Journal of English Language Teaching and Learning (JELTL)
Vol. 6, No. 1, June 2025, 19-26
E-ISSN: 2723-617X
available online at: https://publikasi.teknokrat.ac.id/index.php/jeltl

ARTIFICIAL INTELLIGENCE RESEARCH STUDIES IN ENGLISH LEARNING WITHIN THE LAST 20 YEARS

Rizky Amelia[1], Aneta Rakhmawati[2], Nuruddin Wiranda[3], Fatchul Mu'in[4], Rusma Noortyani[5], Siti Kustini[6]
Politeknik Negeri Banjarmasin[1, 2,6]
Universitas Lambung Mangkurat[3,4,5]

Corresponding email: rizky.amelia@poliban.ac.id

Received: (21 April 2025) **Accepted**: (30 May 2025) **Published :** (30 June 2025)

Abstract

Research on Artificial Intelligence is not hindered in all fields including English learning. Publications in this field increases each year, yet the mapping is not depicted clearly yet. Thus, this study tries to provide the mapping on artificial intelligence in English learning within the last 20 years. This present study employed a bibliometrics analysis involving Scopus-indexed research articles within 20 years (2003-2023). As many as 1.661 articles were used by the researchers with the keywords of Artificial Intelligence, machine learning, English learning, education, and English language. Focusing on some foci, the results show that: [1] Artificial Intelligence in relation to natural language processing, learning systems, and machine learning are three big research trends of AI in English learning; [2] The number of publications increases each year from 2003 to 2023 with 6 publications in 2003 and 333 publications in 2023; [3] Top five countries conducting research of AI in English learning are China (512 publications), United States (230 publications), India (171 publications), United Kingdom (91 publications), and Germany (60 publications); [4] The affiliations with most publications are Peking University (14), Soochow University (12), Chinese Academy of Sciences (11), CNRS Centre National de la Recherche Scientifique (10), and University of Toronto (10); [5] The subject areas of these research studies are Computer Science (1,176), Mathematics (398), Engineering (374), Medicine (256), and Social Sciences (221). Implications of the investigation of specific keyword mapping visualization results can be created and enhanced for more studies in Scopus-indexed especially in Indonesia as they are still considered rare in Indonesia.

Keywords: Artificial intelligence, English, learning, research

To cite this article:
Amelia, R. Rkhmawati, A., Wiranda, N., Mu'in, F., Noortyani, R., & Kustini, S. (2025). Artificial intelligence research studies in English learning within the last 20 years. *Journal of English Language Teaching and Learning*, *6*(1), 19-26.

INTRODUCTION

Artificial Intelligence (henceforth AI) research has advanced in a variety of fields (Bianchini et al., 2022; Gerlich, 2023), including English learning. The integration of AI into English learning not only on receptive skills (listening and reading), but also speaking and writing (Cardona et al., 2023). The advancement of AI provides novel ways of English language instruction. It supports both teachers and students to set and manage their learning (Wang, 2019). Thus, AI integration in English learning has been revolutionary, greatly improving the ways English is taught and learned.

English teachers and lecturers are constantly looking for new approaches and tools to use AI for more effective language training (Ghafar et al., 2023). English learning does not solely taken place in English Department settings. Classes can also take place from many levels and many fields as English becomes one of the lessons in schools and universities. This makes the focus broader. More than that, learning not only takes place in the classroom, but also outside class. These rapid changes of technology particularly with the assistance of AI in English learning help teachers and lecturers in some ways, among others creating teaching materials, helping students with extensive English practices, creating lesson plans, correcting students' mistakes, and grading students (Mushthoza et al., 2023; Wei, 2023).

