The Eastasouth Journal of Learning and Educations
Vol. 02, No. 01, March 2024, pp. 12-20
ISSN: 3025-2504, DOI: 10.58812/esle.v2i01

Bibliometric Analysis of Hybrid and Distance Learning Literature in the Digital Age

Eri Mardiani[1], Wa Ode Riniati[2], Sabil Mokodenseho[3], Adelia Podomi[4], Jessyka Mamonto[5]
[1] Universitas Nasional
[2] Universitas Muhammadiyah Buton
[3] Institut Agama Islam Muhammadiyah Kotamobagu
[4] Institut Agama Islam Muhammadiyah Kotamobagu
[5] Institut Agama Islam Muhammadiyah Kotamobagu

Article Info

Article history:

Received Mar, 2024
Revised Mar, 2024
Accepted Mar, 2024

Keywords:

Bibliometric Analysis
Digital Age
Distance Learning
Hybrid Learning

ABSTRACT

This bibliometric analysis delves into the literature on hybrid and distance learning within the digital age, examining its evolution, trends, and impact. Through systematic retrieval and analysis of scholarly outputs from 1980 to 2024, key bibliometric metrics, network visualizations, and citation analyses were conducted. The findings reveal a significant transition from traditional to technical research themes over time, reflecting broader societal shifts towards data-driven decision-making. Highly cited works underscore the enduring relevance of foundational concepts and the timely exploration of emergent topics, particularly in response to the COVID-19 pandemic. Moreover, future study directions identified through network visualization offer promising avenues for advancing research agendas in education. This analysis provides valuable insights for educators, policymakers, and researchers, informing evidence-based decision-making and fostering interdisciplinary collaborations in educational innovation.

Corresponding Author:

Name: Eri Mardiani
Institution: Universitas Nasional
Email: sabil.mokodenseho@gmail.com

1. INTRODUCTION

In the ever-evolving landscape of education, hybrid and distance learning have emerged as transformative methodologies, particularly in the digital age [1], [2]. The integration of technology into education has not only revolutionized traditional teaching methods but has also paved the way for innovative approaches to learning [3]. As educators, policymakers, and researchers continue to explore the potentials and challenges of hybrid and distance learning, a comprehensive understanding of the existing literature becomes imperative [4]–[8].

The digital age has witnessed a paradigm shift in education, with a significant emphasis on flexibility, accessibility, and personalized learning experiences [9]. Hybrid learning, blending traditional face-to-face instruction with online components, and distance learning, characterized by the delivery of education remotely, have gained prominence as viable alternatives to traditional classroom settings [10]. This shift has been accelerated by advancements in

technology, the proliferation of online resources, and the increasing demand for lifelong learning opportunities [11]–[15].

Despite the growing popularity of hybrid and distance learning, there remains a need for a systematic analysis of the literature in this domain [16]. The rapid expansion of research outputs makes it challenging for stakeholders to navigate and comprehend the breadth and depth of knowledge available. Furthermore, identifying emerging trends, key contributors, and research gaps is essential for informing future research directions and policy decisions.

This research aims to:

1. Conduct a comprehensive bibliometric analysis of the literature on hybrid and distance learning in the digital age.
2. Identify key themes, trends, and patterns within the literature, including publication trends and citation networks.
3. Assess the interdisciplinary nature of research in this field and explore potential collaborations between different academic disciplines.
4. Highlight emerging areas of research and identify gaps in the existing literature that warrant further investigation.

This research endeavor holds significant implications for various stakeholders, including educators, policymakers, researchers, and practitioners in the field of education. By providing a comprehensive overview of the existing literature on hybrid and distance learning, this study aims to inform evidence-based decision-making, foster interdisciplinary collaborations, and stimulate further research in this dynamic and rapidly evolving field. Ultimately, this research seeks to contribute to the ongoing discourse on educational innovation and transformation in the digital age.

