, vol. 1, no. 1, p. 57, 2020.

[8] P. B. Putera, Parama T. W. W. Kusuma, and S. Kadang, "Indonesian International Scientific Publication Trend, 2015-2019," *Pustabiblia J. Libr. Inf. Sci.*, vol. 5, no. 1, pp. 77–96, 2021, doi: 10.18326/pustabiblia.v5i1.77-96.

[9] Suntoro and N. H. Setyaningsih, "Pemetaan Bibliometrik Dengan Vosviewer Terhadap Perkembangan Penelitian Bidang Menulis Karya Ilmiah," *Pustakaloka*, vol. 14, no. 1, pp. 53–70, 2022, [Online]. Available: https://doi.org/10.24853/pl.4.1.12-19.

[10] R. Mallett, J. Hagen-Zanker, R. Slater, and M. Duvendack, "The benefits and challenges of using systematic reviews in international development research," *J. Dev. Eff.*, vol. 4, no. 3, pp. 445–455, 2012, doi: 10.1080/19439342.2012.711342.

[11] R. Randles and A. Finnegan, "Guidelines for writing a systematic review," *Nurse Educ. Today*, vol. 125, no. March, p. 105803, 2023, doi: 10.1016/j.nedt.2023.105803.

[12] S. Indrawati, S. Subadiyono, and A. R. Turama, "the Development of Scientific Paper Teaching Materials Using Process-Genre Approach," *RETORIKA J. Bahasa, Sastra, dan Pengajarannya*, vol. 13, no. 2, pp. 358–367, 2020, doi: 10.26858/retorika.v13i2.13671.

[13] L. Suhirman and B. Rahayu, "Empowering EFL Teachers for Scientific Writing in PPG Workshop: Writing Classroom Action Research Proposal," *Indones. J. EFL Linguist.*, vol. 6, no. 2, pp. 473–486, 2021, doi: 10.21462/ijefl.v6i2.414.

[14] Rianto, "Pengembangan Aplikasi Gim Edu Karim: Gim Edukasi Berbasis Android Pada Mata Kuliah Bahasa Indonesia," *J. Kaji. Bhs.*, vol. 11, no. 1, pp. 153–164, 2022, doi: 10.26499/rnh.v11i.4667 Abstrak.

[15] V. Indriyani, A. G. Ningsih, M. D. F. Henanggil, and W. Fathia, "The Effect of PjBL with Oral Corrective Feedback on Student Scientific Article Writing Skills," *Ta'dib J.*, vol. 26, no. 1, p. 85, 2023, doi: 10.31958/jt.v26i1.8652.

[16] S. Suwandi, "Pembelajaran Bahasa Indonesia Yang Mencerdaskan Dan Tanggung Jawab Menghasilkan Generasi Literat," *FON J. Pendidik. Bhs. dan Sastra Indones.*, vol. 13, no. 2, pp. 1–17, 2018, doi: 10.25134/fjpbsi.v13i2.1562.

[17] P. Pardjono, N. Nuchron, S. Surono, and S. D. Ramdani, "Analisis Faktor-Faktor Penghambat Produktivitas Publikasi Karya Ilmiah Mahasiswa PPs UNY pada Jurnal Internasional Terindeks," *J. Din. Vokasional Tek. Mesin*, vol. 2, no. 2, pp. 139–147, 2017, doi: 10.21831/dinamika.v2i2.16002.

[18] A. Rahmat, A. Ntelu, and M. Mirnawati, "Teknik Keterampilan Menulis Artikel Model IMRAD dengan standar Sinta, Scopus dan WOS," *AKSARA J. Ilmu Pendidik. Nonform. 1383*, vol. 9, no. 02, pp. 1383–1390, 2023, doi: 10.37905/aksara.9.2.1383-1390.2023.

[19] A. Rofiuddin, D. Widyartono, G. Susanto, and D. Pickus, "Developing Scientific Article Writing Materials Using a Hybrid Learning Approach: Insights from an Indonesian Language for Foreign Speakers (BIPA) Program," *J. Pendidik. Teor. Penelitian, dan Pengemb.*, vol. 7, no. 7, pp. 261–266, 2022, doi: 10.17977/jptpp.v7i7.15359.

[20] K. A. Sukarto and M. Zahari, "Bahasa Indonesia Ragam Tulis Makalah Mahasiswa Fakultas Hukum Universitas Nasional Jakarta," *Pujangga*, vol. 6, no. 2, pp. 158–176, 2020, doi: 10.47313/pujangga.v6i2.994.