Researchers and educators also conducted research studies within the scope of Artificial Intelligence in English learning. Some of the previous studies conducted was concerned with construction of corpus in AI age

(Hong, 2018), new era of AI in education (Kamalov et al., 2023), AI on speaking skills and self-regulation in EFL context (Qiao & Zhao, 2023), AI role in developing English learners' communication skills (Huriati et al., 2023), and even future teaching and learning and AI (Cardona et al., 2023). In addition, publications on AI and English learning have increased year after year, demonstrating the growing interest and investment in this junction of technology and education. However, the rapid proliferation of research has resulted in a large and fragmented body of material, making it difficult to perceive the entire picture clearly. In other words, despite tremendous advances, the mapping of AI applications in English learning remains unclear.

The advent of AI has sparked changes across many fields, notably within education in English learning. The existence of AI plays role in changing English teaching practices over the last two decades. By offering a mapping of AI in English learning during the previous 20 years (2003–2023), this study seeks to close this gap. The primary advancements and trends of AI in this field will be emphasized by this study through a methodical evaluation and classification of the body of literature. This mapping will direct future initiatives and be a vital resource for scholars, educators, and other parties involved.

RESEARCH METHOD

This study employed a bibliometric analysis research involving Scopus-indexed research articles within 20 years (2003-2023). There are five stages employed in this present study that can be seen in Figure 1.

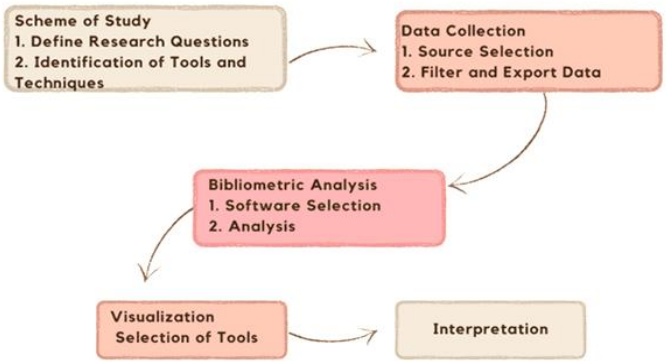

Figure 1. Procedure of Bibliometric Analysis adapted from (Haryandi et al., 2024; Nasir et al., 2020)

The first stage was the scheme of study. In this stage, the researchers defined the research question namely how the mapping on artificial intelligence in English learning within the last 20 years is as well as identification of tools and techniques using the co-occurrence map. Secondly, the researchers collected the data by selecting the source, filtering, and exporting the data. As many as 1.661 documents from conference papers and articles were used by the researchers with the keywords of Artificial Intelligence, machine learning, English learning, education, and English language. Data of this study was taken from Scopus website and saved in RIS and CSV formats. The third stage was selecting the software and analyzing. VOSviewer software was utilized to visualize the networks of the keywords, countries, universities, and subject areas. The fourth stage was visualizing the data and the last stage was interpreting the data.

FINDINGS AND DISCUSSION

The results of this study are divided into some foci. The first focus of this study is the visualization of the analysis with Artificial Intelligence in English Learning. It reveals significant trends and insights into the intersection of Artificial Intelligence (AI) and English learning over the past two decades. The bibliometric analysis indicates that AI has increasingly become a central focus in English language education, with particular emphasis on natural language processing (NLP), learning systems, and machine learning. These areas represent the core research trends, reflecting the growing integration of AI technologies in language learning environments. The steady increase in the number of publications from 2003 to 2023 highlights the expanding interest and research activity in this domain, underscoring the relevance of AI in modern educational practices.