2. LITERATURE REVIEW

The digital age has brought about significant changes in the way education is delivered, with hybrid and distance learning becoming increasingly popular [17]. Hybrid learning combines traditional classroom-based learning with online components, allowing students to access course materials and complete assignments remotely [18]–[20]. This approach has been shown to be effective in improving student engagement and learning outcomes, as it allows students to learn at their own pace and in their preferred learning style [21], [22], [22]–[24].

Distance learning, on the other hand, is entirely online and does not require students to be physically present in a classroom [25], [26]. This approach has been particularly beneficial for students who live in remote areas or have other commitments that make it difficult to attend traditional classes. Research has shown that distance learning can be as effective as traditional classroom-based learning, with students achieving similar learning outcomes [27], [28]. However, it is important to note that both hybrid and distance learning require a significant amount of self-discipline and motivation from students, as they are largely responsible for managing their own learning and staying on track with their coursework [29]–[33].

3. METHOD

This study employs a bibliometric approach to analyze the literature on hybrid and distance learning in the digital age. The initial step involves systematic literature retrieval from relevant databases such as Web of Science, Scopus, and Google Scholar, using a comprehensive set of keywords and search strings tailored to capture relevant publications. The retrieved dataset will be subjected to inclusion and exclusion criteria to ensure the selection of scholarly articles, conference papers, and reviews that directly contribute to the discourse on hybrid and distance learning. Bibliometric software tool such as VOSviewer will be utilized to visualize co-authorship networks, keyword co-occurrence maps, and citation networks, facilitating the identification of key themes, influential authors, and emerging research trends.

4. RESULT AND DISCUSSION

1. Research Data Metrics

Table 1. Research Data Metrics

Metrics Data	Information
Publication years	1980-2024
Citation years	44
Papers	1000
Citations	81967
Cites/year	1862.89
Cites/paper	81.97
Cites/author	46344.01
Papers/author	563.25
Authors/paper	2.51
h-index	126
g-index	247
hI,norm	91
hI,annual	2.07
hA, index	35

Source: Output Publish or Perish, 2024

Table 1 presents the bibliometric data metrics extracted from the research output obtained through Publish or Perish software for the period spanning from 1980 to 2024. The dataset encompasses a total of 1000 papers, accruing a notable citation count of 81967 citations over the citation period of 44 years. On average, each paper received approximately 81.97 citations, indicating a substantial impact within the scholarly community. Moreover, the citation rate per year averaged at 1862.89, underscoring the continuous relevance and influence of the research output over time. The analysis also reveals an average of 563.25 authors per paper, with each author accruing an average citation count of 46344.01, indicative of prolific and collaborative research endeavors within the field. Additionally, key bibliometric indices such as the h-index (126), g-index (247), and hI,norm (91) demonstrate the high impact and productivity of the research output. Notably, the hIannual value of 2.07 highlights the sustained impact of the publications annually, while the hA index of 35 provides insights into the authorship impact. These metrics offer valuable insights into the scholarly impact, productivity, and collaboration dynamics within the field of hybrid and distance learning literature.

2. Network Visualization of Themes

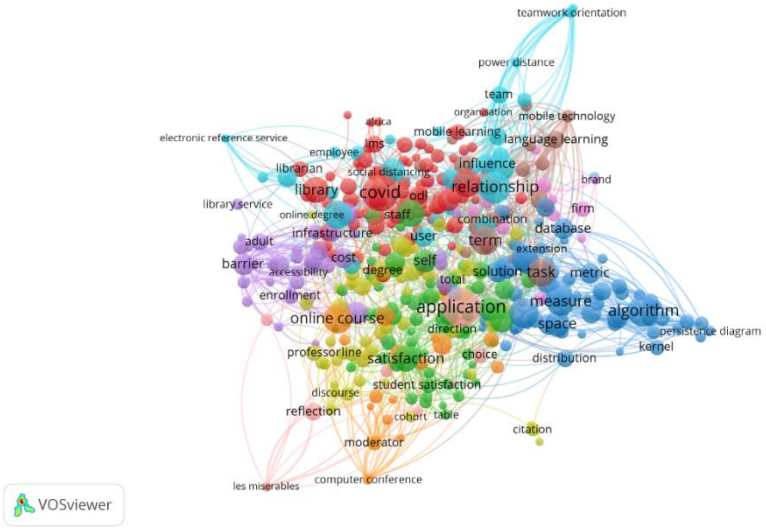

Figure 1. Network Visualization
Source: Data Analysis Result, 2024

This image shows VOSviewer network visualization with various clusters of keywords. Each cluster, typically depicted in a

different color, represents a group of thematically related keywords. The clusters and their themes can be interpreted based on the color coding visible in the image:

1. Red Cluster: This seems to focus on "library" and related terms like "electronic reference service", "librarian", "library service", "covid", and "social distancing". The theme appears to be centered around library services, their adaptation to COVID-19 challenges, and the impact of the pandemic on library staff and operations.
2. Orange Cluster: It includes "adult", "barrier", "accessibility", "cost", "enrollment", and "online course". The theme here is likely adult education or continuing education, with a focus on the challenges and barriers to enrolling in online courses, possibly related to cost and accessibility issues.
3. Yellow Cluster: The terms like "user", "degree", "infrastructure", and "online degree" suggest a focus on the infrastructure required for obtaining degrees online, perhaps considering the user experience and the technological requirements for delivering online education.
4. Green Cluster: This cluster includes "satisfaction", "student satisfaction", "application", "choice", and "direction". It seems to relate to student experiences and satisfaction with their educational choices and the applications (probably software or program applications) they are using.
5. Blue Cluster: Contains terms such as "team", "organization", "mobile learning", "language learning". This cluster appears to be associated with organizational learning and the use of mobile technology in learning environments, including language acquisition.
6. Light Blue Cluster: This features more technical terms like "algorithm", "metric", "measure", "space", "kernel", and "persistence diagram". This indicates a cluster related to data science, algorithms, and possibly computational geometry (given the term "persistence diagram", which is related to topological data analysis).

3. Overlay Visualization and Research Trend Analysis

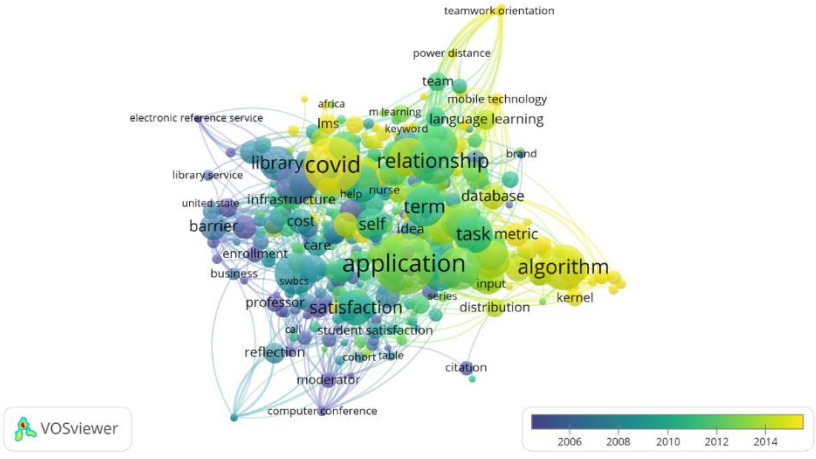

Figure 2. Overlay Visualization
Source: Data Analysis Result, 2024

This VOSviewer visualization incorporates a temporal overlay, which is color-coded according to the gradient at the bottom indicating years from blue (2006) to yellow (2014). The image shows how the prominence of certain themes has evolved within the research landscape over time:

1. Blue (2006): The topics marked with a bluer hue would represent those that were more common in the research around 2006. If we look at the areas with blue, we might deduce that earlier research focused more on foundational aspects such as "library service", possibly indicating a focus on traditional library functions or the beginning of digital transformation in library services.
2. Green (Around 2008-2010): Keywords with a greener shade are indicative of the themes that gained prominence around the middle of the timeframe. You can see "enrollment", "business", "care", and "satisfaction" in greener hues. This might reflect a transition in research focus towards the application of business principles in education and healthcare, customer care, and the exploration of user satisfaction.
3. Yellow (2014): The keywords with a yellowish hue represent the concepts that became more prominent towards the end of the observed period. Here, we see a focus on "algorithm", "metric", "input", and "distribution", suggesting a shift towards more quantitative and computational research methods and possibly the rise of big data analytics in research.