[21] M. S. Lubis, A. Rahimah, and I. S. Lubis, "Kesulitan-Kesulitan Yang Dihadapi Oleh Mahasiswa Program Studi Bahasa Indonesia Ipts Dalam Penulisan Karya Tulis Ilmiah (Kti)," *J. Educ. Dev. Inst. Pendidik. Tapanuli Selatan*, vol. 7, no. 3, pp. 193–199, 2019, doi: 10.37081/ed.v7i3.1228.

[22] S. Sultan and D. Yulianingsih, "Klasifikasi Kesalahan Dan Hambatan Penggunaan Bahasa Indonesia Sebagai Bahasa Akademik Pada Mahasiswa FTK UIN Mataram," *El-Tsaqafah J. Jur. PBA*, vol. 19, no. 1, pp. 72–87, 2020, doi: 10.20414/tsaqafah.v19i1.2345.

[23] N. R. Widuri and A. Prasetyadi, "Tingkat kolaborasi, produktivitas penulis dan artikel metrik pada Jurnal Mechatronics,Electrical Power, and Vehicular Technology," *Berk. Ilmu Perpust. dan Inf.*, vol. 14, no. 1, p. 62, 2018, doi: 10.22146/bip.33408.

[24] S. P. Rahayu and L. Christiani, "Kolaborasi dan Produktivitas Penulis Artikel Imiah pada Jurnal Lentera Pustaka," *J. Ilmu Perpust.*, vol. 9, no. 1, pp. 83–91, 2020, [Online]. Available: https://ejournal3.undip.ac.id/index.php/jip/article/view/29973

[25] R. Damariswara and F. A. Wiguna, "Analisis Kemampuan Menulis Karya Ilmiah dalam Mata Kuliah Bahasa Indonesia (Studi pada Mahasiswa PGSD Angkatan 2016)," *Stilistika J. Pendidik. Bhs. dan Sastra*, vol. 12, no. 2, pp. 111–123, 2019, doi: 10.30651/st.v12i2.2898.

[26] H. Heryani, "Kemampuan Mahasiswa Menggunakan Kalimat Efektif Dalam Menulis Karya Ilmiah," *J. Pendidik. Bhs.*, vol. 8, no. 1, p. 81, 2019, doi: 10.31571/bahasa.v8i1.1134.

[27] M. Lewier, G. Somelok, and A. Yoris, "Peningkatan Keterampilan Berbahasa Produktif Melalui Model Pembelajaran Multiliterasi Pada Mahasiswa Program Studi Pendidikan Bahasa Dan Sastra Indonesia FKIP Universitas Pattimura Ambon," *ARBITRER J. Pendidik. Bhs. dan Sastra Indones.*, vol. 3, no. 1, pp. 405–422, 2021, doi: 10.30598/arbitrervol3no1hlm405-422.

[28] R. R. Khakim, D. Dawud, and T. Harsiati, "Bahan Ajar Menyusun Karya Ilmiah Mahasiswa Bermedia Web," *J. Pendidik. Teor. Penelitian, dan Pengemb.*, vol. 6, no. 5, pp. 735–746, 2021, doi: 10.17977/jptpp.v6i5.14790.

[29] S. Aisah and S. Sukiman, "Pengembangan Bahan Ajar Menulis Ilmiah Berbasis Keterampilan 4C Di Prodi Pendidikan Bahasa Indonesia Universitas Billfath," *J. Bhs. Ling. Sci.*, vol. 14, no. 2, pp. 341–352, 2022, doi: 10.21274/ls.2022.14.2.341-352.

[30] Mujiburrahman, M. Suhardi, and S. N. Hadijah, "Implementasi Model Pembelajaran Project Base Learnig Di Era Kurikulum Merdeka," *COMMUNITY J. Pengabdi. Kpd. Masy.*, vol. 2, no. 2, pp. 91–99, 2023, doi: 10.51878/community.v2i2.1900.

[31] F. Nadiyah and F. Tirtoni, "Pengaruh Project Based Learning Terhadap Kemampuan Berpikir Kritis Siswa Dalam Kurikulum Merdeka Belajar," *VOX EDUKASI J. Ilm. Ilmu Pendidik.*, vol. 14, no. 1, pp. 25–36, 2023, doi: 10.31932/ve.v14i1.2010.