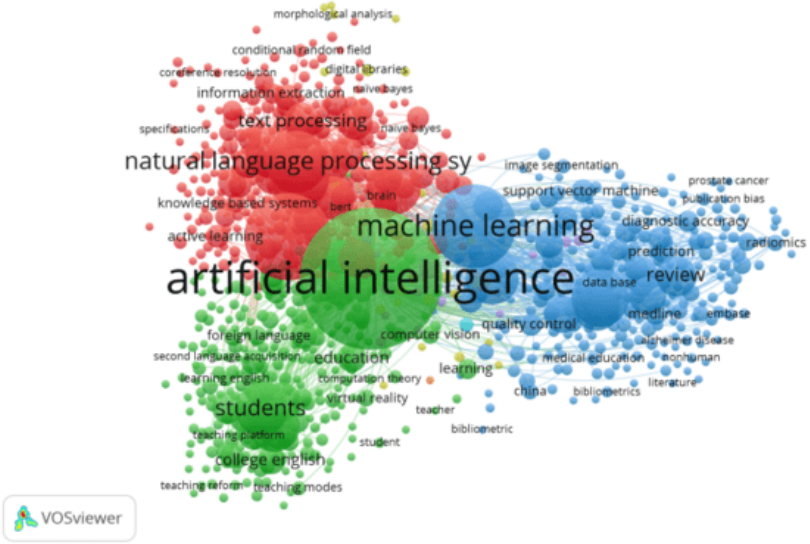

Figure 2. Research trends of AI in English learning

It is seen in Figure 2 that Artificial Intelligence in relation to natural language processing, learning systems, and machine learning are three big research trends of AI in English learning. One of the studies concerning the NLP is conducted by (Chen & Mooney, 2011) entitled learning to interpret natural language navigation instructions from observations. Another study was conducted by (Paladines & Ramírez, 2020) on intelligent tutoring systems with dialogue in natural language.

Egina (2024) stated that AI has revolutionized the language learning to which the early developments have been laying the foundational understanding of how AI could enhance language in education. During this development, Intelligent Tutoring Systems began employing NLP to engage students in interactive dialogues, providing hints, feedback, and explanations tailored to their responses (Graesser et al., 2001; Paladines & Ramírez, 2020). (Graesser et al., 2001) mentioned that intelligent tutoring systems which have been developed for twenty years have proven to be quite successful though the concept of AI had started to culturally assimilated in scientists, mathematicians, and philosophers in 1950s (Anyoha, 2017). Also, the first system namely Theseus, a small robotic mouse that could navigate a simple maze and remember its course was built in 1950 (Roser, 2022). Then, the AI abilities have come a long way or seven decades and now getting very rapidly advanced.

Going further and more detail, the results of network visualization augmented reality co-occurrence analysis are provided in Figure 3.

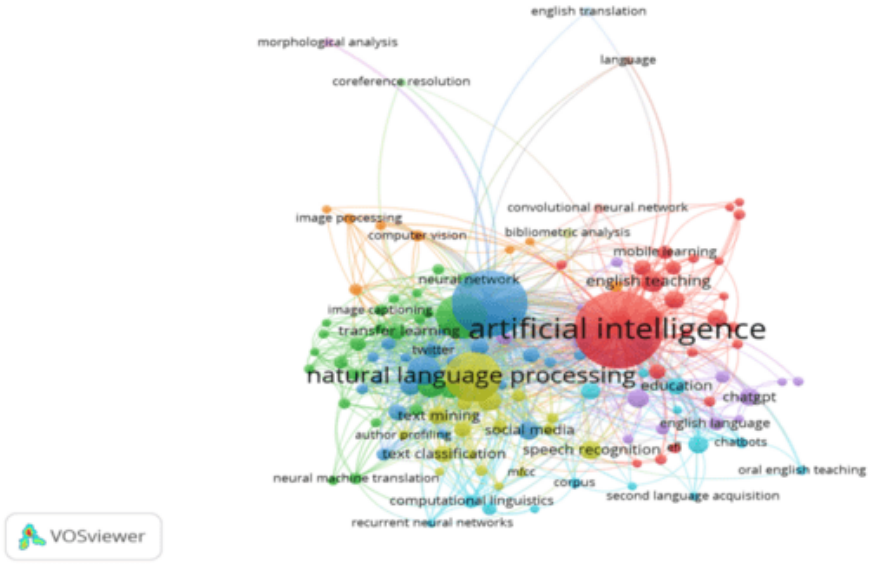

Figure 3. Network visualization of artificial intelligence in English learning co-occurrence analysis