From this progression, it seems that over time, the research has shifted from more traditional, possibly qualitative themes, towards more technical and quantitative areas. This transition may reflect broader trends in academia and industry, where data-driven decision-making has become more prevalent, and computational methods have become increasingly integrated into various fields of study. It's also interesting to note the keywords like "COVID" appear in this visualization, despite the color gradient only going up to 2014. This could be due to several reasons, such as a pre-existing body of research on coronaviruses more generally or the word "covid" being used in a different context prior to the global pandemic that began at the end of 2019.

4. Citation Analysis

Table 2. Most Cited Documents

Citations	Author and Year	Title
7019	Nicholas Carlini, D. Wagner	Towards Evaluating the Robustness of Neural Networks [34]
2211	B. Joyce, Marsha Weil	Models of Teaching
1898	M. Gertler	Tacit knowledge and the economic geography of context, or The undefinable tacitness of being (there) [35]
1654	S. Galea, R. Merchant, N. Lurie	The Mental Health Consequences of COVID-19 and Physical Distancing: The Need for Prevention and Early Intervention. [36]
1194	S. Pokhrel, R. Chhetri	A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning [37]
1117	Anne-Marie Masgoret, R. C. Gardner	Attitudes, Motivation, and Second Language Learning: A Meta-Analysis of Studies Conducted by Gardner and Associates [38]

966	B. Means, Yukie Toyama, Robert F. Murphy, Marianne Baki	The Effectiveness of Online and Blended Learning: A Meta-Analysis of the Empirical Literature [39]
940	Wahab Ali	Online and Remote Learning in Higher Education Institutes: A Necessity in light of COVID-19 Pandemic [40]
862	Judith A. Hall	Nonverbal sex differences : communication accuracy and expressive style [41]
757	Vandana Singh, Alexander C. Thurman	How Many Ways Can We Define Online Learning? A Systematic Literature Review of Definitions of Online Learning (1988-2018) [42]

Source: *Output* Publish or Perish, 2024

Table 2 provides a list of the most cited documents within the field of hybrid and distance learning literature. Topping the list is the paper by Nicholas Carlini and D. Wagner titled "Towards Evaluating the Robustness of Neural Networks," with a remarkable citation count of 7019, reflecting its significant impact on the research community. Following closely is the work by B. Joyce and Marsha Weil on "Models of Teaching," which has garnered 2211 citations, indicating its enduring relevance in educational discourse. Additionally, papers addressing the impact of the COVID-19 pandemic on teaching and learning feature prominently on the list, underscoring the timeliness and importance of this topic. For instance, the study by S. Galea, R. Merchant, and N. Lurie on "The Mental Health Consequences of COVID-19 and Physical Distancing" has received 1654 citations, highlighting the urgent need for preventive interventions. Moreover, the meta-analysis by B. Means, Yukie Toyama, Robert F. Murphy, and Marianne Baki on "The Effectiveness of Online and Blended Learning" has garnered 966 citations, underscoring the growing interest in evaluating the efficacy of digital learning modalities. Overall, these highly cited documents represent seminal contributions to the field, shaping scholarly discourse and guiding research agendas in hybrid and distance learning.

5. Future Study Directions

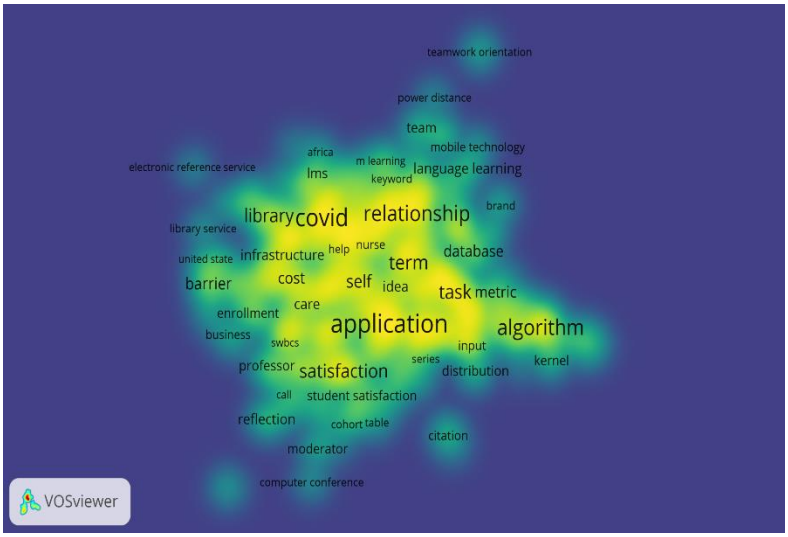

Figure 3. Density Visualization
Source: Data Analysis Result, 2024

In this VOSviewer visualization, the brightness of terms often correlates with their prevalence or focus within the research dataset. Less bright terms might indicate emerging areas or less-explored topics that could present opportunities for future research. In this image, the following suggestions for future research could be derived:

1. Exploration of Team Dynamics: The term "team" seems less bright, which may indicate a need to explore team dynamics and how they are affected by mobile technology and language learning within educational and professional settings.
2. Database Management and Optimization: "Database" appears less bright, suggesting that there might be room for further investigation into the design, implementation, and optimization of databases in different contexts, including their role in supporting mobile learning and library services.
3. Reflection and Moderation in Online Learning: With "reflection" and "moderator" being less bright, there could be a need to study the impact of reflective practices and moderation on student satisfaction and learning outcomes in online courses.
4. Technology's Influence on Self-Directed Learning: The term "self" might suggest an opportunity to investigate how technology influences self-directed learning and personal development, particularly in the context of the challenges imposed by the COVID-19 pandemic.
5. Nursing and Healthcare Services: "Nurse" and "care" are less bright, indicating that future research could focus on the application of mobile technologies in nursing education and the provision of care, assessing both barriers and facilitators.
6. Infrastructure Cost Analysis: "Cost" associated with "infrastructure" points to an area for research into the financial aspects of developing and maintaining the infrastructure needed for technology-enhanced learning environments.
7. Cultural Perspectives on Mobile Learning: The less bright term "africa" may suggest further investigation into how mobile learning is being adopted and adapted in African contexts, including the cultural, economic, and infrastructural factors that influence its effectiveness.

5. CONCLUSION

In conclusion, this bibliometric analysis provides valuable insights into the evolving landscape of hybrid and distance learning literature in the digital age. The comprehensive examination of scholarly outputs, citation patterns, and thematic trends underscores the significant impact of technology on educational practices and pedagogical approaches. Key findings reveal a transition from traditional to more technical research themes over time, reflecting broader trends in academia and society. Highly cited works highlight the enduring relevance of foundational concepts and the timely exploration of emergent topics, particularly in response to the COVID-19 pandemic. Moreover, future study directions identified through network visualization offer promising avenues for advancing research agendas and addressing pertinent challenges in education, such as team dynamics, database management, and the cultural perspectives of mobile learning. Ultimately, this research contributes to a deeper understanding of hybrid and distance learning, informing evidence-based decision-making and fostering interdisciplinary

collaborations in the pursuit of educational innovation and transformation.

REFERENCES

[1] P. T. Williams, "Education Evolution: Pedagogical Techniques for the Modern World," *Int. J. Res. Rev. Tech.*, vol. 2, no. 2 SE-Articles, pp. 7–13, Apr. 2023, [Online]. Available: https://ijrrt.com/index.php/ijrrt/article/view/17

[2] I. Journal and D. Innovation, "Revolutionizing Education : The Dynamic Intersection of Technology and Learning Lampros Kokkinos," vol. 6, no. 1, pp. 26–32, 2024.