Figure 3 shows the network visualization of artificial intelligence in English learning from the VOSviewer as it provides bibliometric analysis mapping. It was obtained by extracting a total of 1.661 articles selected based on title, keywords, and abstracts. This study found five top cited articles within the last 20 years among others (Di

Vaio et al., 2020) with 440 citations, (Amodei et al., 2016) with 416 citations, (Giatsoglou et al., 2017) with 274 citations, Salakhutdinov & Larochelle (2010) with 267 citations, and Chen & Mooney (2011) with 232 citations. Then, a number 13 clusters with 130 identifiable items were obtained and provided in Table 1.

Table 1. Research Development of Each Cluster

Cluster	Number of Items	Keywords
Cluster 1 Dark red	25 items	Application, artificial intelligence, **artificial intelligence technology**, automatic speech recognition, autonomous learning, big data, blended learning, college English, college English teaching, computational intelligence, data mining, e-learning, EFL, English, English as a foreign language, English learning, English teaching, foreign language learning, internet of things, mobile learning, online teaching, second language learning, serious games, **teaching** mode, teaching reform
Cluster 2 Dark Green	24 items	Attention, bert, cross-lingual, deep learning, explainable artificial intelligence, feature extraction, image captioning, lstm, machine translation, neural machine translation, neural network, neural networks, rnn, statistical machine translation, transfer learning, word embedding, word sense disambiguation, word2vec, wordnet
Cluster 3 Dark blue	22 items	Arabic, classification, covid-19. decision tree, English writing, fake news detection, feature selection, hindi, logistic regression, machine learning, multilingual, natural language, naive bayes, nlp, opinion mining, question answering, random forest, sentiment analysis, social media, support vector machine, svm, twitter
Cluster 4 Yellow	17 items	Author profiling, cnn, event extraction, information extraction, information retrieval, language identification, mfcc, named entity recognition, natural language processing, ontology, relation extraction, speech recognition, supervised machine learning, text classification, text mining, transliteration, wikipedia
Cluster 5 Dark purple	14 items	Ai, artificial intelligence, assessment, chatbot, chatgpt, computer-assisted language, English education, English language, generative artificial intelligence, higher education, learning, machine learning, natural language processing, translation
Cluster 6 Blue	14 items	Active learning, chatbots, computational linguistics, corpus, education, evaluation, ict, intelligent tutoring system, language learning, oral English teaching, recurrent neural networks, second language acquisition, sentiment classification, supervised learning
Cluster 7 Orange	8 items	Attention mechanism, computer vision, convolutional neural network, human-computer interaction, image processing, ocr, prediction, virtual reality
Cluster 8 Brown	1 item	Language
Cluster 9 Purple	1 item	Morphological analysis
Cluster 10 Pink	1 item	Convolutional neural network
Cluster 11 Light green	1 item	Conference resolution
Cluster 12 Light blue	1 item	English translation
Cluster 13 Light yellow	1 item	Bibliometric analysis

Each of these clusters represents the development of artificial intelligence in English learning. Among many keywords appear in 1.661 documents, the top five keywords are Artificial Intelligence as many as 1,415 words, 678 words of Learning Systems, Machine Learning is 406 words, 365 words of Natural Language Processing Systems, and 326 words of Learning Algorithms. These keywords are leaned and identical to

personalized learning, automated assessment and feedback which then significantly enhanced the accessibility, engagement, and efficiency of English learning (Bianchini et al., 2022; Cardona et al., 2023; Kamalov et al., 2023; Mushthoza et al., 2023; Wang, 2019).