[3] A. Oke and F. A. P. Fernandes, "Innovations in Teaching and Learning: Exploring the Perceptions of the Education Sector on the 4th Industrial Revolution (4IR)," *J. Open Innov. Technol. Mark. Complex.*, vol. 6, no. 2, p. 31, 2020, doi: https://doi.org/10.3390/joitmc6020031.

[4] L. Blanes and L. M. Ferreira, "Continuing education and active methodologies in distance courses in nursing: integrative literature review," vol. 24, no. 276, pp. 5678–5685, 2021.

[5] K. C. Li, B. T. M. Wong, and H. T. Chan, "Teaching and learning innovations for distance learning in the digital era: a literature review ," *Frontiers in Education* , vol. 8. 2023. [Online]. Available: https://www.frontiersin.org/articles/10.3389/feduc.2023.1198034

[6] E. Béché, "Open and Distance Learning in French-Speaking Sub-Saharan Africa: A Literature Review," *Int. Rev. Res. Open Distrib. Learn.*, vol. 19, no. 3 SE-Research Notes, Jul. 2018, doi: 10.19173/irrodl.v19i3.3265.

[7] R. Meylani, "An In-Depth Literature Review of Remote, Online, and Hybrid Learning with Case Studies of Successful and Failed Attempts," vol. 5, pp. 29–42, Feb. 2024, doi: 10.46328/ijses.87.

[8] W. Santoso, K. Hulliyah, W. Nurjannah, and A. H. Setianingrum, "Systematic Literature Review: Virus Prediction Based on DNA Sequences using Machine Learning and Deep Learning method," in *2022 10th International Conference on Cyber and IT Service Management (CITSM)*, 2022, pp. 1–7. doi: 10.1109/CITSM56380.2022.9935921.

[9] S. Naim and S. Mokodenseho, "Implementation of the Virtual Learning Models during the Covid-19 Pandemic: Students' Perspectives and Its Lessons," *J. Kependidikan J. Has. Penelit. dan Kaji. Kepustakaan di Bid. Pendidikan, Pengajaran dan Pembelajaran*, vol. 8, no. 3, p. 617, 2022, doi: 10.33394/jk.v8i3.5570.

[10] M. E. A. Raad and H. Odhabi, "Hybrid Learning Here to Stay!," *Front. Educ. Technol.*, 2021, [Online]. Available: https://api.semanticscholar.org/CorpusID:236697798

[11] N. Prabakaran, "Shaping New Humanity through Connectivity and Empowerment by Digital Education," *Shanlax Int. J. English*, vol. 12, no. S1-Dec, pp. 463–465, 2023, doi: 10.34293/rtdh.v12is1-dec.132.

[12] D. Baig, "Navigating student views on online education: Balancing preferences, challenges, and opportunities," *Educ. Mind*, Dec. 2023, doi: 10.58583/Pedapub.EM2307.

[13] D. B. - and S. K. R. -, "The Transition from Offline to Online: Unveiling the Challenges and Opportunities," *Int. J. Multidiscip. Res.*, vol. 5, no. 4, pp. 1–6, 2023, doi: 10.36948/ijfmr.2023.v05i04.4444.

[14] S. Rawas, "ChatGPT: Empowering lifelong learning in the digital age of higher education," *Educ. Inf. Technol.*, Aug. 2023, doi: 10.1007/s10639-023-12114-8.

[15] P. Jewpanya, P. Nuangpirom, S. Pitjamit, P. Jaichomphu, K. Chaithanul, and S. Sriyab, "Transforming Industrial Engineering Education: Introducing the CWILE Model for Work-Integrated Learning in the Digital Age," *J. Tech. Educ. Train.*, vol. 15, pp. 146–156, Dec. 2023, doi: 10.30880/jtet.2023.15.04.012.

[16] M. Idris and S. Mokodenseho, "Model Pendidikan Islam Progresif," *J-PAI J. Pendidik. Agama Islam*, vol. 7, no. 2, pp. 72–86, 2021, doi: 10.18860/jpai.v7i2.11682.

[17] G. Fischer, J. Lundin, and J. O. Lindberg, "Rethinking and reinventing learning, education and collaboration in the digital age—from creating technologies to transforming cultures," *Int. J. Inf. Learn. Technol.*, vol. 37, no. 5, pp. 241–252, Jan. 2020, doi: 10.1108/IJILT-04-2020-0051.

[18] F. Sulaiman, E. F. Eldy, Y. Sulaiman, S. N. S. Bakri, and S. N. Butai, "Hybrid Learning during Post-Pandemic Era: Challenges and Way Forward Nurturing Students' Creativity," S. Mistretta, Ed. Rijeka: IntechOpen, 2023, p. Ch. 14. doi: 10.5772/intechopen.1001945.

[19] W. Chaiyasit, K. Chomsuwan, and S. Chanchalor, "Hybrid Teaching Using Problem-Based Learning to Promote Self-Directed Learning Abilities of Students during the COVID-19 Pandemic," *Int. J. Learn. Teach. Educ. Res.*, vol. 22, no. 8, pp. 1–22, 2023, doi: 10.26803/IJLTER.22.8.1.

[20] A. Raes, "Exploring Student and Teacher Experiences in Hybrid Learning Environments: Does Presence Matter?," *Postdigital Sci. Educ.*, vol. 4, no. 1, pp. 138–159, 2022, doi: 10.1007/s42438-021-00274-0.

[21] S. Haningsih and P. Rohmi, "The Pattern of Hybrid Learning to Maintain Learning Effectiveness at the Higher Education Level Post-COVID-19 Pandemic ," *Eur. J. Educ. Res.*, vol. 11, no. 1, pp. 243–257, Jan. 2022, doi: 10.12973/eu-jer.11.1.243.

[22] P. Pathurohman, M. Berger, and G. Michael, "Implementation of Hybrid Learning to Maintain the Quality of Learning in Fostered MTs During the Covid-19 Pandemic," *At-Tasyrih J. Pendidik. dan Huk. Islam*, vol. 8, no. 2 SE-Articles, pp. 96–104, May 2023, doi: 10.55849/attasyrih.v8i2.139.

[23] H. Abuhassna, F. Awae, K. Bayoumi, and A. Alsharif, "Hybrid Learning for Practical-based Courses in Higher Education Organizations: A Bibliometric Analysis," *Int. J. Acad. Res. Progress. Educ. Dev.*, vol. 11, pp. 2226–6348, Mar. 2022, doi: 10.6007/IJARPED/v11-i1/12861.

[24] K. Kumpulainen and A. Mikkola, "Toward Hybrid Learning," *Educ. Technol. Polycontextual Bridg.*, pp. 15–37, 2016, doi: 10.1007/978-94-6300-645-3_2.

[25] S. Mokodenseho, R. Mokodenseho, M. Idris, M. F. Mamonto, and R. Awumbas, "Library Managers' Strategy in Increasing Students' Reading Interest At Min 1 Manado," *J. Islam. Educ. Policy*, vol. 8, no. 1, pp. 34–46, 2023, [Online]. Available: http://journal.iain-manado.ac.id/index.php/jiep/article/view/2288/1399

[26] F. N. Arifah *et al.*, "Meningkatkan Akses Pendidikan Berkualitas Melalui Program Pengabdian Masyarakat di Provinsi Jawa Tengah: Pendekatan Inklusif dan Berbasis Teknologi," *J. Pengabdi. West Sci.*, vol. 2, no. 06 SE-Artikel, pp. 442–450, Jun. 2023, doi: 10.58812/jpws.v2i6.450.

[27] Arkam Lahiya and Sabil Mokodenseho, "Examining the Relationship between Technological Infrastructure and the Quality of Online Education Programs," *West Sci. Interdiscip. Stud.*, vol. 1, no. 02 SE-Articles, pp. 74–83, Feb. 2023, doi: 10.58812/wsis.v1i2.90.