The second focus of this study is the number of publications of artificial intelligence in English learning. The results showed that it increases each year from 2003 to 2023. In 2003 and 2004, the number of publications of artificial intelligence in English learning stayed the same as many as 6 documents. It got more number each year to 2023 with 6 publications in 2003 and rocketed to 333 publications in 2023. In the first 10 years (2003 to 2013), the number of publications is under 30 publications. Then, it increased significantly from 2014 to 2024. The detail number is given in Table 2.

Table 2. Document publications of artificial intelligence in English learning each year

Year	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Number	333	246	224	128	97	109	86	95	77	66	27

Year	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Number	23	26	21	20	26	19	20	8	6	6

The third focus of this study is top five countries conducting research of AI in English learning. From the 1.661 documents in 2003-2023, the top five countries conducting research of AI in English learning are China (512 publications), United States (230 publications), India (171 publications), United Kingdom (91 publications), and Germany (60 publications) as depicted in Figure 4. The geographical distribution of research outputs indicates that these countries are leading in AI research applied to English learning, contributing significantly to the global knowledge base. This concentration of research in certain countries could be attributed to the advanced technological infrastructure and strong academic collaborations in these regions. Meanwhile, Indonesia is on the 24th rank with 18 documents of AI in English learning.

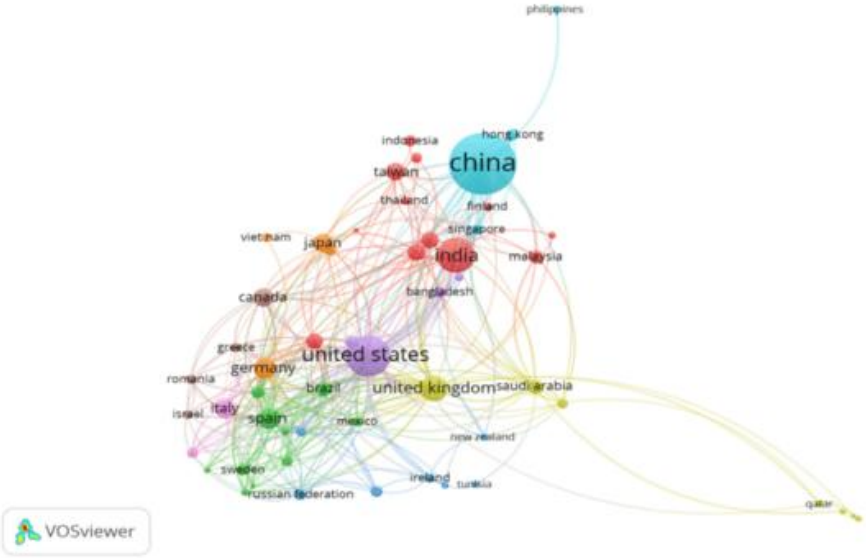

Figure 4. Network visualization of artificial intelligence in English learning

The fourth focus is on the affiliations with most publications. Top five affiliations are (1). Peking University with 14 documents; (2). Soochow University as many as 12 documents; (3). Chinese Academy of Sciences with 11 documents; (4). CNRS Centre National de la Recherche Scientifique produced 10 documents, and (5). University of Toronto with 10 documents as well. The last focus of this study is concerned with the subject areas of the artificial intelligence in English learning research studies. The results revealed that the most subject area is Computer Science (1,176 documents), Mathematics (398 documents), Engineering (374 documents), Medicine (256 documents), and Social Sciences (221 documents). Another field closely related to English learning such as Arts and Humanities only has 70 documents. In fact, English learning is a wide area not only in social sciences, but also many other fields namely Decision Sciences, Physics and Astronomy, Biochemistry, Energy, Neuroscience, Health Professions, Business, Management and Accounting, Materials Science, Environmental Science, Psychology, Chemical Engineering, Earth and Planetary Sciences, Chemistry, Multidisciplinary, Dentistry, Agricultural and Biological Sciences, Pharmacology, Toxicology and Pharmaceutics, Economics, Econometrics and Finance, Nursing, and Immunology and Microbiology. The subject areas linked to AI research in English learning, predominantly in Computer Science, Mathematics, and Engineering, suggest that the research

is heavily technical and interdisciplinary (Rusmiyanto et al., 2023). The involvement of Medicine and Social Sciences also indicates the broad applicability of AI in different contexts of English learning, ranging from educational tools to cognitive and social aspects of language acquisition (Kamalov et al., 2023).