[28] E. W. Muh. Idris Ismail Suardi Wekke, Sabil Mokodenseho, "Peace Resolution in Education and Application on Information and Communication Technologhy," *Int. J. Adv. Sci. Technol.*, vol. 29, no. 06 SE-Articles, pp. 3349–3358, May 2020, [Online]. Available: http://sersc.org/journals/index.php/IJAST/article/view/14076

[29] R. M. G. García-Castelán, A. González-Nucamendi, V. Robledo-Rella, L. Neri, and J. Noguez, "Face-to-face vs. Online learning in Engineering Courses," in *2021 IEEE Frontiers in Education Conference (FIE)*, 2021, pp. 1–8. doi: 10.1109/FIE49875.2021.9637177.

[30] Z. Norman, "Understanding the Effect of Distance Learning vs. Face-to-Face Learning Experiences on Students' Engagement in Higher Education," *SSRN Electron. J.*, Nov. 2020, doi: 10.2139/ssrn.3734764.

[31] J. Abidin, E. HASIBUAN, and M. HARAHAP, "The Effect of Online Learning VS Face-To-Face Learning on Student Learning Motivation Post the Covid - 19 Pandemic at Schools and Colleges," *J. Digit. Learn. DISTANCE Educ.*, vol. 1, pp. 329–337, Jan. 2023, doi: 10.56778/jdlde.v1i8.76.

[32] I. Lakka, V. Zafeiropoulos, and A. Leisos, "Online Virtual Reality-Based vs. Face-to-Face Physics Laboratory: A Case Study in Distance Learning Science Curriculum," *Education Sciences*, vol. 13, no. 11. 2023. doi: 10.3390/educsci13111083.

[33] A. Beik and Y. Cho, "Effects of goal orientation on online learning: A meta-analysis of differences in Korea and US," *Curr. Psychol.*, vol. 43, no. 2, pp. 1496–1506, 2024, doi: 10.1007/s12144-023-04389-4.

[34] N. Carlini and D. Wagner, "Towards Evaluating the Robustness of Neural Networks," *Proc. - IEEE Symp. Secur. Priv.*, pp. 39–57, 2017, doi: 10.1109/SP.2017.49.

[35] M. S. Gertler, "Tacit knowledge and the economic geography of context, or The undefinable tacitness of being (there)," *J. Econ. Geogr.*, vol. 3, no. 1, pp. 75–99, Mar. 2003, [Online]. Available: http://www.jstor.org/stable/26160465

[36] S. Galea, R. M. Merchant, and N. Lurie, "The Mental Health Consequences of COVID-19 and Physical Distancing: The Need for Prevention and Early Intervention," *JAMA Intern. Med.*, vol. 180, no. 6, pp. 817–818, Jun. 2020, doi: 10.1001/jamainternmed.2020.1562.

[37] S. Pokhrel and R. Chhetri, "A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning," *High. Educ. Futur.*, vol. 8, no. 1, pp. 133–141, Jan. 2021, doi: 10.1177/2347631120983481.

[38] A. –M. Masgoret and R. C. Gardner, "Attitudes, Motivation, and Second Language Learning: A Meta–Analysis of Studies Conducted by Gardner and Associates," *Lang. Learn.*, vol. 53, no. 1, pp. 123–163, 2003, doi: https://doi.org/10.1111/1467-9922.00212.

[39] B. Means, Y. Toyama, R. Murphy, and M. Baki, "The Effectiveness of Online and Blended Learning: A Meta-Analysis of the Empirical Literature," *Teach. Coll. Rec.*, vol. 115, no. 3, pp. 1–47, Mar. 2013, doi: 10.1177/016146811311500307.

[40] W. Ali, "Online and Remote Learning in Higher Education Institutes: A Necessity in light of COVID-19 Pandemic," *High. Educ. Stud.*, vol. 10, p. 16, May 2020, doi: 10.5539/hes.v10n3p16.

[41] J. A. Hall, *Nonverbal sex differences: Accuracy of communication and expressive style.* Baltimore, MD, US: Johns Hopkins University Press, 1990.

[42] V. Singh and A. Thurman, "How Many Ways Can We Define Online Learning? A Systematic Literature Review of Definitions of Online Learning (1988-2018)," *Am. J. Distance Educ.*, vol. 33, no. 4, pp. 289–306, Oct. 2019, doi: 10.1080/08923647.2019.1663082.