However, the study also highlights a gap in the research landscape, particularly in regions like Indonesia, where such studies are still rare. This disparity points to an opportunity for researchers in Indonesia and other underrepresented regions to engage more actively in this field, potentially leading to a more diversified and globally representative body of knowledge.

Important implications for future research and practice in the field of AI in English learning are drawn. First, the identification of key research trends such as NLP, learning systems, and machine learning suggests that future research should continue to explore these areas, potentially expanding into emerging subfields like personalized learning and adaptive learning technologies (Jing et al., 2023; Leahy et al., 2019). Second, the dominance of certain countries and institutions in AI research for English learning calls for increased international collaboration, particularly involving underrepresented regions like Indonesia. Such collaborations could help bridge the research gap and foster more inclusive and diverse developments in this field (Khomsi et al., 2024; Nyström et al., 2018). Third, the involvement of multiple disciplines in AI and English learning research implies that future studies should adopt interdisciplinary approaches, combining insights from Computer Science, Mathematics, Social Sciences, and Education to create more comprehensive (Keiler, 2018; Stehle & Peters-Burton, 2019) and effective AI-driven learning solutions (Gerlich, 2023; Wang, 2019). Fourth, the study's findings on specific keyword trends and their visualization can guide researchers in identifying gaps and opportunities for further study. This can lead to more targeted and impactful research efforts, particularly in regions where such studies are currently limited (Hertrich & Brenner, 2024; Ross & Zaidi, 2019). The last is that the growing body of research in AI and English learning can inform educational policymakers and practitioners about the potential benefits and challenges of integrating AI into language education. This could lead to the development of new curricula, teaching methods, and assessment tools that leverage AI to enhance language learning outcomes. These implications on the field of AI in English learning, when addressed well, can continue to grow and evolve, contributing to more effective and accessible language education globally.

CONCLUSION

The existence of artificial intelligence to English learning has advanced during the last two decades. From early language learning apps to advanced deep learning systems, AI has changed the way students interact with the English language. As AI technology advances, it offers even more innovations in personalized learning, immersive experiences, and automated evaluation, making English education more efficient, accessible, and entertaining. This study presents a map of these advances, emphasizing AI's research trends on English learning, the number of publications, top five countries conducting research of AI in English learning, as well as the subject areas of these research studies. This study suggested on the examination of specific keyword mapping visualization findings that can be made and enhanced for more studies in Scopus-indexed publications, particularly in Indonesia, where they are still considered rare so that it can make groundwork for future studies and innovation in the area of AI in English learning in Indonesia. Future research can focus on exploring AI technologies and their full potential in arts and humanities contexts, ensuring that AI's benefits are realized in an equitable and effective manner.

ACKNOWLEDGEMENTS

The author would like to everyone involved in carrying out your study and/or preparing the manuscript.

REFERENCES

Amodei, D., Ananthanarayanan, S., Anubhai, R., Bai, J., Battenberg, E., Case, C., Casper, J., Catanzaro, B., Cheng, Q., Chen, G., Chen, J., Chen, J., Chen, Z., Chrzanowski, M., Coates, A., Diamos, G., Ding, K., Du, N., Elsen, E., … Zhu, Z. (2016). Deep Speech 2 : End-to-End Speech Recognition in English and Mandarin. *Proceedings of Machine Learning Research*, 1–10.

Anyoha, R. (2017). Can Machines Think? *Special Edition on Artificial Intelligence*. https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/

Bianchini, S., Müller, M., & Pelletier, P. (2022). Artificial intelligence in science: An emerging general method of invention. *Research Policy*, *51*(10). https://doi.org/10.1016/j.respol.2022.104604

Cardona, M. A., Rodríguez, R. J., & Ishmael, K. (2023). *Artificial Intelligence and the Future of Teaching and Learning Insights and Recommendations Artificial Intelligence and the Future of Teaching and Learning*. https://tech.ed.gov

Chen, D. L., & Mooney, R. J. (2011). Learning to Interpret Natural Language Navigation Instructions from Observations. *The Twenty-Fifth AAAI Conference on Artificial Intelligence*, 859–865. www.aaai.org

Di Vaio, A., Palladino, R., Hassan, R., & Escobar, O. (2020). Artificial intelligence and business models in the sustainable development goals perspective: A systematic literature review. *Journal of Business Research*, *121*, 283–314. https://doi.org/10.1016/j.jbusres.2020.08.019

Egina, E. (2024). Revolutionising Language Learning with AI: The Role of Apps and Chatgpt. *Empower 4 Digiline*. https://www.empower4digiline.eu/3-

Gerlich, M. (2023). Perceptions and Acceptance of Artificial Intelligence: A Multi-Dimensional Study. *Social Sciences*, *12*(9). https://doi.org/10.3390/socsci12090502

Ghafar, Z. N., Salh, H. F., Abdulrahim, M. A., Farxha, S. S., Arf, S. F., & Rahim, R. I. (2023). The Role of Artificial Intelligence Technology on English Language Learning: A Literature Review. *Canadian Journal of Language and Literature Studies*, *3*(2). https://doi.org/10.53103/cjlls.v3i2.87

Giatsoglou, M., Vozalis, M. G., Diamantaras, K., Vakali, A., Sarigiannidis, G., & Chatzisavvas, K. C. (2017). Sentiment analysis leveraging emotions and word embeddings. *Expert Systems with Applications*, *69*, 214–224. https://doi.org/10.1016/j.eswa.2016.10.043

Graesser, A. C., VanLehn, K., Rose, C. P., Jordan, P. W., & Harter, D. (2001). Intelligent Tutoring Systems with Conversational Dialogue. *AI Magazine*, *22*(4), 39–52.

Haryandi, S., Arlinda, R., Misbah, M., Harto, M., Muhammad, N., & Sunardi, S. (2024). Bibliometric analysis: Trends of gamification in physics learning from 2019 to 2023. *Momentum: Physics Education Journal*, *8*(2), 181–193. https://doi.org/10.21067/mpej.v8i2.9877

Hertrich, T. J., & Brenner, T. (2024). What Hampers Research Collaboration in a Region?: The Perspective of Various Stakeholders from Ten German regions. *Review of Regional Research*, *44*(2), 163–192. https://doi.org/10.1007/s10037-024-00204-0

Hong, C. (2018). Construction of Corpus in Artificial Intelligence Age. *MATEC Web of Conferences*, 1–5. https://doi.org/10.1051/matecconf/2018175

Huriati, N., Fitriani, N., Kusumaning Tyas, N., Rofi, A., Nurmalia Sari, M., Rowo, J., Mijen, K., Semarang, K., Tengah, J., Muhammadiyah Sungai Penuh, S., Martadinata No, J. R., Sungai Penuh, P., Sungai Penuh, K., Sungai Penuh, K., Sains dan Teknologi Komputer, U., Majapahit No, J., & Kidul Semarang, P. (2023). The Role of Artificial Intelligence (AI) in Developing English Language Learner's Communication Skills. *Journal on Education*, *06*(01), 750–757.

Jing, Y., Zhao, L., Zhu, K., Wang, H., Wang, C., & Xia, Q. (2023). Research Landscape of Adaptive Learning in Education: A Bibliometric Study on Research Publications from 2000 to 2022. *Sustainability (Switzerland)*, *15*(4). https://doi.org/10.3390/su15043115

Kamalov, F., Santandreu Calonge, D., & Gurrib, I. (2023). New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution. *Sustainability (Switzerland)*, *15*(16). https://doi.org/10.3390/su151612451

Keiler, L. S. (2018). Teachers' roles and identities in student-centered classrooms. *International Journal of STEM Education*, *5*(1). https://doi.org/10.1186/s40594-018-0131-6

Khomsi, K., Bouzghiba, H., Mendyl, A., Al-Delaimy, A. K., Dahri, A., Saad-Hussein, A., Balaw, G., El Marouani, I., Sekmoudi, I., Adarbaz, M., Khanjani, N., & Abbas, N. (2024). Bridging Research-Policy Gaps an Integrated Approach. In *Environmental Epidemiology* (Vol. 8, Issue 1, p. E281). Wolters Kluwer Health. https://doi.org/10.1097/EE9.0000000000000281

Leahy, S. M., Holland, C., & Ward, F. (2019). The Digital Frontier: Envisioning Future Technologies Impact on the Classroom. *Futures*, *113*. https://doi.org/10.1016/j.futures.2019.04.009

Mushthoza, D. A., Syariatin, N., Rahalele, O., Telussa, S. I., Rasmita, R., & Mokodenseho, S. (2023). Analyzing The Impact Of Artificial Intelligence (AI) On The Future Of English Language Teaching And Learning. *Journal on Education*, *6*(1), 1549–1557.

Nasir, A., Shaukat, K., Hameed, I. A., Luo, S., Alam, T. M., & Iqbal, F. (2020). A Bibliometric Analysis of Corona Pandemic in Social Sciences: A Review of Influential Aspects and Conceptual Structure. *IEEE Access*, *8*, 133377–133402. https://doi.org/10.1109/ACCESS.2020.3008733

Nyström, M. E., Karltun, J., Keller, C., & Andersson Gäre, B. (2018). Collaborative and Partnership Research for Improvement of Health and Social Services: Researcher's Experiences from 20 Projects. *Health Research Policy and Systems*, *16*(1). https://doi.org/10.1186/s12961-018-0322-0

Paladines, J., & Ramírez, J. (2020). A systematic literature review of intelligent tutoring systems with dialogue in natural language. *IEEE Access*, *8*, 164246–164267. https://doi.org/10.1109/ACCESS.2020.3021383

Qiao, H., & Zhao, A. (2023). Artificial intelligence-based language learning: illuminating the impact on speaking skills and self-regulation in Chinese EFL context. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1255594

Roser, M. (2022). The Brief History of Artificial Intelligence: The World has Changed Fast-what Might Be Next? *Our World in Data*. https://ourworldindata.org/brief-history-of-ai

Ross, P. T., & Bibler Zaidi, N. L. (2019). Limited by Our Limitations. *Perspectives on Medical Education*, *8*(4), 261–264. https://doi.org/10.1007/s40037-019-00530-x

Rusmiyanto, R., Huriati, N., Fitriani, N., Kusumaning Tyas, N., Rofi'i, A., & Nurmalia Sari, M. (2023). The Role of Artificial Intelligence (AI) in Developing English Language Learner's Communication Skills. *Journal on Education*, *06*(01), 750–757.

Salakhutdinov, R., & Larochelle, H. (2010). Efficient Learning of Deep Boltzmann Machines. *Proceedings of Machine Learning Research*, 693–700.

Stehle, S. M., & Peters-Burton, E. E. (2019). Developing student 21st Century skills in selected exemplary inclusive STEM high schools. *International Journal of STEM Education*, *6*(1). https://doi.org/10.1186/s40594-019-0192-1

Wang, R. (2019). Research on Artificial Intelligence Promoting English Learning Change. *Advances in Social Science, Education, and Humanities Research*.

Wei, L. (2023). Artificial intelligence in language instruction: impact on English learning achievement, L2 motivation, and self-regulated learning. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1261955